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Post-Stop Phonatory Processes in English and Korean

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1. Aim and Motivation of the Study

This paper investigates the phonation modes of the vowels following the three phonemically different stop consonants in English and Korean: the voiced stops /b, d, g/, the unaspirated voiceless stops /sp, st, sk/, and the aspirated stops /p, t, k/ for English; the tense stops /p', t', k'/, the lenis stops /p, t, k/, and the aspirated stops /p^h, t^h, k^h/ for Korean. This study focuses on the acoustic differences of the vowels following the consonants in question, specifically in /_a/ sequences. The major acoustic measure employed in this study is the measurement of H1*-H2*, a corrected amplitude difference between the first and second harmonics, which will be discussed in detail below. This analysis will allow us insight into the laryngeal settings made in the articulation of the three stop series without the use of fiberoptic measures of glottal width.

2. The Obs(H1-H2) Measure

One way of determining a phonation type is by numeric measurements of the observed amplitude difference in decibels between the first and second harmonics (=Obs(H1-H2), henceforth). As clearly specified in Johnson (1997:127-130), the value of Obs(H1-H2) plays an important role as an index of the relative breathiness or creakiness of phonation. The general assumption is that the value of Obs(H1-H2) is much larger during breathy voice than during creaky voice. The difference in Obs(H1-H2) is mainly due to the difference in the shape of the glottal waveform. Specifically, the amplitude of the first harmonic in the breathy phonation is more dominant over the others because the glottal waveform of breathy phonation is most like a sine wave. The creaky phonation does not show a difference in amplitude between the first few

harmonics; thus the creaky waveform is less like a sine wave. This is mainly due to the closing phase of the glottal waveform falling off abruptly.

On the assumption that the spectral characteristics of the glottal waveform are directly reflected in the vowel, the value of Obs(H1-H2) can be used to determine the phonation mode of that vowel. In this respect, the vowel in question should be a low vowel like [a], where the first formant which is highest among the vowels, does not appear to boost either the first or second harmonic to a considerable degree.

3. The H1*-H2* Measure

However, the method of Obs(H1-H2) is not entirely reliable if it is measured at the voicing onset of a vowel in a /CV/ context. This is because the first and second harmonics undergo a 'boost effect,' mainly due to the amplitude of the first formant during its transition in the initial part of a vowel that follows a consonant. Suppose, for example, that the first formant rises from 200 Hz at the voicing onset to a stable state of 800Hz. This formant transition would affect the amplitude levels of the first few harmonics. This F1 amplitude perturbation effect is also clearly exemplified in Fant (1960:54-55), where the F1 downward shift in frequency with the rest of the formants being fixed results in an amplitude loss in the overall spectral envelope of the vowel. Thus, the Obs(H1-H2) measure is not totally dependable, considering that the main concern of this study is to observe the difference in phonation mode at the voicing onset of the vowel following a stop. At this particular time point the laryngeal influence of the preceding stop is supposedly most salient.

To correct this 'boost' effect at the voicing onset, Stevens and Hanson (1995) suggested a new method of H1*-H2*, a corrected amplitude difference between the first and second harmonics. The value of H1*-H2* is obtained by subtracting the expected value of H1-H2 (=Exp(H1-H2), henceforth) from the value of Obs(H1-H2), as shown in formula (1) below.

$$(1) H1^* - H2^* = \text{Obs}(H1-H2) - \text{Exp}(H1-H2)$$

According to the acoustic theory of speech production (Fant, 1960), we can predict an expected value of Exp(H1-H2) if we know F_0 and the first few formant frequencies (Fant, 1960:49-60; 1972) (cf. for the detailed explanation of how to calculate the value of Exp(H1-H2), see Ahn, 1999). This prediction is based on the assumption that the glottal waveform is characteristic of modal phonation. Hence, the spectral tilt of the glottal source is fixed at -12 dB/octave .

Since $H1^*-H2^*$ compares observed and expected differences, it provides an indication of how the source spectrum deviates from the reference. In this respect, the value of $H1^*-H2^*$ naturally represents a corrected amplitude difference between the first and second harmonics. For example, a zero value of $H1^*-H2^*$ indicates that the sound wave observed at that particular time point has a glottal spectrum of modal phonation; specifically, the spectral tilt of the waveform falls off at a rate of -12 dB/octave.

The $H1^*-H2^*$ value is free from the variations of the formant-patterns. Conversely, a value of $\text{Exp}(H1-H2)$ varies depending on the formant-pattern, so that the value naturally reflects the F1 amplitude perturbation effect. Because $H1^*-H2^*$ is a value obtained by subtracting $\text{Exp}(H1-H2)$ from $\text{Obs}(H1-H2)$, this measure reflects the characteristics of pure glottal phonation, which are computed relative to modal phonation.

4. Experimental Methods

A total of 12 male subjects (six American English speakers and six Korean speakers) participated in the recording. At the time of the recordings, all subjects with the exception of one Korean visiting scholar were graduate students attending the University of Texas at Austin. None reported any medical problems influencing their language ability. The average age of the English subjects was 30.2 and that of the Korean speakers was 36.5. All Koreans speak Seoul dialect. Among the American speakers, two were reared in New York state, two in Texas, one in Colorado and one in New Mexico. Given these facts, it is true that dialectal variance within the English data was not controlled in the experiment. Controlling this variance, however, was considered secondary in this study, in which the vowel quality [a] must have been consistently used. Since all of the American subjects were graduate students with phonetic training, they would have been able to pronounce [a] presented in speech samples, most of which were nonsense one-syllable words as shown in (2) below.

The speech samples were of CV structure with C being a stop consonant varying in place and manner and V being a fixed vowel [a]. Some of these items turned out to be real words, others nonsense words. For the English data, the words in (2) were used, embedded in the carrier sentence in (3):

- (2) a. voiced series: /ba/, /da/, /ga/
 b. voiceless unaspirated series: /spa/, /sta/, /ska/
 c. voiceless aspirated series: /pa/, /ta/, /ka/

(3) Say _____ again

For the Korean data, the words in (4) were used. They were embedded in the carrier sentence in (5).

- (4) a. lenis series: /pa/, /ta/, /ka/
 b. tense series: /p'a/, /t'a/, /k'a/
 c. aspirated series: /p^ha/, /t^ha/, /k^ha/

- (5) sentence: /i+kəs+i ___ita/ [igəʃi ___ida]
 gloss: this + thing + nominative marker _____ be
 (declarative ending)
 meaning: This is _____.

The subjects were required to repeat each of the items in (2) and (4) in succession until 5 clear tokens of each sample were obtained. Eventually, a total of 45 tokens were obtained from each subject (i.e., 3 manner categories * 3 place categories * 5 repetitions = 45 tokens). Subjects were recorded in a soundproofed room in the phonetics laboratory of the University of Texas at Austin. They were asked to speak the samples at normal speed and as naturally as possible in front of the microphone (Electro-Voice® 671A, Dynamic Cardioid, Electro-Voice, Inc.). The microphone was connected to a Power Mac computer (7100/80) via a stereo mixing console (Realisic®[®], Model No. 32-1200B). The recording for each subject took approximately 30 to 45 minutes.

Since keeping constant the amplitude level of each token was of importance in this experiment, the method of online digitization was adopted. The digitization was made at a sampling rate of 22,050 Hz with the aid of 'Sound Scope 1.43f' (Macintosh software program from GW Instruments, Inc.). Those signals clipped either at the top or bottom were discarded. In addition, when the subject found the pronunciation of the token unnatural, that token was also discarded.

The digitized tokens were analyzed using Sound Scope to obtain the following raw data in (6).

- (6) a. Amplitude levels of harmonics 1 and 2
 b. F₀
 c. Frequency values of F 1 through F 4

To obtain the values of the various measures in (6), a digital signal program of 'Fast Fourier Transform Routine' (=FFT, henceforth, included in Sound Scope, was used with the following parameters in (7):

- (7) a. FFT points: 1024
 b. Bandwidth of Filter: 59Hz (25ms window)
 c. 6 dB pre-emphasis: Off

The phonation mode (via H1*-H2*) at voicing onset position was most affected by the laryngeal settings of the preceding stop. To trace the extent to which it was maintained into a vowel, the values in (6) were obtained along a target vowel at the following five different time points as in (8) below:

- (8) a. 13ms away from the voicing onset of the vowel
 (+13ms time point, henceforth)
 b. 1/8 of the vowel (1/8 time point, henceforth)
 c. 1/4 of the vowel (1/4 time point, henceforth)
 d. 3/8 of the vowel (3/8 time point, henceforth)
 e. 1/2 of the vowel (1/2 time point, henceforth)

The reason for measuring at +13ms time point and not right on the first glottal pulse of a vowel (i.e., zero time point of a vowel), was that since the relevant FFT points that were collected centered around the marker on the source waveform in this particular software program, and since the window frame is fixed at 25ms, the +13ms time point (i.e., around half of 25 ms window) could be the minimum distance used to identify a phonation mode of a pure vowel at its earliest measurable position. If the source marker was at the voicing onset position, it would include a mixture of the sound of aspiration and the vowel. Determining the remaining time points (i.e., 1/8, 1/4, 3/8, and 1/2 time points) was somewhat arbitrary and relational, and was mainly decided in reference to the entire length of a vowel.

The gathered raw data were processed using 'Excel' (Microsoft Office 98 for Mac) in order to calculate the theoretical values of $\text{Exp}(H1-H2)$ and $H1^*-H2^*$.

5. Statistical Treatment

For the statistical analyses, the present study used Repeated Measures ANOVA. This method was conducted to test the significance of means of $H1^*-H2^*$ on three manner classes of stops across all subjects. The repeated measures design is well known as one of the most powerful and efficient research designs. This design is employed in situations in which subjects are measured on more than one occasion – i.e., each subject participates in more than one experimental condition. This design is powerful because error variance is reduced

substantially, and efficient because fewer subjects are needed than in nonrepeated measures experimental designs. In sum, the repeated measures ANOVA design employed in this study has the following parameters in (9).

- (9) a. within-subject variables: 3
 manner (3 levels) * place (3 levels) * time (5 levels)
 b. number of randomly selected subjects: 6
 c. dependent variable: 1 ($H1^*-H2^*$)

6. Results of the English Data

6.1 Working hypothesis for the $H1^*-H2^*$ measure

With respect to the nature of the phonation modes of the vowels following the three types of English stops, a plausible working hypothesis for the $H1^*-H2^*$ measure can be formulated as follows:

- (10) The value of $H1^*-H2^*$ is larger in a vowel following an aspirated stop than in a vowel following a voiced or unaspirated stop.

This hypothesis in (10) appears highly motivated. A large amount of VOT (or wide glottal width) is a well-documented fact for aspirated stops. It can be expected to cause breathy phonation, at least in the initial portion of the following vowel.

6.2 Temporal patterns of average $H1^*-H2^*$

The general $H1^*-H2^*$ patterns measured inside vowels are displayed in figure 1:

Figure 1. The average H1*-H2* values of the three English stop classes plotted at the five time points

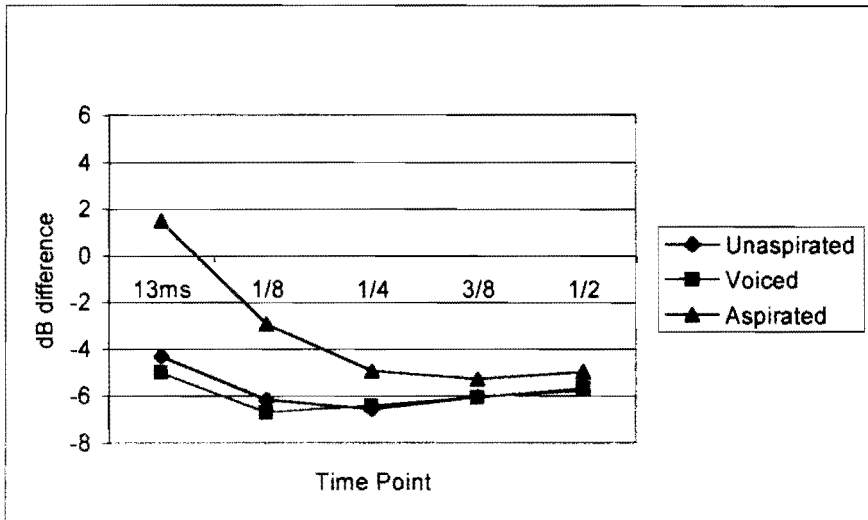


Figure 1 shows two general trends. One is that the average H1*-H2* value of the post-aspirated class decreases and returns to the default phonation. The other trend is that the H1*-H2* patterns are almost identical in the post-voiced and post-unaspirated cases. This is further evidence that the same basic phonation type is shared by these conditions. For statistical confirmation, tables 1 and 2 are provided.

Table 1. Source table: analysis of variance with repeated measures for the H1*-H2* measure at the five time points

Time point	Sum of Squares	Degree of Freedom	Mean of Squares	F-value	p-value
+13ms	2315.50	2	1157.70	43.65	<.001*
1/8	751.14	2	375.57	13.04	<.01*
1/4	145.09	1.077 ¹	134.663	12.96	<.05*
3/8	35.57	2	17.79	5.71	<.05*
1/2	32.05	2	16.03	3.02	.094

Table 2. The pair-wise comparisons (the Bonferroni test with an alpha level of .05) of the estimated H1*-H2* mean values of the three manner classes obtained at the +13ms, 1/8, 1/4, and 3/8 time points. Such a test at the 1/2 time point is unnecessary, since non-significance is found for the Manner factor at that particular location (see table 1).

Time point	Manner Classes Compared		
	Unaspirated vs. Voiced	Unaspirated vs. Aspirated	Voiced vs. Aspirated
+13ms	1.000	<.01*	<.01*
1/8	1.000	<.05*	<.05*
1/4	1.000	<.001*	.079
3/8	1.000	.154	.090

According to the statistical results of the univariate test with repeated measures (see table 1), the main effects for the Manner factor are highly significant from the +13 ms time point up to the 3/8 time point. The associated post-hoc tests (the Bonferroni tests) show that the mean values of the H1*-H2* measure are substantially greater in the post-aspirated cases than in the other two classes. However, this is the case only up to the 1/4 time point. Note in table 2 that the results of the Bonferroni test for the pair-wise comparisons of estimated means at the 3/8 time point show no significant differences between any pairs, even though the univariate analysis with repeated measures at that particular time point shows a significant main effect for the Manner factor as seen in table 1. There are two reasons for the mismatch between the results of the two statistical methods. First, the repeated measures ANOVA is calculated on the basis of the observed data, while the mean comparisons are calculated using the estimates of the population marginal means, which are the values adjusted for covariance. Second, the Bonferroni test employed as a post-hoc test is well known for its conservativeness and less likely to make a Type I error. For this study, I have chosen to rely on the results of the Bonferroni test rather than to risk a Type I error by accepting the results of the univariate test.² Under this assumption, there is no significant main effect for the Manner factor at and after the 3/8 time point. The mean difference between post-voiced and post-unaspirated classes is non-significant at all time points during the vowel. Also notice that the voiced and aspirated classes begin to show non-significance from the 1/4 time point, even though the H1*-H2* value of the latter class is significantly dominant to that of the former class at the +13 ms and 1/8 time points.

6.3 Discussion

As shown in table 2, the difference in estimated means at the +13ms time point between post-unaspirated and post-voiced cases was found to be non-significant, whereas the estimated mean value of the aspirated class was significantly higher than the mean values of the other two classes. Consequently, the working hypothesis in (10) is strongly supported. On the other hand, the significant differences observed at the +13ms time point were lost between the 1/4 and 3/8 time points as the measure returned to its default laryngeal settings.

One more interesting finding is that the post-voiced and post-unaspirated classes have statistically identical glottal widths and glottal waveforms, as clearly evidenced by the perfect p-value of 1.000 at all time points as displayed in table 2. This finding leads us to conclude that American English speakers do not implement distinct laryngeal settings—i.e., each speaker uses the normal default voicing—for these two stop classes.

7. Results of the Korean Data

7.1 Working hypotheses for the H1*-H2* measure

According to the fiberoptic studies (Kim, 1965; Kagaya, 1974), the three Korean stop categories can be distinguished in terms of the glottal width during the stop closure: it is smallest for the tense stops, intermediate for the lenis stops, and largest for the aspirated stops. Since these distinct physiological characteristics can be reflected most saliently in the H1*-H2* values at the +13ms time point, we can suggest the following working hypotheses for this measure as shown in (11):

- (11)a. The H1*-H2* value should be larger in the aspirated class than in the lenis class at the +13ms time point.
- b. The H1*-H2* value should be larger in the aspirated class than in the tense class at the +13ms time point.
- c. The H1*-H2* value should be larger in the lenis class than in the tense class at the +13ms time point.

7.2 Temporal patterns of average H1*-H2*

The relevant graph is presented in figure 2:

Figure 2. The average H1*-H2* values of the three Korean stop classes plotted at the five time points

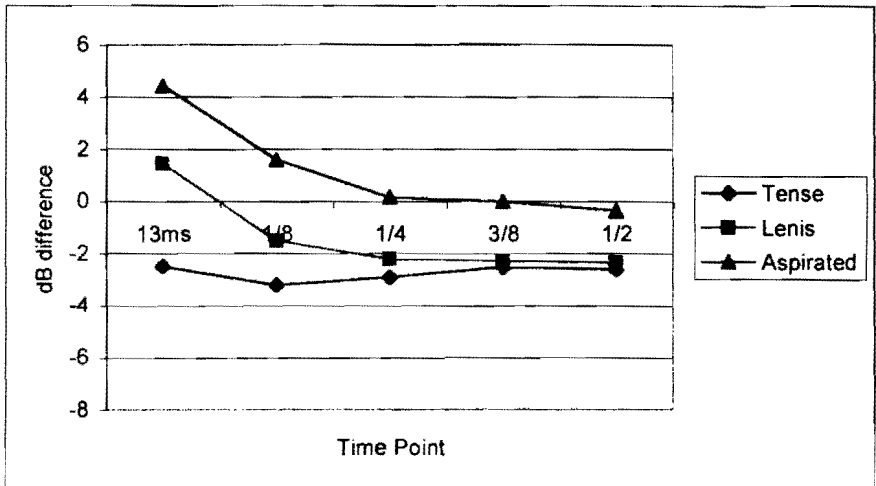


Figure 2 shows the general trend that the average H1*-H2* values tend to decrease as a function of time for the post-lenis and post-aspirated classes, while the corresponding post-tense values remain relatively flat. Statistically, the differences in this measure disappear among the three classes at and after the 1/4 time point, as shown by the statistical results of a univariate test with repeated measures in table 3 (see the p-values). The associated Bonferroni test is given in table 4 to determine which means really differ at the +13ms and 1/8 time points.

Table 3. Source table: analysis of variance with repeated measures for the H1*-H2* measure based on the Korean data at the five time points

Time point	Sum of Squares	Degree of Freedom	Mean of Squares	F-value	p-value
+13ms	2175.51	2	1087.76	15.84	<.01*
1/8	1066.23	2	533.18	7.50	<.05*
1/4	459.65	2	229.82	2.57	.125
3/8	342.52	2	171.26	2.57	.126
1/2	269.47	2	134.73	2.85	.105

Table 4. The pair-wise comparisons (the Bonferroni test with an alpha level of .05) of the estimated H1*-H2* mean values of the three Korean manner classes obtained at the +13ms and 1/8 time points. The same tests at the remaining time points are unnecessary, since non-significance was found for the Manner factor at those particular locations (see table 3).

Time point	Manner Classes Compared		
	Tense vs. Lenis	Tense vs. Aspirated	Lenis vs. Aspirated
+13ms	<.05*	<.01*	.365
1/8	.462	<.05*	.356

According to table 4, the post-hoc test (the Bonferroni test) shows that the mean H1*-H2* value is substantially greater in the post-aspirated class than in the post-tense class. However, there is no significant mean difference between the post-aspirated and post-lenis classes. At the +13ms time point, the estimated mean value of the post-tense data is significantly lower than the mean values of the other two classes.

7.3 Discussion

The working hypothesis in (11a) is refuted, while those in (11b,c) are accepted. According to the statistical analysis, the lenis and aspirated classes are just variations of sampling distribution: they derive from one single population. The phonetic and statistical findings presented so far are not totally in agreement with the results of the fiberoptic studies mentioned in section 7.1, which suggested that glottal width at release is one of the physiological cues for distinguishing the three Korean manner classes. Under the assumption that the

glottal width during the stop closure is proportionally reflected in the H1*-H2* value, however, the glottal width parameter does not appear to play a role in distinguishing between the lenis and aspirated stop categories, even though this measure clearly differentiates the lenis stops from the tense stops, and the aspirated stops from the tense stops.

Notes

1. At this particular time point, the assumption about the variance-covariance matrices of the dependent variable H1*-H2* is rejected by a Mauchly's test of sphericity with a significance of .02*. An adjusted degree of freedom by the Greenhouse-Geiser method was used instead.
2. The aim of this research is to describe the facts with the aid of statistics. The author has no intention of favoring any particular statistical result concerning this research. Since it is evident that accepting/rejecting the null hypothesis is on the edge, it is basically up to the reader to decide which result is more reliable.

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Split-Inflection in Auxiliary Verb Constructions

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1 Types of Inflection in Auxiliary Verb Constructions

Auxiliary verb constructions in the languages of the world show a remarkable degree of variation. Generally speaking, auxiliary verb constructions [AVCs] are mono-clausal verb phrases which minimally consist of an auxiliary verb component which contributes some grammatical content to the expression and a lexical verb component which contributes lexical content to the expression. Auxiliary verb is here defined as an element on the full lexical verb to bound functor element grammaticalization chain that performs some more or less definable grammatical function. Inflection is here understood to mean the obligatory formal marking of categories relating the verb to its referents, the real world, time, etc. in a semantically predictable manner.

Inflection in auxiliary verb constructions in the languages of the world fall into several distinct patterns with respect to the morphosyntactic locus of the inflection, or in other terms, the inflectional head. In many of the world's languages, the auxiliary verb stands as the inflectional head, with the lexical verb component appearing in an unmarked, or marked dependent or nominalized form (converb, participle, infinitive, etc, depending on the language and the tradition of analysis). This is the pattern seen in numerous languages, both familiar and obscure; see examples in (1).

(1)

a. Huallaga Quechua [Quechuaymaran; Peru]

Pillku-man aywa-sha ka-shaq

P-GOAL go-PRTCPL AUX-1FUT

'I will have gone to Pillku' (Weber 1989: 18)

b. Iatmul [Papuan, PNG]

klə-kə li-kə-win

get-DEP AUX-PRES-1SG

'I am getting it' (Foley 1986: 144)

c. Nivkh [language isolate; Siberia]

tʰuγ̆r̆ c̆i-tot tʰuγ̆r̆ pʰi-t hup-t huam-d-γun
 fire lay-CV.TEMP fire stay-CV.MAN sit-CV.MAN AUX-FIN-PL
 'after laying the fire, they were sitting near the fire' (Gruzdeva 1998: 63)

d. Xakas [Turkic; Siberia]

annaγar ijem xaxixtan par-ar-ina izen-ip odir-γa-m
 therefore mother-1 be.healthy AUX-FUT-3.DAT hope-CV AUX-PAST.I-1
 'for that reason I hoped that mama will get healthy' (Anderson 1998: 67)

e. Diyari [Australian, Pama-Nyungan; Australia]

γathu jukurru wayi-rna wanthi-yi
 1sg.Agent kangaroo cook-PRTCPL DISTANT.PAST-PRES
 'I cooked a kangaroo (a long time ago)' (Dixon 1980: 430)

Despite the diversity of the group in (1), it is far from the case that this is the only possibility for inflection in AVCs. Many other patterns are seen in the languages of the world, for example, the Doubled pattern, where both the lexical verb and the auxiliary verb appear as inflectional co-heads (or show 'concord' of some kind); see (2).

(2) a. Gorum (Parengi) [Austroasiatic, South Munda; India]

i. *miγ ne-γaʔ-ru ne-laʔ-ru* ii. *miγ ne-adaʔ-ru? ne-k-ru?*
 I 1-eat-PAST 1-AUX-PAST I 1-thirst-PAST 1-AUX-PAST
 'I ate vigorously' (Aze 1973: 279) 'I was thirsty' (Aze 1973: 296)

iii. *e-niγ bam-(m)-iʔγ duk-iʔγ* iv. *putiputi-nom ir-om luʔr-om*
 1 OBJ-1 hit-1OBJ AUX-1OBJ heart-2 beat-2 AUX-2
 'it (an arrow) has hit me' (Aze 1973: 298) 'your heart is beating' (Aze 1973: 284)

b. Limbu [Sino-Tibetan, Tibeto-Burman, E. Himalayan, E. Kiranti; Nepal]

i. *yaγ te-s-u-γ sur-u-γ* ii. *seʔl-ε neʔl-ε* iii. *seʔr-u-γ nett-u-γ*
 money spend-3-1PT AUX-3-1PT kill-1.NPT AUX-1.NPT kill-3-1.PT AUX-3-1.PT
 'I've spent all the money' 'she's about to kill me' 'I was about to kill him'
 (van Driem 1987: 119) (van Driem 1987: 124) (van Driem 1987: 125)

c. Venda [Niger-Congo, Bantu; South Africa, Zimbabwe]

ndo-vha ndo-vhona

1sg.PERF-AUX 1sg.PERF-see

'I had seen' (Heine 1993: 38)

The inverse of the basic pattern is also found, although this is the rarest type. It occurs, for example, in various dialects of Ainu (3). Here the auxiliary verb occurs as an uninflected element and the lexical verb bears personal inflection.

(3) a. Ainu, Itadori dialect [language isolate; Japan, Russia; extinct]

nep kamuye i-turen rok kus

what god 1-bless PERF perhaps

'perhaps some god has blessed me' (Shibatani 1990: 79)

b. Ainu, Sakhalin dialect [language isolate; Russia/Japan; extinct]

ku-konte hemaka'

1-give PERF

'I have given him/her/it'

(Hattori 1967: 78)

Of course, certain languages lack inflection, or at least inflectional morphology, of any kind. These languages will not be considered in this paper.ⁱⁱ

2 Split Inflection in Auxiliary Verb Constructions

2.1 The Split pattern: One category marked on AV, one on LV

In some instances, the inflectional head in an AVC is more difficult to determine. There are languages in which the realization of the obligatorily indexed inflectional categories are split between the components of the AVC.ⁱⁱⁱ In such languages exhibiting this 'Split' inflectional pattern, certain categories are realized only on the auxiliary verb component while others may only be realized on the lexical verb element.

In Jakaltek, a Mayan language of Guatemala, absolutive arguments are realized on the auxiliary verb and ergative arguments on the lexical verb (4). Note that this distribution is maintained in imperatives and prohibitives as well.

(4) Jakaltek (Jacaltec) [Mayan; Guatemala]^{iv}

- a. *šk-ach* *w-ila* b. *tzet yuxin ch-in ha-teye*
 Cmpl-ABS2 ERG1-see why ASP-1ABS ERG2-laugh
 'I saw you' (Craig 1977: 60) 'why are you laughing at me'
- c. *mach ch-in* *ha-maka* cf. *mach ch-ach* *pisi*
 not INCMPL-ABS1 ERG2-hit not INCMPL-ABS2 sit
 'don't hit me' (Craig 1977: 71) 'don't sit down' (Craig 1977: 71)
- d. *maj-ab ch-ach s-mak naj*
 NEG-EXHORT ASP-ABS2 ERG3-hit he
 'would that he not hit you'
 (Craig 1977: 73)

In Palana Koryak (5), the south-central Siberian language Tiva dil (6), and Aleut (7), the negative is found on the lexical verb, but person and tense on the auxiliary.

(5) Palana Koryak [Chukotka-Kamchatka; Siberia]

- a. *gəmme el* *e-l'lep-ke* *t-itə-tkən*
 I not NEG-look-NEG 1-AUX-PRES
 'I'm not looking' (Zhukova 1980: 114)
- b. *el e-l'lep-ke mət-ella-tkən* c. *el e-l'lep-ke ella-tkən-etək*
 not NEG-look-NEG 1PL-AUX-PRES not NEG-look-NEG AUX-PRES-2PL
 'we are not looking' (Zhukova 1980: 115) 'you (all) are not looking'
- d. *gəmme el* *e-l'lep-ke* *tə-tit-əŋ*
 I not NEG-look-NEG 1-AUX-FUT
 'I won't look' (Zhukova 1980: 114)

(6) Tiva dil [Turkic; Siberia]

men ol nom-nu nomču-vastay ber-di-m

I that book-ACC read-NEG.CV INCH-PAST.II -1

'I stopped reading that book' (Anderson and Harrison 1999: 46)

(7) Aleut [Eskimo-Aleut; North Pacific (Alaska/Russia)]

anaġi-x̄ *hamang* *uku-lakan* *a-na-q*
 anything-SG (behind).there see-NEG.CONJ AUX-REM-1
 'I did not see anything there' (Bergsland 1997: 199)

In the probabilitive mood in *Xakas*, the tense is marked on the lexical verb, but person on the auxiliary.

(8) Xakas (Anderson 1998: 60)

a. *sin it-ken polar-zig* b. *min nime-e ċobal-ċatxan-im-ni sīrer pil-ċe polar-zar*
 you do-PAST.I PROB-2 I what-DAT be.sad-PRES.PRTCPL-1-ACC y'all know-PRES.I PROB-2
 'you probably did it' 'you probably know what I am sad about'

2.2. The Split/Doubled pattern: One category is split-marked, one is double-marked

In addition to straight split inflection, in certain languages, there are categories that are split between the lexical verb element and the auxiliary verb element, but others that are realized on both components, i.e. they show a 'Split-Doubled' pattern.

The North Pakastani isolate language Burushaski shows a range of constructions with the split-doubled inflectional pattern. Object is marked only on the lexical element, but (some) subjects are marked on both the lexical verb and the auxiliary verb element (9a). As in Palana Koryak, Aleut and *Tiwa dīl*, negative is also marked on the lexical verb alone in Burushaski (9b).^v

(9) Burushaski [Language isolate; N. Pakistan]

a. i. *jāa a-yūgusanc moó-y-a bá-a* ii. *māa mā-ma kʰosé ċʰar-ulum mu-cʰū-ya bá-a*
 I.GEN 1-daughter.PL 2PL-give-1 AUX-1 y'all.GEN 2PL-mother DET.III rock-INABL II-get-1 AUX-1
 'I herewith am giving you my daughters' 'I got your mother from this rock-mtn'
 [Berger 1998a: 161] [Berger 1998b: 202]

b. i. *kʰué-eje māa moó-y-aa máari, yáare musulman-e máari oó-moó-ċ-a bá-a*
 this-SUPERESS y'all-GEN 2PL-give.DUR-1 tribute rather tribute NEG-2PL-give.DUR-1 AUX-1
 I am ready to give you these (as) tribute, but I won't give you Muslims as tribute'
 [Berger 1998a: 162]

ii. *óo-du-móo b-o-m*

NEG-D-II AUX-II-AP

'she didn't come'

[Berger 1998b: 198]

Certain auxiliaries may take the plural marker – *hci* in Sakhalin Ainu, which also appears on the lexical verb. The auxiliaries, however, generally lack subject agreement.⁶

(10) Ainu, Sakhalin dialect [language isolate; Russia/Japan; extinct]

ku-konte-hci hemaka-hci

1-give-PL PERF-PL

'I have given them' (Hattori 1967: 78)

In Limbu, some auxiliary verb constructions show double-marking of subject, but object is only marked on the lexical verb.

(11) Limbu [Sino-Tibetan, Tibeto-Burman, E. Himalayan, E. Kiranti; Nepal]

a. *sapt-u-ŋ wa-?ε*

write-3-1 AUX-1

'I am writing (it)'

(van Driem 1987: 159)

b. *khεεʔi-t-nε-rɔ way-aŋ*

you think-1>2-GER.PRES AUX-1.PT

'I was thinking of you'

(van Driem 1987: 159)

In Jamul Diegueño, some auxiliaries index the subject in a doubly marked construction, but other auxiliaries have only the distal prefix and no subject agreement, i.e. they show a straight split pattern.

(12) Jamul Diegueño [Hokan, Yuman; S. California/Mexico]

a. *Pablo mariik u-rar t-aayaw*

Pablo beans 3-cook DIST-AUX

'Pablo was cooking beans'

(Kellogg 1990: 35)

b. *Pablo we-naw te-w-aa*

Pablo 3-run DIST-3-AUX

'Pablo is/was running'

(Kellogg 1990: 36)

3 Univerbated Forms

Univerbated forms coming from auxiliary verb constructions exhibiting the split and split-doubled patterns are also found in complex verb forms from a number of languages.^{vi} For example, in the North Munda language Santali, object was originally marked on the lexical verb, and subject (and the finitizer or predicator suffix) on the auxiliary verb. These appear in large univerbated complexes in the modern language.^{vii}

(14) Santali [Austroasiatic, North Munda; India]

a. *uni dal-iñ-kan-a-e*

s/he beat-1- PROG-FIN -3

'he is beating me'

(Ghosh 1994: 95)

b. *dal-et'-me-tahε-kan-a-e*

beat-PRES(.TR)-2-IMPERF-FIN-3

'he was beating you'

(Ghosh 1994: 106)

In Yug, a recently extinct Yeniseian language of north central Siberia, object was marked on the original auxiliary verb component, but subject was marked on both the original lexical component and the original auxiliary component, i.e. these arose from an auxiliary verb construction of the split/doubled pattern. Note that this is the opposite of the split pattern in Burushaski discussed above.

(15) Yug [Yeniseian, Siberia; extinct]

t-ku-g-dí-χi-p

1-2-SUBJ.VERSION-1-sell

'I sell you' (Werner 1997: 138)

Other formations result from an auxiliary verb construction of the split type in Yug. For example, past tense was marked prefixally on certain auxiliary verbs in Yug, but not on the original lexical verb component at all. Subject may have been marked on either the original lexical verb component or the original auxiliary verb component, even within one and the same synchronic paradigmatic set.^{viii}

(16) Yug [Yeniseian, Siberia; extinct]

a. *xož-di-de*

be.scared-1-AUX

'I am scared'

(Werner 1997: 141)

b. *di-xođan-a-get'*

1-fear-PRES-AUX

'I am ever fearful'

c. *di-xođan-o^hr-get'*

1-fear-PAST-AUX

'I was scared'

In Timucua, an extinct isolate language of the Southeast, there are various complex verb forms that arose from the historical fusing of an auxiliary verb construction. The lexical element bore the subject agreement (as in some Ainu forms), but both were marked for the proximate.

(16) Timucua [language isolate; SE Georgia/Florida; extinct]

a. *chi-huba-so-le-ha-be-la*

2-love-TRANS-PROX-FUT-BND-PROX

'you will love him'

(Granberry 1993: 100)

b. *chi-huba-so-le-he-la*

2-love-TRANS-PROX-CAP-PROX

'you can love him'

(Granberry 1993: 101)

On the other hand, in Crow, there are a number of complex verb forms which arose from the fusing of a lexical verb bearing a subject marker and an auxiliary verb bearing both the subject marker and the declarative mood suffix *-k*.

(17) Crow [Siouan; Montana]

a. *b-eelax-b-isshi-k*

1-urinate-1-MOD-DECL

'I need to urinate' (Graczyk 1991)

b. *da-saax-daa-hku-i-k*

2-snore-2-AUX-HABIT-DECL

'you always snore'

Summary of Split and Split-Doubled Inflection

Language	Split Category	Doubled Category
Aleut	NEG LV	
Sakhalin Ainu	SUBJ LV	PL
Burushaski	NEG LV	SUBJ
Crow	DECL AV	SUBJ
Jamul Diegueño	DIST AV, SUBJ LV	SUBJ
Jakaltek	ABS AX, ERG LV	
Palana Koryak	NEG LV	
Limbu	OBJ LV	SUBJ
Santali	OBJ, TENSE LV SUBJ, FIN AV	
Timucua	SUBJ LV	PROX
Tiva däl	NEG LV	
Xakas	NEG LV	
Yug	OBJ AV	SUBJ

4 Conclusions

Auxiliary verb constructions in the languages of the world show a remarkable range of variation with respect to headedness and to the morphosyntactic locus of inflection. To be sure, the 'basic' pattern is common in most well-known languages, where the auxiliary verb is the inflectional head, bearing all relevant, obligatorily indexed inflectional marking, the lexical verb element appearing in an unmarked or marked dependent/nominalized (converb, gerund, participle, infinitive) form. The issues of headedness and inflectional locus in an AVC thus

never really arises in the analysis of these languages. However, the basic inflectional type is far from the only pattern observable in auxiliary verb constructions in the world's languages. Both the lexical verb and auxiliary verb elements may bear full inflection in the so-called 'Doubled' pattern. More interestingly, the obligatorily indexed inflectional categories may be split between the two components of the auxiliary verb construction, or, some categories may be split between the two components, while other categories are obligatorily indexed on both.

In the preceding pages we have presented data from a range of languages exemplifying the latter two inflectional patterns, i.e. the 'Split' and 'Split-Doubled' patterns, as well as languages that have complex verb forms that resulted from the univerbation of an AVC of the Split or Split-Doubled type. It appears that in true split constructions, the lexical verb alone may typically mark either negative or object. However, the auxiliary verb alone may mark object in certain univerbated auxiliary verb constructions in Yug, and marks absolutive arguments (i.e. transitive objects) in Jakaltek, showing that syntactic dominance or command, and semantic scope relations are not the only factors at work in determining the placement of inflection in split inflectional constructions. Declarative markers tend to be split in favor of the auxiliary verb element. Tense categories are also frequently split in favor of the AV, but in Santali, the reverse is true.^x

In split-doubled forms, the categories that are doubly-marked are primarily referent categories, subject, and less commonly object as well; properties of referents salient to the discourse tend to be the categories most frequently found in formations with multiple-marking cross-linguistically (Anderson 1993, 1995, 1996, 1997a, 1997b). Of course, other categories may also be doubly-marked in AVCs, e.g. proximate in Timucua.

In languages with auxiliary verb constructions exemplifying the Split and Split-Doubled inflectional patterns, an exact determination of the inflectional head is difficult. Is the lexical element which bears certain inflectional information to be considered the head, or the auxiliary element, which likewise bears markers of only a small subset of the obligatory inflectional categories of the language? Resolving this issue on an individual, language specific basis diminishes the value of the notion of head as a (morpho-)syntactic primitive, and is thus theoretically undesirable. However, it seems difficult to find a cross-linguistically valid notion of head given the type of data presented above.

It is hoped that the presentation above on the Split and Split-Doubled inflectional patterns in auxiliary verb constructions demonstrates the fundamental problem of formulating cross-linguistic generalizations based on an empirically impoverished set of data: Not only do auxiliary verb constructions

show a much greater range of variation than previously discussed (cf. Harris and Ramat 1987; Heine 1993), but also the very notion of inflectional head (and therefore the related notion of head-marking) appears to not be as clearly definable as has generally been assumed.

Abbreviations Used

ABS	Absolutive	ACC	Accusative	ARTCL	Article
ASP	Aspect	AUX	Auxiliary	BND	Bounded
CAP	Capabilitive	CMPL	Completive	CONJ	Conjunctive
CV	Converb	DAT	Dative	DECL	Declarative
DEP	Dependent	DIST	Distal	ERG	Ergative
EXHORT	Exhortative	FIN	Finite	FUT	Future
GER	Gerund(ive)	HABIT	Habitual	HSY	Hearsay
I	Class-I	II	Class-II	III	Class-III
IMPFV	Imperfective	IMPRF	Imperfect	INCH	Inchoative
INF	Infinitive	INCMPL	Incompletive	MAN	Manner
MOD	Modal	NEG	Negative	NPAST	Non-Past
NPT	Non-Preterite	OBJ	Object	OPT	Optative
PERF	Perfect	P/F	Present-Future	PL	Plural
PRES	Present	PRFV	Perfective	PROB	Probabilitive
PROG	Progressive	PROX	Proximate	PRTCPL	Participle
PT	Preterite	REM	Remote	SFX	Suffix
SG	Singular	SUBJ	Subject	SUP	Supine
SPRESS	Superessive	TEMP	Temporal	TRANS	Transitive
1	First Person	2	Second Person	3	Third Person

Notes

ⁱ Note that in the Sakhalin dialect of Ainu this pattern occurs with the perfect auxiliary *hemaka* only when the object is third singular; see below.

ⁱⁱ Note that even in predominantly 'isolating' languages, one can find the doubled inflectional pattern: Palaung (Austroasiatic) or Kirma (Niger-Congo):

(i) Palaung [Austroasiatic, Palaung-Wa; Myanmar, S. China] ɛa ɪ

ye: ka be: ye: re bi: ra:t e:h ye: kɪn ye:

we NEG able IPL wait man steal curse we curse we

'we could not wait' 'the thieves cursed us' (Milne 1921: 19, 21)

(ii) Kirma [Niger-Congo, Gur] (Heine 1993: 37, citing Prost 1964: 56-59; Blansitt 1975: 20)

mi ta mi wo

1SG AUX 1SG eat

'I am eating'

ⁱⁱⁱ By this is not meant the kind of issues raised by Zwicky (1985), noting that in some ways the auxiliaries of English (and therefore of languages of the basic type generally) act as heads and in other ways the lexical verbs do. Nor do we have in mind the interesting observation of Mufwene

(1991) that auxiliaries in Gullah are syntactic heads but semantic operators. In this paper, we discuss languages where the head itself seems to be split between the elements of an AVC.

^{iv} Note that the modal auxiliary stem *-u* 'may, can' appears either as the form taking the aspectual prefix *ch-*, in a construction with a dummy third person subject, with the person and number of the actual subject appearing on the lexical verb, or, the auxiliary appears in an unmarked form, with the aspectual marker appearing with the absolutive suffix, and the lexical verb in an infinitive form, (i.e.) in a construction similar to the basic pattern mentioned in 1 above.

(iii) Jakaltek

ch-u ha-can beti' cf. *ch-ach u can-*of* beti'* but **ch-ach u ha-can beti'*
 ASP-(3)-MOD 2-stay here ASP-ABS2 MOD stay-SFX here ASP-ABS2 MOD 2-stay here
 'you can/may stay here' (Craig 1977: 88)

^v Note however, that negative marking follows scope relations in compound auxiliary formations in Burushaski.

(iv) Burushaski [language isolate; N. Pakistan]

a. *je un-cum baydir huru-i-ĩ a-yaa-may-a ba-a* or b. *un-cum baydir huru-as a-yaa-may-a ba-a*
 I you-ABL live-OPT/SUP NEG-1-CAP.DUR-1 AUX-1 you-ABL live-INF NEG-1-CAP.DUR-1 AUX-1
 'I can't live without you' 'I can't live without you'
 [Berger 1998a: 173] [Berger 1998a: 173]

^{vi} Note that Hattori (1967: 77ff.) remarks that some speakers commented that the 'highest' style form in Sakhalin Ainu was a doubly-marked construction, with the singly marked inverse pattern and a singly-marked 'basic' pattern considered very informal, and somewhat informal, respectively.

^{vii} Of course, unverbated forms coming from the doubled and the basic pattern are found commonly as well, see Anderson (1999) for examples and further discussion.

^{viii} These unverbated forms probably were originally fused by the Proto-Kherwarian level, as cognate formations are found in Mundari and other modern Kherwarian languages.

^{ix} That these come from prefixed tense markers on the auxiliary verb and not suffixed tense markers on the lexical verb is suggested by the presence of simplex forms of the type in (v) in Yug, with prefixal inflectional markers:

(v) Yug [Yeniseian, Siberia; extinct]

du-d-dox *di-r-di-dox*
 3M-1-eat 3M-PAST-1-eat
 'he is eating me' 'he ate me' (Werner 1997: 141)

^x In the Santali form cited above, there are actually historically two markers of tense-aspect, one in the lexical verb element, and one frozen in the auxiliary verb form itself

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On the Coordination Argument for Overt Object Shift

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Within the minimalist program it has been argued that verbal objects must move out of the VP to check Case. Following the literature I will call this movement object shift. Although there is some consensus that object shift has to take place, there is quite a bit of disagreement concerning how and when this movement takes place. Object shift has been proposed to take place before spell-out (Johnson (1991), Koizumi (1993), Lasnik (1993, and subsequent work), Bošković (1997a,b)) or after spell-out (Chomsky 1993, 1995). It has been supposed to affect the whole category (Johnson (1991), Koizumi (1993), Lasnik (1993), Chomsky (1993)) or just some features (Chomsky (1995)).

In this paper I will focus on object shift in ECM constructions. In particular I will focus on the height argument and on the coordination argument. I will confront these arguments with a problematic type of example. The conclusion I will reach is that object shift has to be covert at least sometimes, and that covert movement can affect interpretation, in particular, that covert movement can affect binding relationships.

1. Arguments for Overt Object Shift in English

1.1 Height argument (Lasnik (1995))

Lasnik (1995) presents a clear argument for the overt nature of object shift in English. The structure of his argument is as follows. First, Lasnik shows that covert movement does not feed binding relations using examples like (1). In (1a), the subject *Some linguists* is able to bind the anaphoric expression from the matrix Spec,IP position. However, in (1b), the anaphor cannot be bound. This is unexpected if the associate *some linguists* moves to the position of *there* at LF, since from that position *some linguists* should be able to bind the anaphor, as in

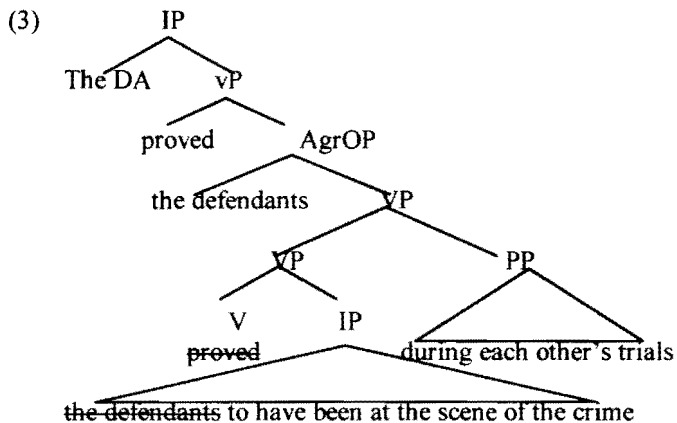
(1a). Lasnik's proposal to explain the contrast in (1) is that LF movement does not affect binding configurations.

- (1) a. Some linguists seem to each other [*t* to have been given good job offers]
 b. *There seem to each other [*t* to have been some linguists given good job offers]

The second step in Lasnik's argument is to show that the subject of infinitival ECM constructions can have high behavior with respect to binding (see also Lasnik and Saito (1991)), as shown by the examples in (2). In (2a), *the defendants*, the ECM subject, is able to bind into the adjunct phrase that modifies the matrix clause. On the other hand, in (2b) the subject of the finite clause cannot bind into the adverbial expression that modifies the matrix clause.

- (2) a. The DA proved [the defendants to have been at the scene of the crime] during each other's trials
 b. ?*The DA proved [that the defendants were at the scene of the crime] during each other's trials

Lasnik takes this as evidence that there is object shift in English. The representation after raising of the ECM subject to Spec,AgrOP appears in (3). In that representation it can be observed how the ECM subject can bind into the matrix adverbial phrase: the adverbial phrase is within the c-commanding domain of *the defendants* in Spec,AgrOP.



The last step in Lasnik's argument is that since object shift affects binding relations and earlier we saw that covert operations do not affect binding relations, we must conclude that object shift might be overt.¹

The contrast in (3) shows that in English overt object shift may take place, but not that it must. Following Postal (1974), Lasnik uses examples like (4) to prove that overt object shift must take place in English. If object shift were optional in English, *him* could stay in the embedded infinitival clause and no binding theory violation would be expected: *him* would raise to Spec,AgrOP covertly and no violation of BT should arise, since as we have seen covert movement does not feed binding relations, according to Lasnik.^{2,3}

(4) *John believes [him_i to be a genius] even more fervently than Bob_i does

2.2 Coordination argument (Bošković (1997a))

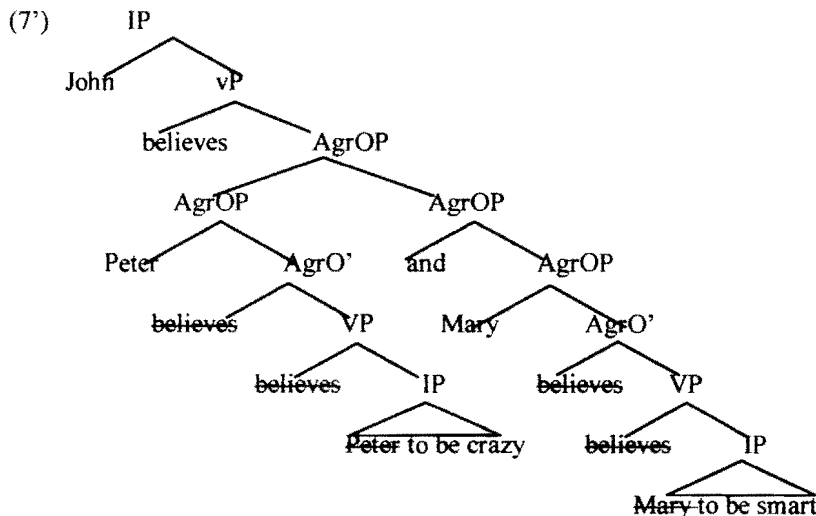
Bošković (1997a) presents another argument for the overt object shift analysis of ECM constructions in English. His argument is based on the Case assignment in conjoined ECM infinitivals. He considers sentences like (5). He claims that in order to get Case assignment right in sentences like (5), we cannot have a structure like the one that appears in (6), where the constituent that is coordinated is the embedded IP. If we were to have IP coordination, then we would not have enough AgrOs to check all the accusative cases since we would have one AgrO and two DPs that have an accusative Case that needs to be checked.

(5) John believes Peter to be crazy and Mary to be smart.

(6) John [_{AgrOP} [_{VP} believes [[_{IP} Peter to be crazy] and [_{IP} Mary to be smart]]]]

Bošković argues that in order to get Accusative Case marking right, we need to have matrix AgrOP coordination, Across the Board (ATB) movement of the verb and overt movement of the subject of the infinitival to Spec,AgrOP. The structure we would have appears in (7). For the reader's convenience, I offer both the bracketed representation and the tree representation:

(7) John believes_j [[_{AgrOP} Peter_k t_j [_{VP} t_j [_{IP} t_k to be crazy]]]] and [_{AgrOP} Mary_i t_j [_{VP} t_j [_{IP} t_i to be smart]]]]



In (7), we have two matrix AgrOPs coordinated, so there are enough AgrO's to check all the accusative Cases present in the structure. The verb moves in each conjunct from the VP interna position to AgrO, and from that position it moves to the upper VP shell in an *Across The Board* way.

There is additional evidence that in coordinated ECM infinitivals like (5), constituents bigger than IP might be coordinated. Consider the example in (8).

- (8) The DA proved John to be guilty during Peter's trial and Mary to be innocent during Antonio's trial.

In this example, each conjunct contains an adverbial phrase that is modifying the matrix predicate. Clearly, it cannot be the case that in (8) we have coordination of just the infinitival IPs since more than the embedded IPs are coordinated. The sentence in (8) receives a straightforward explanation under Bošković's proposal, according to which the conjoined constituents would be matrix AgrOPs, as in (9).

- (9) The DA proved_j [[AgrOP John_k t_j [VP t_j [IP t_k to be guilty] during Mary's trial]] and [AgrOP Peter_i t_j [VP t_j [IP t_i to be innocent] during Antonio's trial]]]

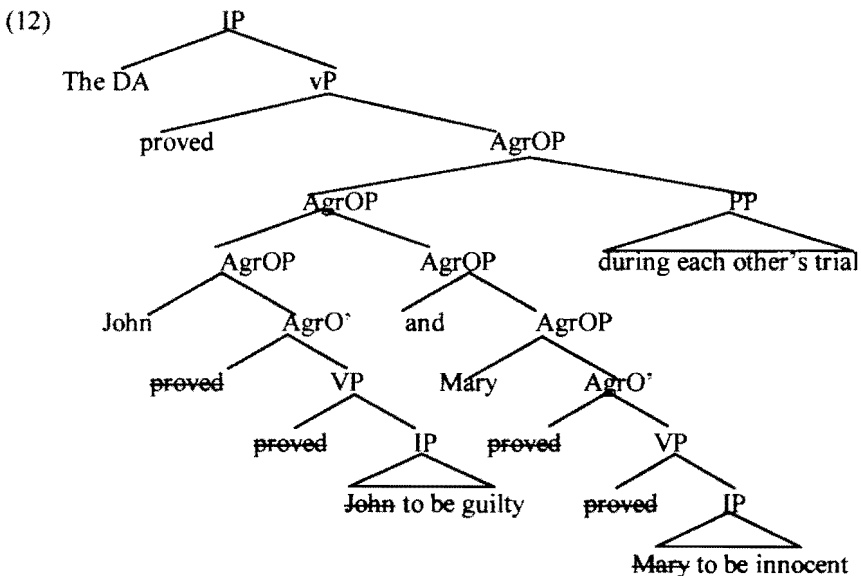
2. One Problematic Case and a Proposal

Consider the example in (10), which according to Howard Lasnik (p.c.) was first brought up in this context by Alan Munn. The grammaticality of (10) casts doubts on the overt object shift analysis. If we ignore the adverbial expression, the sentence in (10) would have the structure that appears in (11) under Bošković's (1997a) proposal.

(10) The DA proved John to be guilty and Mary to be innocent during each other's trials

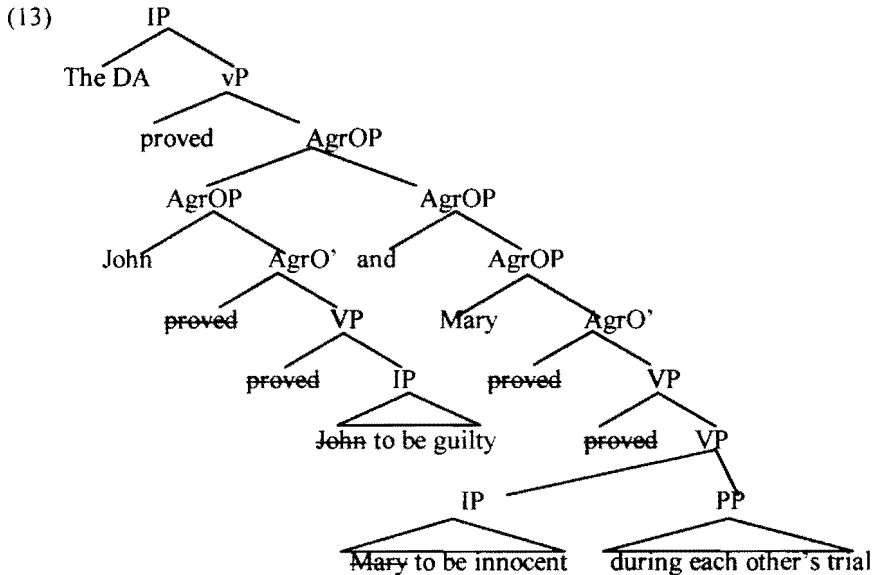
(11) The DA proved_j [[AgrOP John_k t_j [VP t_j [IP t_k to be guilty]]] and [AgrOP Mary_l t_j [VP t_j [IP t_l to be innocent]]]]

Now the crucial question is where we should place the adverbial expression. It cannot be too high in the structure since otherwise it is not going to be c-commanded by *John* and *Mary*. But it cannot be too low since it needs to modify the matrix VP. One possibility would be to adjoin the adverbial expression to the phrase that immediately dominates the conjoined AgrOPs, which I will assume is another AgrOP for convenience. The schematic structure appears in (12).



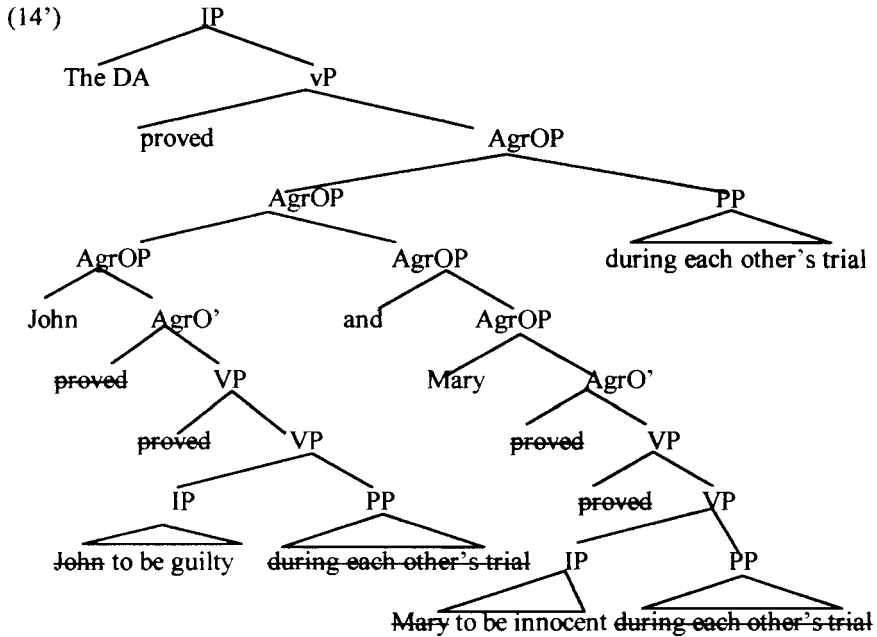
However, the structure in (12) cannot be the correct one because *Mary* (and maybe *John*) does not c-command the anaphor.

Another possibility would be that the adverbial expression is adjoined to some lower constituent, say the lower VP as in (13). In (13) *John* and *Mary* bind *each other*. However, the adverbial expression modifies only the event of *Mary* being proved innocent but not the event of *John* being proved guilty, contrary to facts.



There is one more possibility that would put the adverbial expression under the c-command domain of both *John* and *Mary* and without the problem noted for (13). This option would be to adjoin the adverbial expression to each VP in the two conjuncts and then right extrapose the adverbial expression in an ATB way. (14a) and (14b) represent two steps of the derivation of (10) according to this proposal. The tree appears in (14').

- (14)a. The DA proved_j [[_{AgrOP} John_k t_j [_{VP} [_{VP} t_j [_{IP} t_k to be guilty]]] during each other's trial]] and [_{AgrOP} Mary_l t_j [_{VP} [_{VP} t_j [_{IP} t_l to be innocent]]] during each other's trial]]
- b. The DA proved_j [[[_{AgrOP} John_k t_j [_{VP} [_{VP} t_j [_{IP} t_k to be guilty]]] t_m]] and [_{AgrOP} Mary_l t_j [_{VP} [_{VP} t_j [_{IP} t_l to be innocent]]] t_m]]] [during each other's trial]_m]



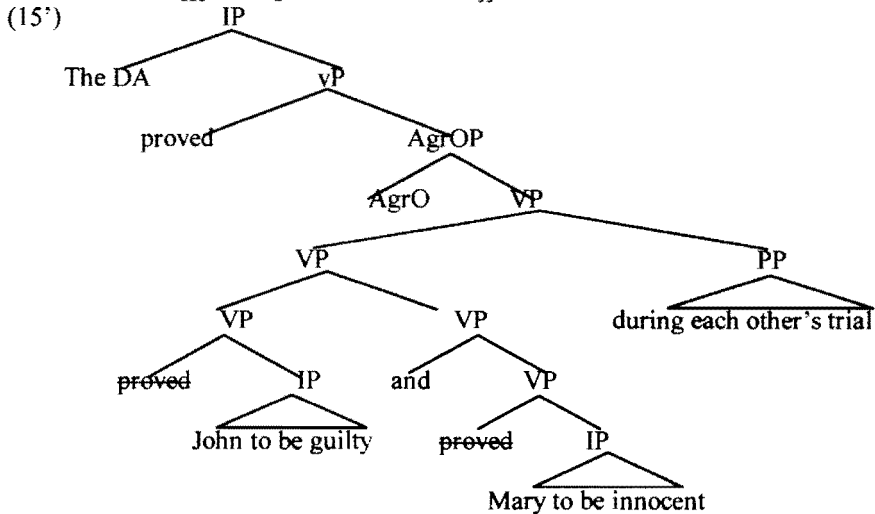
However, under this proposal, even though both *John* and *Mary* c-command *each other* at some point in the derivation, they do it separately, and that does not seem to be enough to satisfy condition A of BT: At no point is a single instance of *each other* c-commanded by both *John* and *Mary*. In the first conjunct, *each other* is not c-commanded by *Mary*. In the second conjunct, *each other* is not c-commanded by *John*. And after extraposition, *each other* is not c-commanded by either *John* or *Mary*.

In other words, the problem with a sentence like (10) is that there does not seem to be a step in the derivation in which *John* and *Mary* c-command *each other*. In fact, there does not seem to be a step in the derivation in which *John* and *Mary* are together and can act as an antecedent of the reciprocal.

The solution I would like to propose for this problem (namely, the apparent lack of c-command between *John* and *Mary* and *each other*) is to reject the overt object shift proposal for English, to assume the covert version of object shift in English, to propose that covert movement can take place in an ATB fashion, and that covert movement can affect Binding Theory.

Consider again the problematic sentence in (10). I will propose that the structure of (10) at Spell-out is the one in (15).

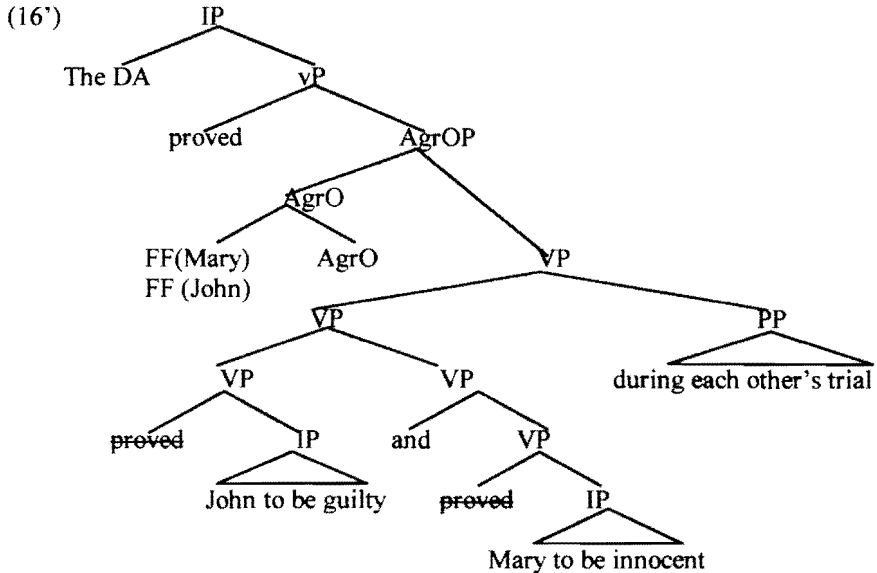
(15) The DA [_{AgrOP} proved_j [_{VP} [_{VP} [_{VP} t_j [_{IP} John to be guilty]]] and [_{VP} t_j [_{IP} Mary to be innocent]]] during each other's trial]]



The characteristics of (15) are the following: the constituent that is being coordinated is matrix VP. The subject of the infinitival remains in the subject position of the infinitival. And the adverbial phrase appears in matrix VP adjoined position.

At LF, the formal features of the infinitival subjects raise to AgrO in an ATB fashion. The resulting configuration is the one that appears in (16). In this configuration, the formal features of both *John* and *Mary* c-command the anaphor within the adjunct, and the appropriate conditions for binding are established, solving the puzzle created by (10). In the representation in (16), we can see that the anaphor is being c-commanded by the formal feature of both *John* and *Mary*. That is, *each other* can be licensed because it has a plural c-commanding antecedent.

(16) The DA [_{AgrOP} FF(John) FF(Mary) proved_j [_{VP} [_{VP} [_{VP} t_j [_{IP} John to be guilty]]] and [_{VP} t_j [_{IP} Mary to be innocent]]] during each other's trial]]



Crucially for my proposal, LF formal feature movement must affect Binding Theory. Note also that the case checking considerations, which were the basis for Bošković's argument, are also taken care of: the Case of the infinitival subjects is checked at LF after their formal features raise to AgrO.

However, there is at least one problematic aspect with the ATB movement that creates (16). This problem is that ATB movement normally requires the moved element to be exactly the same. However, in (16) the moved elements are not the same: the formal features of *Mary* do not seem to be the same as the formal features of *John*.

In order to solve this problem I would like to propose that the formal features of different DPs are similar enough to undergo LF ATB movement. Additional evidence for this can be found in the examples in (19)-(20). Lasnik has shown that the high behavior of the infinitival subject can be attested not only with anaphor binding but with Weak Cross Over (WCO) and NPI licensing. The fact that in (17a), *no suspect* can bind the pronoun *his* without creating a WCO violation indicates that *no suspect* c-commands into the adverbial. (17b) minimally contrast with (17a). Since in (17b) the embedded subject does not c-command into the infinitival, binding of the pronoun by *no suspect* creates a WCO violation. The same can be said about the NPI licensing in (18).

- (17)a. The DA proved [no suspect_i to have been at the scene of the crime] during his_i trial
 b. ?*The DA proved [that no suspect_i was at the scene of the crime] during his_i trial
- (18)a. The DA proved [noone to be at the scene] during any of the trials
 b. ?*The DA proved [that noone were at the scene] during any of the trials

If we combine the NPI and WCO cases with the coordination cases, we get examples like (19)-(20).

- (19)a. ?The DA proved no husband to be innocent and no son to be guilty during his trial.
 b. ?*The DA proved no husband to be innocent and Mary to be guilty during his trial.
 c. ?*The DA proved Mary to be innocent and no husband to be guilty during his trial.
- (20)a. ?The DA proved no professor to be rich and no student to be sick during any trial
 b. ?*The DA proved Mary to be rich and no student to be sick during any trial
 c. ?*The DA proved no professor to be rich and Mary to be sick during any trial

There seems to be a tendency that in (19)-(20) the (a) examples are better than the (b/c) examples. That is, there seems to be a requirement that the infinitival subjects are of the same type. In (19a) and (20a), both infinitival subjects are N-words. However, in the rest of the sentences in (19)-(20), the infinitival subjects do not match.

3. Conclusion

To sum up, in this paper I have combined two of the arguments for overt object shift in English: the height argument from Condition A of Binding Theory and the Coordination argument. Surprisingly, the result of combining these two argument seems to indicate that object shift might be covert and that covert operations might affect Binding relations.⁴ As for the evidence that covert movement does not affect binding relations (see the contrast in (1)) one could adopt any of the analysis that reject the idea that in *there*-sentences the associate

moves to subject position, such as Den Dikken (1995), Moro (1997), Bošković (1997b) among others).

The argumentation in this paper is not conclusive for at least three reasons. First the grammaticality of the key example (10) is not universally accepted. Second, the proposed solution (ATB LF feature movement) seems rather ad hoc and Bošković and Franks (1997) provide empirical evidence against such a proposal. And third, my proposal should be tested against the other arguments for covert object shift that Lasnik (1995, to appear) presents (Condition C, quantifier interpretation, pseudogapping). However, I haven't been able to obtain clear results. I hope that future research will shed more light on these facts and on the appropriate theoretical tools that are needed to explain them.

Notes

¹ The high binding behavior of the ECM subject does not show that object shift must always be overt since it could be the case that object shift is overt only when needed.

² Lasnik (to appear) has a slightly different view on these facts. Lasnik (to appear) assumes that overt object shift in English is optional. The fact that sentences like (4) are ungrammatical is attributed to the cross-linguistically tested tendency that pronouns must undergo obligatory object shift while all other NPs must do so only optionally.

³ See the examples (18)-(19) for evidence that the high behavior of ECM subjects can also be attested in WCO and NPI contexts.

⁴ See Yatsushiro (1999) for additional evidence that covert movement can affect binding relations.

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Resultatives at the Crossroads between the Lexicon and Syntax

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1 Introduction

The sentences in (1) are examples of transitive resultative constructions which are composed of the following elements: an agent NP, an activity-denoting verb, a postverbal patient NP, and a resultative phrase which expresses the change of state or location of the patient as a result of the event expressed by the matrix verb.

- (1) a. Claire painted the door red. c. Chris drank Martin under the table.
 b. Pat ran his Nikes threadbare. d. Nicole danced Sascha tired.

Resultative constructions have received much attention over the last decade because their syntactic and semantic distribution constitutes a challenge to theories within the Principles and Parameters framework (henceforth: P & P), such as the Small Clause Theory or the Binary Branching Analysis. There has, by no means, been any consensus as to whether the semantic predication relation that holds between the postverbal NP and the resultative phrase should be encoded syntactically, or not.

This paper has two main goals. In the first part, I want to challenge the assumption that purely syntactic analyses are indeed the best way to account for the distribution of resultative constructions. The discussion focuses on the theory-internal syntactic motivations that underlie the individual analyses of resultative constructions within the P & P framework. In the second part, I will discuss a lexicalist approach to resultatives in terms of complex predicates. I will propose three different kinds of lexical rules, each forming a complex predicate in a different way.

2 Syntactic analyses of resultatives

2.1 Resultatives as Small Clauses

Within the P & P framework, adherents of the Small Clause Analysis propose that the postverbal NP and the resultative phrase form a syntactic constituent, namely a Small Clause (henceforth: SC). Following Stowell (1981), Hoekstra (1988) and Aarts (1992) argue that there exists a semantic predication relation between the resultative predicate and the postverbal NP that parallels that of a subject and a predicate in full clauses. Thus, the resultative phrase *red* in (2a) theta-marks the postverbal NP *the door*.

- (2) a. Claire painted [_{SC} [_{NP} the door] [_{AP} red]]
 b. Pat ran [_{SC} [_{NP} his Nikes] [_{AP} threadbare]].
 c. Chris drank [_{SC} [_{NP} Martin] [_{PP} under the table]].

Although proponents of the SC Theory concentrate on providing syntactic evidence in favor of a SC Analysis of resultative constructions, they are not concerned about the semantic distribution of the postverbal NP (the SC subject), or the resultative phrase (the SC predicate).

- (3) a. Claire painted the door {red/?old/*visible/*broken}.
 b. Pat ran his Nikes {threadbare/?blue/*new/*small}.
 c. Chris drank {Martin/?himself/*his Martini/*the glass} under the table.
 d. Nicole danced {Sascha/herself/?her cat/*her goldfish} tired.

The data in (3) illustrate that semantically strange or uninterpretable resultative phrases and postverbal NPs block a full interpretation of resultatives. Note that on the SC Analysis of resultatives, there are no principled mechanisms that guarantee a proper semantic selection of the resultative phrase (cf. (3a) and (3b)) and thus a straightforward interpretability of the resultative construction. These shortcomings are due to a number of theory-internal assumptions of the SC Analysis.

The first problem has to do with the status of the SC subject. Chomsky's (1981) Theta Criterion allows each argument to receive only one theta role. Since the resultative predicate already assigns a theta-role to the postverbal NP, any theta marking by the matrix verb is blocked for this reason. Thus, the matrix verb cannot restrict the semantic range of the postverbal NP. In this connection, Hoekstra observes that in sentences such as (2b) and (2c) there exists no "sensible semantic relationship" (1988: 116) between the postverbal NPs and the

matrix verbs. This would lead him to conclude that the postverbal NPs in (2b) and (2c) are not arguments of the matrix verb and that therefore all resultatives should be analyzed in terms of SCs.

In a similar fashion, the SC Analysis has no principled way of restricting the semantic range of the resultative phrase in (3a)-(3d). This shortcoming is due to yet another assumption of the P & P framework, namely the Projection Principle (Chomsky 1981: 29), which requires that the selection requirements of particular lexical items must be met at all levels of representation. Based on the Projection Principle, Aarts (1992:22) points out that a verb “always shows the same subcategorization properties” which leads him to propose that “in sentences containing SCs, the matrix verb s-selects a proposition (namely, the SC)” (1992: 23). For Aarts, “this must be so because this verb assigns a Θ -role either to a single NP argument (...) or to a propositional (clausal) argument (...) but never to two arguments.” (1992: 22) According to this view, the entire SC constituent receives a propositional theta-role from the matrix verb instead of the two postverbal constituents receiving individual theta-roles. Note, however, that the propositional theta-role merely serves as a formal diacritic instead of a semantic selection mechanism that has access to the lexical semantics of the constituents of the SC. Thus, it cannot distinguish between different kinds of semantic categories and only marks the SC with a “propositional theta-role” that is inadequate to restrict the semantic range of the resultative phrases in (3a)-(3d). Both Hoekstra (1988) and Aarts (1992) fail to explicitly address the issue of how and why certain resultative phrases are allowed in resultative constructions while others are not.

Finally, questions remain about the status of the matrix verbs in (3b)-(3d). Note that although this sense of *run* is lexically intransitive, it is followed by *her Nikes* as its postverbal NP in (3b). If the Projection Principle indeed holds at all levels of representation, then it is not clear why a lexically intransitive verb occurs with a postverbal NP which is the affected object of *run* (cf. *The Nikes were run threadbare by Pat*). Similarly, Hoekstra’s (1988: 118) proposal to detransitivize transitive verbs like *drink* in (3c) to allow for postverbal NPs that do not match the lexical semantic selection restrictions of the matrix verb lacks any empirical motivation. It is thus not clear how *Martin* can appear as the postverbal NP to *drink* in (3c). This observation calls into question how the selection restrictions of lexically transitive verbs like *drink* are altered in the course of the syntactic derivation in order to accommodate resultative constructions as in (3c).

Our brief discussion of the SC Analysis has shown that it cannot account for the semantic selection restrictions that hold for the postverbal constituents of resultatives. In addition, it fails to account for the differences in

subject”, postverbal NPs of resultatives containing lexically intransitive verbs exhibit the behavior of arguments under passivization (*The Nikes were run threadbare*). This, however, is not expected under C & R’s analysis.

Finally, consider our data concerning the semantic selection of the postverbal NPs and the resultative phrases in (3) above. Although C & R propose that the two postverbal constituents are theta-marked by the matrix verb, they do not explicitly address the issue of how to restrict the semantic range of the postverbal NP and the resultative phrase. Thus, their approach faces the same shortcomings as the SC analysis when it comes to an explanation of the semantic selection restrictions that hold for the two postverbal constituents. In what follows, I will propose a lexicalist analysis of resultatives in terms of complex predicates.

3 Towards a lexical treatment of resultatives

The discussion of the syntactic approaches towards resultative constructions in the preceding sections has pointed to several factors which need to be taken into account in an adequate model of these constructions: the semantic selection restrictions with respect to the postverbal NP and the resultative phrase, the treatment of lexically intransitive verbs that occur with an object NP, the analysis of transitive verbs with non-subcategorized object NPs, and the syntactic licensing of the resultative phrase. As I have pointed out, neither the SC Analysis nor the Ternary Branching Analysis provide a satisfactory treatment of these points.

3.1 Syntactic derivations without lexical semantics?

I would like to suggest that these problems are due to three shortcomings inherent to the framework underlying both approaches. First, the Projection Principle requires that the selection requirements of particular lexical items must be met in the same categorial form at different levels of representation. It does therefore not allow for any change of the subcategorization frame of the matrix verb during the course of the syntactic derivation. Thus, the assumption of the Projection Principle makes it impossible to deal adequately with the occurrence of object NPs following intransitive verbs in resultative constructions.

Second, both the SC Analysis and the Ternary Branching Analysis fail to recognize the importance of the meanings associated with the constituents of the resultative construction. This is due to the emphasis placed on the syntactic component within the P & P framework. According to this theory, semantic

selection restrictions are expressed in terms of loosely defined theta-roles that do not provide any detailed semantic description of the arguments of a verb, but rather function as mere diacritics. Any theory that neglects the fine-grained semantic distinctions between different potential arguments of a verb cannot effectively predict the semantic selection restrictions that hold for the postverbal constituents in resultative constructions.

Finally, given the tendency within the P & P framework to describe disparate construction types in the same structural terms, both the SC Analysis and the Ternary Branching Analysis analyze all of the resultative constructions in (1) as either SCs or as ternary branching structures. Note, however, that both syntactic approaches miss important meaning differences between the constructions in (1). Although all of the resultatives in (1) share a common syntactic surface structure (cf. (6)) as well as a common core meaning (cf. (7)), there is an important difference between the meanings of the individual constructions.

- | | |
|---|--|
| (6) Res. Construction | (7) Core meaning of Resultative Construction |
| NP _X V NP _Y ResP _R | X V-ed and X's V-ing caused that Y became R |

Boas (to appear) observes that there are at least two different kinds of verbs that can occur in transitive resultative constructions, namely lexically intransitive verbs such as *run* and *dance* and lexically transitive verbs such as *paint*. The crucial difference between the two verb classes is that the resultative construction has different meanings depending on the transitivity of the matrix verb. Boas (to appear) proposes that the meaning of resultative constructions containing an intransitive verb as in (8a) can be paraphrased as in (8b). In contrast, the meaning of a resultative construction containing a transitive verb as in (9a) can be paraphrased as in (9b):

- | | |
|---|---|
| (8) a. Pat ran his Nikes threadbare. | (9) a. Claire painted the door red. |
| b. X V-ed and X's V-ing caused that Y became R. | b. X V-ed Y and X's V-ing caused that Y became R. |

According to this analysis, the difference between the transitive and the intransitive verb is that the semantic relationship between the matrix verb and the postverbal NP is closer in (9) than it is in (8). This difference in meaning is captured by the first part of the paraphrases. Whereas in the transitive case (9b), the *X directly affects Z* by performing some action of which *Y* is the direct undergoer (*X V-ed Y*), this is not the case with resultatives containing intransitive verbs. These sentences do not exhibit such a close relationship between the matrix verb and the postverbal NP, as indicated by the paraphrase

(9b). In this case, X performs some activity (X V-ed), and by performing that activity Z gets somehow affected. This means that Z, the postverbal NP, is only *indirectly affected* by the activity.

Let us finally turn to a set of data which contain verbs that I want to dub “weird” transitive verbs. These are lexically transitive verbs whose subcategorization frames are different when they occur in resultative constructions. The data in (10) illustrate the different selection restrictions of “weird transitives” in their lexically specified interpretation (10 d, e) vs. their resultative interpretation (10 a-c).

- (10) Weird transitive resultatives
- | | |
|------------------------------------|--------------------------------|
| a. *Jack drank Bob. | d. Jack drank his water. |
| b. *Jack drank Bob empty. | e. Jack drank his water empty. |
| c. Jack drank Bob under the table. | |

(10e) is a case of a regular transitive resultative. (10a), however, is a case of a semantically strange postverbal NP following *drink*. Typically, one does not drink people, but liquids. In the context of a resultative construction, however, *Bob* can be interpreted as the undergoer of the matrix verb. I would like to suggest that the change in selection restriction is due to the presence of the resultative phrase *under the table*. On this view, the semantic requirements of the resultative construction make the semantics of the resultative phrase fuse with the semantics of the transitive verb in order to produce a “weird transitive.”

Both the SC Analysis and the Ternary Branching Analysis, however, miss these important differences in meaning. Given their unified syntactic treatment of predication structures, they fail to account for the lexical semantics involved in the formation of the three types of resultatives described in the previous paragraphs. What is therefore needed is a balanced analysis that incorporates the interpretation differences as well as the differences in subcategorization between the individual verbs. Such an approach is presented in the following section.

3.2 Resultatives as Lexical Rules

Before discussing the mechanisms of my analysis in detail, let us take a brief look of the properties of the three resultative constructions we have identified in the previous sections. The table below provides an overview of the facts that we have to account for.

(11) Resultatives affecting the argument structure of different kinds of verbs

Type of matrix verb affected	Change in argument structure
(a) Transitive verb	<ul style="list-style-type: none"> • Add a resultative phrase
(b) Weird transitive verb	<ul style="list-style-type: none"> • Add a resultative phrase • Change semantic selection restrictions on patient argument
(c) Intransitive verb	<ul style="list-style-type: none"> • Add a resultative phrase • Add a patient argument

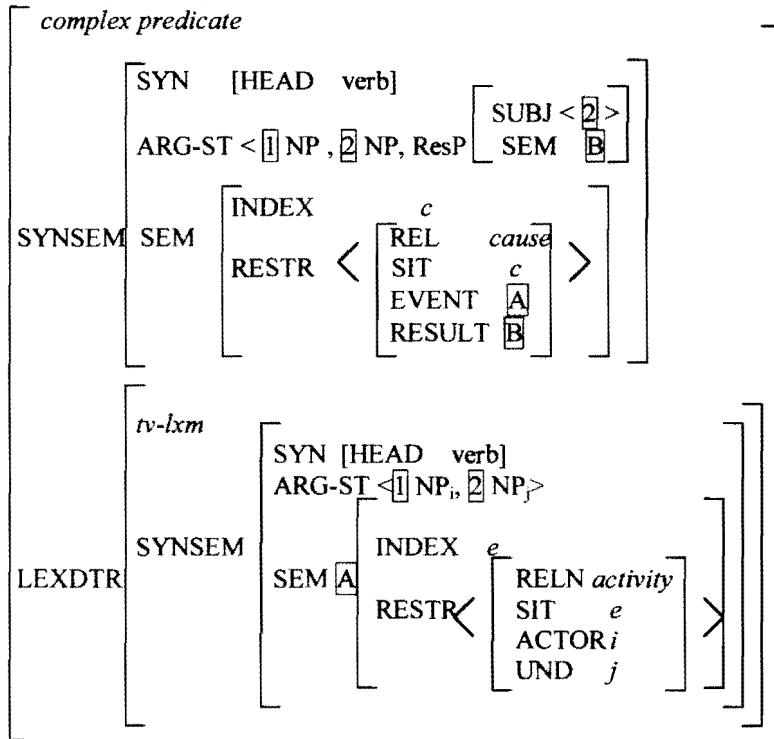
The lexicalist analysis I would like to suggest accounts for the distribution in (11) in terms of complex predicates that incorporate verbs and change their subcategorization frame and semantic selection restrictions. This process of predicate formation is sensitive to the lexical semantic information associated with the lexical daughter of the complex predicate. For each of the three verb classes, there is a different lexical rule that alters a verb's subcategorization frame to derive a complex resultative predicate.

The first class of resultative predicates contains lexically transitive verbs like *paint* or *sweep*. The lexical rule deriving the transitive resultative predicate takes the transitive verb as its input and adds a resultative phrase to its subcategorization frame. This is illustrated in the structure of the complex predicate in (12) that consists of an HPSG-style attribute-value matrix (see Sag & Wasow 1999). The transitive resultative predicate in (12) has the structure of a complex predicate and consists of two parts. It contains the syntactic and semantic properties of the complex predicate (SYNSEM) and its lexical daughter (LEXDTR), which is a lexical entry by itself. In this analysis, predicates like the transitive resultative predicate are derived predicates (cf. Ackerman & Webelhuth 1998) as can be seen by the presence of the lexical daughter in (12). The complex predicate has access to the feature structure of its lexical daughter in the lexicon and fuses it with the resultative phrase. When this complex predicate interacts with the syntax, only its SYNSEM attribute will be visible.

Let us begin by looking at the SYNSEM of the lexical daughter (a transitive verb) which consists of three attributes, namely syntax (SYN), argument structure (ARG-ST), and semantics (SEM). SYN indicates that the syntactic properties of the predicate are that of a verb. We see that the argument structure list in (12) contains the subject NP and the postverbal NP. The boxed numbers on the two NPs are used to indicate identity of information, i.e., information that is present in the structure only once but describes two different attributes. For

example, the boxed '1' attached to the first NP reappears on the first NP on the argument structure of the complex predicate to indicate that the two elements share the same information. The subscripts on the NPs of the lexical daughter's argument structure are used to identify them with their respective semantic roles in the semantics of the verb. The semantics (SEM) of the transitive verb consist of an index e which corresponds to the situation described by the verb, as well as restrictions (RESTR) on its semantic make-up. As we see, the transitive verb has to contain an activity component, an ACTOR role, and an UNDERGOER role.

(12) Transitive Resultative Predicate



Let us now turn to the *SYNSEM* of the complex predicate. Its argument structure contains the NPs of the transitive verb, as is indicated by the boxed numbers. In addition, it contains the Res(ultative) P(hrase) (either an AP, PP, or NP) whose occurrence is motivated by the semantics of the complex predicate. This is illustrated by the information in brackets that follows the ResP. The

bracketed information following the ResP represents both syntactic and semantic information. The boxed '2' indicates that the second NP (the UNDERGOER) is the subject of the ResP.

The boxed 'B' representing the semantics of the ResP accomplishes two things. First, it motivates the occurrence of the ResP on the ARG-ST of the complex predicate. That is, if we look at the semantic restriction of the complex predicate we see that it requires two events to be in a *cause* relation. The semantics 'A' of the first event is that of the lexical daughter. The semantics 'B' of the second event has to denote a result state. It is the *cause* semantics of the complex predicate that requires the presence of an element denoting a result state. Thus, the occurrence of the ResP on the ARG-ST of the complex predicate is a syntactic reflex of the *cause* semantics of the complex predicate. This is shown by the boxed 'B' notation present in both the semantics of the *cause* relation as well as following the ResP.

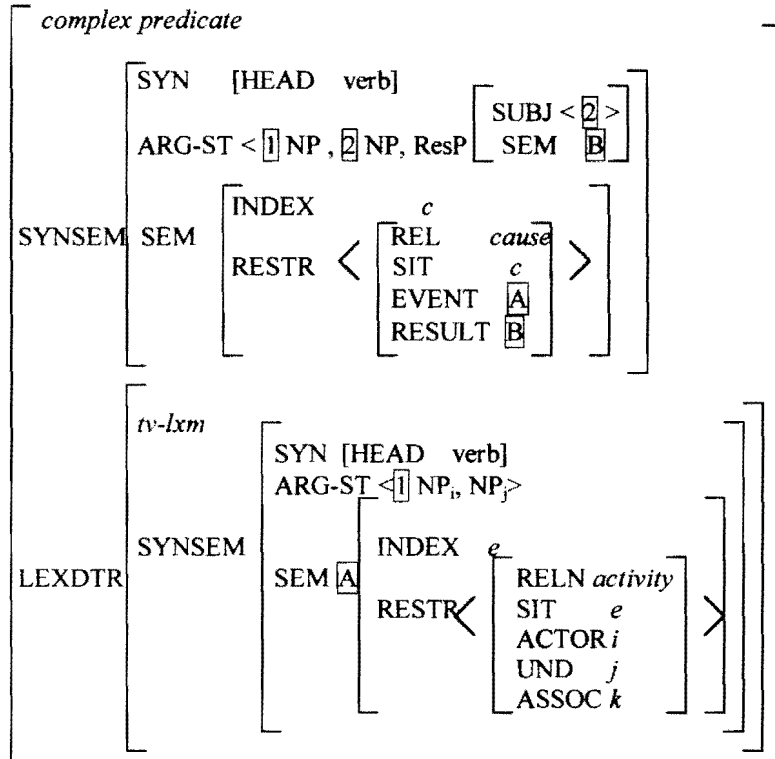
Second, the semantics 'B' of the ResP is a crucial factor in determining whether it can occur in the transitive resultative predicate. The *cause* relation achieves the result that the semantics of the resultative phrase have to be compatible with the semantics of the causing event 'A.' That is, although the result phrase might denote a possible state of the NP it predicates over (*the house (is) wooden*), that state might not be an acceptable result state of the activity of the causing event (**paint the house wooden*). In other words, the *cause* semantics of the complex predicate has access to all of the lexical semantic information associated with both the causing event and the result event. On the basis of this information, the *cause* semantics decides whether the two lexical semantic structures are compatible. As a result, the transitive resultative predicate only allows resultative phrases that are compatible with both the UNDERGOER argument, and the activity denoted by the matrix verb.

In (12) we have postulated a property that all three types of resultatives share: resultative predicates are derived from a verb whose argument structure is changed by the addition of a resultative phrase. But we have only discussed the structure of transitive resultative predicates. In the next sections, I will show how the structures of the two other resultative predicates differ from the transitive resultative predicate.

Let us next turn to what I have dubbed "weird" transitive resultative predicates. Recall that these verbs show different semantic selection restrictions when they occur in resultatives. (13) represents the structure of weird transitive resultatives. (13) exhibits the same general architecture as our regular transitive resultative predicate in (12) above, with two important differences. First, compare the argument structure of the complex predicate with the argument structure of its lexical daughter. Although the argument structure of the complex predicate

contains two NPs, only its first NP is coindexed with the ACTOR NP of the lexical daughter. Instead of incorporating the UNDERGOER NP of the transitive verb, the complex predicate contains a different UNDERGOER NP. The occurrence of this NP is licensed by the presence of the resultative phrase which takes the NP as its subject. In other words, the *cause* semantics of the complex predicate - which also licenses the ResP - licenses the second NP on its argument structure.

(13) Weird Transitive Resultative Predicate



The second difference between the transitive and the weird transitive lies in the amount of lexical semantic information necessary to drive the formation of the complex predicate. Thus, the semantics of the lexical daughter in (13) contains additional information that is necessary for the licensing of the second NP (UNDERGOER) on the argument structure of the complex predicate. For lack of

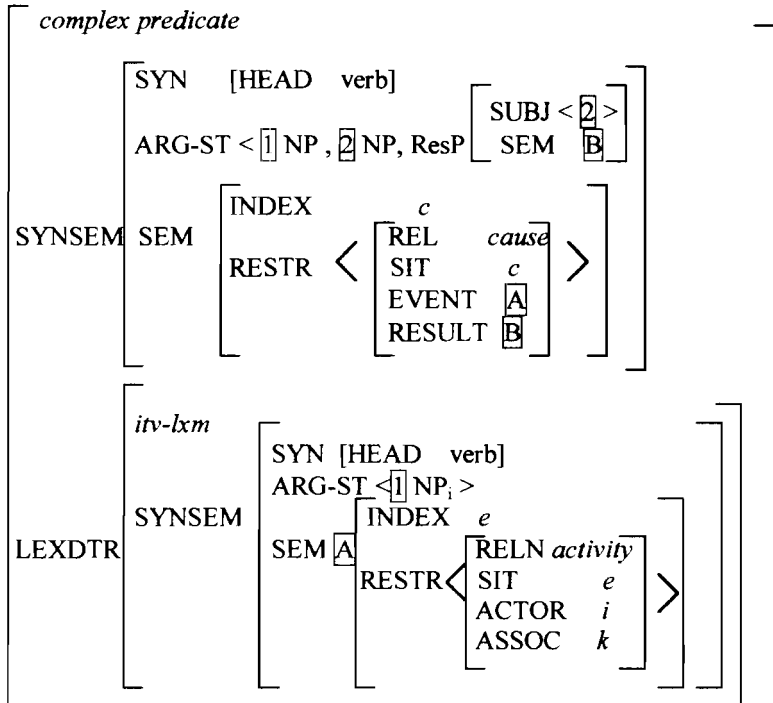
space, I will call this additional information “associate” (ASSOC) information. ASSOC contains semantic information in the style of Frame Semantics (Fillmore 1982, Baker 1999), an approach to the understanding and description of the meanings of lexical items in grammatical constructions. Proponents of this theory claim that in order to understand the meanings of the words in a language we must first have knowledge of the conceptual structures, or semantic frames, that underlie the meaning of words. Semantic frames contain frame elements, i.e., descriptions of the meanings of the frame’s participants in terms of situational roles. A given verb cannot only invoke one frame, but also multiple frames.

I suggest that the formation of weird transitive resultatives crucially depends on the inclusion of lexical semantic information in the form of Frame Semantics. That is, in order to derive weird transitive resultatives such as *Pat ate his plate empty* we must have access to the frame semantic knowledge associated with the matrix verb *eat*. This information will tell us that eating does not only involve putting food into one’s mouth, but that in a prototypical eating situation, the food is taken off a plate before being put into one’s mouth. In other words, in this case *eat* does not invoke a frame describing food consumption, but rather a frame of emptying a container. I propose that the rich frame semantic information associated with a lexical item in the form of associate information in (13) is crucial in determining whether a resultative predicate can change the semantic selection restrictions of a transitive verb when forming a complex predicate. As a result of incorporating frame semantic information, the *cause* semantics of the complex predicate can check whether the semantics of the resultative phrase is compatible with both the semantics of the matrix verb and the undergoer argument of the complex predicate.

Finally, let us turn to the structure of intransitive resultative predicates in (14)³. They exhibit the same general architecture as the two other complex predicates, except for two differences. As (14) shows, intransitive resultative predicates take only intransitive verbs as their input. Since intransitives only provide an ACTOR NP for the argument structure of the complex predicate, intransitive resultative predicates provide both an UNDERGOER NP and a resultative phrase. As in (13) above, the ResP which is licensed by the *cause* semantics of the predicate licenses the occurrence of the UNDERGOER because it requires a NP as its subject. What kind of UNDERGOER is licensed depends on the frame semantic information associated with the intransitive lexical daughter as well as on the semantic compatibility between the ResP, the UNDERGOER, and the matrix verb. Thus, *Pat ran his Nikes threadbare* is licensed since one of the general frames inherited by *run* tells us that running can be done in shoes which can undergo some change of state as the result of running. Moreover, shoes have

the property of becoming threadbare after a lot of running. With the semantic compatibility checked by the cause semantics of the resultative predicate, *Nikes* is licensed as the UNDERGOER argument of *run-threadbare*.

(14) Intransitive Resultative Predicate



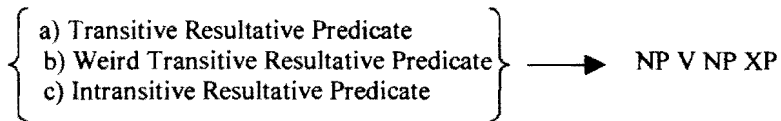
4 Conclusion

In this paper, I have shown that there is semantic as well as syntactic evidence against an analysis of resultative constructions in terms of SC Theory (Hoekstra 1988, Aarts 1992) or the Ternary Branching Analysis (Carrier & Randall 1992). I have argued that the shortcomings of both approaches are due to the architecture of the P & P framework which places emphasis on the analysis of syntactic structures while systematically avoiding any detailed discussion of the influences of semantic information on syntactic derivations. More specifically,

both accounts fail to address the fact that all transitive resultative constructions exhibit the same syntactic pattern but differ in their meanings.

The alternative theory that I am proposing in this paper does not suffer from these flaws. As the following diagram illustrates, my analysis distinguishes between three classes of complex resultative predicates that all derive the same syntactic surface pattern, but in different ways.

(15) Different types of complex predicates deriving the same surface pattern



The crucial difference between the three types of complex predicates lies in the type of verb class they incorporate in the resultative construction. Thus, my analysis distinguishes between three classes of complex resultative predicates that all derive the same syntactic surface pattern by restructuring the argument structure of the matrix verb in the lexicon, but in different ways. The predicate representations of the individual resultative predicates capture all the properties of the respective resultative constructions listed in (11) above: (a) the transitive resultative (12) adds a resultative phrase to the argument structure of the matrix verb; (b) the weird transitive (13) adds a resultative phrase and changes the semantic selection restrictions with respect to the undergoer argument; (c) the intransitive resultative (14) adds both a resultative phrase and an undergoer argument.

In section 3.2 we have also seen that the formation of resultative predicates is constrained by the lexical semantics associated with the matrix verb, the postverbal NP, and the resultative phrase. I have argued that a semantic representation in terms of Frame Semantics (Fillmore 1982, Baker 1999) is necessary to distinguish between multiple scenes and their related senses in order to motivate the licensing of non-subcategorized undergoer arguments.

Based on Ackerman & Webelhuth's (1998) Theory of Predicates, I have suggested that resultative predicates enter the syntactic derivation as predicates with fully specified argument structures. On this view, syntax fills the predicate's open argument slots to yield a complete resultative sentence. Although the ideas sketched here are preliminary, I hope that they can serve as a basis for forthcoming research that will lead to the development and integration of a more complete theory of the lexical semantics underlying the formation of complex predicates in the lexicon⁴.

Notes

¹I would like to thank Collin Baker, Charles Fillmore, Andreas Kathol, Paul Kay, and Josef Ruppenhofer for helpful discussions and comments. All remaining errors are, of course, my own.

²For an extensive review and critique of Theta Theory, see Rauh (1988).

³Wechsler's (1997) account of resultatives differs from my analysis in various points. First, Wechsler assumes only two kinds of resultatives (control and ECM). Second, Wechsler interprets the meaning of the resultative as a BECOME relation which mediates between two different states (change of state). Third, Wechsler's approach does not provide any mechanism to include the broad range of lexical semantic information into the resultative. Finally, Wechsler's analysis does not deal with what I call weird transitive resultatives.

⁴In my discussion of resultatives I have left out any discussion of Construction Grammar analyses of resultatives (Fillmore & Kay 1993, Goldberg 1995). While these accounts are similar in spirit to the analysis proposed in this paper, they do not make any fine grained distinctions between three different classes of resultatives.

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Identificational Foci in Georgian

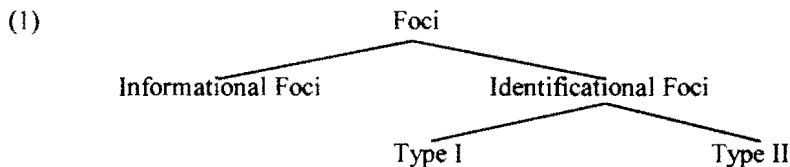
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1 Introduction

As works like Halliday 1967, Roberts 1996 and Kiss 1998 have shown, there are a number of different ways in which languages can express emphasis, or ‘Focus’. In particular, good evidence has been given for distinguishing *informational foci* and *identificational foci* (as in *I saw a RUTABAGA* and *It was a RUTABAGA that I saw*, respectively).

Based on data from Georgian, we argue that within the category of identificational focus, two subtypes must be distinguished. The well-known cases of English it-clefts and Hungarian focus-moved constituents belong to one subtype (‘Type I’ identificational foci), while Georgian focus-moved constituents belong to a new subtype (‘Type II’ identificational foci):



Type II identificational foci differ from Type I identificational foci in that they lack certain distributional restrictions. We claim that this behavior is due to a difference in focal structure: while Type I foci have narrow identificational focus, Type II foci have broad identificational focus, with the whole sentence being in focus.

1.1 Informational and identificational foci

Examples of *informational focus* are provided by English foci with falling intonation (when relevant, a forward slash will be used to represent the falling intonation, which is H* in the framework of Pierrehumbert 1980), and

Hungarian in-situ foci (throughout, small caps will indicate informational focus):

- (2) [What did Mary pick out for herself?]
Mary picked out **A HAT** for herself.
- (3) [What did Mary pick out for herself?]
Mari ki nézett magának **EGY KALAPOT**.
Mary out picked herself a hat
'Mary picked out **A HAT** for herself.'

I will assume the framework of Alternative Semantics of Rooth 1992, according to which informational foci indicate new (non-presupposed) information. Furthermore, they are associated with alternatives, such as {a hat, a coat, some shoes, ...} for (2) and (3), which can be operated on by focus-sensitive operators like *only* or *also*.

Examples of *identificational focus* are provided by English *it*-clefts and Hungarian focus-moved constituents (boldface will indicate the pivot of an identificational focus¹):

- (4) [What did Mary pick out for herself?]
It was **a hat** that Mary picked out for herself.
- (5) [What did Mary pick out for herself?]
Mari **egy kalapot** nézett ki magának.
Mary a hat picked out herself
'It was a hat that Mary picked out for herself.'

Identificational foci are also associated with alternatives, but have an additional meaning contribution, a *conventional* (i.e. non-cancellable) implicature of exhaustivity, committing the speakers of (4) and (5) to the claim that Mary didn't pick out anything other than a hat.

1.2 Tests to distinguish informational and identificational foci

Kiss 1998 gives a number of tests to distinguish identificational foci from informational ones. Here we will concentrate on two of them, the 'Continuation Test' and 'Conjoined NP Test', which test directly for exhaustiveness.

First, we have the *Continuation Test*. It is infelicitous to try to add other things to a set whose membership was exhaustively indicated by the focus:

- (6) Mary bought a **HAT**... She also bought a coat.

- (7) It was **a hat** that Mary bought... #She also bought a coat.

Since the continuation ...*She also bought a coat* sounds fine in (6), there is no exhaustiveness implicature and the focus therefore is informational. In (7), however, since the continuation sounds odd, there is an exhaustiveness implicature and the focus is therefore identificational.

The second test is the *Conjoined NP Test* (Szabolcsi 1981). Take two sentences of the form in (8):

- (8) a. ... [α and β]_F ...
 b. ... [α]_F ...

The only thing that can stop S1 from entailing S2 is an exhaustiveness implicature. So, S1 entails S2 iff the focus is informational. First we will test English foci with falling intonation, then it-clefts:

- (9) a. Mary picked out A COAT AND A HAT\ for herself.
 b. Mary picked out A HAT\ for herself.
- (10) a. It was **a coat and a hat** that Mary picked out for herself.
 b. It was **a coat** that Mary picked out for herself.

Since (9a) entails (9b), the focus does not have an exhaustiveness implicature, and therefore is informational. Since (10a) does not entail (10b), the focus in those sentences does carry an exhaustiveness implicature, and therefore is identificational.

2 Georgian Identificational Foci

In this section, we turn to data from Georgian. Like Hungarian, Georgian has foci that occur in two positions: postverbally (in-situ), and in the focus position (focus-moved), as in following (postverbal foci in (a); preverbal foci in (b)):

- | | |
|--|---|
| <p>(11) a. [<i>Merim ra iqida?</i>]
 'what did Mary buy?'</p> <p>Merim iqida KUDI.
 Mary bought hat
 'Mary bought A HAT\.'</p> | <p>b. [<i>Merim ra iqida?</i>]
 'What did Mary buy?'</p> <p>Merim kudi iqida.
 mary hat bought
 'Mary bought a hat\.'</p> |
| <p>(12) a. [<i>Dghes sad midixar?</i>]
 'where are you going today?'</p> | <p>b. [<i>Dghes sad midixar?</i>]
 'where are you going today?'</p> |

- | | | |
|---------|---|--|
| | Mivdivar UNIVERSITET-SHI.
I-go university-to
'I'm going to THE UNIVERSITY.' | Universitet-shi mivdivar.
university-to I-go
'I'm going to the university/Λ.' |
| (13) a. | [<i>Bavshma ra moitexa?</i>]
'What did the child break?' | b. [<i>Bavshma ra moitexa?</i>]
'What did the child break?' |
| | Bavshma moitexa PEXI.
child broke leg
'The child broke HIS LEG.' | Bavshma pexi moitexa.
child leg broke
'The child broke his leg/Λ.' |

In section 2.1, we will demonstrate the status of these foci as informational or identificational. Then, we will concentrate on the focus-moved constituents, and show the distinguishing characteristics that motivate separating them out as 'Type II' identificational foci, different from the 'Type I' identificational foci seen above.

2.1 Testing for informational/identificational foci

The tests introduced above show that Georgian in-situ foci are informational while Georgian focus-moved constituents are identificational.

According to the Continuation Test, using a continuation like 'and she bought something else too' is infelicitous with identificational foci, and felicitous with informational foci. With the in-situ foci the continuation is felicitous, so they are informational:

- (14) Merim iqida KUDI... Man **p'alto-ts** iqida.
Mary bought hat she coat-also bought
'Mary bought A HAT... She also bought a coat.'

However, with the focus-moved constituents the continuation is infelicitous, so they are identificational:

- (15) Merim **ku'di** iqida... #Man **p'alto-ts** iqida.
Mary hat bought she coat-also bought
'Mary bought a hat/Λ. She also bought a coat.'

The Conjoined NP Test confirms the diagnosis just given. The in-situ foci are informational, since (16a) entails (16b). The focus-moved constituents are identificational, however, since (17a) does not entail (17b):

- (16)a. Merim iqida KUDI DA P'ALTO

- mary hat and coat bought
 ‘Mary bought a coat and a hat\.’
- b. Merim iqida KUDI.
 ‘Mary bought a hat\.’
- (17)a. Merim **kudi da p’alto** iqida
 mary hat and coat bought
 ‘Mary bought a coat and a hat\.’
- b. Merim **kudi** iqida
 ‘Mary bought a hat\.’

So, the in-situ foci are straightforward informational foci, while the focus-moved constituents are identificational foci. Hereafter, we will only be concerned with the latter.

2.2 Distinguishing characteristics of Georgian identificational foci

Though the Georgian focus-moved constituents have been shown to be identificational foci in the previous section, they behave differently from Type I foci in three respects: the *‘Also’-Phrase Test*, the *Proportional Quantifier Test*, and the *‘Nothing’-Phrase Test*.²

First, the *‘Also’-phrase Test* (Kiss 1998). An ‘also’-phrase is felicitous with informational foci, but infelicitous when in the pivot of a Type I identificational focus:

- (18) Mari ki nézett magának EGY KALAPOT IS.
 Mary out picked herself a hat also
 ‘Mary also picked out a hat for herself.’
- (19) #Mari **egy kalapot is** nézett ki magának.
 Mary a hat also picked out herself
 (‘It was **also a hat** that Mary picked out for herself.’)

The Georgian identificational foci, surprisingly, do not act like the Type I identificational foci. While (19) is infelicitous, the following is fine³:

- (20) Merim **p’alto-ts** iqida.
 mary coat-also bought
 ‘Mary also bought a coat\.’

Next, we have the *Proportional Quantifier Test*. Proportional quantifiers (Partee 1988) are felicitous in informational focus, but infelicitous in the pivot of a Type I identificational focus⁴:

- (21) I saw { EVERYBODY\
MOST HATS\
AT LEAST HALF OF THE HATS\
}
- (22) #It was { **every hat** } that Mary bought.
{ **most hats** }
{ **at least half** }

As in the previous test, the Georgian identificational foci behave unlike the Type I identificational foci. While the *it*-clefts in (22) are bad, the following is felicitous:

- (23) Merim **qvela kudi** iqida.
mary every hat bought
'Mary bought every hat/.'

Finally, we have the '*Nothing*'-phrase Test. It is based on another property of Type I identificational foci, the presence of an existential presupposition (for *it*-clefts, this was first argued by Chomsky 1972). That is, uttering *It was a hat that Mary bought* presupposes that Mary bought something. One way to test for this is the following, based on observations by Rochemont 1986:

- (24) #It was **nothing** that Mary bought.
(25) Mary bought **NOTHING**.'

The *it*-cleft variant in (24) is bad because the cleft carries an existential presupposition that Mary bought something, which is contradicted by the main assertion that Mary bought nothing. The ordinary falling focus variant in (25) is fine, since it carries no such existential presupposition.

Since '*nothing*'-phrases are felicitous in the Georgian identificational foci, however, they do not carry an existential presupposition:

- (26) Merim **araperi ar** iqida.
mary nothing NEG bought
'Mary bought no/thing.'

2.3 Summary of the Data

We have seen evidence that Georgian focus-moved constituents act like identificational foci, but differ from the Type I identificational foci in three respects:

- (27) (a) '*also*'-phrases can occur in the pivot

- (b) proportional quantifiers can occur in the pivot
- (c) there is no existential presupposition

An indication that we are dealing with a new subtype of identificational foci and not just an idiosyncratic language is the fact that English foci with rising intonation like in (28) share the same set of properties (Bush and Tevdoradze *to appear*):

- (28) *[What did Mary buy?]*
Mary bought a **hat**^.

The existence of two subtypes of identificational focus raises three questions. How are these subtypes related? How should they be represented in the semantics? And, how can we account for the three properties in (27)? In the next section, we show that answers to these questions can be found if we posit a difference in the focal structure of Type I and Type II identificational foci.

3 Broad and Narrow Identificational Foci

Our analysis claims that identificational foci can be categorized as either broad or narrow, just as informational foci can be. Before we spell this out in detail, let us see how informational foci behave. There is ample independent evidence for recognizing informational foci of different sizes, as in the following contrast (the main sentence stress is in boldface, while the focused phrase is in marked with a subscript 'F'):

- (29) *[What did Mary buy?]*
Mary bought [a **hat**]_F.
- (30) *[What happened?]*
[Mary bought a **hat**]_F.

The focus in an answer corresponds to the wh-word in the question in the familiar way. The focus can be narrow, as in (29), with just the NP *a hat* in focus, or broad, as in (30), with the whole sentence in focus.

We argue that identificational foci can also be categorized as broad or narrow. Type I identificational foci like the English it-cleft are narrow, with only the pivot being in focus, while the Type II identificational foci are wide, with the whole sentence in focus. We will represent this using subscript 'IDF' to mark the size of identificational focus⁵:

- (31) It is [a **hat**]_{IDF} that Mary bought.

- (32) [Merim **kudi** iqida]_{IDF}.
 mary hat bought
 ‘Mary bought a hat^.’

Two further comments about the focal structures must be made. First, in addition to the identificational focus there is also informational focus. Informational focus is always present, to indicate what information is new and what is given. Keeping in mind that the informational focus in an answer corresponds to the wh-word in the question, consider the following dialogs:

- (33) [*What did Mary buy?*]
 It is [[**a hat**]_F]_{IDF} that Mary bought.
- (34) [*Merim ra iqida?*]
 ‘What did Mary buy?’
 [Merim [**kudi**]_F iqida]_{IDF}
 ‘Mary bought a hat^.’

Since both (33) and (34) answer the same question, the informational focus is the same, just on ‘a hat’. With narrow identificational focus, the identificational and informational focus (usually) coincide, but with broad identificational focus, the informational focus is smaller than the identificational focus.

With these focal structures in mind, we can move on to the interpretation. A difference in size of focus will lead to a difference in meaning, since different things are emphasized (as in the examples of informational focus in (29)–(30)). This meaning difference due to the size of identificational focus will be shown to account for the different properties of the various foci.

3.1 The interpretation of Type I identificational focus

Following Heycock and Kroch 1999’s work on English pseudoclefts, we assume that the utterances with Type I identificational foci are analyzed as equatives. Following Jacobson 1988, we take the cleft clause *that Mary bought* to denote an individual rather than a set, namely the individual in (35):

- (35) ιy [Mary bought y]

Here, the Russellian iota operator (ι) is defined as the following:

- (36) ιy [$f(y)$] denotes a iff $f(a) \wedge (\forall z)((f(z) \wedge z \in \text{ALT}(a)) \rightarrow z \leq a)$

For example, *that Mary bought* denotes a particular thing a iff Mary bought a and for all alternatives z , if Mary bought z , then z is identical to (or part of) a . In other words, Mary must not have bought any alternatives to a , and this is the source of the exhaustiveness implicature.

Using the iota expression, we interpret an it-cleft like *It is a hat that Mary bought* as the following equation of individuals:

$$(37) \quad \iota y[\text{Mary bought } y] = \text{'a hat'}$$

Since (37) contains an iota expression, in order for it to be true, the iota expression must denote some individual, which by (36) means Mary must not have bought anything other than some individual a . Since (37) indicates that a is a hat, we derive the exhaustiveness implicature:

$$(38) \quad \text{'Mary bought a hat, and didn't buy anything else'}$$

3.2 The interpretation of Type II identificational focus

A similar act of equation is being performed in the case of Type II focus, but because the identificational focus is broader, the equation is at the level of sentences. Intuitively, for a sentence like (32), repeated here, the speaker is asserting that the set of true relevant sentences is exhaustively indicated by the one just uttered, as in (40) (for convenience, we will use the English translation when possible).

$$(39) \quad [\text{Merim kudi iqida}]_{\text{IDF}} \\ \text{mary hat bought} \\ \text{'Mary bought a hat/\text{.}'}$$

$$(40) \quad \iota p[p \text{ is true}] = \text{'Mary bought a hat'}$$

As with Type I identificational focus, these foci carry an exhaustiveness implicature derived from the iota operator, though the derivation is a bit more complicated. Just as (37) gave us (38) above, (40) gives us (41):

$$(41) \quad \exists p[p \text{ is true} \wedge \forall q[(q \text{ is true} \wedge q \in \text{ALT}(p)) \rightarrow q \leq p]] \\ \text{'there is a true sentence } p, \text{ and none of the alternatives to } p \text{ are true'}$$

Since (40) indicates that p is 'Mary bought a hat', we get the following:

$$(42) \quad \text{'Mary bought a hat' is true} \wedge \forall q[(q \text{ is true} \wedge q \in \text{ALT}(\text{'Mary bought a hat'})) \rightarrow q \leq \text{'Mary bought a hat'}] \\ \text{'Mary bought a hat' is true, and none of the alternatives to it are true'}$$

The alternatives to the sentence 'Mary bought a hat' are contextually restricted to those sentences could be substituted into the discourse: 'Mary bought a coat', 'Mary bought some shoes', etc.. Substituting these alternatives into (46), we get (47), which reduces to (48):

- (43) ‘ ‘Mary bought a hat’ is true, and ‘Mary bought a coat, Mary bought some shoes,’ ‘Mary bought a parasol,’ etc., are false.’
 (44) ‘Mary bought a hat, and didn’t buy anything else’

This is the same implicature as with the Type I identificational focus in (42), which explains the close similarity of the two types of identificational focus.

4 Accounting for the Data

Though the size differences between the identificational foci do not greatly affect the final form of the implicatures, they do have a significant effect on how the foci behave in certain respects, given in (27) above and repeated here. These properties can be explained based on the size of identificational focus:

- (45) (a) ‘also’-phrases can occur in the pivot
 (b) proportional quantifiers can occur in the pivot
 (c) there is no existential presupposition

4.1 Compatibility with ‘also’-phrases

First we will explain why *also* cannot occur in the pivot of the Type I identificational foci, and then show why the Georgian identificational focus does not similarly give rise to infelicity. The data, we recall, is that when *also* is in the pivot of an it-cleft, the utterance is infelicitous:

- (46) [I know that Mary bought a coat. What else did she buy?]
 #It was [also [a hat]_F] _{IDF} that Mary also bought.

The interpretation of (46) will be the following⁶:

- (47) ιy [Mary bought y] = ‘also a hat’

The iota expression in (47) conventionally implicates that Mary only bought one thing, a hat (keeping in mind that *also a hat* is truth-conditionally equivalent to *a hat*). *Also* carries the presupposition that Mary bought something other than a hat. These two meanings are contradictory, and result in infelicity.⁷

With this in mind, let us move on to the Type II foci, where there is apparently no conflict between *also* and the exhaustiveness implicature. Let us take the Georgian case, which has broad identificational focus:

- (48) *[Vici, rom Merim iqida p'alto. Ra k'idev iqida?]*
I know that Mary bought a coat. What else did Mary buy?

[Merim [kudi]_F-ts iqida]_{IDF}
 Mary hat-also bought
 'Mary also bought a hat^'

The interpretation of (52) will be the following:

- (49) $\wp[p \text{ is true}] = \text{'Mary also bought a coat'}$

Since the whole sentence is in identificational focus, the alternatives are whole sentences, namely ones that could be used in the dialog in (48): *Mary also bought some shoes, Mary also bought a parasol*, etc.. The implicature will be that all those alternatives are false:

- (50) Mary didn't also buy anything other than a hat

Since this does not contradict the existential presupposition of *also*, we correctly predict (48) to be felicitous.

4.2 Computability with proportional quantifiers

In this section we return to the proportional quantifier data given in (21-23) above. While these quantifiers cannot occur in the pivot of Type I identificational foci, they are fine as Georgian identificational foci:

- (51) #It was **every hat** that Mary picked out for herself.
 (52) Merim **qveta p'alto** iqida.
 mary every coat bought
 'Mary bought every coat^.'

As in the previous section, first we will explain why proportional quantifiers are infelicitous in the pivot of Type I identificational foci, and then show why they are fine with the Type II identificational foci.

The infelicity in the Type I identificational focus case is due to a type mismatch (Heycock and Kroch 1999). Since the focus is narrow, just on the DP, the interpretation should be a statement of equivalence at the level of individuals. Proportional quantifiers, however, do not denote individuals (or even sets of individuals); they denote sets of sets of individuals. So, they do not fit in the required equivalence assertion about individuals, and there is a type mismatch.

Now, why are these quantifiers felicitous in the Georgian identificational foci? Because the focus is wide, the equivalence assertion is at the level of sentences, not individuals. For such an equivalence assertion, it does not matter whether a certain DP (the one in the focus position) denotes an individual or a set of sets of individuals. No type mismatch will occur, and the utterances are correctly predicted to be felicitous.

4.3 Lack of existential presupposition

The last property of identificational foci that we will discuss is the presence or absence of an existential presupposition. Using the phrase ‘nothing’ contradicts the existential presupposition of the it-cleft in (57) (see Chomsky 1972, Higgins 1974, Halvorsen 1978), but since there is no such presupposition in (54), there is no contradiction and the utterance is felicitous:

(53) #It was **nothing** that Mary bought.

(54) Merim **araperi** ar iqida.
mary nothing NEG bought
‘Mary bought no^thing.’

The question becomes why Type I identificational foci carry an existential presupposition while Type II identificational foci do not. The answer, as before, depends on the size of identificational focus. Since it-clefts have narrow identificational focus, they make assertions of equivalence like the following:

(55) \wp [Mary bought y] = ‘a hat’

The two parts of the equivalence are not introduced at the same time, however, but sequentially (Higgins 1979). The one on the left side is presupposed, so there is an existential presupposition that Mary bought something.

With this in mind, we turn to the Georgian case, interpreted as in (60):

(56) \wp [p is true] = ‘Mary bought a hat’

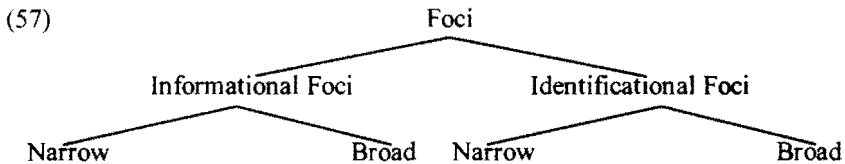
Again, the left half of the equation, (the background, which can be thought of as part of the Assert operator) is what is presupposed. So, all that is presupposed is that some sentence is true. Perhaps there is some kind of very weak existential presupposition that some sentence is true, but that would never be contradicted and therefore seems rather irrelevant. In any case, there is no existential presupposition about individuals.

5 Conclusion

In addition to the previously recognized distinction between informational and identificational foci, we also need to recognize the subdivision between Type I and Type II identificational foci. These subtypes differ in whether or not they allow *also*-phrases and proportional quantifiers in the pivot, and whether they carry an existential presupposition. In determining what foci are identificational, we must take care so that Type II foci are not misdiagnosed. If we simply applied all the tests in section 2.2 (as Kiss 1998 does), we would misidentify Type II identificational foci as informational.

Our analysis explains why the two types of identificational foci behave differently, and how they are related to each other. Both Type I and Type II foci have identificational focus, but differ in the size of the focus. Since all three properties are explained by the same factor, we predict that no language should have an identificational focus with any other combination of properties.

Our analysis yields a symmetrical typology of foci, in which both informational and identificational foci can be categorized as broad or narrow:



Notes

¹ We use the term 'pivot' as a general term referring not just to the position where the stressed element occurs in it-clefts, but also to the focus position in languages like Hungarian and Georgian.

² These tests have been used by Kiss 1998 to distinguish identificational and informational foci, though the results given here suggest that is misleading.

³ Furthermore, 'also'-phrases cannot occur in-situ: #*Merim iqida KUDI-TS* (mary bought hat-also).

⁴ Kiss 1998 states this test in terms of universal quantifiers, but the pattern seems to be more general.

⁵ This is not intended as a theoretical claim that identificational foci are distinguished by a separate focus feature. Whatever means we use to mark the size of Type I focus, the same means can also be used with Type II foci, even though the focus is wider. See Bush (forthcoming) for a proposal on how identificational foci are marked.

⁶ For the sake of simplicity, I will follow Kiss 1998 in assuming that *also* modifies *a coat* directly, forming a constituent. See Bush (forthcoming) for a more detailed discussion, however.

⁷ This explanation is slightly different from that given by Kiss 1998, but we can not compare them due to limitations of space.

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Partial Honorific Agreement in Korean Verbal Coordination

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1 Introduction

Korean honorific agreement is a pragmatic constraint that is determined by the social status of the individuals, specifically between the referent of the subject and the speaker. This honorific relation is manifested by morphemes such as subject honorific marker *-nim* and verbal honorific affix *-si*, as given in (1).

- (1) Kim sacang-nim-i ilccik chulkun.ha-#(si)-n-ta.
Kim president-HON-NOM early come.to.office.do-HON-PRES-DECL
“President Kim comes to the office early.”

As shown in (1), when the subject honorific marker *-nim* indicates the pragmatic fact that the speaker honors the referent of the subject, that same fact should be marked by verbal affix *-si*.

However, the verbal honorific affix *-si* is optional in the non-final conjunct of verbal coordinate constructions as shown in (2).

- (2) Kim sacang-nim-un ilccik chulkun.ha-(si)-ko
Kim president-HON-TOP early come.to.office.do-HON-CONJ
ilccik toykun.ha-si-ess-ta.
early leave.office.do-HON-PAST-DECL
“President Kim came to the office early and left early.”

One question raised in this partial honorification is how the non-final conjunct satisfies the pragmatic agreement constraint without an honorific affix *-si*.

Using a Head-Driven Phrase Structure Grammar (HPSG) framework, this paper proposes an analysis in which pragmatics, morphology and syntax interact

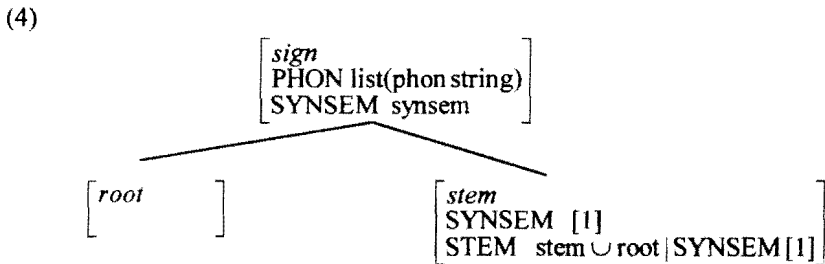
in the partial distribution of the honorific morpheme *-si* in verbal coordinate constructions while remaining faithful to the Lexical Integrity Principle: “the syntax neither manipulates nor has access to the internal form of words” (Anderson 1992:84).

2 Honorification in Type-hierarchical Approach

With respect to the Korean verbal inflection system, Kim (1994) suggests that *root* and *stem* are subsorts of *lexical sign* in addition to *word* and *phrase* as illustrated in (3) (c.f., Pollard and Sag 1994).



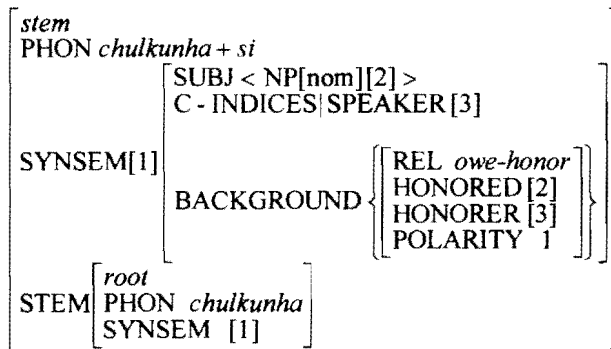
Objects of *root* are basic lexical elements that do not include an inflectional morpheme. Objects of *stem* have word internal structure consisting of a root and inflectional affixes. These definitions of *root* and *stem* can be captured by the sort declarations given in (4) below.



The feature structure of *sign* in (4) declares that objects of *sign* must have an attribute PHON whose value is the sort *list* and another attribute SYNSEM whose value is the sort *synsem* specifying syntactic and semantic information. The sorts *root* and *stem* are subsorts of *sign*, and they must inherit the feature declaration of *sign*. Objects of the sort *root* are basic morphological units that cannot be analyzed any further. The feature structure of the sort *root* in (4) is declared to inherit every feature declaration from *sign*. Objects of the sort *stem* employ an additional attribute STEM whose value is of the sort *stem* or *root*. If the value of STEM is *stem*, then the feature structure specifies another internal

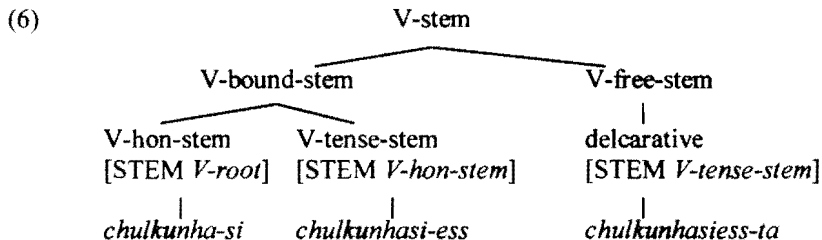
morphological structure. If the value of STEM is *root*, then the feature structure does not specify any more internal morphological structure. One important constraint declared in (4) is that the SYNSEM value of stem is token-identical to that of *root* or internal *stem*. This means that inflectional affixation does not change any semantic or syntactic information of the host *stem* or *root* but encodes the syntactic and semantic information of the resulting form that is not specified in the host *stem* or *root*. For example, a verb *chulkunha-si-ess-ta* ‘come-to-office-hon-past-decl’ consists of a *root*, *chulkunha*, an honorific affix *-si*, and declarative morpheme *-ta*. Then following the feature declaration of the *stem*, the verb stem *chulkunha-si* can be analyzed as in (5).

(5) *chulkunha-si*



As shown in the feature structure of (5), *chulkunha-si* as an object of *stem* shows internal morphological structure by using the feature STEM. STEM, in turn, takes *root* as its value. Then the internal morphological structure is not analyzed any further because *root* is not equipped with any feature such as STEM.

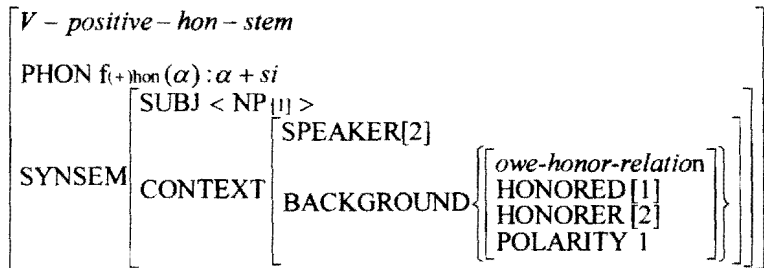
Based on Kim (1994), Korean *V(erb)-stem* can be defined as in (6).



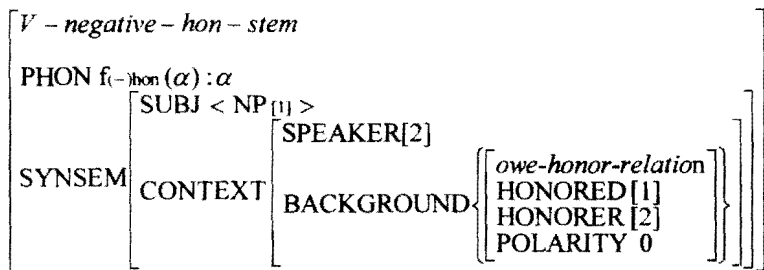
In (6), *V-stem* is partitioned into *V-bound-stem* and *V-free-stem*. An object of *V-bound-stem* cannot be a word without further affixation whereas an object of *V-free-stem* can. *V-bound-stem* is further partitioned into *V-hon-stem* and *V-tense-stem*. A constraint on *V-hon-stem* requires that its STEM value be a *V-root* as also illustrated in the feature structure of (5).

As observed by Kim (1994), every tense affixed stem is marked with honorification whether it has a positive or negative honorific value. Thus a constraint on *V-tense-stem* specifies *V-hon-stem* as its STEM value. In addition, following Kim's sort hierarchy, *V-hon-stem* can be further partitioned into *positive-hon-stem* and *negative-hon-stem* as shown in (7) below.

(7) a.



b.



As in (7a), when the PHON value including *-si* encodes *V-positive-hon-stem*, the verb has a BACKGROUND feature in which the owe-honor relation specifies POLARITY 1, indicating that the relation is realized between the honored and the honorer. On the other hand, when a verb does not have an honorific morpheme, its STEM attribute specifies *negative-hon-stem*. Then the owe-honor relation in BACKGROUND of the CONTEXT feature will specify POLARITY

0, indicating that the *owe-honor-relation* is not realized between the honored and the honorer.

As discussed in section 1, the subject should share the information of the background *owe-honor-relation* with the verb. Thus, the feature structure of the subject also specifies an *owe-honor-relation* whose polarity is the same as that of the head verb.

3 Partial Honorification in A Type-hierarchical Approach

3.1 Type-hierarchical approach and partial honorification

The *-ko*-affixed conjunct in verbal coordination can omit tense as well as the honorific affix. The omission of inflectional morphemes can be explained by the feature declaration of *-ko*-affixed conjunction words as shown in (8).

(8) *-ko* affixed conjunct word

$$\left[\begin{array}{l} \text{PHON } f - ko(\alpha) : \alpha + ko \\ \text{STEM } \left[\begin{array}{l} V - bound - stem \cup V - root \\ \text{PHON } \alpha \end{array} \right] \end{array} \right]$$

According to the feature declaration in (8), conjunction affix *-ko* must combine with an object of *V-bound-stem* or *V-root*. However, it cannot combine with an object of *V-free-stem*. Thus **chulkunkuhasiess-ta-ko* is impossible because *chuljunhasiess-ta* is an object of *V-free-stem*. The STEM value that is either *V-bound-stem* or *V-root* predicts the omission of inflectional morphemes as illustrated in (9) below.

- (9) a. V-root + *ko*: [chulkunha] + *ko*, → partial honorific agreement
 b. V-hon-stem + *ko*: [chulkunha-si] + *ko*, → tense omission
 c. V-tense-stem + *ko*: [chulkunhasi-ess] + *ko*

When the STEM value is *V-root*, the *-ko*-affixed conjunction word omits an honorific affix and a tense affix, as illustrated in (9a). When the STEM value is *V-hon-stem*, the conjunct omits a tense affix as in (9b). When the STEM value is *V-tense-stem*, the conjunction word is morphologically full-fledged as in (9c). Thus the constraint in (8) allows the possible morphological combinations of *-ko*-affixed conjuncts as shown in (9).

- (12) a. [chulkunha _{V-root}] - ko
 b. [chulkunha _{V-negative-hon-stem}] - ko

That is, the verb in the first conjunct can be either unmarked with honorification or marked with negative honorification. Suppose conjunction morpheme *-ko* combines with *V-root* as in (12a). According to honorific agreement constraint, a verb should specify the same owe-honor relation as that of its subject. In (11), however, the first conjunct does not specify any honorific information because it does not subsume *V-hon-stem*. Thus the first conjunct does not subcategorize for a subject that has any owe-honor relation. The verb in the final conjunct includes the honorific affix *-si*. Consequently, the polarity of owe-honor relation specified by the verb becomes 1, and the verb requires its subject to have the same owe-honor information. In turn, in (11), the two conjuncts should have the same valence list. Although the first conjunct does not specify any honorific agreement with the subject, the coordinate construction in (11) does not violate any honorific agreement requirement and becomes felicitous. On the other hand, if the conjunct morpheme *-ko* combines with *V-negative-hon-stem* as in (12b), the sentence should be infelicitous because the subject subcategorized by the first conjunct and the subject subcategorized by the final conjunct specify different owe-honor relations. However, when speakers encounter coordinate constructions as in (11), they do not consider the ungrammatical choice in (12b), because the grammatical construction in (12a) exists, which has the same surface form as (12b).

One important assumption for the construction in (11) was that the non-final conjunct underspecifies the honorific relation in its BACKGROUND feature. This underspecification is due to a morphological combinatorial property of *ko*-affixed conjunct word. If a verb includes a tense morpheme, it always specifies some honorific relation in its BACKGROUND as declared in the sort hierarchy in (6). This fact is shown in the sentences in (13).

- (13) a. # Kim sacang-nim-un ilccik chulkun.ha-ko
 kim president-HON-TOP early come.to.office.do-CONJ
 ilccik toykun.ha-yess-ta
 early leave.office.do-PAST-DECL
 "President Kim came to the office early and left early."
- b. # Kim sacang-nim-un ilccik chulkun.ha-yess-ko
 kim president-HON-TOP early come.to.office.do-PAST-CONJ
 ilccik toykun.ha-si-ess-ta
 early leave.office.do-HON-PAST-decl

In (13a), the verb in the final conjunct does not include any honorific affix though it has a tense morpheme. Since a tense morpheme always combines with a *V-hon-stem*, the verb in the final conjunct in (13a) includes a *V-negative-hon-stem*. However, the subject includes an honorific marker so that it specifies an *owe-honor-relation* whose polarity is 1. This mismatch of CONTEXT information between the subject and the verb explains why the sentence in (13a) is infelicitous. Likewise, the first conjunct in (13b) includes a tense morpheme. Thus it also includes a *V-neg-hon-stem*. According to the Head-Conjunct Schema in (10), each conjunct should have an identical VALENCE feature. However, in (13b) each conjunct specifies a different *owe-honor-relation*. Thus the sentence in (13b) is also infelicitous.

In sum, this proposed analysis explains partial honorific agreement based on the interaction of morphology, syntax and pragmatics without violating the Lexical Integrity Principle.

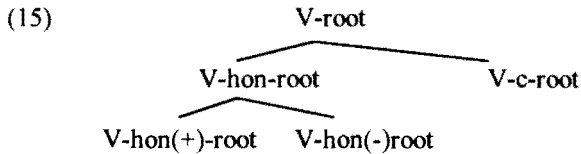
3.2 Idiosyncratic honorific word

In the previous section, it was suggested that honorific encoding occurs in *V-hon-stem* that has an internal morphological structure. However, the existence of idiosyncratic honorific words as in (14) forces the generalization to be revised.

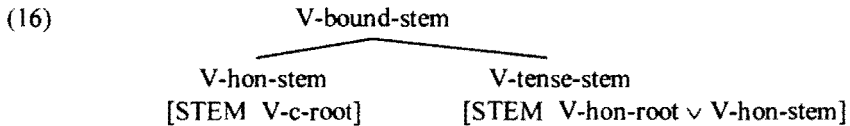
- (14) a. Sensayng-nim-un ilccik ilena-ko ilccik cwumu.si-n-ta
 Teacher-HON-TOP early get.up-CONJ early sleep.HON-PRES-DECL
 “(My) teacher gets up early and goes to bed early.”
- b. *Sensayng-nim-un ilccik cwumu-ko ilccik ilena-si-n-ta
 Teacher-HON-TOP early get.up-CONJ early sleep-HON-PRES-DECL

The ungrammaticality of (14b) shows that *cwumusi* cannot be separated into *-si* and *cwumu* in contrast with other normal *-si* affixed honorific words. In particular, the fact that *cwumu* without *-si* is not only infelicitous but ungrammatical provides a very important hint for the analysis of *cwumusi*. That is, *cwumusi* is an object of *V-root* and the minimal unit with which a conjunctive particle combines. To account for this observation, it is necessary to revise the sort hierarchy suggested in (6).

The first revision is that *root* is divided into *V-hon-root* and *V-c(ommon)-root*. *V-hon-root* is further divided into *V-hon(+)-root* and *V-hon(-)-root*, such that it encodes honorific information into the resulting word. This revision is illustrated in the sort hierarchy in (15).



The objects of *V-hon(+)-root* such as *cwumusi* and *capswusi* (eat.HON) contain a CONTEXT feature in which the *owe-honor-relation* becomes polarity 1. On the other hand, the objects of *V-hon(-)-root* such as *ca* (sleep.negativeHON) and *mek-* (eat.negativeHON) contain a CONTEXT feature in which the *owe-honor-relation* becomes polarity 0. In addition, the feature declaration of *V-hon-stem* should be revised. Otherwise, we cannot block the occurrence of ungrammatical morphological combination such as **cwumusi-si* and **mek-usi* (eat.negativeHON-HON). According to the No Vacuous Affixation Principle by Marantz (1984), any affixation that results in the overlapping of information is prohibited. Under this approach, the same effect can be drawn from the feature declarations of *V-bound-stem* as shown in (16).



The STEM value of *V-hon-stem* is *V-c-root*. Because *cwumusi-* and *mek-* belong to *V-hon-root*, they cannot be the STEM values of the objects of *V-hon-stem*. As a result, in this morphological system, ungrammatical combinations such as *cwumusi-si-* and *mek-usi-* cannot be generated.

To sum up, the partial honorification in (14a) is explained by the same mechanism as that in (11). However, the honorific information of the verb *cwumusi-* is encoded inside *root*. Since the minimal unit with which the conjunctive particle *-ko* combines is *V-root*, *si* in *cwumusi* cannot be omitted in the non-final conjunct in verbal coordination, in contrast with honorific affix in *V-hon-stem*.

4 Conclusion

In this paper I have shown that the partial distribution of an honorific morpheme can be best analyzed by type-hierarchical morphology. Based on the type

hierarchy, the optional occurrence of the honorific morpheme *-si* is due to the morphological combination of *-ko* affixed conjunct words. In addition, the constructional constraint of Head-Conjunct schema explains honorific agreement in the case of the partial distribution of the honorific morpheme *-si*. Finally, idiosyncratic behaviors of the honorific word *cwumusita* (sleep) and the non-honorific word *mekta* (eat) are explained by a dual honorific marking system: feature specification of *root* and honorific affixation in *V-hon-stem*. Although this proposed approach is based on the interaction of morphology, syntax and pragmatics, it maintains the Lexical Integrity Principle.

Notes

* I thank Stephan Wechsler and Jongbok Kim for comments on earlier versions of this paper. A long version of this paper is downloadable from //ccwf.cc.utexas.edu/~incheol/.

¹ Choi (1999) argues headed structure analysis for *-ko*-affixed verbal coordination based on the evidence: first, the information of category only comes from the final conjunct; second, the partial distribution of the inflectional affixes can be only observed in the *-ko*-affixed coordination. However, in this paper, I will not pursue this topic further.

² The Head-Conjunct schema in (22) does not require the sharing of CAT value between conjuncts in contrast with Coordination Principle in Pollard and Sag (1994). However, the schema in (22) capture that each conjunct share the NONLOCAL value and VALENCE value.

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On the Subject of Resultative Phrases:¹ Does Syntax Reflect Event Structure?

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1. Argument Realization and Lexical Semantics

The research program of *grammatical semantics* attempts to identify grammatically relevant meaning (Mohan and Wee 1999). Researchers in the grammatical semantics tradition (e.g. Levin and Rappaport-Hovav (to appear) and Wunderlich (1997b)) argue that argument realization is a reflection of event structure. For example, Levin and Rappaport-Hovav (to appear: 6) claim that the reflexive *myself* signals a causative event structure for (2) that is not present in the event structure for (1).

(1) I wriggled free. (*simple eventuality*)

(2) I wriggled **myself** free. (*complex eventuality*)

In this paper I argue that argument realization patterns, like those in (1) and (2), should not be our guide when seeking a semantics of resultatives. My argument comes in two parts. First, patterns of argument realization do not directly reflect the complexity of event structure. I will establish this hypothesis via a small set of languages (English, German, Korean and Tamil). Second, language particular linking constraints govern the relationship between argument structure and the semantics of resultatives. We should think of resultative formation in a particular language as a member of a class of language-particular *semantically potent argument shifts*: a certain pattern of change in argument structure accompanied by a systematic change in the meaning of the verb which undergoes the argument structure shift (Dowty 1999). I show how cross-linguistic patterns of argument realization in resultatives can be captured via language-particular repertoires of semantically potent argument shifts and linking constraints.

2. Cross-Linguistic Patterns in Resultatives

In this section I lay out the cross-linguistic variation in the realization of the subject of resultative phrases. I show that this variation can be described via simple lexical rules.

Resultatives are a certain type of causative construction in which the causative relation cannot be traced to any overt lexical head or morpheme (Bittner 1999: 3). Two lexical heads, the causative predicate and the resultative predicate, denoting the cause and the effect, are the only overt expression of the causative relation in resultative clauses (see Bittner (1999), Levin and Rappaport-Hovav (to appear)). (3) is an English resultative (*barked* is the causative predicate, *awake* is the resultative predicate).

- (3) The dog barked the neighbors awake.

Cross-linguistically, resultative phrases are predicative phrases syntactically selected by the causative predicate (English: Roberts (1988), Korean: Jang (1997)).

English and German pattern differently than Korean and Tamil in how the subject of resultative phrases is realized when it is not a thematic argument of the causative predicate. The descriptive generalizations are given in (4) and (5).

- (4) In English and German, the subject of resultative phrases is **always** realized as a syntactic argument of the causative predicate (cf. Levin and Rappaport-Hovav (1999:42ff.)).
- (5) In Tamil and Korean, the subject of resultative phrases forms an independent clause with the resultative predicate if it is not a thematic argument of the causative predicate.

In what follows I illustrate the syntactic argument structure of causative predicates which have undergone resultative formation via simple argument structure lists. Below each argument structure list I specify whether a particular argument is a θ (thematic, semantically-selected) argument of the causative predicate and/or the result(ative) predicate. (6) and (7) illustrate the format of each example.

- (6) The dog barked the neighbors awake.

- (7) barked: <NP NP AP>
 causative θ θ
 result θ

2.1. English, German

English allows verbal passives based on resultatives (Levin and Rappaport-Hovav 1995: 44) as (10) illustrates.

(8) Amy chewed her gums sore. (Jackendoff 1990: (39a))

(9) chewed: <NP NP AP>
 causative θ θ
 result θ

(10) Her gums were chewed sore.

(11) chewed: <NP AP>
 causative θ
 result θ

(12) is an example of a German fake object resultative. As in English, the thematic subject of a resultative phrase can function as a syntactic argument of the causative predicate in German resultatives. For example, the subject of resultative predicates becomes a promoted surface subject in the passive and middle construction (see (14)) and receives structural case.

(12) **German:** *fake object resultative*

Karl ißt seinen Teller leer.
 "Karl eats his plate empty."

(13) ißt: <NP NP AP>
 causative θ θ
 result θ

(14) **German:** *middle*

Der Rasen läuft sich leicht platt. (Wunderlich 1997a: 47b)
 "The lawn runs flat easily."

(15) läuft: <NP AP>
 causative θ
 result θ

2.2. Tamil, Korean

Tamil allows resultatives productively with some transitive verbs. In (16), the resultative phrase predicates of the direct object of the causative predicate.

- (16) **Tamil:** *shared argument, transitive causative predicate*
 Avan kariya:ka sa:ppa:dai samaitta:n
 He NOM black=COMP food=ACC cook=PST.MSC.3rd.SG
 "He cooked the food (causing it to become) black."

- (17) samaitta:n : <NP NP CP>
 causative θ θ θ
 result θ

So called unergative verbs allow resultative phrases in Tamil. Unlike English and German, resultative phrases predicate over a nominative subject embedded in CP as in (18):

- (18) **Tamil:** *embedded subject, unergative causative predicate*
 Na:n yen seruppuhal vi:na:ka a:dine:n
 I NOM my=GEN slipper/shoe=PL.NOM useless=COMP dance=PST.1st.SG
 "I danced causing my shoes to become useless."

- (19) a:dine:n : <NP CP>
 causative θ θ
 result (nominative subject internal to CP)

Unlike English and German, Tamil allows a resultative phrase to act as a predicate for an embedded nominative subject rather than the direct object of the transitive causative predicate as in (20).

- (20) **Tamil:** *embedded subject, transitive causative predicate*
 Sure:sh utaduhai ka:ya kadavulai pukarnteen
 Suresh NOM lip=PL.NOM dry=COMP god=ACC praise=PST.MSC.3rd.SG
 "Suresh praised God causing his lips to become dry."

- (21) pukarnteen : <NP NP CP>
 causative θ θ θ
 result (nominative subject internal to CP)

Korean patterns in a similar way to Tamil with regard to the realization of the embedded subject of resultative phrases. In (22), the resultative phrase predicates over the thematic object of the causative predicate.

- (22) **Korean** (Kim 1998: (4)): *shared argument, transitive causative predicate*
 Ku-nun soy-lul pyongpyongha-key chyessta
 He=TOP metal=ACC flat=COMP pounded
 "He pounded the metal flat."

Given patterns like those in (18), (20), (26) and (28), where resultative phrases predicate over a nominative subject embedded in CP, dummy-taking predicates are predicted to be possible (e.g. “Suresh praised God causing it to rain”).

In conclusion, the table in (30) summarizes the mini-typology of possible realizations of the subject of resultative phrases. The subject of the resultative phrase is marked !NP!.

(30)

Realization of the Subject of Resultative Phrases	
English, German	Tamil, Korean
<NP !NP! XP> (e.g. (8), (12))	<NP !NP! XP> (e.g. (16), (22))
<!NP! XP> (e.g. (10), (14))	<!NP! XP> (e.g. (24))
	<NP CP> (embedded) (e.g. (18), (26))
	<NP NP CP> (embedded) (e.g. (20), (28))

2.3. Syntactic Analysis

In this subsection I show that the patterns of argument realization discussed above can be easily modeled using a notion of syntactic argument structure. Two lexical rules cover the mini-typology given in the previous section.

The cross-linguistic variation in the realization of the subject of resultative predicates can be described with a simple list of the **syntactic** arguments of a causative predicate. (31) is an illustration of a syntactic argument structure list where ARG-ST (= argument-structure) is a feature which takes as its value a list of syntactic arguments (see Manning (1996) and Manning and Sag (1998)):

(31) [ARG-ST <XP₁....., XP_n>]

In all the languages discussed, the causative predicate in a resultative undergoes a lexeme-to-lexeme rule in which a resultative phrase is added to a causative predicate's ARG-ST list. The resultative formation rule for Tamil and Korean is given in (32)². The resultative phrase can be either saturated (i.e. the resultative phrase predicates over an embedded nominative subject) or unsaturated (i.e. the resultative phrase predicates over a syntactic argument of the causative predicate).

(32) **Resultative Rule:** Tamil, Korean:

[ARG-ST <.... >] → [ARG-ST <... XP>]

(XP = CP → saturated, XP = 'Pred'P[SUBJ <NP: *refl*>] → unsaturated)

The resultative formation rule for English and German is given in (33). Note that the embedded reflexive subject of the resultative phrase **must be unsaturated**.

(33) **Resultative Rule:** German, English:

[ARG-ST <.... >] → [ARG-ST <.... XP[SUBJ <NP: *refl*>]>]

Principle A of the binding theory in Pollard and Sag (1994) requires that the unexpressed reflexive subject of the predicative XP in the output of (33) be coindexed with an element which outranks the XP on the ARG-ST list of the causative predicate. Since binders of reflexives must be referential, resultatives like (34) are ruled out:

(34) * Kim screamed it to be known that there was a riot in the park.

However, it is not clear what status the resultative rules in (32) and (33) have within the context of the grammars of English, German, Tamil and Korean generally. Why are there so-called athematic objects/athematic reflexives in English and German resultatives and not in Tamil and Korean? I address this problem in the next two sections.

3. The Semantics of Resultatives

Resultative constructions make reference to a single complex eventuality via the overt expression of two lexical heads or morphemes (see Bittner (1999), also Hale (1989: 192)). The causal relation between the two lexical heads, the cause and the effect, is not mediated by an overt causative word or morpheme. In this section I lay out what I believe to be uniform about the cross-linguistic semantics of resultatives.

I use a rough-and-ready definition of a causative event based on work of Lewis (1973), McCawley (1976) and others. Essentially: an event *e* causes another event *e'* in a world *w* just in case (a) the result event *e'* doesn't begin before the causative event *e* in world *w* and (b) if no cause *e* and all else remained the same in world *w*, no *e'* in world *w* (*no cause, no effect*).

The four semantic properties in (35) hold of resultatives cross-linguistically.

- (35) (a) The causal relation is *emergent*; i.e. the causal relation cannot be linked to any lexical head or morpheme.
 (b) The causal relation is *direct* (see Bittner (1999), Levin and Rappaport-Hovav (to appear), among others). The sentence in (36) is false if my bullet only

grazes the sheriff, but the flesh wound triggers an unfortunate heart attack and the sheriff dies (Dowty (1979)).

(36) I shot the sheriff dead.

- (c) The causal relation presupposes the simple (in)transitive sentence without the result.
- (d) The causal relation entails the inchoativeness of the result.

In Section 2 I demonstrated that the syntactic realization of the resultative subject in Tamil and Korean is distinct from the syntactic realization of the resultative subject in German and English. Despite the syntactic distinctiveness of German and English vs. Tamil and Korean, all four languages show uniformity in satisfying the semantic constraints in (35a-d). Given the cross-linguistic uniformity in resultative interpretation, we need a way of linking up the distinct, language-particular syntactic expression of resultatives without losing cross-linguistic semantic generalizations like (35a-d).

4. Linking Patterns in Resultative Clauses

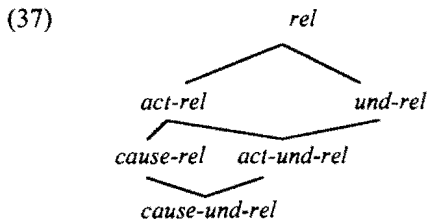
In this section I illustrate how the cross-linguistically uniform semantic properties of resultatives can be linked up to the language-particular patterns of argument realization illustrated in Section 2. As pointed out there, the key difference between resultatives in Tamil and Korean and resultatives in German and English is that the latter allow athematic objects while the former do not. The linking theory framework of Davis (1996) and Davis and Koenig (to appear) is expressive enough to capture the diverse argument realization patterns of resultatives cross-linguistically while still capturing the semantic uniformities.

4.1. Semantic relations

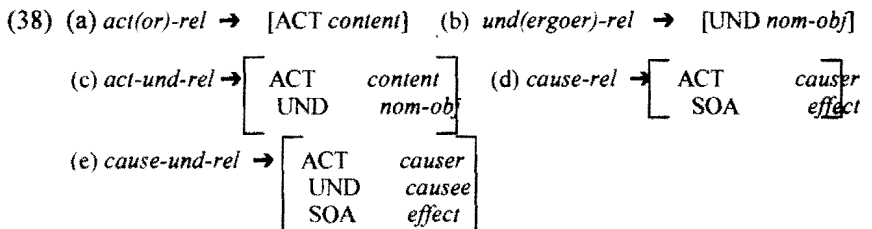
Resultatives are a particular sort of causative relation. The causative relation involved in resultatives should be positioned in the context of the grammar (of English, German, Korean, Tamil) generally. We want our linking theory to be expressive enough for us to relate the linking generalizations which hold of more general types of relations (e.g. activities) to those which hold of more specific types of relations (e.g. causatives).

The format of the hierarchy in (37) (based on Davis (1996) and Davis and Koenig (to appear)) serves to minimize redundant specification of linguistic information in the lexicon. Properties which are characteristic of a class of

linguistic objects (in this case, semantic relations) are associated with the general types (e.g. *act(or)-rel(ation)*) and passed down to the more specific types (e.g. *cause-rel(ation)*) in the hierarchy. Linguistic objects are allowed to be members of several classes at once (a.k.a *multiple inheritance*).



A *cause-rel* (causative relation) involves, minimally, an actor and an effect. Linking constraints on the overt expression of the actor in an *act-rel* hold of the actor in the *cause-rel*. The attributes associated with the relational types classified in (37) are a reification of the classes of entailments needed for the purposes of linking; see Davis and Koenig (to appear: 22). (38) states the information associated with each relational type in (37) (SOA = state of affairs).



4.2. Linking constraints

Linking involves the sorting of (types of) words constraining the relationship between the semantic relations of (types of) words and their argument structure (Davis and Koenig (to appear: 25)). (39) illustrates the conditional linking constraints on the semantic relations *act-rel* and *und-rel* which say that an actor is realized as the first argument on the ARG-ST list and an undergoer is realized as the last argument on the ARG-ST list (cf. Davis and Koenig (to appear)).

$$(39) [\text{CONT(ENT) } \textit{act-rel}] \rightarrow \left[\begin{array}{l} \text{CONT} \quad [\text{ACT } i] \\ \text{ARG-ST} \quad \langle \text{NP}_i, \dots \rangle \end{array} \right]$$

$$[\text{CONT(ENT) } \textit{und-rel}] \rightarrow \left[\begin{array}{l} \text{CONT} \quad [\text{UND } i] \\ \text{ARG-ST} \quad \langle \dots, \text{NP}_i \rangle \end{array} \right]$$

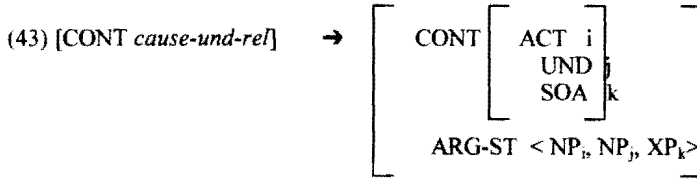
The linking constraints in (40) and (41) are for the English and German semantic relations *cause-rel* and *cause-und-rel*.

$$(40) [\text{CONT } \textit{cause-rel}] \rightarrow \left[\begin{array}{l} \text{CONT} \quad \left[\begin{array}{l} \text{ACT } i \\ \text{SOA } j \end{array} \right] \\ \text{ARG-ST} \quad \langle \text{NP}_i, \text{XP} \left[\begin{array}{l} \text{SOA } j \\ \text{SUBJ } \langle \text{NP}_i, \textit{ref} \rangle \end{array} \right] \rangle \end{array} \right]$$

$$(41) [\text{CONT } \textit{cause-und-rel}] \rightarrow \left[\begin{array}{l} \text{CONT} \quad \left[\begin{array}{l} \text{ACT } i \\ \text{UND } j \\ \text{SOA } k \end{array} \right] \\ \text{ARG-ST} \quad \langle \text{NP}_i, \text{NP}_j, \text{XP} \left[\begin{array}{l} \text{SUBJ } \langle \text{NP}_j, \textit{ref} \rangle \\ \text{SOA } k \end{array} \right] \rangle \end{array} \right]$$

The linking constraints in (40) and (41) work for the output of the resultative rule in English and German as shown in Section 2. Tamil and Korean, however, need different linking constraints: causative predicates can take clausal complements with nominative subjects; i.e. the SUBJ list of the resultative phrase can be empty. The linking constraints in (42) and (43) for Tamil and Korean underspecify the realization of the embedded subject of the resultative phrase.

$$(42) [\text{CONT } \textit{cause-rel}] \rightarrow \left[\begin{array}{l} \text{CONT} \quad \left[\begin{array}{l} \text{ACT } i \\ \text{SOA } j \end{array} \right] \\ \text{ARG-ST} \quad \langle \text{NP}_i, \text{XP}_j \rangle \end{array} \right]$$



4.3. Resultatives as semantic argument structure shift

In a given language, *resultative formation* (e.g. the resultative rules in Section 2.3) is a member of a language-particular class of *semantically potent argument shifts* (Dowty 1999: (7)) (including, for example, English *tough-movement*): a pattern of change of argument structure subcategorization in a class of verbs that is necessarily accompanied by a systematic change in the meanings of the verbs that undergo it. The notion of semantically potent argument shifts can be formalized in the linking theory of Davis (1996).

Given the linking constraints on *cause-rel* and *cause-und-rel* in Tamil, Korean, English and German, all four languages utilize the relations in (44) and (45) to express resultatives.

(44) *act-rel* → *cause-rel*

(‘If the lexical semantic relation of a word A is a subtype of *act-rel* then the lexical semantic relation of A is also a subtype of *cause-rel*’)

(45) *act-und-rel* → *cause-und-rel*

The output of (44) is a two-place causal relation with an unergative causative predicate and a controlled resultative subject in English and German. In Tamil and Korean, the subject of the resultative phrase in the output of (44) can be embedded. The output of (45) is a three-place causal relation with a transitive causative predicate and a controlled resultative subject in English and German (controlled by the influenced (undergoer) role of the causative predicate). In Tamil and Korean, the subject of the resultative phrase in the output of (45) can be embedded. The Tamil example in (46) illustrates the case where the object of the main predicator does not control the embedded (nominative) subject of the resultative phrase.

(46) Sure:sh utaduhai ka:ya kadavulai pukarnteen
 he NOM lip=PL.NOM dry=COMP god=ACC praise=PST.MSC.3rd.SG
 ‘‘Suresh praised God (causing) his lips to become dry’’

The relations in (47) and (48) are productive in English and German.

(47) *act-rel* → *cause-und-rel*

(48) *cause-rel* → *cause-und-rel*

The relation in (47) explains the so-called fake reflexive present in (49). In (49), the lexical semantic relation of *drank* is a subtype of *cause-und-vb*.

(49) He drank himself silly.

5. Building “Resultatives” From Scratch

A question that has been left unaddressed in both the lexical semantics and syntactic literature on resultatives is *What is our justification for labeling a particular construction as a resultative?*

A resultative semantics is usually characterized as a property of certain syntactic configurations associated with a particular semantics. Both the syntactic configurations and the semantic interpretation show up independently of one another. For example, resultative semantics in English can appear independently of NP V NP XP resultative syntax (e.g. *I wriggled free of my captors*). Also, resultative syntax can appear independently of resultative semantics (e.g. *I cooked the food drunk*).

Cross-linguistically, resultatives do not have a specialized (morpho)syntax (Sells 1998), unlike causatives. Rather, resultatives often are parasitic on the (morpho)syntax of other constructions (e.g. causatives). While resultative syntax is parasitic on the syntax of causatives in particular grammars, certain semantic properties of resultatives are shared cross-linguistically (e.g. direct causation). No *solely* syntactic explanation of resultatives will ever exist. The same semantic constraints on resultatives show up cross-linguistically with many different syntactic characteristics. Languages have parochial *semantically potent argument shifts* (Dowty 1999). Resultatives are better understood as descriptive categorizations of certain language-particular instantiations of these semantically potent argument shifts.

Notes

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comments on various versions of this work. Thanks also to Hanjung Lee, Yukiko Morimoto, Siva Narayanan, Eunjin Oh, Hema Raju, Shiao-Wei Tham and Ida Toivonen for data, judgments and suggestions.

² The rule in (32) is identical to the lexical rule Kim (1999) postulates for Korean except for the fact that my rule is lexeme-to-lexeme. The lexeme-to-lexeme nature of resultative formation predicts that the argument structure configurations of causative predicates in resultatives is independent of the overt realization of the subject of resultative phrases. This has empirical consequences for ergative languages.

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On Particle Verbs in English: More Evidence from Information Structure

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1 Introduction

It is a well known fact that transitive particle verbs (PV) in English occur in two different constructions, namely the *continuous* one, where the particle is adjacent to the verb and precedes the nominal complement as in (1a), and the *discontinuous* one where the particle follows the nominal complement (1b).

- (1) a) I carry in the tray. / I look up the word. / I eat up my dinner.
b) I carry the tray in. / I look the word up. / I eat my dinner up.

This paper deals with the influence that the information structure (IS) has on the choice of the construction.

The remainder of the paper is organized as follows: In section 2 I want to provide a survey of the main assumptions that can be found in the literature on particle verbs with respect to IS. I am also going to briefly introduce the IS model that my analysis is based on (section 3).

In section 4 I map the evidence from IS onto the syntactic structure of particle verbs. I claim that the overt syntactic movement of the nominal complement is triggered by a focus feature [F], i.e. by the mismatch between a DP that is negatively specified for the focus feature and its position within the focus domain.

In section 5 I want to show that the focus feature corresponds to a prominence feature in phonology. This claim is supported by data from a pilot study on intonation.

I make some final remarks in section 6.

2 Particle verbs and information structure

The idea that the particle verb construction in English is influenced by the context, that is by information structure, is not new. In the literature (cf. Erades 1961, Bolinger 1971, Chen 1986, Olsen 1996, 1997 among others) three main assumptions about the influence of the information structure on the positions of the particle and the complement in English particle verb constructions can be found. Firstly, the final object position is the neutral one, secondly, objects carrying new information focus are realised in the sentence final position, and thirdly, objects that belong to the background of the sentence, i.e. that do not introduce new information, occur between the verb and the particle. Following Jackendoff (1972) I roughly define *focus* as new information that is not shared between the speaker and the hearer and *background* (= *presupposition*) as information that is shared by speaker and hearer, i.e. that is familiar to both of them.

The first assumption about the neutral object position is, I argue, supported by the syntactic and morphological behaviour of PV, e.g. in nominalization processes, *wh*-extraction, types of complements, etc (cf. Nicol 1999 for details and examples).

I have shown that the continuous construction is the neutral one in an experiment in speech production (cf. Dehé 1999).

There are many examples supporting assumptions 2 and 3. For space reasons, I can only mention a few.

2.1 Nominal objects which introduce new information into the context occur in the sentence final position

These can be simple DPs, of course, or, most obviously, modified DPs, as modification of the DP leads to an increase of its news value and to focus placement on the DP, as in (2) and (3). In (2) the DP *the villa* follows the particle because of its modification by the sentence introduced by *that*. In (3), the DP *the means* is modified by the *by which* phrase and therefore occurs in the sentence final position.

- (2) After a few years he could not endure to be long out of England, and gave up the villa that he had shared at Trouville with Lord Henry, as well as the little white walled-in house at Algiers, where they had more than once spent the winter. (Oscar Wilde, *The Picture of Dorian Gray*)
- (3) Even if euro-efficiency brings a new era of growth and job creation ... there will be a time lag of several years that could prove to be more than

Europeans are willing to tolerate. But they will turn in vain to their politicians for relief, because the politicians are *giving up* ^{DP}[*the means by which they traditionally reduce unemployment and absorb economic shocks*].
(TIME Magazine May 11, 1998:26)

Also, focused pronouns can follow the verb-particle complex, as in (4).

- (4) The lights won't pick up THIS. (Olsen 1996:279 (35b))

2.2 Nominal objects that do not introduce new information but refer to somehow familiar entities occur between the verb and the particle

Typically, DP-objects which are pronouns are background constituents. In general (i.e. in cases where they are not focused as in (4) above) pronouns refer to a well-known entity, to a noun that has been mentioned before in the context. Therefore pronouns are placed between the verb and the particle. This is illustrated by the example in (5).

- (5) „Pollyanna, you may *bring out your clothes* now, and I will look *them* over.“
(E.H. Porter, *Pollyanna*)

The first complement *your clothes* introduces new information, which is why it follows the particle. The pronominal complement *them* refers to this familiar entity, and therefore precedes the particle.

Semi-pronominal nouns as *matter* and *thing* behave similarly to pronouns in that they refer to an idea or an event that has already been mentioned in the context or is otherwise familiar to the hearer. But, similarly to pronouns, they can also be focused and then follow the particle:

- (6) „Well, if you ain't the beat'em for asking' questions!“ sighed the boy impatiently. – „I have to be“, retorted Pollyanna calmly, „else I couldn't find out a thing about you.“
(E.H. Porter, *Pollyanna*)

Bolinger (1971) and Erades (1961) argue that objects that are implied by the verb do not introduce any new information independent of the verbal meaning, and, consequently, occur between the verb and the particle. Examples are given in (7) and (8) below.

- (7) She cried her eyes out. (Erades 1961:58)
(8) a) Where's Joe? He's sailing his boat in. as opposed to
b) Where's Joe? He's hauling in his boat. (Bolinger 1971:56)

Related to the idea of the implication of the object by the verb is the familiarity of the object. Bolinger (1971:57) argues that in the examples in (9) and (10) the content of the object is familiar from the context which is why the object is

placed in the mid-position. The *nighty* in (9), he argues, is familiar from the *ten o'clock* context, *the tools* in (10) from the *job*-context.

(9) It's almost ten o'clock. *Put your nighty on*, now, and run up to bed.

(10) I shouldn't think it would take you half an hour to do this small job. --
Huh. It takes that long to *put the tools away*.

The relevant literature can be briefly summarised as follows: the information structure of the context influences the choice of the word order of the particle verb construction in English in that the continuous order is the neutral one and is chosen if the object is focused, whereas the discontinuous construction can be found in cases where the DP-object is a background constituent.

3 The Focus Model

Before I come to the syntactic structure of PV in English I want to briefly introduce the focus model that my analysis is based on. It is the model as suggested by Jackendoff (1972) and Rosengren (1993, 1994, 1994). It differs from Selkirk's (1984) model in one important point, namely that it is not a *bottom-up model*, but a *top-down model*. Both Rosengren and Jackendoff divide the sentence into a focus and a background domain. A syntactic focus feature F is assigned to the highest dominating node (XP) of the relevant focus domain, then the focus domain is established by the dominance relation. Constituents that are dominated by F constitute the focus of the sentence. All constituents that are dominated by +F are focused, all constituents that are not dominated by the focus feature, i.e. which are not within the focus domain, are background constituents. A constituent that belongs to the background of the sentence but is dominated by the focus feature in its base position must leave the focus domain by a movement operation. This will become clearer in the next section where I suggest a syntactic structure for transitive particle verbs.

The division of the sentence into focus and background is exactly what interests us with regard to the PV construction.

By the assignment of the focus feature to the corresponding constituent we can distinguish between maximal focus, where the whole sentence is focused, non-minimal-focus, where part of the sentence is focused, e.g. the VP, and minimal focus, i.e. one constituent is focused, e.g. the DP-complement of the verb.

Both Jackendoff and Rosengren assume that the syntactic focus feature corresponds to an abstract accent marker in phonology, the prominence feature +P. This is important with respect to the placement of the accent. The constituent carrying the +P feature in the focus domain is called the *focus*

exponent. In the case of wide focus +P is normally placed on the most deeply embedded element within the focus domain. I will come back to the placement of the accent in section 5.

In this paper I am only dealing with neutral focus, not with special kinds of focus like contrastive focus or VERUM focus.¹

Having said this, I want to suggest a syntactic structure for transitive PV in English that takes into account the evidence of IS on the choice of the construction as outlined in section 2.

I consider the following subjects: a) the neutral order; b) the case of maximal focus; c) the case of intermediate focus; d) the case where the DP-complement is focused; e) the case where the DP-complement is a background constituent, which is the most interesting case as we will see shortly.

4 The Syntactic Structure

4.1 The syntactic background

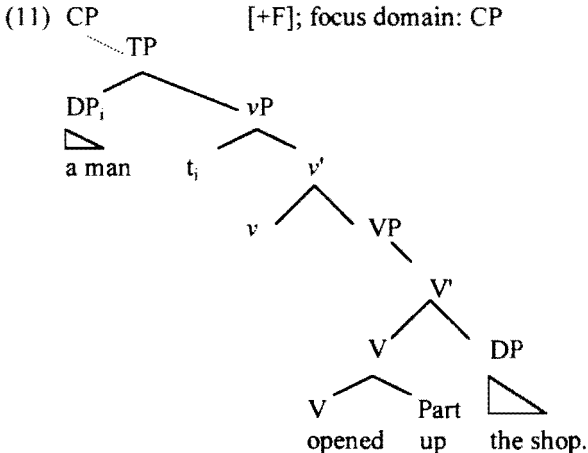
My suggestion for a syntactic structure is based on Chomsky's (1995:331) structure for transitive verbs and Olsen's (1997) suggestion for particle verbs. Both assume a VP-shell-analysis. According to Olsen (1997), the PV is inserted as one syntactic head under V⁰ for various syntactic reasons (cf. Olsen 1997:58ff and also Johnson 1991). The complex verb takes an internal argument: the object DP. In the continuous construction, movement of the object is not necessary.² To derive the discontinuous construction, Olsen assumes overt VP-internal movement of the complement into an adjunction position in the lower VP. The verb moves to the light verb position.

4.2 The neutral structure and maximal focus

As outlined above, the neutral PV construction is the continuous one and I assume the structure shown in (11) below. Following Olsen (1997), Johnson 1991, Koizumi (1993) and others I insert the particle verb as a complex head taking the DP as a complement.

I combine the neutral structure and the maximal focus structure in one tree as they only differ in the presence of the focus feature. The given sentence *A man opened up the shop* could be the answer to the question *What happened?*. In the case of maximal focus, the focus feature is assigned to the CP as the highest dominating node of the relevant focus domain. The whole sentence is focused.

Focus does not force a movement operation since all constituents are in the focus domain.



4.3 Non-minimal focus

Non-minimal focus in our context is focus on the whole VP, including the object DP. I have chosen the same example as in (11) above, this time as a possible answer to the question *What did the man do?* The focus feature is assigned to VP₂ which is the constituent that includes the focused constituents, namely the particle verb and the DP-complement. Again, no movement of the DP is necessary, as it is focused and is in the focus domain in its base position. The resulting structure is given in (12b).

- (12) a) What did he do?
 b) He_m VP₁ [t_m VP₂ +F[opened up the shop]].

4.4 Focused DP-complement

In the question-answer-pair in (13) the DP-complement is minimally focused and is assigned the focus feature. It constitutes the focus domain. The focus domain is limited to the DP by assignment of the focus feature. As in (11) and (12) above, movement of the DP is not necessary.

- (13) a) What did Peter hand in?
 b) He handed in +F DP[his paper].

4.5 The DP-complement as a background constituent

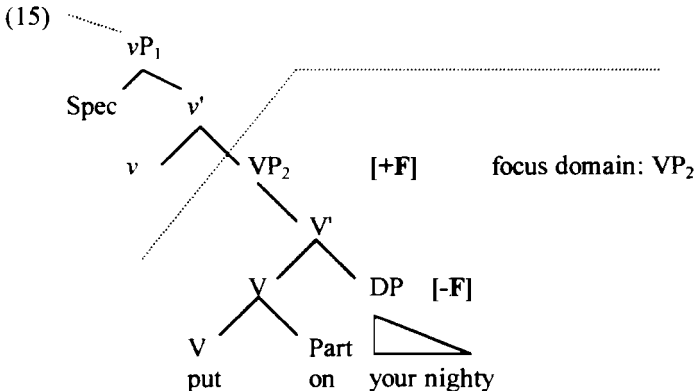
To illustrate the case where the complement-DP is a background constituent I have chosen Bolinger's (1971) example that was given in (9) above and is repeated here for convenience.

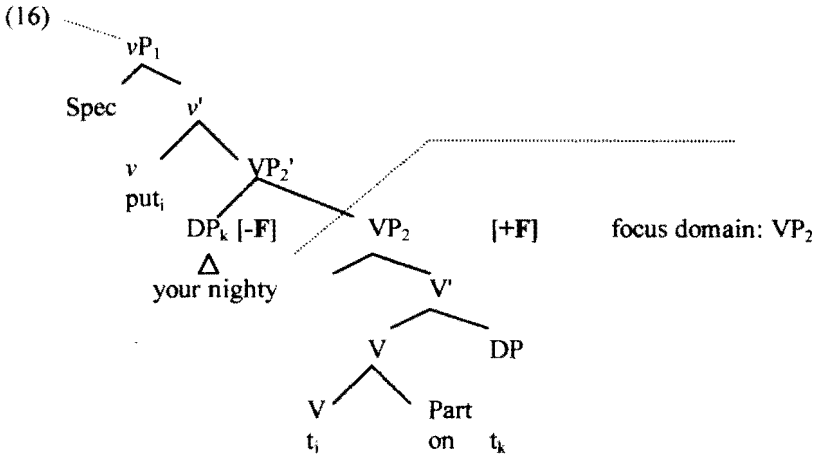
(14) It's almost ten o'clock. *Put your nighty on*, now, and run up to bed.

We are interested in the phrase *put your nighty on* and in the syntactic movement process that takes place to derive the discontinuous construction.

The relevant focus domain is the verbal constituent as the (in this case covert) subject and the object (*your nighty*) are familiar, i.e. can be concluded from the context. The focus is placed on the complex verb. I therefore assume that the focus feature is assigned to the lower VP as the highest dominating node of the focus constituent. The focus feature percolates downwards, so that VP₂ constitutes the focus domain.

In the base structure in (15) the complement is generated within VP₂. But the DP is not focused, but is a background constituent, illustrated by the assignment of a negatively specified focus feature [-F]. Because of this mismatch of features – the DP that is negatively specified for [F] on the one hand and its position within the focus domain, i.e. in the domain that is dominated by the positive focus feature [+F], on the other hand – triggers the movement of the complement DP. It adjoins to VP₂. At the same time, the verb *made* exorporates out of the complex verbal head and moves overtly to the light verb position *v* for independent syntactic reasons. The complex verbal head is split up. The particle remains in its base position, which is within the focus domain, and functions as the focus exponent. The movement operations are illustrated in (16).





What is important is that it is the feature mismatch, [+F] focus domain vs. [-F] DP, that triggers the VP-internal DP-movement operation. The movement process leaves the DP outside the focus domain in its VP-adjunction target position, while the particle remains within the inner VP and thus becomes the sole exponent of the focus feature (the *focus exponent*).

5 The Placement of the Accent

I follow Jackendoff (1972) and Rosengren (1993, 1994, 1995) in their assumption that the syntactic focus feature corresponds to a prominence feature in phonology. Also, according to Selkirk (1984:200), "the focus structure of a sentence is inextricably related to its intonational structure." In particular, she argues that pitch accent assignment is directly related to the focus properties of the sentence: "... roughly speaking, the presence of a pitch accent correlates with a focus [...] while the absence of a pitch accent indicates the lack of focus."

Accents in English can be high or low tones, but, according to Pierrehumbert (1999), focused information is marked by high tones (H*) or by a rise from a low level of the intonation contour to a high point (L+H*).

Based on these studies, my assumption with regard to the PV construction in English is that the accent is placed on the DP in continuous constructions – the noun as the most deeply embedded element being the focus exponent in all three cases (maximal, non-minimal, and minimal focus) – and that the accent is placed on the particle in the discontinuous construction.

If these assumptions could be proved this would provide important evidence for the claims made above about the syntactic movement operation triggered by the focus feature.

To test my assumptions I carried out a pilot study on the intonation of PV constructions in English.

4.1 An experimental pilot study on intonation

I recorded pre-prepared utterances which were read from a list of sentences by the participants. Ten non-professional native speakers of English were recorded.³

4.1.1 Materials

The sentences containing the particle verbs were embedded in short contexts. 30 experimental items with transitive particle verbs were chosen, i.e. 15 pairs of sentences. Each pair consisted of one item containing the continuous construction, and one item containing the discontinuous construction with the same verb. The order chosen was dependent on the given context, following the IS theory outlined above. Examples are given in (17), (18), and (19) below.

(17) compositional PV⁴

- a) – "Do you know where that noise is coming from?" – "Yes, I do. It's the radio of our next door neighbour, a student, She likes her music loud." – "Fine, but I can't stand it. I'll go and ask her to turn the radio down."
- b) It's late and I want to go to bed. I would like you to turn down the radio. The music is too loud, I won't be able to sleep.

In (17a), the radio has been mentioned before and appears between the verb and the particle after having moved out of the focus domain. Accent placement is expected on the particle. In (17b), the radio brings in new information, i.e. it is within the focus domain and appears in the continuous construction. The accent is expected on the noun.

(18) idiomatic PV

- a) Sam liked her job, it was interesting, but when she moved to another town she had to give the job up.
- b) Sam sold her house and moved to another town, but she didn't give up her job.

(19) aspectual PV

- a) When you move it's a good idea to hire a van. And of course it's better not to have too much space in it but to load the van up.

- b) We had bought so much stuff in the superstore that we couldn't take it home on our bikes. So what we did was *load up mum's car*.

The pattern in (18) and (19) with respect to focus and object position is parallel to that in (17). The accents are expected on the particle in (a) where the DP moved out of the focus domain as a background constituent, but on the noun in (b) where the object introduces new information into the context.⁵

4.1.2 *Data treatment*

The data were transferred to a computer with a frequency of 44.1 kHz and a 16 bit sampling rate, and the speech signal was digitalized. The phrases containing the particle verb, the nominal object, and the subject were extracted from their contexts. Only these fragments of the complete experimental items were analysed. Erroneous utterances were excluded from further analysis.

The strongest correlate of how the listener perceives the speaker's intonation and stress, i.e. of accent placement, is the fundamental frequency (pitch, f₀; fundamental frequency in Hertz (Hz) plotted against time), which is why the corresponding prosodic curve was used to analyze the experimental items.

4.1.3 *Results and discussion*

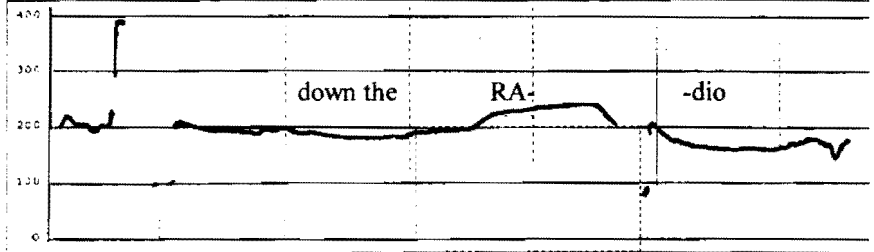
I cannot report all experimental items in detail, but will consider some of them, exemplarily. They do reflect the general results, though.⁶ We are interested in what happens on the particle and on the object. What I found on these elements supports the assumptions made above on focus assignment and accent placement.

In the continuous construction, i.e. in the sentences of the kind (17b), (18b), and (19b), the accent was placed on the noun as the focus exponent within the DP-complement. In contrast, but again as expected, the accent was placed on the particle in the discontinuous construction. This can be seen in the intonation curves in (20) through (23). I have chosen the same speaker for each sentence, exemplarily. (20) represents (17b). We can see an obvious rise of the contour from a low point (199Hz) to a high level (243Hz) (L+H*) on the first syllable of *radio*. (17a) is represented by the curve in (21). Here, the rise from a low to a high tone can be seen on the particle *down* (227 to 250 Hz). This is a result that is quite reasonable for compositional particle verbs. One could argue that the particle has its own semantic content and can therefore be stressed.

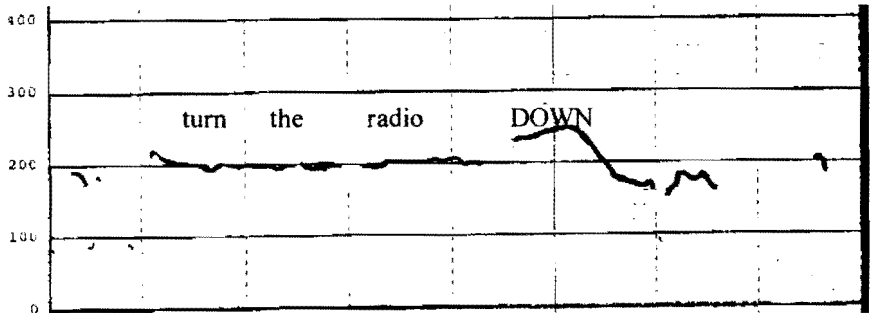
However, the same pattern can be found for idiomatic and aspectual particle verbs. As can be seen in (22) and (23), the accent is placed on the noun in the continuous construction in (19b), and on the particle in the discontinuous construction in (19a). ((18) shows the same pattern, but cannot be given here for space reasons.)

The type of pitch accent in all examples is a rise from a low to a high level of the intonation contour.

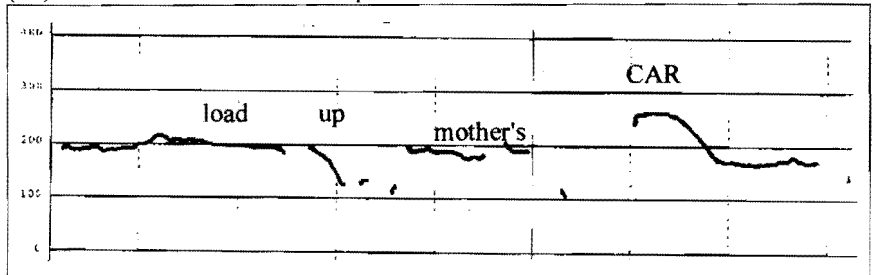
(20) ... to turn down the radio



(21) ... to turn the radio down



(22) ... what we did was load up mother's car



focus background structure, and that this claim is supported by the intonational properties of the PV constructions. I have mapped these assumptions onto the syntactic structure of particle verbs.

I would like to add that this can only be a default analysis, so far. We can of course imagine sentences where for example the accent is placed on the object despite its appearance in the discontinuous construction. An example is given in (25).

(25) Lisa is doing the washing-up. She asks her brother:

"Can you bring me the glasses, please, I want to wash THEM up, not the cups."

Here the pronoun *them* is a background constituent in that it refers back to the DP *the glasses*. But it is also focused. This is a case of contrastive focus, where I would have to assume that the default analysis is overridden by a contrastive focus rule that corresponds to the placement of the accent.

There are of course other examples, not necessarily involving contrastive focus. I will have to leave this problem to future research.

Notes

¹ With contrastive focus, it might be possible to place the accent on the object in the discontinuous construction. I will come back to this assumption in the final section.

² Note that both Chomsky (1995) and Olsen (1997) do not assume overt object-DP-movement within the VP as suggested by Koizumi (1993), Harley & Noyer (1997), and others.

³ Thanks to Katie White and her family and to Sam and Val Gage, and Val's friends.

⁴ Compositional PV: The meaning of the complex verb is made up of the meaning of the verb plus the meaning of the particle.

Idiomatic PV form a semantic unit. Their meaning is not fully predictable from the meaning of the constituents.

In aspectual PV, the particle adds a telic interpretation to the verb, such as in *eat* vs. *eat up*.

⁵ For space reasons. I cannot give a full description of the experimental design. I would like to add that the materials also contained 30 filler items and that the order of the reading list was pseudo-randomized. The participants were instructed to read the sentences in a natural way.

⁶ I can only offer a descriptive analysis here, but will hopefully add a statistic analysis in the near future.

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A Reanalysis of Bidirectionality in Auca*

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1 Introduction

Auca, an isolate language of Ecuador, allows stress clash within words. Interestingly, the distribution of clashing stresses depends on morphological domains, the stem domain ("stem train") and the suffixal domain ("suffix train").¹ The stress and the morphology must in part be treated together because morphological structure is key to determining where clashing stresses are allowed.²

In this paper, I show that Auca is best analyzed in the following manner. Clashing stresses and the location of final stress show the restrictions on degenerate feet. Binary feet are the only type permitted in the suffix train. I propose that Auca stress receives the simplest account by positing a domain-specific constraint that is violated by the presence of degenerate, nonbinary feet in the suffix train. The analysis is characterized within Optimality Theory (Prince and Smolensky 1993, McCarthy and Prince 1993, 1995). Optimality Theory allows two basic types of constraints: faithfulness and markedness. I claim that the markedness constraint used in this analysis, FOOTBINARITY, must be relativized for position. The resulting constraint, FOOTBINARITY_{SUFFIX} is a *Positional Markedness* constraint (see also Steriade 1997, Zoll 1998). In this way, markedness constraints can be positional. The proposed case of *Positional Markedness* presented here is novel because it does not involve a case of featural licensing in a particular context, but rather a case involving a constraint that militates against a particular type of structure, here FOOTBINARITY.

The analysis is also interesting because it shows that Auca is not a bidirectional stress system, as was claimed in Hayes (1995), for example. Directional effects in stress systems are obtained different ways in derivational and nonderivational theories. In a system using syllabic trochees, a final degenerate foot indicates left-to-right foot parsing for Hayes (1995). The same system, treated in Optimality Theory, uses the final degenerate foot as showing the relevance of an align constraint, ALL-FEET-RIGHT, (as in McCarthy and

Prince 1994 and Crowhurst and Hewitt 1995). A bidirectional stress system might be expected to invoke two align constraints that conflict in direction; such a proposal is shown to be unworkable because the system will always reflect the bias of the higher-ranked ALIGN constraint. Iterative bidirectional footing within a single constraint hierarchy should be impossible using ALIGN constraints. Only unidirectionality obtains iteratively with ALIGN constraints.³

This paper is organized as follows. First, I present the stress data from Auca. I show the relevant generalizations, particularly the absence of both final stress and clashing stresses within the suffix domain. I then turn to an analysis of these patterns within Optimality Theory. I argue that the descriptive generalizations require the use of a novel type of *positional markedness* constraint. Following this section, I sketch out how we might expect an alignment-based analysis of these facts. I show that such an analysis is not possible because it cannot restrict degenerate feet from appearing in the suffix train. Finally, I conclude the paper.

2 The Stress Pattern of Auca

The forms in (1) represent words that consist only of stem morphemes. The size of these forms varies from one to four syllables. The forms show that all odd syllables are stressed, and that stem-final stresses are tolerated. Stressed monosyllables are also permitted, and trisyllabic and longer words stress the first and third syllables.

(1) Stem trains only⁴

a.	σ]	bɔ̃	'cotton bird'	SP 6
		mɔ̃	'leaf'	SP 6
b.	σσ]	báɖə	'mother'	P 426
		kɔ̃ɔ̃	'kapok'	P 426
		æ̃i	'high'	SP 23
		bíwi	'younger brother'	P 429
		óbe	'boa'	SP 7
c.	σσσ]	mɔ̃j̃kɔ̃	'blanket'	SP 24
		g̃j̃nɔ̃j̃	'yellow'	SP 24
		má̃j̃kɔ̃	'dirt'	SP 23
d.	σσσσ]	bódæpókə	'anthill'	P 426

The words in (1) show that stem trains stress all odd syllables. This distribution pattern suggests syllabic trochees. The presence of final stress

suggests that the directionality of this system is left-to-right, and that degenerate feet (feet consisting of a single syllable) are permitted.

The next set of forms, shown in (2), are words where the stem train is joined by a monosyllabic suffix train. Words that consist of an even number of syllables (2a,c) act like the stem trains described above, stressing all odd syllables, even final ones. When the total syllable count is odd, as in (2b,d), the pattern is different. These cases, the boxed blocks in (3b,d), consist of an odd number of total syllables. Such forms never surface with final stresses; instead, clashing stresses fall within the stem train.

(2) Stem trains with a suffix train of one syllable:

a.	σ]σ	á]bo	'I see'	SP 15
		gó]bo	'I go	P 425
		wæ]ŋa	'he dies'	P 426
		á]kə	'he sees'	SP 15
b.	σσ]σ	wóðç]ŋa	'she hangs up'	P 427
		tæñç]mi	'you spear'	P 428
		áá]kə	'he bathes'	SP 18
		yçmç]ŋa	'he plucks out'	SP 5
c.	σσσ]σ	íçç]bi	'you cut'	SP 23
		yæmçgá]bo	'I am deaf'	SP 5
		kíwɛŋç]ŋa	'where he lives'	P 426
		ææñé]bo	'I yawn'	SP 18
d.	σσσσ]σ	gánææmæ]ŋa	'he raised up his arms'	P 427
		kæçŋinéwá]kə	'his tongue hurts'	SP 6
		tççççç]ŋa	'cotton bird'	SP 6

The boxed forms in (2b,d) total an odd number of syllables. (2b) shows that a trisyllable has stresses the first and second syllable. A form consisting of five syllables, shown in (2d), stresses the first, third and fourth syllables of the word. The inclusion of a suffix train means that the system no longer looks like a straightforward left-to-right stress system because suffix trains always follow a stressed syllable with an unstressed one. The even parity forms in (2a,c) stress all odd-numbered syllables.

In (3) we see examples of stem trains which have been suffixed with disyllabic suffix trains. These forms repeat the patterns in (1-2); if the word has an even total number of syllables, all odd syllables are stressed. This type of pattern is found in (3b,d). If the word consists of an odd total, as in (3a,c,e), the pattern is

different. All odd syllables within the stem train are stressed, and there are clashing stresses that fall at the juncture between the stem and suffix train.

(3) Stem trains with a suffix train of two syllables:

a.	σ]σσ	gó]bópa	'I go (declarative)'	P 425
		gó]dége	'when he went'	SP 5
		kæ]móba	'we (exclusive) do'	SP 25
		gó]kæ̃j	'must go'	SP 23
b.	σσ]σσ	kæga]kám̃ba	'his tooth hurts'	P 427
		gówæ̃]nám̃ba	'he fell down'	P 429
		áta]móba	'we (exclusive) saw'	SP 6
c.	σσσ]σσ	yíwæ̃mó]nám̃ba	'he carves; he writes'	P 427
		épokæ̃]bópa	'I swim'	P 429
d.	σσσσ]σσ	pædæ̃pónó]nám̃ba	'he handed it over'	P 426
e.	σσσσσ]σσ	tíkawóðonó]kám̃ba	'he lights'	P 427

The asymmetry between words of odd and even parity is repeated in (4), which all have trisyllabic suffix trains. These words have penultimate stress, and only a single stress falls in the suffix train. Words of even parity stress all odd numbered syllables (4a,c). Words of odd parity, boxed in (4b), stress the first, second, and fourth syllables of the word.

(4) Stem trains with a suffix train of three syllables:

a.	σ]σσσ	gó]tabópa	'I went'	P 426
		mó]nandápa	'he slept'	P 429
		tó]kandápa	'(he) laughed'	P 429
b.	σσ]σσσ	dádó]nandápa	'he fished'	SP 24
		éná]kandápa	'he was born'	P 427
		ówó]kandápa	'he stayed at home'	P 429
c.	σσσ]σσσ	ápæ̃né]kandápa	'he speaks'	P 428
		wóq̃ó]nandápa	'he blew his blowgun'	P 430

The only attested example with a suffix train of four syllables has a monosyllabic stem train; the result is stress on the first, second and fourth syllables.⁵

(5) Stem trains with a suffix train of four syllables:

a.	σ]σσσσ	gó]tám̃onápa	'we two went'	P 426
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The chart in (6) summarizes graphically the following descriptive generalizations about Auca stress. First, all words of even parity, regardless of

morphological composition, stress every odd-numbered syllable. Second, unsuffixed words of odd parity surface with a word-final (and stem-final) stressed syllable. Third, suffixed words of odd parity always surface with a stem-final (but not word-final) stress; this means that there is stress clash at or before the stem and suffix juncture. Finally, every stressed syllable in the suffix train is always followed by a stressless syllable. Stressed syllables in the suffix train never precede a word boundary or another stressed syllable. This is all shown in (6).

(6) Chart of Auca Stress

		SUFFIX TRAIN				
		∅]σ]σσ]σσσ]σσσσ
S	σ	σ	σ]σ	σ]σσ	σ]σσσ	σ]σσσσ
T	σσ	σσ	σσ]σ	σσ]σσ	σσ]σσσ	??
E	σσσ	σσσ	σσσ]σ	σσσ]σσ	σσσ]σσσ	??
M	σσσσ	σσσσ	σσσσ]σ	σσσσ]σσ	??	??
	σσσσσ	??	??	σσσσσ]σ	??	??

The distribution of stress in words with an even number of syllables suggests that the foot type is the syllabic trochee. Furthermore, in words of odd parity, if there is no suffix train, the word ends in a stress. This suggests that all syllables are parsed into feet, and that a degenerate foot can appear word-finally in some words, suggesting rightward directionality. The chart in (7) presents the data with the proposed footing; stressed syllables that are not followed by an unstressed syllable are assigned into a degenerate foot. Shaded blocks show the cases where the degenerate foot is nonfinal.

(7) Proposed Footing

] SUFFIX TRAIN				
		∅]σ]σσ]σσσ]σσσσ
σ	(σ)	(σ]σ)	(σ)]σσ)	(σ]σ)(σσ)	(σ]σ)(σσσ)	(σ)]σσ)(σσ)
σσ	(σσ)	(σ]σ]σ)	(σσ)]σσ)	(σ]σ]σ)(σσ)	??	??
σσσ	(σσ)(σ)	(σσ)(σ]σ)	(σσ)(σ)]σσ)	(σσ)(σ]σ)(σσ)	??	??
σσσσ	(σσ)(σσ)	(σσ)(σ]σ]σ)	(σσ)(σσ)]σσ)	??	??	??
σσσσσ	??	??	(σσ)(σσ)(σ)]σσ)	??	??	??

The chart in (7) leads to several interesting observations, some of which have been previewed by the above discussion. First of all, there is never a degenerate foot in the suffix train, as words with suffix trains always stress the penult (never the ultima). The degenerate foot falls to the left of the juncture of the two trains if the suffix train is even; if the suffix train is odd, then the degenerate foot is as close to the right edge of the stem as possible. Finally, feet never

consistently align to the right edge of the stem boundary. Any analysis that accounts for the footing in suffix trains must account for the variability in this aspect of Auca stress.

3 An Analysis within Optimality Theory

The analysis in this paper assumes Optimality Theory (Prince and Smolensky 1993), and follows the basic approach to stress systems in the Optimality Theoretic literature, especially with regard to alignment constraints (e.g., McCarthy and Prince 1994). The first constraint that is necessary is one that evaluates the type of foot with regard to the location of the head (stressed element). Given that a disyllabic form is stressed on the left side, FOOTFORM forces heads to be on the left edge of the foot.

(8) FOOTFORM (abbreviated FTFM)

Heads are on the left edge of the foot.

Also relevant is the number and type of elements that this foot contains, which is regulated by FOOTBINARITY in (9). When possible, feet in Auca consist of two syllables.

(9) FOOTBINARITY (abbreviated FTBIN)

Feet are analyzable as binary on the syllabic level.

The tableau in (10) shows the evaluation of a disyllabic stem train. Given these two constraints alone, we do not have a direct ranking argument between them. We will see later that there are arguments that show a relatively low-ranking of FOOTBINARITY.

(10) Evaluation of a disyllabic form.

/bada/	FTBIN	FTFM
a. (báda)		
b. (badá)		*!
c. (bá)(dá)	*!*	

The tableau in (10) compares three output candidates. The two syllables in (10a) are grouped together in a trochaic foot, satisfying both constraints. This is the optimal candidate. The two nonoptimal candidates are ruled out for different reasons. (10b) is a binary foot, but the foot is iambic and so FOOTFORM is violated, while (10c) has two feet of one syllable each, and so incurs two violations of FOOTBINARITY.

Another constraint needed here is one that forces syllables to be included in feet. This constraint, PARSE- σ , must dominate FOOTBINARITY. PARSE- σ is violated whenever a syllable is not parsed into a foot.

(11) PARSE- σ (abbreviated PARSE)

Syllables must be parsed into feet.

The tableau in (12) motivates the ranking between PARSE- σ and FOOTBINARITY. A monosyllabic form shows that all syllables should be footed, even if the resulting foot is degenerate.

(12) Evaluation of a monosyllabic stem train:

/b σ /	PARSE	FTBIN	FTFM
a. (b σ)		*	
b. b σ	*!		

The best output for a monosyllabic form is one where the syllable is parsed into a degenerate foot, as in (12a). This candidate violates FOOTBINARITY. Compare this with the nonoptimal (12b), which fails to parse the syllable at all and so violates the higher-ranked PARSE- σ .

Recall that a trisyllabic stem train surfaces with final stress, which is typical of left-to-right directionality. In Optimality Theory, this is captured by ALL-FEET-RIGHT, given in (13).

(13) ALL-FEET-RIGHT (abbreviated FTRT)

Align (Foot, Right, Prosodic Word, Right)

Auca parses all syllables, even when this results in degenerate feet. The degenerate foot (in words without a suffix train) comes at the right edge. This pattern supports the ranking: PARSE- σ » ALL-FEET-RIGHT.

(14) Evaluation of /m σ jko/

/m σ jko/	PARSE	FTRT	FTBIN	FTFM
a. (m σ j)(k σ)		*	*	
b. m σ (jko)	*!			
c. (m σ)(jko)		**!	*	

This tableau compares different parses of a trisyllable. In the optimal (14a), the initial foot is misaligned from the right edge by one syllable, and the final foot is well aligned with the right edge. This results in one violation of ALL-FEET-RIGHT, as well as the violation on FOOTBINARITY caused by the presence of a degenerate foot. Candidate (14b) fails to parse the initial syllable, so even though the word has one perfectly aligned, binary trochee, the PARSE- σ violation is fatal. The third candidate, (14c), has a degenerate foot in word-initial position. This means that foot is two syllables away from the right edge, and the candidate incurs two violations on ALL-FEET-RIGHT. This is one more violation than the optimal form.

Unfortunately, the hierarchy faces problems in predicting the correct pattern in suffixed forms with an odd number of total syllables. The ranking predicts an unattested final stress, *(gó]bo)(pá) rather than the actual form, (gó)(]bópa).

The actual output is ruled out because of an additional violation on ALL- FEET-RIGHT (which will always favor a final degenerate foot over an initial one). The problem is that forms with suffix trains never surface with final stress. In fact, these forms avoid any degenerate feet at all in the suffixal domain. The avoidance of final stress suggests a possible solution would be to invoke NONFINALITY (Prince and Smolensky 1993), a constraint that prohibits a final stress. However, this is complicated by two facts. First, final stress is only prohibited in suffix trains. Second, trisyllabic suffix trains do not merely prohibit final stress; they do not allow degenerate feet anywhere. In fact, if we prohibit degenerate feet entirely from the suffix train, we can predict the fact that all stressed syllables must be followed by unstressed syllables in the suffix train.

Here I propose that Auca employs a domain-based constraint that prohibits degenerate feet within the suffix domain. All this requires is that we specify a context to the familiar constraint, FOOTBINARITY. This means that a "structural markedness" constraint, FOOTBINARITY, and we give it position-specific information. The literature in Optimality Theory currently holds two views of thought on positional constraints. One view, *Positional Faithfulness*, holds that prominent positions can allow special faithfulness constraints (Beckman 1997). This allows, for example, a general IDENT[F] constraint and a context-specific IDENT_{INITIAL_G}[F] constraint, which may be interleaved with structural markedness constraints. The contrasting viewpoint holds that features may be marked in particular positions (Steriade 1997), a perspective labeled *Positional Markedness* in Zoll (1998).

The facts of Auca favor Positional Markedness, as Auca suffix trains require the use of a context-specific markedness constraint. Two constraints on FOOTBINARITY, one "context-free" and the other positionally restricted (and ranked higher), are required to account for the distribution of degenerate feet in Auca. This approach to Positional Markedness differs in two ways from the approaches elsewhere (Steriade 1997, Zoll 1998). First, here the context is morphological, rather than segmental or prosodic as in other analyses. This parallels other research in which morphological domains, such as roots or the bases of reduplication, play an important role in constraint. Second, the markedness constraints invoked in other analyses typically refer to licensing contexts, especially for features. For example, Steriade (1997) employs constraints that ban [αvoice] in various segmental contexts according to the perceptibility of the various cues for voicing. Here the markedness constraint is

a different type because FOOTBINARITY prefers binary feet (and bans degenerate feet). This both assigns structure and evaluates for a particular type of structure, giving this type of structural markedness a different flavor than a featural constraint like *CORONAL (Prince and Smolensky 1993). The proposed constraint relevant for Auca is:

(15) FOOTBINARITY_{SFX}

Feet are binary under syllabic analysis within suffix trains.

This positionally restricted constraint rules out a degenerate foot from occurring anywhere in the suffix train. This constraint must dominate ALL-FEET-RIGHT, otherwise, (16a) would be predicted as the incorrect output. The context-specific constraint must also outrank the context-free general constraint to have any effect. This ranking is shown in (16), where the positional markedness constraint, FOOTBINARITY_{SFX}, is introduced.

(16) Evaluation of /go]bopa/

/go]bopa/	PARSE	FTBIN _{SFX}	FTRT	FTBIN	FTFM
a. (gó]bo)(pá)		*!	*	*	
☞ b. (gó)(]bópa)			**	*	

The above tableau shows that the revised hierarchy correctly predicts the optimal output, (16b). This form still violates ALL-FEET-RIGHT twice, but these violations are inconsequential because (16a) violates the higher-ranked FOOTBINARITY_{SFX}. The two forms differ in where the degenerate foot is located. In (16a), it is in the suffix train, which is fatal. In (16b), it is in the stem-train, which only violates the lower-ranked general constraint on binarity. Below tableau (17) shows the evaluation of an odd parity form with a trisyllabic suffix train. Such forms only allow a single stress in the suffix train, on the penult.

(17) Evaluation of /dadq]ŋadapa/

/dadq]ŋadapa/	PARSE	FTBIN _{SFX}	FTRT	FTBIN	FTFM
☞ a. (dá)(dó]ŋá)(dápa)			*****	*	
b. (dádq)](ŋáda)(pá)		*!	****	*	
c. (dádq)](ŋá)(dápa)		*!	*****	*	

A disyllabic stem train plus a trisyllabic suffix train avoids final stress because the highly-ranked positional markedness constraint rules out a degenerate foot word-finally (17b). This constraint also rules out the nonoptimal (17c), where stress clash falls completely within the suffix train.

The constraint ranking argued for in this section involves the use of standard prosodic and alignment constraints to predict stress. The main innovation of this section has been to extend Positional Markedness to allow a domain-specific constraint, FOOTBINARITY_{SFX}. This constraint excludes the presence of

degenerate feet from all positions in the suffix train. The constraint hierarchy motivated in this section is: PARSE- σ » FOOTBINARITY_{SFX} » ALL-FEET-RIGHT, FOOTBINARITY, FOOTFORM.

4 An analysis using align constraints to predict degenerate feet

In this section, I consider an approach that invokes alignment constraints to account for the distribution of stress in the suffix train. At first glance, this approach seems like a reasonable way to account for bidirectionality, because alignment constraints have been used to characterize directionality effects in stress systems. This type of analysis is untenable because it would require some other alignment constraint to outrank ALL-FEET-RIGHT. Unfortunately, this is problematic because the location of the degenerate foot is rather variable. Auca allows the degenerate foot before the juncture of stem and suffix trains, as well as allowing the penultimate syllable in the stem to be footed alone. One possible constraint would force alignment of a foot to the right edge of the root, as this approximates the location where degenerate feet can occur. The hypothesized constraint is given in (18).

- (18) Possible constraint: ALIGNROOT (ALROOT)
ALIGN (Root, Right, Foot, Right)

ALIGNROOT must dominate ALL-FEET-RIGHT because the critical problem is that a high-ranking ALL-FEET-RIGHT constraint will always prefer a candidate with a word-final degenerate foot. To prevent this in words with suffix trains, another align constraint must rank higher. (19) shows that ALIGNROOT obtains the correct results for the trisyllabic form evaluated above.

- (19) Evaluation of a monosyllabic stem plus a disyllabic suffix:

/go bopa/	PARSE	ALROOT	FTRT	FTBIN	FTFM
a. (gó bo)(pá)		*!	*	*	
b. (gó bo)pa		*			
c. (gó) (bópa)			**	*	
d. (gó) (bó)(pá)			***!	***	

Candidate (19a) has a final degenerate foot, which means that there is no foot aligned to the right edge of the stem. This causes a fatal violation of ALIGNROOT. The nonoptimal (19b) fails to parse the same final syllable, also violates ALIGNROOT. The optimal (19c) has the right edge of a foot aligned to the right edge of the stem; it also violates ALL-FEET-RIGHT twice. This candidate wins out over (19d) because (19d) violates ALL-FEET-RIGHT three times. The problem with ALIGNROOT becomes evident in the next two tableaux,

where two forms of odd parity are evaluated, and the wrong candidates are selected as optimal.

(20) Evaluation of a disyllabic stem plus a monosyllabic suffix:

/wod _o]na/	PARSE	ALROOT	FTRT	FTBIN	FTFM
(^{ES})a. (wó)(d _o]na)		*!		**	*
kb. (wódo)](ná)				*	*
c. (wó)(d _o)](na)				**!*	***

Here the attested form, (20a) is wrongly ruled out because it fails to align a foot to the right edge of the stem. This leaves the way open for (20b) to be incorrectly selected as optimal, because it satisfies ALIGNROOT and also violates ALL-FEET-RIGHT one fewer time than candidate (20c). The problem with the unattested, "bad" winner in (20) is that it contains a degenerate foot in the suffix train. Under an alignment approach, the highest ranked align constraint (whatever it may be) is decisive. If this is ALIGNROOT, this gives us no way to specifically exclude degenerate feet from the suffix train. In fact, there is no way to predict these two problem cases with align constraints, especially because forms with trisyllabic suffix trains allow a foot boundary to cross the stem-suffix juncture. Under the Positional Markedness analysis presented in the previous section, we can easily predict the distribution of stress as a result of FOOTBINARITY_{SFX} dominating ALL-FEET-RIGHT. An analysis that relies exclusively on alignment constraints cannot account for this data. Furthermore, the way in which strictly ranked alignment constraints operate suggests that there is no way to predict a bidirectional stress system, because the top-ranked align constraint will be favored. This observation suggests that putative bidirectional systems, like Auca, are best analyzed in some other way, such as the approach used here.

5 Conclusion

Auca has previously been analyzed as a bidirectional stress system (for example, Idsardi 1992, Hayes 1995). In Optimality Theory, directional effects in stress assignment are typically captured with align constraints. However, an exclusively directional account of Auca misses the generalization that degenerate feet never occur at all in suffix trains. Here I have argued for a different type of account for this data.

Auca morphology and stress interact to provide an interesting distribution of degenerate feet. The stress pattern is actually a combination of rightward directional effects combined with a restrictive prohibition on what type of feet

occur in suffix trains. I have argued that this prohibition is best accounted for by a domain-specific version of a prosodic constraint, FOOTBINARITY_{SFX}. This constraint should be viewed in the context of other markedness constraints that can be context-specific, as in recent work on features by Steriade (1997) and Zoll (1998). These Positional Markedness constraints have been contrasted with an approach that only allows Positional Faithfulness (Beckman 1997). If Positional Faithfulness is correct, then it is faithfulness constraints, rather than markedness constraints, that can refer to specific contexts. However, such a restricted theory cannot account for the analysis of Auca presented here. Auca requires that a structural markedness constraint, FOOTBINARITY, refer to a specific context. This can be viewed as an extension of Positional Markedness; if markedness constraints can truly be positional, then any markedness constraint should be able to refer to positional context. While I have only shown this with regard to FOOTBINARITY, the presence or absence of positional markedness constraints in other languages can be determined.

One language that may provide additional support is Cahuilla, which has also been analyzed as bidirectional in the derivational literature (Idsardi 1992, Hayes 1995). However, like Auca, Cahuilla appears to restrict the distribution of degenerate feet. Unlike Auca, Cahuilla prohibits degenerate feet from appearing in the prefixal domain. This suggests two conclusions. First, it suggests at first glance that bidirectionality is a result of positional restrictions on FOOTBINARITY, with the domain-specific version outranking the context-free constraint. Second, it suggests that there may be at least some cross-linguistic evidence for Positional Markedness constraints of a morphological sort.

Notes

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¹ These terms are due to Pike (1964).

² Previous accounts of Auca include Pike (1964), Halle and Kenstowicz (1991), Idsardi (1992) and Hayes (1995).

³ However, the "initial dactyl" effect in English and other languages can be analyzed unproblematically, as in McCarthy and Prince (1993).

⁴ Data is either from Saint and Pike (1962) or Pike (1964). The source and page number for each form is indicated in the rightmost columns, P indicates Pike, SP indicates Saint and Pike, and the number indicates the page of the Auca form.

³ There is a form with a supposed five-syllable train, *gólkáedqmonáimba* 'we two would have gone' (Pike, page 426). However, there are contradictory claims of how vowels in hiatus act.

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Rising Declaratives

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1 Overview

This paper analyzes syntactic declaratives with rising intonation:

- (1) a. The play starts at 8?
- b. We'll see you tomorrow, then?
- c. That's a persimmon?

A familiar use of rising declaratives is as a type of yes-no (polar) question, similar to the corresponding syntactic interrogative:

- (2) That's a persimmon? \approx Is that a persimmon?

Intuitively, the rise imparts the force of a question to what would otherwise be a statement. Consistent with this intuition, rising declaratives behave in many ways like syntactic interrogatives in discourse and exhibit some of the same restrictions on use, as Section 2.1 shows. Since falling declaratives do not share this behavior, we may assume that the question-like qualities of rising declaratives are attributable to the rise, and that is the analysis I pursue here.

However, the story doesn't end there. It turns out, as Section 2.2 shows, that in some ways rising declaratives differ from syntactic interrogatives and systematically pattern with *falling* declaratives. Following the same line of reasoning, I attribute this behavior to the element that rising and falling declaratives have in common and that interrogatives lack, namely their syntactically declarative form.

In short, I propose an analysis in which the two defining components of rising declaratives, rising intonation and declarative form, make separate contributions to the conventional meaning of the sentence. I isolate these contributions using a minimal-pair methodology, holding the lexical content and location of the nuclear accent constant while varying either the intonation or

syntactic form. I model the interpretation in terms of context update functions, partial functions into contexts, using the framework of Heim 1988.

The term (*polar*) *interrogative* will be reserved for sentences with subject-auxiliary inversion, while *declarative* is used for the non-inverted versions. *Question* is used more generally as the name of a functional category to which either interrogatives or rising declaratives may belong.

My phonological assumptions are kept to a minimum. I assume that rising and falling intonation are meaningfully contrastive. Interrogatives discussed in the paper are assumed to have rising intonation (typical for American English), and when compared with rising declaratives, assumed to have the same contour. (Note that I do not claim that interrogatives invariably have rising intonation or that the rise on an interrogative is necessarily identical to the rise on a declarative; the methodology simply exploits the fact that the two forms *can* have the same intonation.) For more concreteness, the rising contour under discussion may be taken to be L* H H%, the standard “yes-no question” tune, according to Pierrehumbert and Hirschberg 1990. The counterpart for falling declaratives is “neutral declarative intonation”, H* L L%.

I’ll concentrate on the questioning use of rising declaratives throughout the paper, although the analysis proposed is flexible enough to accommodate other uses. For now I ignore the possibility of informative rising declaratives, the phenomenon sometimes referred to as “uptalk”. This is a purely practical decision, made with the expectation that understanding questioning uses can aid in the investigation of informative uses. See Bartels 1997 (Ch. 7) for related discussion of “assertive” uses of non-interrogative questions.

2 The Distribution of Rising Declaratives

Section 2.1 supports the intuition that rising declaratives are question-like by documenting uses and restrictions shared with interrogatives. I turn to the contrast between declaratives and interrogatives in Section 2.2.

2.1 Rising declaratives pattern with rising interrogatives

As noted in the introduction, rising declaratives are easily interpretable as questions to which an informative answer of *yes* or *no* can be given. The rising declaratives in (3b) and (4b) have an effect similar to that of the (rising) interrogative in the (a) versions. The falling declaratives in (3c) and (4c), by contrast, do not routinely function as requests for information.

- (3) a. Are reservations required?
 b. Reservations are required?
 c. #Reservations are required. [# as a routine request for information]
- (4) a. Does the play start at 8?
 b. The play starts at 8?
 c. #The play starts at 8.

Rising declaratives also share restrictions on use with rising interrogatives. (5)-(8) demonstrate that both types of rising sentences are infelicitous as attempts to convey new information, *i.e.*, information that the addressee is assumed to lack. Announcements certainly qualify as attempts to give new information, and as seen in (5)-(6), neither interrogatives nor rising declaratives are felicitous in such circumstances. A doctor holding a newborn, for instance, is unlikely to use (5b) to announce its sex to the parents; if she does, the parents are probably going to be more concerned than pleased. The falling declaratives in (5c)-(6c) constitute the prototypical way to convey new information.

- (5) [doctor holding baby, to new parents]
 a. #Is it a boy?
 b. #It's a boy?
 c. It's a boy.
- (6) The final vote has just been counted.
 a. #Has the ballot measure passed?
 b. #The ballot measure has passed?
 c. The ballot measure has passed.

(7)-(8) make a similar point about answers to information questions. The answer to an information question is assumed to be new to the questioner; that's presumably why the question was asked. There is apparently a conflict between that assumption and the use of rising declaratives and interrogatives. Once again, only the falling declaratives (7c)-(8c) are convincingly informative.

- (7) [traveler at ticket counter addressing a ticket agent]
 Q: When's the next bus to San Jose?
 a. #Is the next one at 10:30?
 b. #The next one's at 10:30?
 c. The next one's at 10:30.

- (8) Q: Was Fred at the party?
 a. #Yes, was he?/#No, wasn't he?
 b. #Yes, he was?/#No, he wasn't?
 c. Yes, he was./No, he wasn't.

In (9)-(10) we see a more subtle use of rising sentences: they can be used to insinuate that the addressee is in a position to know the answer to the question. For instance, asking *Is shoplifting fun?* or *Shoplifting's fun?* as in (9a,b) can be a not-so-innocent way to communicate that the addressee is known to be a shoplifter. Note that for this effect, it is immaterial whether the addressee answers *yes* or *no*; the damage is done by the question itself.

- (9) a. Is shoplifting fun?
 b. Shoplifting's fun?
 c. #Shoplifting's fun. [# as an attempt to malign the addressee]
- (10) a. Was the food good in jail?
 b. The food was good in jail?
 c. #The food was good in jail.

A generalization that covers the above parallels between rising declaratives and their rising interrogative counterparts is given in (11):

- (11) Rising sentences (declarative or interrogative) are felicitous in contexts where the addressee can be assumed to know whether the propositional content is true.

2.2 Rising declaratives are like falling declaratives

Rising declaratives also share restrictions on use with falling declaratives, as seen in (12)-(17). As (12)-(13) show, the use of declaratives is incompatible with attributing an interrogative attitude to the speaker. While the interrogative in (12a) is fine, for instance, the declaratives in (12b-c) have a contradictory flavor, strongest in (12c) but also present with the rising declarative in (12b).

- (12) I don't know who was at the party.
 a. Was Peter there?
 b. #Peter was there?
 c. #Peter was there.

- (13) a. Was Mary lying to him? Robert wondered, but he couldn't be sure.
 b. Mary was lying to him? #Robert wondered, but he couldn't be sure.
 c. Mary was lying to him. #Robert wondered, but he couldn't be sure.

A related observation is that declaratives express a bias which rules out describing their content as open or contingent, as seen in (14)-(15). (14b) simply does not qualify as the expression of an "open" question. Similarly with (15b).

- (14) It's an open question.
 a. Did she lie to the grand jury?
 b. #She lied to the grand jury?
 c. #She lied to the grand jury.
- (15) a. Will the incumbent win re-election? It could go either way.
 b. The incumbent will win re-election? #It could go either way.
 c. The incumbent will win re-election. #It could go either way.

A final restriction considered here is the failure of declaratives to function as *neutral* attempts to elicit information, as shown in (16)-(17). As seen earlier, rising declaratives can indeed function as requests for information. But in a setting where the questioner is supposed to be impartial, only a true interrogative is acceptable. (16b)-(17b) have an accusatory flavor that makes them inappropriate; the (c) cases are clearly inappropriate as well.

- (16) [at a committee hearing]
 a. Are you a member of the Communist party?
 b. #You're a member of the Communist party?
 c. #You're a member of the Communist party.
- (17) [from a tax form]
 a. During the tax year, did you receive a distribution from a foreign trust?
 b. #During the tax year, you received a distribution from a foreign trust?
 c. #During the tax year, you received a distribution from a foreign trust.

A generalization that covers the contrasts in (12)- (17) is given in (18):

- (18) *Descriptive generalization for declarative form*
 Declaratives are felicitous in contexts where the speaker can be assumed to have a position on the propositional content.

3 The Rise

In this section I offer an account of how rising intonation contributes to the meaning of rising declaratives. Section 4 will treat declarative form.

The basic tool employed is the notion of a context update function, modeling the contribution of a linguistic element in terms of how its use affects the discourse context. I will follow the approach of Heim 1988, where sentence meaning is viewed as a partial function from contexts to contexts. The presupposition associated with the use of a linguistic element specifies the subset of contexts for which the update function has a defined result.

There are two aspects of the rise to be accounted for: the “question force” that it contributes, and the restrictions on use. I analyze the force in terms of the context change carried out when a rising sentence is interpreted and implement the contextual restriction as a presupposition associated with the rise.

3.1 Preliminaries

The first step is to specify what a context is. I treat it as an ordered pair, as given in (19). The set of all such ordered pairs will be referred to as CX.

(19) Let a context c be $\langle CG, QUD \rangle$, where:

- a. CG is the Common Ground, a set of propositions representing the mutual beliefs of the discourse participants (following Stalnaker 1978).
- b. QUD is a set of propositions representing the Question Under Discussion (Büring 1995, 1999; Roberts 1996).

The notion of Common Ground employed here is the standard Stalnakerian one: the set of propositions mutually accepted by the participants, which in turn defines a set of worlds ($\cap CG$), those that are consistent with what the participants take to be true. The QUD provides a way to model the effect of questions as setting the discourse topic. The idea of representing the context as CG plus a question element is adapted from Büring 1995, 1999, who uses the term *D(iscourse)-Topic* for the question component. The term QUD is used here instead, following Roberts 1996.

3.2 Question force

Let us assume that a sentence has question force when it constitutes an instruction to set the QUD. The effect of the rise, I propose, is to do just that, as given in (20). Thus, the interpretation of a rising sentence is as a function setting the QUD, leaving the CG unchanged, as defined in (21).

- (20) Rise represents an instruction to set the Question Under Discussion (QUD) to $\{p\}$, where p is the propositional content expressed by the sentence.
- (21) $|S_{\text{Rise}}|$ = The function R into CX such that for $c \in CX$:
- The QUD of $R(c)$ is $\{p\}$, where p is the propositional content of S_{Rise} .
 - The CG of $R(c)$ is unchanged.

The function definition is straightforward. But by itself, the notion of the QUD has little content, aside from the intuition represented by its name and type. In formal discourse models like those of Büring and Roberts, the real work is done by stipulations about what kinds of discourse moves are allowed relative to the content of the QUD. To model information questions, a *relevance* condition is enforced that requires the next move to at least partially resolve the QUD. The next move must also be *informative*, that is, its content must not already be entailed by the CG. Adopting similar conditions, the information question use of rising declaratives follows straightforwardly.

Note, however, that the notion of setting the QUD is coherent as a general expression of question force even without these additional conditions, or more accurately, with other conditions replacing them to characterize other uses. The advantage of this approach is that it allows all sorts of utterances having the form of questions – rhetorical questions, exam questions, polite requests, etc. – to be characterized as having question force, and thus to count as questions, as they intuitively do.

The generality of this approach to question force means that nothing about the speaker's propositional attitude or discourse goal follows directly from the instruction itself. Again, this is a desirable result given the variety of attitudes and goals compatible with use of rising declaratives and questions more generally. But it also means that restrictions on use cannot be derived from the instruction itself; they will have to be specified separately.

3.3 Contextual restriction

The generalization concerning the distribution of rising sentences was given in (11), repeated below:

- (11) Rising sentences (declarative or interrogative) are felicitous in contexts where the addressee can be assumed to know whether the propositional content is true.

The task of this section is to formalize the descriptive generalization as a presupposition associated with the rise, i.e., a restriction on the domain of the

update function. In Heim's formulation, a sentence S presupposes p iff all contexts that admit S entail p . The question to be answered here, then, is:

(22) Which contexts admit S_{Rise} ?

The generalization is stated informally in terms of the addressee 'knowing whether' the propositional content is true. Given that the CG is characterized as a set of mutual *beliefs*, this is too strong. A more careful version appears in (23):

(23) Presupposition associated with S_{Rise} :

'A believes one of p or not- p ', where A denotes the addressee and p is the propositional content of the sentence.

Truth conditions for the above can readily be stated using a standard possible-worlds semantics for 'believe' (Hintikka 1969):

(24) 'A believes one of p or not- p ' is true with respect to a world w iff one of (a) or (b) holds:

- a. For all worlds w' doxastically accessible to A from w , p is true in w' .
- b. For all worlds w' doxastically accessible to A from w , not- p is true in w' .

The idea behind (24) is that if we take a person's beliefs to define a set of worlds (the ones consistent with those beliefs, or 'doxastically accessible'), it is true that the person believes p if p is true in all those worlds; similarly for the not- p case.

Now the question in (22) can be answered:

(25) A context admits S_{Rise} iff for all $w \in \cap \text{CG}$, 'A believes one of p or not- p ' is true with respect to w .

What the above amounts to is the following:

- In any context that admits S_{Rise} , it's mutually known that the addressee has a belief about p .

3.4 Accounting for the data

Having formalized the contextual restriction, I now want to go back to the original observations and make sure that the analysis does give us a way to understand them. Ideally, infelicitous uses of rising declaratives should count as cases of presupposition failure. Given (25), the presupposition fails just in case it *cannot* be mutually known in context that the addressee has a belief as to p .

The first restriction on use involved the infelicity of rising declaratives as announcements (see (5)-(6)). Now, to give a complete story of the infelicity of

rising announcements we would need an independent study of the contextual requirements for announcements, which I will not undertake here; the same point holds for the other examples to be discussed. What I will do instead is suggest reasonable assumptions about the shape a full analysis would take.

To begin with, assume, reasonably, that a speaker making an announcement expects the content to be new to the addressee; that is (at least part of) what an announcement is. It is clear that such an expectation conflicts with what has to be presupposed for the rising declarative – namely that the addressee has already formed a belief as to whether or not *p* is true. The context cannot be such that the information is new to the addressee and yet the addressee already has a belief about it. Thus, the infelicity of rising announcements follows.

The infelicity of rising answers to information questions (see (7)-(8)) receives a similar explanation, given that the speaker attempting an informative answer assumes the addressee to be uninformed.

But what about the third category, the shoplifting-type examples? Suppose (9a) or (9b) is uttered in circumstances like the following. The speaker, in a recent visit to the local mall, observed the addressee being apprehended for shoplifting. The addressee doesn't know about the speaker's knowledge; hence, it can't be mutually believed that the addressee has a belief about whether shoplifting's fun. Nevertheless, (9a) can be successful as a sly way for the speaker to publicize the addressee's shoplifting habit.

I take these to be cases of the well-known phenomenon of *accommodation*, i.e., adjustment of the context by the participants to conform to the presupposition. I assume that minimally, for accommodation to take place, the context must be compatible with the presupposition. That is, there must be at least one world consistent with the CG in which the addressee does have a belief of the right sort. Accommodation adds the presupposition to the CG, eliminating all worlds in which the addressee doesn't have a belief of the right sort. The contextual requirement is then met and the update function has a defined result.

The presence of an evaluative predicate like *fun* or *good* is what makes the insinuation in these examples work so well. (Compare *Is shoplifting a crime?*/*Shoplifting's a crime?*, which lack the effect.) It generally takes personal experience to judge whether an activity is fun. Thus, the set of worlds in which the addressee has a belief about whether shoplifting's fun will (in the usual case) coincide with the set of worlds in which the addressee has shoplifted.

4 Declarative Form

As with the rise, I propose that declarative form has a ‘force’ modeled as a context update.

(26) Declarative form represents an instruction to enter p as a *candidate* for the Common Ground.

To implement this proposal, I add a new element to the context structure, the (c) clause in (27), where the (a) and (b) clauses are unchanged from (19):

- (27) Let a context c be $\langle \text{CG}, \text{QUD}, \text{CANDIDATE} \rangle$, where:
- a. CG is the Common Ground, a set of propositions representing the mutual beliefs of the discourse participants (following Stalnaker 1978).
 - b. QUD is a set of propositions representing the Question Under Discussion (Büring 1995, 1999; Roberts 1996).
 - c. CANDIDATE is a proposition nominated for inclusion in the CG.

The update function simply sets the CANDIDATE to p , the propositional content of the sentence.

- (28) $|S_{\text{Decl}}| =$ The function D into CX such that for $c \in CX$:
- a. CANDIDATE of $D(c)$ is p , the propositional content of S_{Decl} .
 - b. QUD and CG of $D(c)$ are unchanged.

As defined, setting the CANDIDATE does not update the CG (by hypothesis, that’s the role of falling intonation) or the QUD.

The points made earlier with respect to the QUD apply here as well. Just as with the QUD, it may be convenient to add conditions characterizing a subset of cases where the nominated proposition is informative with respect to the CG. We also expect that in the ordinary case, the speaker nominates p on the basis of believing it to be true. But these conditions are not built into the structure. Rather, issuing an instruction to set the CANDIDATE is a general sort of discourse move to which, for analytical purposes, various conditions appropriate to different uses can be attached. Again, this generality is an advantage in accounting for the wide range of uses of declaratives (including ironic or sarcastic uses, for example, where the speaker clearly does not intend to be interpreted as believing what is literally said); and again this generality means that the contextual restriction must receive a separate explanation.

4.1 Contextual restriction for declaratives

The generalization concerning the distribution of declaratives is repeated below:

- (18) Declaratives are felicitous in contexts where the speaker can be assumed to have a position on the propositional content.

I will formalize this just as was done in Section 3.3 for the rise, except that this time the *speaker* is presupposed to have a belief rather than the addressee.

- (29) Presupposition of S_{Decl}
 ‘S believes one of p or not-p’, where S denotes the speaker.

Truth conditions are the same as in (24), modulo the substitution of S for A. So we are now in a position to state which contexts admit S_{Decl} :

- (30) A context admits S_{Decl} iff for all $w \in \cap \text{CG}$, ‘S believes one of p or not-p’ is true with respect to w.

4.2 Accounting for the data

For declarative form, the presupposition is expected to fail if the assumption that the speaker has a position on p is *cannot* be consistent with the context.

The first class of declarative examples, in (12)-(13), involved the incompatibility between use of declaratives and use of interrogative predicates. The infelicity follows straightforwardly under the reasonable assumption that attributing an interrogative attitude to the speaker conflicts with presupposing that the speaker has a belief as to p.

The second set of examples, while intuitively similar, is not accounted for quite as straightforwardly. In (14)-(15), description of the content of declaratives as open or contingent is infelicitous. But in these cases there is no direct connection with a conflicting speaker attitude.

To handle examples of this sort I will introduce a notion of *contextual bias*:

- (31) A context c is *unbiased* with respect to a proposition q if, according to the CG, none of the participants has a position on q or on its negation. Otherwise, the context is *biased* with respect to q.

Given (31), the line to be followed for (14)-(15) is that calling something an ‘open question’ or saying that it could turn out ‘either way’ is a claim that the context is unbiased, contrary to the declarative presupposition.

The final category of examples, (16)-(17), shows the inappropriateness of rising declaratives as neutral questions. For this category I assume that institutional settings – courtrooms, committee hearings, tax forms, examinations, etc. – may come with interrogative conventions demanding that the questioner maintain the appearance of neutrality. Questioning via a rising

declarative violates that rule due to the presupposition, which, if satisfied or accommodated in context, will convey that the speaker is not neutral.

5 Assembling the Pieces

So far I have given independent analyses of the two components of rising declaratives, the rise and declarative form. I assume that the meanings of the two elements combine compositionally. There are two possibilities:

- (32) a. $RD(c) = R(D(c))$ b. $RD(c) = D(R(c))$

Nothing at present dictates choosing one order over the other, so I just give a definition of the composite function that results in either case:

- (33) $|S_{RD}|$ = The function RD from C_{RD} to C_{RD} updating c as follows (where C_{RD} is the subset of CX such that every context in C_{RD} admits S_{RD} and $c \in C_{RD}$):
- The QUD of $RD(c)$ is $\{p\}$, where p is the propositional content of S_{RD} .
 - The CANDIDATE of $RD(c)$ is p .
 - CG of $RD(c)$ is unchanged.

The function definition in (33) simply combines the updates associated with the two elements: both the QUD and the CANDIDATE are set when a rising declarative is used, which allows for the questioning use along with a statement-like flavor. The function has a defined result only for a subset of contexts, C_{RD} , namely those which admit rising declarative sentences:

- (34) A context admits S_{RD} iff for all $w \in \cap CG$, both of (a) and (b) hold:
- 'A believes one of p or not- p ' is true with respect to w .
 - 'S believes one of p or not- p ' is true with respect to w .

The contexts which admit rising declaratives are those that meet the presuppositions both of the rise and of declarative form. Ruled out by (34) are contexts in which either the speaker or the addressee has no position on p . As the data introduced in this paper show, this provides an accurate characterization of the distribution of rising declaratives.

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A Link between Contrastive Stress and Contrastive Gemination in Mayo: Evidence for Optimality Theory

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1. Introduction.

Languages which exhibit stress may be classified into two broad categories: quantity-sensitive (QS) and quantity-insensitive (QI). A language's stress system is said to be QS if the placement of stress is determined by counting moras.¹ Those languages which do not utilize the mora in determining stress placement are said to be QI. Warao exemplifies a language with QI stress. The following data from Osborn 1966 show that stress occurs on every other vowel counting from the right edge of the word.

(1) tíra	<i>woman</i>
apáu	<i>well placed</i>
koránu	<i>drink it!</i>
rùhunáe	<i>he sat down</i>
yiwáranáe	<i>he finished it</i>
nàhoròahàkutái	<i>the one who ate</i>

A description of Warao stress thus requires no reference to the mora.

Cairene Arabic exemplifies quantity sensitive stress. In this language, stress always falls on one of the last three syllables. The decision as to which of these gets stressed is determined as follows. First, if the word ends in a super-heavy syllable (defined as a syllable containing three moras), that syllable is stressed. This is illustrated below:²

(2) katábt	<i>I wrote</i>	sakakiin	<i>knives</i>
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If the final syllable is not super-heavy, it is not stressed. Instead, stress falls on either the penultimate or the antepenultimate syllable, according to the following criteria. If the penultimate syllable is heavy, then it is stressed, as shown below:

- (3) qamálti you (*f.sg.*) *did* hadáani these (*f.du.*)

If neither of the preceding conditions holds, i.e., if the final syllable is not super-heavy and the penultimate syllable is not heavy, then the following criterion applies: Stress either the penultimate or the antepenultimate syllable, depending on whichever one is separated by an even number of syllables from the closest preceding heavy syllable; zero counts as even. If there is no such syllable, then count from the beginning of the word. Examples are shown below:

- | | | | |
|-------------|-------------------|----------------|--------------------|
| (4) martába | <i>mattress</i> | búxala | <i>misers</i> |
| katabítu | <i>they wrote</i> | kátaba | <i>he wrote</i> |
| shajarátun | <i>tree</i> | shajarátuhu | <i>his tree</i> |
| 'adwiyatúhu | <i>his drugs</i> | 'adwiyatúhumaa | <i>their drugs</i> |

The stress system of Cairene Arabic, although somewhat cumbersome to describe, holds one thing in common with all other QS systems: it utilizes the mora. In contrast, QI systems make no reference to the mora.

Thus, a major typological distinction is observed between languages with QS stress versus languages with QI stress. During the past two decades, generative theories of stress (e.g., Hayes 1981, 1995, Prince 1983, Hammond 1984, Halle and Vergnaud 1987) have treated this typological distinction as a linguistic primitive. In other words, it has been assumed that, if a language has stress, it must be either QS or QI; it cannot be both.

This paper argues that the stress system of Mayo, a Uto-Aztecan language of northwestern Mexico, exhibits both of these primitives in ways which cannot be explained using the existing mechanisms of the above-named theories. The Mayo data are then analyzed using optimality theory (McCarthy and Prince 1993, 1995; Archangeli and Langendoen 1997). It is shown that optimality theory (OT) is superior to generative theories of stress in at least two ways. First, OT is able to account for the Mayo data using only independently needed principles, whereas the derivational approaches of generative theories require special rules. Second, OT claims that all aspects of universal grammar are potentially present in every grammar. Accordingly, OT predicts that both kinds of stress (QS and QI) are in some way present in every grammar. Mayo instantiates a grammar in which the latter situation is visibly manifest. Under generative approaches, such a grammar is an anomaly at best.

2. The Problem of Stress and Length in Mayo.

Mayo exhibits a contrast between first and second syllable stress, as illustrated below:³

<u>2nd σ stress:</u> <u>Gloss:</u>		<u>1st σ stress:</u> <u>Gloss:</u>	
(5) noká	<i>talks</i>	nóka	<i>knows (a specific) language</i>
(6) poná	<i>plays (instrument)</i>	póna	<i>pulls</i>
(7) suwá	<i>pays attention to</i>	súwa	<i>kills (plural object)</i>
(8) kobá	<i>overcomes</i>	kóba	<i>head</i>
(9) anía	<i>helps</i>	ánia	<i>world</i>

The stress category of each root is preserved under affixation:

<u>2nd σ stress:</u> <u>Gloss:</u>		<u>1st σ stress:</u> <u>Gloss:</u>	
(10) poná	<i>plays</i>	póna	<i>pulls</i>
(11) ponáme	<i>one who plays</i>	póname	<i>one who pulls</i>
(12) popóname	<i>one who keeps playing</i>	póponame	<i>one who keeps pulling</i>

Furthermore, short words with *second* syllable stress undergo *vowel* lengthening in phrase-final position:⁴

<u>Gloss:</u>	<u>Non-phrase-finally:</u>	<u>Phrase-finally:</u>
(13) <i>is talking</i>	noká	noóka
(14) <i>wind</i>	jeká	jeéka
(15) <i>tomorrow</i>	yokó	yoóko

In contrast, short words with *first* syllable stress undergo *consonant* lengthening in phrase-final position:

<u>Gloss:</u>	<u>Non-phrase-finally:</u>	<u>Phrase-finally:</u>
(16) <i>knows (a specific) language</i>	nóka	nókka
(17) <i>shadow</i>	jéka	jékka
(18) <i>what</i>	jíta	jítta

To summarize, in phrase-final position, *vowel* lengthening occurs in short words with *second* syllable stress, and *consonant* lengthening occurs in short words with *first* syllable stress. Thus, there is a relationship between each stem's stress category and the type of phrase-final lengthening which it undergoes.

In spite of this interaction between stress and moras, basic stress placement is insensitive to syllable weight:

(19) pon-á	<i>plays</i>	pón-a	<i>pulls</i>
(20) pon-náke	<i>will play</i>	pón-nake	<i>will pull</i>
(21) po-pón-a	<i>keeps playing</i>	pó-pon-a	<i>keeps pulling</i>

The foregoing data pose a problem for rule-based theories of stress such as Hayes 1981, Hayes 1995, Hammond 1984, and Halle and Vergnaud 1987. Under these theories, one is forced to stipulate Mayo's observed relationship between each stem's stress category and the type of phrase-final lengthening which it undergoes; it does not follow from any independently required elements of the theory. Nor is there any way to explain why a stress system which is basically QI nevertheless interacts with the phonology in a QS manner. In many languages, phonetic length is a feature of stress, and this is easily accounted for in generative theories. However, such theories are at a loss as to how to link contrastive QI stress to contrastive lengthening in Mayo.

In contrast, OT is able to account for the above data using only constraints which are attested in many other languages. The next section defines and describes each of these constraints and applies them to the Mayo data.

3. The Optimality Analysis.

Following McCarthy and Prince 1995, I assume that linguistic systems contain no derivations and no rules. Instead, an input (underlying form) is related to its output via a set of universal, violable constraints. Each language contains all of these constraints. The uniqueness of any individual grammar is due only to the unique order in which these constraints are ranked for that grammar.

3.1. The set of constraints.

The following constraints are listed in relative order from the highest-ranked to the lowest-ranked. Evidence for this ranking will be pointed out in the tableaux in the next section.

- (22) **Extrametricality (EM):** The final syllable of a phrase cannot be incorporated into a foot.

Extrametricality is a well-known feature of many of the world's stress systems. In the formalism of McCarthy and Prince 1995, the above constraint is best stated as: Align (σ , Λ , Σ , R). In plain language, this says that every foot must have a syllable immediately following it. It is permissible for a word boundary

to intervene between the end of a foot and the beginning of the next syllable. Thus, this constraint is potentially violated only in short phrase-final words.

$$(23) *H \text{ on } \mu_2 \quad \begin{array}{c} * H \\ | \\ \mu \mu \\ | / \\ \sigma \end{array}$$

The above constraint asserts that high tone, which is the sole distinguishing feature of Mayo stress, cannot be associated to the second mora of a syllable.⁵

$$(24) \text{ Accent: Left-Anchor: Foot} - H$$

The above constraint says that a high tone (i.e., stress) goes on the left edge of a foot.⁶ I have assigned the label *Accent* to this constraint because it produces the effect (when unviolated) of exceptional initial stress. Thus, this constraint is relevant only to those inputs which are lexically marked for it, whereas the other constraints that are employed in this analysis are relevant for all inputs. Notice also that *Accent* competes directly with (26), which, when unviolated, accounts for default second syllable stress.

$$(25) \Sigma \geq \mu\mu$$

The above constraint states that feet are *minimally* bimoraic. Hence, it is violated whenever a foot contains less than two moras but not if it contains two or more than two. In Mayo, coda consonants and vowel length both count as moraic. To the extent that this constraint influences the selection of the correct output, Mayo stress is QS.

$$(26) \text{ R-Anch: } \Sigma - H$$

The above constraint states that stress must occur at the right edge of a foot. Notice that it competes with (24).

$$(27) \Sigma = \sigma\sigma$$

This constraint says that feet are exactly disyllabic. Notice that it is similar to (25) but also potentially in competition with it, since syllables and moras are not always in a one-to-one relationship. To the extent that this constraint influences the selection of the correct output, Mayo stress is QI.

(28) **Dep: I-O**

The above constraint means simply that every segment of the output has a corresponding segment in the input. In addition to prohibiting segmental epenthesis, I define this constraint as prohibiting the splitting of a long vowel into a sequence of two vowels, or vice versa, as illustrated below:



The final constraint requires that the right edge of the input correspond exactly with the right edge of the output. In other words, faithfulness violations are more serious on the right edge of the word than they are in other places:

(29) **R-Anch: I-O****3.2. Applying the constraints to Mayo.**

Now we are ready to examine some tableaux showing how well various possible outputs correspond to a given lexical input. In all the following tableaux, syllable boundaries are indicated by a period, foot boundaries are indicated by parentheses (), the pound sign # indicates a phrase boundary, and stress is represented by an acute accent.

First, consider the simple case presented in (30). This example is non-phrase-final, so extrametricality is not relevant. Applying the relevant constraints in the order in which they are listed above, the resulting tableau indicates that Mayo feet are optimally disyllabic and right-headed.⁷

(30)	/nok-a/ "speak-Present"	R-Anch: Σ-H	Σ = σσ
	(nó.) ka		*!
	no. (ká)		*!
	(nó.ka)	*!	
	ϕ (no.ká)		

Mayo feet are generally insensitive to syllable weight, for if a word lacks lexical accent, stress falls on the second syllable even if the first is heavy:

(31)

/nok-nake/ "speak-Future"	R-Anch: Σ -H	$\Sigma = \sigma\sigma$
∅ (nok.ná.) ke		
(nók.na.) ke	*!	
(nók.) na.ke		*!

In spite of the fact that syllable weight does not appear to play a role in stress assignment, there has to be a relationship between moras and stress, for the preceding section showed there is a direct correlation between a stem's stress category and the type of phrase-final lengthening which it undergoes. In contrast to generative approaches, OT allows (and, in a sense, *requires*) feet to be both syllabic (QI) and moraic (QS). This was not possible in earlier theories; feet had to be of either one type or the other. According to OT, the ranking of these two constraints with respect to each other determines whether a language's feet appear to be sensitive or insensitive to quantity. The Mayo data attest to this claim in that both kinds of feet (syllabic and moraic) play a significant role in determining optimal outputs, as demonstrated below.⁸

(32)

/nok-a/#	EM	*H on μ_2	$\Sigma \geq \mu\mu$	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	Dep: [-O]	R-Anch: [-O]
(no.ká.)	*!						
(noó.) ka		*!			*	*	
(nó.o.) ka				*!		*	
(nó.) ka			*!		*		
(nók.) ka					*!	*	
(no.ká.) a						*	*!
∅ (no.ó.) ka						*	

Consider next the non-phrase-final form of the lexically accented word /nók-a/. The optimal output for this form differs from that of (30) only in the placement of stress. The lexical constraint *Accent* dominates *R-Anchor: Σ -H* as well as $\Sigma \geq \mu\mu$, thus forcing exceptional initial stress in the output as shown below.

(33)

/nók-a/ "know lang-Pres"	*H on μ_2	Accent	$\Sigma \geq \mu\mu$	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	Dep: I-O
(nó.) ka			*!		*	
◊ (nó.ka)				*		
(nó.o.) ka				*		*!
(nóo.) ka				*	*!	*
(no.ká)		*!				
(nók.ka)				*		*!

The above demonstrates that *R-Anch: Σ -H* outranks *Dep: I-O*. Also, there is a four-way tie with respect to *R-Anchor: Σ -H*. Three of the tied candidates violate one or more lower-ranked constraints which the winner does not violate.

(34)

/nók-a/# "know lang-Pres"	EM	*H on μ_2	Accent	$\Sigma \geq \mu\mu$	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	R-Anch: I-O	Dep: I-O
(nó.ka)	*!				*			
(no.ó.) ka			*!					*
(nó.o.) ka					*!			*
(nóo.) ka					*!	*		*
(noó.) ka		*!	*			*		*
(no.ká.) a			*!				*	*
(no.ká.)	*!		*					
(nó.) ka				*!		*		
◊ (nók.) ka						*		*

Consider next the effect of lexical accent on the phrase-final form of /nóka/ in (34). Since the winning candidate violates $\Sigma = \sigma\sigma$ as well as *Dep: I-O*, it must be the case that both of these constraints rank below each of the following: *Accent*, *R-Anch: Σ -H*, and $\Sigma \geq \mu\mu$. If it were otherwise, a different candidate would have won over the empirically correct *nókka*.

One of the salient features of Mayo phonology, which is found in many other languages around the world, is that the minimal word is bimoraic. This is evidenced by the fact that Mayo has a number of stems and particles which are clearly monomoraic in their underlying forms, but which surface with vowel length when they have no other morphemes attached to them. For example, the word for "no" has the form *kaá* when it occurs as a word by itself and the form *ka* whenever anything is attached to it. This is illustrated below. The lengthening in (35) is purely phonological, as evidenced by the absence of length in (36) and (37).⁹

- (35) Kaá kó'okore. (S)he is not sick.
no be sick
- (36) ka-tím kó'okore. They are not sick.
no-they be sick
- (37) ká-k waánte. (S)he doesn't feel any pain.
no-location feel pain

(38)

/ka/ "no"	*H on μ_2	$\Sigma \geq \mu\mu$	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	R-Anch: I-O	Dep:I-O
∅ (ka.á)					*	*
(ká.a)			*!		*	*
(ká)		*!		*		
(ka)		*!	*	*		
(kaá.)	*!			*	*	*
(kát)				*!	*	*

Hagberg 1993 argues, on the basis of the existence of a number of words with invariant vowel length, that the above length alternation has to reflect a

lengthening process rather than a shortening process. The argument is summarized below. In OT, of course, there are no derivational processes, but the same basic argument applies; it has to be the case that the input for the word for "no" is monomoraic. In fact, the ranked set of constraints which was used to account for all the earlier data is precisely what is needed to select the correct output in (38).¹⁰

Mayo has a number of words which contain underlyingly long vowels. The evidence for the underlying nature of these long vowels is that these words do not exhibit length alternations; rather, the long vowel is long in all contexts. Examples are given in the (a) forms below. Each of these underived forms contrasts with the unrelated (b) form, which contains only short vowels.

Underived length:		No length:	
(39) (a)	yóoko <i>jaguar</i>	(b)	yóka <i>paint</i>
(40) (a)	téeka <i>sky</i>	(b)	téku <i>squirrel</i>
(41) (a)	naáte <i>begin</i>	(b)	nátemac <i>ask</i>
(42) (a)	boorók <i>toad</i>	(b)	porówim <i>type of lizard</i>

The stress pattern of (42)(a) provides an argument for the claim that the long *o* in *boorók* is monosyllabic. If it were disyllabic, then this would be an exceptional instance of third syllable stress. Since no such stress pattern is attested among words which lack long vowels, I conclude that the long *o* in *boorók* is monosyllabic.

This conclusion makes it possible to pinpoint the ranking of several more constraints while demonstrating the ability of OT to handle data that can't be accounted for by generative theories of phonology. Consider the following:

(43)	/bo:rok/ "toad"	*H on μ_2	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	Dep: l-O
	(bo.ó.) rok				*!
	(boó.) rok	*!		*	
	o (boo.rók)				
	(bóo.) rok		*!	*	

The above tableau demonstrates that a lexically long vowel cannot optimally be split into two syllables: Nevertheless, the prohibition against phrase-final stress sometimes *forces* a lexically long vowel to be split into two syllables; this is true for the phrase-final version of /bo:rok/:

(44)

/bo:rok/#	EM	*H on μ_2	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	Dep: I-O
⊃ (bo.ó.) rok					*
(boó.) rok		*!		*	
(boo.rók)	*!				
(bóo.) rok			*!	*	

There is no way to account for the difference between non-final *boorók* and phrase-final *boórok* without positing different syllabification configurations for the two forms. Generative theories are forced to appeal not only to complex rule-based derivations but also to constraints similar to the ones used here.¹¹ The obvious advantage of OT is that it needs only the constraints.

Given that Mayo's grammar distinguishes between monosyllabic vowel length and disyllabic vowel length in surface forms (*boo.rók* versus *bo.ó.rok*), one might expect to find this same distinction in underlying forms. It was argued earlier that the long *o* in the input to *boorók* is monosyllabic, but are there any forms with an underlyingly disyllabic long vowel? Yes, there are a few words whose initial vowel is long and bears stress on the second mora in all environments. One of these is *naáte* "begin", which was listed in (41)(a). The following tableau shows that the first vowel of the input cannot be monosyllabic:

(45)

/na:te/ "begin"	*H on μ_2	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	Dep: I-O
(na.á.) te				*!
(naá.) te	*!		*	
!⊃ (naa.té)				
(náa.) te		*!	*	

The optimal output in (45) is *not* the observed *naáte*; therefore the hypothetical input *na:te* must be incorrect. If, instead, the input is assumed to contain a sequence of two identical vowels, the correct output is selected:

(46)

/naate/ "begin"	*H on μ_2	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	Dep: I-O
\curvearrowright (na.á.) te				
(naá.) te	*!		*	
(naa.té)				*!
(na.a.té)			*!	
(náa.) te		*!	*	

Thus, the input to *naáte* contains a sequence of two identical vowels.

Mayo also has a few words which contain a non-initial disyllabic long vowel. Here is a word-final sequence of identical vowels in phrase-final position:

(47)

/takaa/ # "body"	EM	*H on μ_2	$\Sigma \geq \mu_1$	R-Anch: Σ -H	$\Sigma = \sigma\sigma$	Dep: I-O
\curvearrowright (ta.ká.) a						
(ta.káa)	*!			*		
ta.(ká.a)	*!			*		

As this analysis predicts, the phrase-medial output is identical to the phrase-final output.

4. Conclusion.

Based on the facts of Mayo, I have argued that OT is superior to generative theories of phonology in two ways. First, Mayo presents a tough problem for rule-based theories of stress such as Hayes 1981, 1995, Prince 1983, Hammond 1984, and Halle and Vergnaud 1987, for the latter do not have any means of explaining the observed dependency relationship between a word's stress category and its segmental lengthening category. OT, on the other hand, is able to account for this relationship using only constraints which are independently attested in a wide variety of languages. Second, OT claims that all aspects of universal grammar are potentially present in every grammar. Accordingly, OT

predicts that both kinds of stress (QS and QI) are in some way present in every grammar. Mayo instantiates a grammar in which the latter situation is visibly manifest. According to the basic assumptions of generative theory, however, such a grammar is predicted *not* to occur.

The OT view of the universality of constraints finds further support in the two structurally different types of vowel length found in Mayo. In one type, a single segment is associated to two moras. In the other type, two identical vocalic segments are adjacent to one another. Furthermore, this contrast is observed in underlying forms as well as in surface forms. This poses a problem for theories which rely on serial derivation, for they would find it necessary to invoke many of the same constraints used in the above OT analysis, some of which contradict each other. Since OT actually predicts that conflicting constraints are present in *every* language, the Mayo data provide a strong argument against serial derivation and in favor of OT.

Notes

¹ For a definition of the mora and a discussion of its role in phonological theory, see Hayes 1989.

² All data for Cairene Arabic are from Langendoen 1968 and McCarthy 1979; the descriptive summary is from Hayes 1995.

³ All the Mayo data in this paper are from my field notes, which were gathered mainly between 1983 and 1988. The sole phonetic feature of stress is high pitch. The lexicon is fairly evenly divided between words with first syllable stress and words with second syllable stress. Since phrase-final stress can be perturbed, all data in this paper are non-phrase-final except where otherwise noted.

⁴ A short word is defined here as consisting of two syllables, the first one being monomoraic. Regardless of the stress class, if the first syllable is bimoraic, then lengthening is not observed.

⁵ This has been commonly assumed in the analysis of many tonal systems as well as stress systems. Hayes 1995 explicitly argues against the possibility of such a configuration in stress systems.

⁶ Following Hagberg 1993, I assume that feet are inherently headless and that stress functions as an autosegment. Although Hagberg 1993 predates OT, the arguments for these two points are still valid.

⁷ I follow McCarthy and Prince 1995 in utilizing the following conventions within tableaux: The constraints are listed in order of highest-ranking to lowest-ranking going from left to right. Each asterisk * indicates a violation of the constraint found at the top of that column by the output candidate listed at the beginning of that row. An exclamation point ! indicates a fatal violation. The pointing hand ☞ indicates the winning candidate, i.e., the optimal output (of which there may be more than one) for the given input. See McCarthy and Prince 1995 and Archangeli and Langendoen 1997 for further explanation of these conventions.

⁸ This tableau demonstrates that *EM* outranks all the other constraints, with one possible exception. Since there is no phonetic difference between *no.ó.ka* and *no.ó.ka*, it cannot be proven that *EM* outranks **H* on μ . None of the claims of this paper hinge on their relative ranking.

⁹ This alternation in vowel length occurs in other short words as well; these are presented and discussed in detail in Hagberg 1990, 1993.

¹⁰ Notice that the constraints *R-Anch*: Σ -*H* and $\Sigma = \sigma\sigma$ must dominate *R-Anchor*: *I-O*.

¹¹ See Hagberg 1990, 1993 for a generative analysis of these data.

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The Logic of Optimality Theory

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1 Introduction

This paper is an attempt to determine the underpinnings of Optimality Theory (henceforth OT; Prince and Smolensky, 1993; McCarthy and Prince, 1993), and what logic might have to do with it.¹ This is important because, without this kind of work, very strange misunderstandings of the theory crop up. The work reported here is preliminary, but nothing of this sort has previously been attempted for OT, even though the theory has been around since 1993 and is the predominant framework for phonological research in North America.

The goals of the paper are as follows. First, I develop a logical statement of Optimality Theory. Next, I go on to prove some theorems. Third, I go on to show how the framework allows us to reason about partial derivations, and provides promise as the basis of a theory of acquisition and a theory of parsing.

The organization of the paper is as follows. First, I provide a review of OT. Next, I introduce the basic logical formulation for a pruned-down version of OT with only one constraint. In the following section, I extend the formulation to treat real OT, where there is more than one constraint. I go on in the next section to prove several theorems. Some of these are simply to show that the formalization is doing the right thing, but some of these are quite important in their own right. Finally, I go on to show how the formalization allows us to reason about derivations given incomplete information.

There are a number of results of this paper, but one real important one is that I establish that OT allows for multiple winners. That is, a tableau can have several winning candidates. This may seem obvious to the reader familiar with OT, but many presentations of OT imply or even state that this isn't so. For example:

As mentioned before, for each underlying form (input_{*i*}) there is a surface form (output_{*i*}) which is the candidate from the set

(candidate₁, candidate₂, ..., candidate_n)
that best satisfies the constraint ranking (Rosenthal (1994); p.10).

Likewise:

This set of candidate forms is then submitted in parallel to a hierarchy of constraints for evaluation, and the candidate form which 'best satisfies' the hierarchy emerges as the optimal form. The optimal form is the output form, and vice versa.

Eval{cand₁, cand₂, ...} → cand_k(the output, given input_i)
(Hung (1994); p.2)

Finally, Tesar (1995) is most explicit:

The idea is that by examining the marks assigned by the universal constraints to all the candidate outputs for a given input, there is one which is least marked, or optimal: this is the *one and only* (my emphasis: MH) well-formed description that may be assigned to the input by the grammar (Tesar (1995); p.3).

My point in citing these authors is not to take them to task. Rather, my point is to demonstrate that this understanding of OT is widespread. Thus, a formalization that demonstrates the falsity of this position is of even more use.

For the reader not familiar with logic, the formalism used here may appear quite daunting. However, the basic ideas are rather straightforward. Moreover, I will in all cases recast formal statements in ordinary language.

2 Optimality Theory

Let's take phonology, or any component of grammar, as exhibiting a "tension". What I mean by this is that there are two forces that conflict in generating the observed phonology of a language.

Basically, each word needs to be different, but there are generalizations that tie together the expressions of a language. For example, in English, syllable-initial voiceless stops are aspirated. For example: *tack* [t^hæk], *cat* [k^hæt], and *pat* [p^hæt].

Optimality Theory is one way of accounting for this relation. What are the basic claims of OT? It is actually not altogether clear. One could answer this in terms of what Prince and Smolensky thought they were proposing, but it is surely more meaningful to understand this in terms of what linguists have actually concluded.²

There are three central claims. First, all phonological generalizations can be modeled with constraints. Second, constraints can interact only by strict ranking.

Third, all constraints are universal. Prince and Smolensky actually maintain that they only really propose the second, but things have turned out differently. I go through each of these below.

There are three central components to the theory: GEN, CON, and EVAL. The idea is that any lexical representation can be mapped to any pronounceable thing. This general mapping is performed by GEN. The correct output for some form is achieved by constraints. These constraints govern what is a well-formed mapping. For example, an input form like /kæt/ for *cat* would undergo GEN as follows.³

- (1) /kæt/ → {[kæt], [k^hæt], [dɔg], [karandaf], [k^hɪtɪ], etc.}

Lexical entries are mapped to surface forms in every imaginable way (GEN) and constraints (CON) limit the set of acceptable mappings. According to Prince and Smolensky, the constraints are finite and universal, but this is all that is known. The process whereby the correct candidate is chosen is called EVAL.

Consider now how the system works with a simple example. Let's go through some of what is required to get aspiration in English to come out correctly.⁴ The first thing we need is a constraint to enforce the inertia of lexical representations: FAITH. This constraint penalizes any candidate that differs from the input.

- (2) FAITH

Input and output should be identical.

If this were all there were to it, the lexical representation would win, as exemplified below. OT "derivations" are presented in constraint tableaux. The input is given in the upper left. Candidates are given along the left side and constraints along the top. Constraint violations are given as asterisks and the winning candidate is indicated with a pointing hand. Here, the form [kæt] wins.

- (3)

	/kæt/	FAITH
☞	[kæt]	
	[k ^h æt]	*!
	[dɔg]	*!
	[karandaf]	*!
	[k ^h ɪtɪ]	*!

This is, of course, incorrect. The initial consonant must surface as aspirated. We need a constraint that expresses this generalization about English. Presumably, this can be expressed in more general terms and is a reflection of some more

general phonetic tendency regarding laryngeal gestures, but I won't attempt this here.

- (4) ASPIRATION
Word-initial voiceless stops are aspirated.

The ASPIRATION constraint is exemplified in the following tableau. Notice how this constraint also fails to pick out the correct candidate. Instead, it allows any candidate that satisfies the constraint, including those candidates that are otherwise unfaithful to the input.

(5)

	/kæt/	ASPIRATION
	[kæt]	*!
☞	[k ^h æt]	
☞	[dɔg]	
	[karandaf]	*!
☞	[k ^h ɪtɪ]	

To get the right results, we need both constraints. However, simply having both constraints fails, since there is no candidate which passes both. We need both constraints plus the notion of “strict ranking”. Strict ranking says that constraints are ordered and violations of higher constraints are more important than violations of lower constraints. In this case, the ASPIRATION constraint outranks the FAITH constraint. This is written as follows.

- (6) ASPIRATION \gg FAITH

This can be exemplified in the following tableau. Ranking is indicated with left-to-right ordering of constraints. The interaction of constraints via strict ranking selects the correct candidate.

(7)

	/kæt/	ASP	FAITH
☞	[k ^h æt]		*
	[kæt]	*!	
	[dɔg]		**!*

There are several things to notice about this. First, notice that the winning candidate need not be perfect. For example, [k^hæt] wins, but violates FAITH. Second, ranking is strict. This means that a single violation of a higher constraint overpowers any number of violations of a lower constraint. Finally, notice that there will

always be *at least* one winning candidate. In the logical formalization I propose below, these properties will follow.

A clear example of how the ranking is strict is given in the following hypothetical tableau. Notice that candidate [y] wins even though it has more total violations and more violations of constraint B than either of the other candidates.

(8)

/X/	A	B
[y]	*	***
[z]	**!	*
[w]	**!	

Notice also that there may be more than one winning candidate given the system as presented. A tableau showing how this works is given below. The two winners tie on all constraints, neither violating the higher constraint and both violating the lower constraint. I'll return to this below.⁵

(9)

/X/	A	B
[y]		*
[z]		*
[w]	*!	

The review of OT presented here has necessarily focused on the issues of relevance to this paper. In addition, I have not discussed any of the phonological substance of the model. For further detail, see Prince and Smolensky (1993), McCarthy and Prince (1993), or Archangeli and Langendoen (1997).

3 Logic

Let's now consider how this might be expressed in terms of first order logic. There have been various attempts to treat phonology in terms of logic before. See, for example, Bird (1995), Calder and Bird (1991), and Oehrle (1991). There have as yet been no attempts to do this for OT. The only discussion of logic in the context of OT is with regard to "constraint conjunction", e.g. Smolensky (1993) and Crowhurst and Hewitt (1997). These papers treat the question of whether independent constraints can be combined into a new constraint using logical conjunction or disjunction; they do not treat the larger question of a logical interpretation of constraint interaction.

The key move in the formulation I propose is to define winning candidates as true with respect to a predicate we can think of as “is a winner”.

(10) Truth

The candidates that win with respect to a constraint, or a ranked set of constraints, are true with respect to the predicate “is a winner”.

In what follows, I will symbolize this predicate as “ win ”.

We now define a language in which we can talk about constraints, candidates, ranking, and violations. The basic ideas here are mostly quite straightforward. First, we want to have the power of first order logic so we can prove things. Second, we want to define terms and syntax for ranking and violations.

First, we need the usual logical connectives.

(11) $\rightarrow, \wedge, \vee, \neg, \leftrightarrow, \exists, \forall$

These have their usual interpretations: implication, conjunction, disjunction, negation, bidirectional implication, and the existential and universal quantifiers. In addition, we’ll need some additional connectives which will be defined below. These allow us to formalize the comparison of violations and ranking.

(12) $=, >, \equiv, \gg, \text{win}$

Finally, I’ll use lowercase greek letters, α, β, γ , etc., to refer to cells in a tableau, and capital greek letters, A, B, Γ , etc., to refer to candidates.

Let’s now consider the auxilliary predicates of (12). First, we use the normal “ \gg ” symbol to indicate a difference in ranking, but we also need something to refer to two cells that have the same ranking: “ \equiv ”. We write $\alpha \gg \beta$ if α and β are cells for the same candidate (but different constraints) and α outranks β . We write $\alpha \equiv \beta$ if α and β are cells for the same constraint (but different candidates).

These relations have the expected properties. The “ \equiv ” relation is symmetric, reflexive, and transitive.

- (13) a. $\alpha \equiv \alpha$.
 b. If $\alpha \equiv \beta$, then $\beta \equiv \alpha$.
 c. If $\alpha \equiv \beta$ and $\beta \equiv \gamma$, then $\alpha \equiv \gamma$.

The “ \gg ” relation is transitive, but not symmetric, and not reflexive.

- (14) a. $\neg(\alpha \gg \alpha)$
 b. $\neg((\alpha \gg \beta) \wedge (\beta \gg \alpha))$
 c. If $\alpha \gg \beta$ and $\beta \gg \gamma$, then $\alpha \gg \gamma$.

We need to compare violations numerically, and the simplest way to do that is with successor notation: we define $0, 0', 0'', 0''', \dots$, where $0 = 0, 0' = 1, 0'' = 2, 0''' = 3$, etc. The “ $>$ ” and “ $=$ ” relations are straightforward. Using successor notation, “ $>$ ” relation is defined recursively. The “ $=$ ” relation can then be defined in terms of “ $>$ ”. Let x, y, z be numbers in successor notation.

$$(15) \quad x > y \text{ if } x \text{ is } y' \text{ or if } (x > z) \wedge (z > y).$$

$$(16) \quad x = y \text{ if } \neg(x > y) \wedge \neg(y > x).$$

All the other comparisons can then be defined in terms of these. The key point here is that we can do the necessary math within the formalization proposed.

The other numerical comparisons can be treated as abbreviations.

$$(17) \quad \begin{array}{ll} \text{abbreviation} & \text{stands for} \\ \alpha < \beta & \beta > \alpha \\ \alpha \geq \beta & (\alpha > \beta) \vee (\alpha = \beta) \\ \alpha \leq \beta & (\alpha < \beta) \vee (\alpha = \beta) \end{array}$$

Here’s a tableau so we can see how these can be used. I’ve marked individual cells with specific greek letters.

(18)

input	constraint A	constraint B
candidate 1	κ : *	λ : ***
candidate 2	μ : **	ν : *

The ranking relations we want are: $\kappa \equiv \mu, \lambda \equiv \nu$ and $\kappa \gg \lambda, \mu \gg \nu$. The numerical comparisons from the tableau above are: $\kappa = \nu, \mu > \kappa, \lambda > \kappa, \mu > \nu, \lambda > \nu, \lambda > \mu$.

The logical properties of the “ \gg ” operator are obviously key, and are treated in the next sections. For the moment, let “ \gg ” be a unary operator that should be interpreted as “is a winner”, or “is true”.

The essential points of the formalization given so far can be easily summarized in general terms. First, cells can be compared in terms of ranking relations. Second, cells can be compared in terms of the number of violations they exhibit. Let’s now consider how this works. I’ll do this in two passes. First, I’ll show what we would need if there were only one constraint. Then we enrich the system to deal with normal OT where there is more than one constraint.

4 One Constraint

For a single constraint, the idea is simple: the candidate or candidates exhibiting the fewest violations win. This can be expressed formally as follows.

$$(19) \models \alpha \leftrightarrow \neg \exists \beta ((\beta \equiv \alpha) \wedge (\beta < \alpha))$$

This can be expressed straightforwardly in normal language as well. This says that some cell α is interpreted as true if and only if there does not exist some other cell β that has fewer violations, where α and β are cells for the same constraint. This can also be expressed as follows.

$$(20) \models \alpha \leftrightarrow \forall \beta ((\beta \equiv \alpha) \rightarrow (\beta \geq \alpha))$$

Let's look at an example. Here the first and third candidates have the fewest violations and so they are both winners or "true with respect to \models ". In tableaux, I will mark cells that are true with a \top and cells that are false with \perp .

(21)

a.	<table border="1" style="display: inline-table;"><tr><th>/kæt/</th><th>ASP</th></tr><tr><td>[k^hæt]</td><td></td></tr><tr><td>[kæt]</td><td>*!</td></tr><tr><td>[dɔŋ]</td><td></td></tr></table>	/kæt/	ASP	[k ^h æt]		[kæt]	*!	[dɔŋ]	
/kæt/	ASP								
[k ^h æt]									
[kæt]	*!								
[dɔŋ]									

b.	<table border="1" style="display: inline-table;"><tr><th>/kæt/</th><th>ASP</th></tr><tr><td>[k^hæt]</td><td>\top</td></tr><tr><td>[kæt]</td><td>\perp</td></tr><tr><td>[dɔŋ]</td><td>\top</td></tr></table>	/kæt/	ASP	[k ^h æt]	\top	[kæt]	\perp	[dɔŋ]	\top
/kæt/	ASP								
[k ^h æt]	\top								
[kæt]	\perp								
[dɔŋ]	\top								

Recall that the winners aren't necessarily perfect. The formalization covers this case as well. Here's a sample tableau showing how this works. The key move is that the logical formulation looks for the cells with the fewest violations, not for cells with no violations. Here the first cell has the fewest violations and is thus true.⁶

(22)

a.	<table border="1" style="display: inline-table;"><tr><th>/X/</th><th>A</th></tr><tr><td>[y]</td><td>*</td></tr><tr><td>[z]</td><td>**!</td></tr><tr><td>[w]</td><td>**!</td></tr></table>	/X/	A	[y]	*	[z]	**!	[w]	**!
/X/	A								
[y]	*								
[z]	**!								
[w]	**!								

b.	<table border="1" style="display: inline-table;"><tr><th>/X/</th><th>A</th></tr><tr><td>[y]</td><td>\top</td></tr><tr><td>[z]</td><td>\perp</td></tr><tr><td>[w]</td><td>\perp</td></tr></table>	/X/	A	[y]	\top	[z]	\perp	[w]	\perp
/X/	A								
[y]	\top								
[z]	\perp								
[w]	\perp								

Recall that there can be more than one winner and the schema captures these cases as well. This is exemplified in the following tableau. Here the first and second cells satisfy the requirement that there is no other cell for the same constraint that has fewer violations. They are then both true.

(23)

a.	<table border="1"><tr><td>/X/</td><td>A</td></tr><tr><td>[y]</td><td></td></tr><tr><td>[z]</td><td></td></tr><tr><td>[w]</td><td>*!</td></tr></table>	/X/	A	[y]		[z]		[w]	*!
/X/	A								
[y]									
[z]									
[w]	*!								

b.	<table border="1"><tr><td>/X/</td><td>A</td></tr><tr><td>[y]</td><td>T</td></tr><tr><td>[z]</td><td>T</td></tr><tr><td>[w]</td><td>⊥</td></tr></table>	/X/	A	[y]	T	[z]	T	[w]	⊥
/X/	A								
[y]	T								
[z]	T								
[w]	⊥								

What happens if all candidates tie? The theory says that in such a case, all the candidates win. Here is a tableau showing how this looks. All cells satisfy the requirement that there is no other cell that has fewer violations. Hence all are true.

(24)

a.	<table border="1"><tr><td>/X/</td><td>A</td></tr><tr><td>[y]</td><td>*</td></tr><tr><td>[z]</td><td>*</td></tr><tr><td>[w]</td><td>*</td></tr></table>	/X/	A	[y]	*	[z]	*	[w]	*
/X/	A								
[y]	*								
[z]	*								
[w]	*								

b.	<table border="1"><tr><td>/X/</td><td>A</td></tr><tr><td>[y]</td><td>T</td></tr><tr><td>[z]</td><td>T</td></tr><tr><td>[w]</td><td>T</td></tr></table>	/X/	A	[y]	T	[z]	T	[w]	T
/X/	A								
[y]	T								
[z]	T								
[w]	T								

5 More than One Constraint

Let's now consider full OT where there is more than one constraint. The key move here is to restrict the choice of winning/true candidates with respect to some constraint to only those candidates that are true with respect to higher constraints

This can be put in prose as follows: when a constraint is ranked below other constraints, the truth values of its cells are a function of the truth values of higher-ranked constraints. Putting this in formal terms is a little complex, so I've broken it into two parts. The following general statement says that a cell α is true if two conditions hold.

$$(25) \quad \varepsilon\alpha \leftrightarrow (A \wedge B)$$

The first condition says that α is true if and only if there is no β where β has fewer violations than α , and α and β are with respect to the same constraint, and all cells that outrank β are true.

$$(26) \quad A: \neg\exists\beta((\beta < \alpha) \wedge (\beta \equiv \alpha) \wedge \forall\delta((\delta \gg \beta) \rightarrow \varepsilon\delta))$$

The second condition says that all cells that outrank α must also be true.

$$(27) \quad B: \forall\gamma((\gamma \gg \alpha) \rightarrow \varepsilon\gamma)$$

Both of these can be cast in prose as well. Condition A is true if and only if there is no cell β such that i) β has fewer violations than α , ii) β is for the same

constraint as α , and iii) all cells dominating β are true. Condition B is true if and only if all cells dominating α are true.

Notice that the one-constraint case is handled successfully by this more complex statement as well. There are no higher-ranked cells so the conditions on them are vacuously satisfied. If a constraint is top-ranked, then there are no higher-ranked cells. In this case, the conditions on higher-ranked cells are vacuously satisfied.

Let's go through a case.

(28)

a.	/kæt/	ASP	FAITH
☞	[k ^h æt]		*
	[kæt]	*!	
	[dɔg]		**!*

The higher-ranked constraint is straightforward; The first and third candidates win because they have the fewest violations. Turning to the second constraint, the second candidate is false because it fails to satisfy condition B.

(29)

b.	/kæt/	ASP	FAITH
	[k ^h æt]	⊥	*
	[kæt]	⊥	⊥
	[dɔg]	⊥	**!*

Both the first and third candidates satisfy condition B, but the third candidate does not satisfy condition A because the third candidate has more violations. Hence, the third candidate is false for the second constraint.

(30)

c.	/kæt/	ASP	FAITH
☞	[k ^h æt]	⊥	⊥
	[kæt]	⊥	⊥
	[dɔg]	⊥	⊥

This is pretty straightforward and suggests that the truth of a candidate in toto can be seen as the conjunction of the truth values of its cells. In other words, a candidate is true if and only if all its cells are true. This is given formally below.

$$(31) \quad \text{☞} \Omega \leftrightarrow \left(\bigwedge_{n=1}^m \text{☞} \alpha_n \right)$$

A candidate Ω is a winner if and only if all of its cells are assigned \top .

6 Consequences

Let's now look at the consequences of all this. The basic idea will be to show that with this relatively simple formulation we can prove some important results about OT. I do this by proving several theorems.⁷ The general idea is what is most important here. If we understand the logic of OT, we can understand the properties of OT more clearly. Consider first a relatively simple idea: all inputs have at least one output.

Theorem 1 *All inputs have at least one output.*

This can be proved relatively easily by mathematical induction. In the case at hand, the proof comes from the observation that given some set of positive integers, there will always be some subset that contains the elements that are smaller than all the rest. Moreover, the effect of constraint ranking, as defined here, is to narrow that further, but not to eliminate all candidates.

Proof:

- Assume that the candidate set has at least one candidate and all candidates exhibit some finite number of constraint violations.
- If there is only one constraint, then there will be a set of cells, $\{\alpha_1, \dots, \alpha_n\}$, representing constraint violations for the different candidates. The relation “<” will always pick out a set of at least one cell, $\{\alpha_i, \dots, \alpha_k\}$ where all members have the same number of violations, but where no other cells have as few. Hence there will be at least one winner in the case of a single constraint.
- Assume this is true for a system with n constraints.
- We must now show that it is true for a system with $n + 1$ constraints. Let us assume that the system with n constraints has resulted in a set $\{\alpha_1, \dots, \alpha_n\}$ of winners. We add another constraint C , such that all the other constraints outrank C . Constraint C assigns violations to all candidates. The schema entails that we only need to consider those candidates that are within the set of winners determined by the topmost n constraints. Among these, we again apply the relation “<” to pick out a set of cells that satisfy the same conditions. Though this only applies to the reduced set of winners $\{\alpha_1, \dots, \alpha_n\}$, it will still be the case that this set contains at least one cell with a minimum number of violations.
- Therefore a system with $n + 1$ constraints will have at least one winner.

□

Notice that this might seem to create problems for cases where phonologists want to rule out any output. For example, McCarthy and Prince (1993) discuss the case of Yidin^y where prosodic constraints interact so that in some morphological categories no output results. McCarthy and Prince get around this by allowing the candidate set to include the null parse. The distribution of such a candidate is limited by a constraint M-PARSE, judiciously ranked. Thus even in cases where the facts tell us there is no output, the theory has been constructed so that the derivation results in a “null” output. Even when the winning candidate is one that violates a constraint like M-PARSE (McCarthy and Prince, 1993), there is still a winning candidate; it is simply a candidate that has no pronunciation.

Let’s do another theorem. This is simply to show that the formalization as presented gives us strict ranking, as desired.

Theorem 2 *Constraint ranking is strict.*

Recall that strict ranking is the claim that no number of violations of a lower-ranked constraint is sufficient to overpower a single violation of a higher-ranked constraint. This is exemplified in the following tableau.

(32)

	/X/	A	B
☞	[y]		****
	[z]	*!	

The theorem follows from the fact that the two conditions A and B are conjoined.

Proof:

- Consider the case of two constraints, referring to the tableau above. For a candidate to win, its cells must be assigned \top for all constraints. If some cell α has fewer violations than some cell β for some constraint A, then α, β will be assigned \perp . Because the condition that all higher-ranked cells must be assigned \top must generally hold, it follows that no number of violations for a lower-ranked constraint will have an effect.
- Assume that it is true for two constraints in a system of n constraints with lots of other irrelevant constraints ranked above and below the key constraints.
- For these other constraints to be irrelevant, they must assign \top to both of the candidates in question.
- Increasing the constraint set to $n + 1$ by adding another such constraint does not alter the conclusion. \square

Here is a trivial one. This theorem is simply the expression of the fact that numerical comparison defined over the numbers allowed by the successor notation we've adopted will always select a cell with no violations as a winner.

Theorem 3 *If a candidate violates no constraints, it is a winning candidate.*

Proof:

- If CON has only a single constraint, then the smallest number of violations a candidate can have is 0. Such a candidate will be assigned \top and will therefore be in the set of winning candidates.
- Assume this is true when CON has n constraints. That is, if there are n constraints and some candidate $[x]$ violates none of them, it will be in the winning set.
- Now add one more constraint Z and assign $[x]$ no violations of it. With no loss of generality, we can assume that Z is bottom-ranked. If $[x]$ has no violations of Z, then $[x]$ will be assigned \top for Z, since 0 is the smallest number of possible violations.
- Because candidate $[x]$ was a winner when there were only n constraints, it must have had been assigned \top for all n constraints. With $n + 1$ constraints, it is still assigned \top in all cells. Hence $[x]$ is in the winning set. \square

Here is the most interesting case. Interestingly, the proof is the simplest.

Theorem 4 *There can be multiple winners.*

Proof:

- Nothing in the formal system prevents some constraint A from assigning violations to all but 2 candidates ($\exists\alpha\exists\beta(\alpha = \beta = 0)$).
- Assume this is true for n constraints. That is, the first constraint rules out all but two and none of the $n - 1$ remaining constraints distinguish the two surviving candidates ($((\gamma \equiv \delta) \wedge ((\alpha \gg \gamma) \wedge (\beta \gg \delta))) \rightarrow (\gamma = \delta)$).
- To complete the induction, we simply add one more constraint that does not distinguish the two candidates. \square

The proof of this one relies on the existence of at least two candidates that are not distinguished by any constraints.

This may seem unlikely, but notice that this intuition (which I actually share!) is an intuition about the kinds of constraints in CON. The theory simply says that these are universal and finite. Nothing about OT as it stands forces us one way or the other with regard to this situation.

7 Partial Information

Let's now consider the question of partial information. The idea here is to think about whether the formulation might help us in other domains, e.g. parsing and acquisition. The idea is that if a speaker is confronted with partial information about some phonological pattern in parsing an utterance or in determining the nature of their phonology, the logic of OT can help. The system we have developed here will allow us to reason about tableaux with partial information.

Let's consider the problem with a partially filled-in tableau. Imagine that all we know is that there are three constraints ranked $A \gg B \gg C$. Moreover we know that input /X/ is pronounced [y].

(33)

/X/	A	B	C
[y]			
[z]			
[w]			

What do we know in such cases? We know that [y] must be true for all cells. I put letters in each cell so we can refer to individual cells. We immediately know that all the cells of candidate [y] must be assigned \top .

(34)

/X/	A	B	C
[y]	\top_a	\top_b	\top_c
[z]	d	e	f
[w]	g	h	i

We also know that at least one cell of [z] and [w] is assigned false. We also know that a false cell will never outrank a true cell. The former is given formally below.

$$(35) \quad \neg(\varepsilon d \wedge \varepsilon e \wedge \varepsilon f) \wedge \neg(\varepsilon g \wedge \varepsilon h \wedge \varepsilon i)$$

If we want to think about the number of violations that occurs in each cell, we can reason further. For example: imagine we know that cell e has fewer violations than cell b . It follows that cell a must have fewer violations than cell d .

This follows because we know all cells for [y] are assigned \top . Hence if candidate [z] were assigned a \top in cell d for constraint A, the fact that cell e has fewer violations than cell b would entail that [y] cannot be in the winning set. Therefore [z] cannot be assigned a \top in cell d for constraint A. Since A is the topmost constraint, the fact that [y] is true and [z] is false must follow from a different number

of violations. Hence, if cell e has fewer violations of B than cell b , then cell a must have fewer violations of A than cell d .

Reasoning about partial information is a very important result because it paves the way for OT-based theories of acquisition and parsing.

In acquisition, the idea would be that the child is confronted with partial information and must learn other information. The logical structure proposed provides a means to do that.

In parsing, a similar problem obtains. The listener is confronted with partial information and must deduce(!) additional information. Again, the logical structure proposed provides one possible mechanism by which a parser might proceed.

8 Conclusion

I've tried to develop a formulation of at least some aspects of OT in terms of first order logic. Essentially, a cell α is true if all higher-ranked cells are true and there is no other cell β for the same constraint where i) all cells dominating β are true, and ii) β has fewer violations than α . This formulation is surely naive in some regards, but it is the first attempt at this in the literature.

The formulation has allowed us to state and prove several theorems. First, all inputs have at least one output. Second, constraint ranking is strict. Third, if a candidate violates no constraints, it is a winning candidate. Finally, there can be multiple winners.

The most interesting theorem is the last as this is a domain where there has been some misunderstandings in the literature. Notice that there are a variety of ways one could respond to this.

One possibility that I pursued in earlier work Hammond (1994) was to show that one needs multiple winners to handle variation. This would put the issue on satisfyingly familiar empirical grounds.

The other possibility would be to revise the theory of constraints so that we guarantee that there will be no more than one winner in any particular case. This, in fact, is what the practice of most phonologists has been, but it would be really nice to put some theoretical teeth to this.

Finally, the framework proposed has implications for how we might view acquisition and parsing, where the subject is confronted with partial information about phonological representations.

I want to reiterate that the formalization is only partial, but I hope to have demonstrated that there are some useful consequences to this kind of work and hopefully this will encourage others to continue this kind of work.

Notes

¹This paper is for my former colleague Dick Oehrle, who recently left Arizona for greener pastures. Thanks also to Colleen Fitzgerald, James Myers, Diane Ohala, and the audience at WECOL for useful discussion. All errors are my own.

²It is also, of course, exceedingly difficult to know what the authors thought!

³I assume Correspondence theory here (McCarthy and Prince, 1995).

⁴There's much more required than this; see Hammond (1999) for more details.

⁵I addressed the issue of whether there is empirical support for allowing OT derivations to result in more than one candidate in an earlier unpublished paper (Hammond, 1994). See also Idsardi (1992).

⁶Of course, as we will see later on, a cell with no violations is necessarily in the set of cells with the fewest violations.

⁷The theorems are a compromise in terms of the degree of formality. I've done this for readability.

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Fixed-Segment Reduplication in Hip-Hop and Gangsta Rap*

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1. Introduction and Preliminaries

Given the foundational assumption that verbal art makes use of the same faculty that is available to normal language-use, it follows that any theory of grammar should also be amenable to accounting for verbal art. I include in my definition of “verbal art” what has traditionally fallen under the rubric of “speech play” and “language games”. The tradition of treating such events in a theoretical way within phonology is well-established. For example, Sherzer (1972) has discussed “the psychological reality of phonological descriptions” as revealed in the Kuna language game *Sunmakke*, and Chomsky and Halle (1968) discuss English syllable structure as revealed in *Pig Latin*. For a review of and systematic contribution to this literature the curious reader should see Bagemihl (1985).

The purpose of this paper is to further this work by employing the theoretical apparatus provided by Optimality Theory in order to elucidate two kinds of artful fixed-segment reduplication found in Hip-Hop and Gangsta Rap music: the affixation of the vacuous reduplicative morpheme *-iggity* and the use of nicknames that I will call Hip-Hop Hypercoristics, or “hiphopocoristics”.

Alderete et al. (1999) identify two distinct types of fixed-segment reduplication, which can be described in two different ways. The first is phonological and falls into the rubric of the Emergence of the Unmarked (McCarthy and Prince 1994), and the second is morphological and involves standard affixation and morphological overwriting. These will be discussed in detail below.

Although familiarity with Optimality Theory is assumed throughout this paper, I will remind the reader that in the “basic model” of Correspondence Theory (McCarthy and Prince 1995) there are two kinds of relevant faithfulness relations for the Reduplicant and Base. The first is faithfulness between the input and the base, which is governed by the constraint MAX-IO, and the

second is identity between the base and the reduplicant, which is governed by the constraint MAX-BR.

2. Vacuous Reduplication in Gangsta Rap: *-iggity* Affixation

Vacuous Reduplication is reduplication that is non-morphological, i.e. a form of reduplication which serves prosody without contributing to semantic meaning (Fitzgerald 1998). Descriptively, vacuous reduplication takes place in Gangsta Rap music when rappers take a word and copy the onset consonant(s) and affix these to the vacuous morpheme *-iggity*. Some examples from attested song lyrics are given in 1 (compiled from ESG 1994 and Geto Boys 1993):

1	swangin'	→	swiggity-swangin'
	bangin'	→	biggity-bangin'
	bang	→	biggity-bang! biggity-bang!
	bustin'	→	biggity bustin'

Since rap music is not governed by adherence to a fixed meter, vacuous reduplication is unpredictable: the *-iggity* morpheme is available for the artist to use, but is not required by the prosodic structure of any given song. Thus, its appearance in any given instance is the result of an option taken by the artist¹.

2.1 Analysis: morphological overwriting

As discussed in Alderete et al. (1999), morphological overwriting occurs when a morphological affix overlaps with part of a reduplicant. The English example that they use comes from the so-called “*sm-*” words. The constraints necessary to account for the overwriting of part of the reduplicant are as follows:

- 2 MAX-IO: A segment in the input must be present in the output.
- 3 MAX-BR: A segment in the base must appear in the reduplicant.
- 4 DEP-BR: A segment should not be in the reduplicant if it is not in the base.

Table 5 below illustrates the interaction of these constraints in the OT analysis of English *sm-* words given by Alderete et al. (my 5 corresponds with their 12, with the addition of a column for the lowly ranked DEP-BR). They assume an undominated alignment constraint which prefixes the *sm-* morpheme, and that

the reduplicative base is the entire input word /*table*/. The constraints are crucially ranked as shown²:

5 MAX-IO >> MAX-BR (>> DEP-BR) in *table smable*

/table-RED-sm/	MAX-IO	MAX-BR	(DEP-BR)
a. ☺ <u>table-smable</u>		t	(sm)
b. <u>table-table</u>	sm!		
c. <u>smable-table</u>	t!	sm	
d. <u>smable-smable</u>	t!		

Although Alderete et al. make no mention of this, the candidate with the complex onset *sm-t* is presumably ruled out by an undominated markedness constraint on onset consonant clusters in English.

Here, the *sm-* is functioning as a morpheme which is lexically represented, thus when it fails to appear in the output (e.g. candidate b) there is a violation of MAX-IO for each of the missing segments. Candidates c and d also violate MAX-IO, since they omit part of the base. The winning candidate violates MAX-BR, hence the crucial ranking of input-output faithfulness over base-reduplicant identity.

In footnote 26 of Alderete et al., the question is raised whether *sm-* is part of the formal reduplicant or not: that is, the question is raised whether the correct output should be *table-smable* or *table-smable*. If the former is the case, the overwriting would also violate DEP-BR. Since the tableau should predict the latter (with no violation of DEP-BR), the latter should always win.

The issue of what constitutes the base is critical: without the base being defined it will be impossible to assess violations of MAX-BR. Although this may seem to be intuitive, below we will see how being explicit about the constitution of the base is necessary.

Assuming that the entire input word is the reduplicative base, we can attempt to apply the same analysis to *-iggity*, generating the output shown in the next table:

6 MAX-IO >> MAX-BR (with the entire input word assumed to be the base)
target output: *swiggity swarjin*

/RED-igity-swarjin/	MAX-IO	MAX-BR
a. swarjin	i!gity	swarjin
b. <u>swarjin</u> swarjin	i!gity	
c. swarj-igity_swarjin	i!	in
d. ⊗ <u>swarjin</u> -igity swarjin		
e. swarj-igity_swarjin		in!
f. ⊗ <u>sw</u> -igity swarjin		anjin

Candidates a-c leave out the part of the input corresponding to the *-igity* morpheme, and are ruled out by MAX-IO. The only one of the remaining candidates to have a reduplicant which completely copies the base is f, which should be the winning candidate. But as is illustrated, using the same technique here that worked in 5 will generate the incorrect output: candidate d.

There are two issues here. The first is how to assess the gradient violations of MAX-BR. The tradition within OT is that the important matter here is the number of violations, in which case e and f are equally bad. But, one can imagine possible scenarios wherein two candidates have an equal number of violations of a particular constraint, but that one of the candidates has more egregious violations than the other, and how this would be captured is obscure: I will simply raise this issue here without further comment.

The next issue is more readily addressable: How do we get the real output to emerge when there would appear to be several more optimal candidates? The approach that I take here seems to be the simplest: i.e. I want to generate a winning candidate which has the fewest possible violations of MAX-BR. We can do this if we redefine the base. If, rather than assuming that the base is the entire input word, we assume that the base is only the onset consonant(s) of the input word, we generate the correct output, as shown in 7:

7 MAX-IO>>MAX-BR>>DEP-BR (onset consonant(s) assumed to be the base)
output: *swiggity swanjin*

/RED-igity-swanjin/	MAX-IO	MAX-BR	DEP-BR
a. swanjin	i!gity	Sw	
b. swanjin swanjin	i!gity		anjin
c. swan-gity swanjin	i!		an
d. swanjin-igity swanjin			a!njin
e. swan-igity swanjin			a!n
f. ☺ sw-igity swanjin			
g. s-igity swanjin		w!	
h. w-igity swanjin		s!	

In this tableau, a-c are again ruled out because their omission of input segments violates MAX-IO. Candidates g and h have reduplicants which leave out a segment from the base, fatally violating MAX-BR. Since the base is now only the onset consonants of the input word, each of the candidates (d and e) which reduplicate more than this violate DEP-BR, and are ruled out. As demonstrated here, although there is no longer any morphological overwriting, the affixation analysis will work if we take the liberty to redefine the base in this way.

Note that any of the other candidates could be produced by an artist in any given song, and in some cases (e.g. c and d in 7) as artistically felicitous as in f: these would simply not be generated by the paradigm established for *-iggity* affixation. They would be something new, and could hence become a new paradigm. That is, there would either be a different input (e.g. *-ity* rather than *iggity*), or the morpheme would call for a differently defined base (e.g. *swan-* rather than *sw-*), or both of these possibilities combined.

What I want to claim is this: the morpheme *-iggity* in some sense “selects” MAX-BR and DEP-BR to act in conjunction with the constraint which aligns *iggity*, and these in tandem define the base domain as being the onset consonants of a prosodic word. It is in this sense that this kind of fixed-segment reduplication is “templatic”: the form is pre-defined. In section 4 I will discuss the implications of the fact that the actual reduplicant, the onset consonant(s), is technically not a traditional prosodic category.

3. Hip-Hop Hypercoristics (Hip-hop-ocoristics)

The output of what I am calling Hip-Hop Hypercoristics is relatively well-known. Descriptively, to form a hiphopocoristic one takes a monosyllabic first name or monosyllabic hypocoristic and generates a pseudo-adjective out of that name by fully copying it and epenthesizing the vowel [-i] between base and reduplicant. This can be formalized as in 8:

8 **Hiphopocoristic** = $\sigma_\alpha \rightarrow \sigma_\alpha + i + \sigma_\alpha$, where α = a monosyllabic proper name.

Attested examples are given in 9a; forms which do not conform to the this kind of nickname are given in 9b:

- | | | | |
|-----|-------------------|-----|-------------------------------------|
| 9 a | Mark → Marky Mark | 9 b | Byron → *Byrony Byron |
| | Dogg → Doggy Dogg | | Diana → *Diana-y Diana |
| | Mel → Melle Mel | | Peter → *Petery Peter |
| | Cel → Celly Cel | | Hephaestus → *HephaestusyHephaestus |

The question immediately arises as to what is the reduplicant and what is the base.

There are two possibilities: both involve full-copy of the base (here, the entire input word) and epenthesis of the [i]-vowel (either a DEP-BR violation, if it is part of the reduplicant; or a DEP-IO³ violation if it is not). We need to decide which alignment is correct.

On the left-alignment analysis the reduplicant is a prefix, as seen in 10 (since this is full-copy reduplication, MAX-BR is assumed to be unviolated, and for now I will assume that DEP-IO is the relevant DEP constraint):

10 Align Red L, MAX-BR >> DEP-IO

output: Marky Mark

/RED + Mark/	AlignREDLeft	MAX-BR	DEP-IO
a. <u>Mark</u> <u>Mark</u>	*!		
b. <u>Ma</u> <u>Mark</u>		r!k	
c. Ⓢ <u>Mark</u> <u>Mark</u>			
d. ⊗ <u>Mark</u> Y <u>Mark</u>			*(!)

Given just these constraints, the incorrect candidate is predicted to win, since the correct candidate (d) should be ruled out by DEP-IO, which is not violated by c.

The same fact reveals itself again under the right-alignment (suffixing) analysis, as we see in 11:

11 Align RED R, MAX-BR >> DEP-IO
output: Marky Mark

/Mark + RED/	AlignREDRt	MAX-BR	DEP-IO
a. <u>Mark</u> Mark	*!		
b. Mark <u>Ma</u>		r!k	
c. ☉ Mark <u>Mark</u>			
d. ☹ Mark Y <u>Mark</u>			*!

Fortunately, Alderete et al. (1999) provide us with a way out of this conundrum. Under the model proposed in the rubric of the Emergence of the Unmarked (TETU) (McCarthy and Prince 1994), there is a “reduplication-default connection”, where “when not copied, reduplicants function as defaults” (Alderete et al. 1999:334).

If we assume that /i/ is the English default epenthetic vowel (and this independently motivated by Yip 1987), then TETU will do the trick here. Under TETU, “the normally inactive markedness constraint M reveals itself in BR mappings where IO faithfulness is not relevant” (Alderete et al. 1999:330). This idea can be schematized thus (McCarthy and Prince 1994):

12 FAITH-IO >> M >> FAITH-BR
(MAX-IO/DEP-IO) (MAX-BR/DEP-BR)

Given the nature of the TETU schema in 12, we must assume that if the emerging [-i] vowel is a default, then the lower-ranked DEP violation is between the reduplicant and the base, rather than between the input and the output.

Let’s add a markedness constraint which would yield the correct results:

13 *STRESS CLASH: Adjacent syllables should not receive equal stress.

The new analysis is given in 14 (for the time being, I assume Align-Right):

14 MAX-IO >> *CLASH >> MAX-BR >> DEP-BR

/Mark + RED/	MAX-IO	*CLASH	MAX-BR	DEP-BR
a. Ma <u>Mark</u>	r!k			(rk)
b. <u>Mark</u> <u>Mark</u>		*!		
c. <u>Mark</u> <u>Ma</u>			r!k	
d. ☺ <u>Mark</u> <u>Y</u> <u>Mark</u>				*

In this case, the winning candidate violates only the lowest-ranked constraint, DEP-BR, and thus, given the crucial rankings, is the winner⁴.

There is evidence that Align-Right is correct, and this comes from the process of back-formation from English hypocoristics, as seen in 15:

15	Cathy	→	Cathy Cath
	Katie	→	Katie Kate
	Andy	→	Andy And
	Tony	→	Tony Tone
	Amy	→	Amy Aim

If we allow back-formation to redefine the “base” in English *hypocoristics*, the same approach used in 14 can work in 16, where the base is taken to be a monosyllabified version of the disyllabic hypocoristic. Here, the base is indicated in the input:

16

/Cath + RED/	MAX-IO	*CLASH	MAX-BR	DEP-BR
a. Ca <u>Cathy</u>	θ!i			
b. <u>Cath</u> <u>Cath</u>		*!		
c. <u>Cath</u> <u>Ca</u>			θ!	
d. ☺ <u>Cath</u> <u>Y</u> <u>Cath</u>				*

If we do not allow the redefinition of the base, this analysis will not work, as shown in 17:

17

/Cathy + RED/	MAX-IO	*CLASH	MAX-BR	DEP-BR
a. Ca <u>Cathy</u>	θ!i			
b. <u>Cath</u> <u>Cath</u>	i!	*		
c. ☹ <u>Cathy</u> <u>Cath</u>			i!	
d. ☹ <u>Cathy</u> <u>Cathy</u>				

With the /i/ already in the input, there is no longer any motivation for TETU. In fact, in 17 we must now explain why full-copy of the base no longer applies (i.e. why does the second /i/ delete?).

The data in 16 and 17 seem to show that the base seems to be whatever it needs to be to generate the correct output. This can be explained if we take the forms in 14 to be reanalyzed as similar to the forms in 9. This post-hoc definition of the reduplicative base leads one to conclude that to the extent that the evaluation metric necessary to identify the correct winning candidate requires access to the correct output, OT is a performance model.

4. Reduplicative Templates

In McCarthy and Prince (1993), a reduplicative template is defined as follows: “morphological category = prosodic category”, where by “prosodic category” they mean a traditional prosodic unit: mora, syllable, foot, etc. As we saw with the *-iggity* affixation above, reduplicative morphemes need not constitute such units (for more details on reduplication without prosodic units, and a theory of reduplication without templatic constraints, see Hendricks 1999).

Rather than regarding the reduplicative elements themselves as a template, I would like to suggest the possibility of analyzing the entire output (base + reduplicant) paradigm itself as the template, formalized in 18:

18 **Hiphopcoristic** = $\sigma_\alpha \rightarrow \sigma_\alpha + i + \sigma_\alpha$, where α = a monosyllabic proper name.⁵

For the purposes of the evaluation metric, whatever candidates fail to conform to the hiphopcoristic template will be automatically ruled out. This template is seen in action in 19 and 20:

19 Hiphopcoristic >> MAX-BR, DEP-BR

/Cathy + RED/	Hiphopcoristic	MAX-BR	DEP-BR
a. ☺ Cathy Cath		*	
b. ☺ Cathy Cath<y>		*	
c. Cath<y> Cathy	*!		*
d. Cathy Cathy	*!		

20 Hiphopcoristic >> DEP-IO, DEP-BR

/Mark + RED/	Hiphopcoristic	DEP-IO	DEP-BR
a. ☺ <u>Mark y Mark</u>		*	
b. ☺ <u>Mark y Mark</u>			*
c. <u>Mark Mark</u>	*!		
d. <u>Mark Marky</u>	*!		*

The effect of this suggestion is that as long as the output corresponds to the highest-ranking of the constraints, the hiphopcoristic template, little difference is made how the candidate goes about getting its conformative shape (Cf. endnote 4).

Another way to think about the kind of template that I am suggesting in 19 and 20 would be to propose it as a constraint on possible inputs. Any form which is going to generate a hiphopcoristic has to conform to 18. If this hiphopcoristic already takes the form of 18 at the input level, then the winning candidate will be absolutely faithful to the input.

Finally, I would like to offer a bit of speculation: I will say that it is perhaps the case that we can analyze reduplicative templates and/or reduplicants as prototype categories (Lakoff 1987); i.e. prototype effects can be seen in reduplicants: whether prosodic categories (syllable, foot, etc.) or the entire output of the reduplicant with its base, as in 19 and 20 above.

5. Conclusion

In this paper I have illustrated two kinds of fixed-segment reduplication which are found in Hip-Hop and Gangsta Rap music, and have accounted for this reduplication with fixed-segmentism in terms of Optimality Theory. One form, *iggity* affixation, is characterized by morphological affixation, and the second shows that, with the reanalysis of *hypo*-coristics forms as *hyper*-coristic forms, a template constraint can hold over the base-reduplicant pairing.

In conclusion, the evidence provided by these forms of reduplicative verbal art support the claims made by Alderete et al. (1999) regarding morphological affixation (overwriting) of fixed segments and default phonological “fixed segments”, as well as supporting OT generally, iff we can define input/output and base/reduplicant relations to suit what we already know independently to be the correct output. Thus, in this sense, Optimality Theory can be viewed as a model of performance.

Notes

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¹ Just to give the reader the flavor of how this optional morpheme is utilized, I provide an excerpt from a song on ESG (1994), "Swangin' and Bangin'":

...fo' deep in a 'lac, yeah, comin' down tight
swiggity-swangin' biggity-bangin'

like I'm turnin' left I'm biggity-bustin' a right

and now you know: in-and-out, out-and-in

we dip down... them fools down south are a trip....

² Throughout the paper the reduplicant will be underlined; the base will be identified in the text. The symbols that I will be using are as follows: ⊙ = incorrectly selected candidate; ⊗ = actual output not selected for in a given tableau; ⊕ = optimal candidate selected for in a given tableau.

³ DEP-IO is defined as follows: a segment should not appear in the output if it is not in the input.

⁴ It would also be possible to analyze the emerging $[-i]$ vowel as a morphological fixed segment, as $-iggity$ was above. Given Yip (1987)'s independent motivation for the default status of $[i]$ in suffixes in English, and the similarity between it and the cases discussed by Alderete et al., I will go with the present analysis. Either would support the specific claims of the general model.

⁵ Trisyllabic forms are also not traditional prosodic units.

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Remarks on Case Feature-Checking in Japanese*

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1. Introduction

On the basis of the following assumptions about Case features in (1) (cf. Chomsky 1995), this paper attempts to explain how Case features of NPs can be checked (i.e., eliminated) in Japanese.

- (1) a. Case features are uninterpretable and must be checked in the derivation of LF.
- b. Case features of T and v (or V) are intrinsic, whereas Case features of NPs are universally assigned in the numeration (= NUM).
- c. Case features can be checked via Spec-head agreement.¹

This paper proposes that Case features can be checked via one-to-one Spec-head agreement in Japanese, showing that the parametric difference between English and Japanese with respect to “multiple nominative constructions” can be ascribed to the presence/absence of Case particles, which are assumed to be overt realizations of the functional (Case) category K.

2. Case Feature Checking and Spec-Head Agreement

It has generally been assumed that Case cannot be licensed via Spec-head agreement in Japanese (cf. Saito 1982, Fukui 1986, Fukui and Takano 1998, and Saito and Fukui 1998). The assumption is based on the fact that Japanese allows “multiple nominative” constructions as in (2):

- (2) [dansei-ga [heikin zyumyoo-ga mizikai]
 male-NOM average lifespan-NOM is short
 'It is men that their average lifespan is short'

By contrast, English does not allow such constructions.

- (3) * Male, average lifespan is short.

The ungrammaticality of (3) can be straightforwardly captured by the restrictive theory of Spec-head agreement, in which only one-to-one Spec-head agreement is permitted (Saito and Fukui 1998): Case features of multiple NPs cannot be checked by one-to-many Spec-head agreement, yielding a crashed derivation. On the other hand, the well-formedness of (2) might suggest that in Japanese Case features of NPs are somehow eliminated in a way other than Spec-head agreement on the assumption that Spec-head agreement is one to one.⁴ If this is the case, we have to specify the way of eliminating Case features since Case features of NPs are universally assigned in NUM (= (1b)). In what follows, I will briefly go over Fukui and Takano's (1998) analysis of Case feature-checking in Japanese, pointing out an empirical problem for it and suggest that Case features can be eliminated via one-to-one Spec-head agreement in Japanese regardless of the fact that "multiple nominative" constructions are possible in Japanese.

3. On the Status of Case Particles in Japanese

3.1 Spell-Out and the elimination of Case features

Fukui and Takano (1998) (henceforth F&T) suggest that Case features of NPs in Japanese can be eliminated by the operation Spell-Out. They propose that Case particles, which they assume to be overt realizations of Case features and the functional (Case) category K (Bittner and Hale 1996, Fukui 1986, Ikawa 1996 and Lamontagne and Travis 1987), are linked to phonological features and can make Case features of NPs "visible" to Spell-Out. Thus, after Spell-Out, the Case features enter the PF component, but they do not enter the LF component because Spell-Out can strip away the visible Case features from the structure already formed in the overt syntax. Since Case features are "visible" in the PF component, they can "survive" in PF and do not have to be eliminated in the derivation of PF. Therefore, apparently, F&T's analysis can capture how Case features of NPs can be eliminated in Japanese without recourse to Spec-head

agreement and can explain why “multiple nominative” constructions are licensed in Japanese, but not in English, which lacks overt Case particles in the lexicon. However, notice that if Case features of NPs are eliminated by Spell-Out, we have to explain how Case features of T and a transitive V are eliminated in Japanese. F&T suggest that T lacks a nominative Case feature in Japanese (cf. Fukui 1986, Fukui and Nishigauchi 1992, Fukui and Takano 1998, Kuroda 1983, Saito 1982, 1983, 1985) and that Japanese V has “inherent” Case (cf. Takahashi 1993), which need not be checked in LF since it is related to some θ -role (Chomsky 1986). Adopting the idea that the small v is the locus of the accusative Case feature (Chomsky 1998 and Raposo and Uriagereka 1996), I assume that accusative Case features are lacking in the small v in Japanese.

3.2 Subject-object asymmetry in “Case-marker drop”

However, there is an empirical reason to doubt that F&T’s analysis of eliminating Case features is tenable. Consider the following examples of the so-called “Case-marker drop”, which exhibits a subject-object asymmetry (Kuno 1973a and Saito 1983, 1985):

- (4) a. dare-**ga** piza-o tabeta no?
 who-NOM pizza-ACC ate Q
 ‘who ate pizza?’
 b. *dare piza-o tabeta no?
 who pizza-ACC ate Q
- (5) a. John-wa nani-**o** tabeta no?
 -TOP what-ACC ate Q
 ‘What did John eat?’
 b. John-wa nani tabeta no?ⁱⁱⁱ
 -TOP what ate Q

In (5b), the accusative Case particle *o* is missing, but the sentence sounds natural in colloquial speech and is well-formed. The problem for F&T’s analysis is how the accusative Case feature of *nani* ‘what’ in (5b) can be eliminated in their mechanism of Case feature-checking. Since, according to F&T, the existence of overt Case particles enables Spell-Out to eliminate Case features of NPs, it is not clear how the accusative Case feature of *nani* ‘what’ can be eliminated without the overt Case particle. One possible way out to avoid the problem is to assume that Case particles can be optionally deleted in PF. Then, the grammaticality of (5b) is no longer problematic since the Case particle can make the accusative

Case feature of *nani* ‘what’ “visible” to Spell-Out before it gets deleted in PF. However, it is problematic to the ill-formedness of (4b): if Case particles can be deleted in PF, why isn’t the grammatical status of (4b) the same as that of (5b)? Therefore, on the basis of the ungrammaticality of (4), it seems reasonable to conclude that Case particles cannot be deleted in PF and to assume that if Case particles are missing, they are not contained in NUM from the outset.

In the next section, in order to account for the above subject-object asymmetry, we will consider an alternative analysis of Case feature-checking in Japanese and pursue its theoretical and empirical consequences.

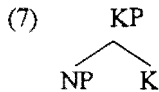
4. Bare NP-Movement and Spec-Head Agreement

4.1 The phrase structure of Japanese and bare NP-movement

Before going into details of how Case features are checked in Japanese, let us consider the status of Case particles in Japanese. From the assumption that a Case particle is an overt manifestation of a Case feature and the functional (Case) category K, it follows that K consists of Case and phonological features. Therefore, unlike other major functional categories such as C, T and D, K has nothing to do with any semantic feature and semantic interpretation. Given this, we have to address the following questions:

- (6) a. How is a Case particle (= K) introduced in the overt syntax?
 b. How can the Case feature of K be checked?

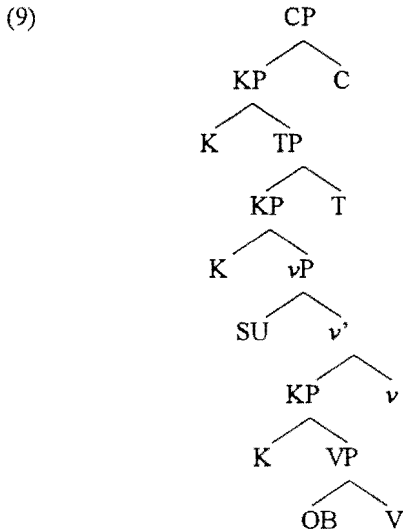
First, consider (6a). It has been assumed that K can be merged with a “bare NP” (= NP without Case particles) and projects up to its maximal projection KP as in (7) (Bittner and Hale 1996, Fukui and Takano 1998, Ikawa 1996, Lamontagne and Travis 1987 and Takano 1996).



However, it should be noted here that (7) violates the theta-theoretic principle in (8), which is suggested by Chomsky (1998).

- (8) Theta-theoretic principle:
 Pure Merge in θ -position is required of (and restricted to) arguments.

Since K has nothing to do with any semantic interpretation, the sister of K cannot be counted as a θ -position. Thus, if (8) is correct, K and a bare NP must be introduced separately into the derivation. More precisely, a bare NP must be merged in θ -position within vP and VP, whereas K can be merged outside vP and VP, where no θ -role is assigned to K. The phrase structure of Japanese is thus represented as in (9).^{iv}



However, given the above phrase structure of Japanese, how can we obtain the right association between bare NPs and Case particles? Consider the following simple example in (10) and see how it can be derived.

- (10) John-ga pizza-o tabeta
 -NOM pizza-ACC ate
 ‘John ate pizza’

The derivation for (10) goes like this: VP is created without the accusative Case particle as in (11a) and the accusative Case particle *o* is merged with VP, projecting up to KP (= *oP*) as in (11b).

- (11) a. [_{VP} pizza tabeta]

- b. pizza ate
 [_{oP} o [_{vP} pizza tabeta]
 ACC pizza ate

Note that if oP is embedded within vP, the following surface form would be obtained, which is ill-formed:

- (12) * [_{vP} [_{oP} o [_{vP} pizza tabeta] v]
 ACC pizza ate
 ‘ate pizza’

The ill-formedness of (12) indicates that K cannot stand alone, although it is independently introduced into the derivation. Presumably, K might be an “affix” in the overt syntax and must be supported by a bare NP. To rule out examples such as (12), I assume the following filter, which is originally suggested by Lasnik (1981) (cf. Ikawa 1996):

- (13) The Stranded Affix Filter:
 A stranded affix must be supported in the overt syntax.

In order to satisfy the stranded affix filter, the bare NP *pizza* ‘pizza’ combines with *o* ‘ACC’ in (12). I propose here that bare NPs can combine with K only if they are adjacent to each other (cf. Bobaljik 1995). The notion of adjacency can be stated as in (14) (cf. Agbayani 1999).

- (14) α and β are adjacent to each other only if there is no “visible” element (XP or X⁰) intervening between α and β .

Thus, after (11b), the bare NP *pizza* ‘pizza’ moves to oP because the “visible” maximal projection VP intervenes between the Case particle and the bare NP. This is what I call “bare NP-movement”.

- (15) [_{oP} pizza₁ [_o o [_{vP} t₁ tabeta]]]
 pizza ACC ate

Then, as (16) indicates, v merges with oP and the subject NP *John* is generated in SpecvP.

- (16) [_{vP} John [_v [_{oP} pizza₁ [_o o [_{vP} t₁ tabeta]]] v]]
 pizza ACC ate

Finally, *ga* 'NOM' merges with *vP* (= (17a)) and *John* moves to *SpecKP* (= *SpecgaP*) to satisfy the stranded affix filter (= (17b)).^v

- (17) a. $[\text{gaP } \text{ga} [\text{vP } \text{John} [\text{v}' [\text{oP } \text{pizza}_1 [\text{o}' \text{o} [\text{vP } \text{t}_1 \text{tabeta}]]] \text{v}]]]$
 NOM pizza ACC ate
- b. $[\text{gaP } \text{John}_2 [\text{ga}' \text{ga} [\text{vP } \text{t}_2 [\text{v}' [\text{oP } \text{pizza}_1 [\text{o}' \text{o} [\text{vP } \text{t}_1 \text{tabeta}]]] \text{v}]]]]]$
 NOM pizza ACC ate

The important consequence of this analysis is to predict that bare NPs and K cannot form a constituent. This seems empirically true. Consider the following examples, which show that the target of topicalization must be bare NPs (Kayne 1994: 143):

- (18) a. $[\text{NP } \text{John}]$ -wa pizza-o tabeta
 -TOP pizza-ACC ate
 'As for John, he ate pizza'
- b. * $[\text{KP } \text{John-ga}]$ -wa pizza-o tabeta
 -NOM-TOP pizza-ACC ate
- (19) a. John-ga $[\text{NP } \text{piza}]$ -wa tabeta
 -NOM pizza-TOP ate
 'As for pizza, John ate it'
- b. * John-ga $[\text{KP } \text{piza-o}]$ -wa tabeta
 -NOM pizza-ACC-TOP ate

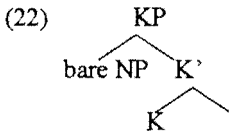
The ungrammaticality of (18b) and (19b) suggests that the bare NP plus K cannot be a constituent on the assumption that only a single constituent can be topicalized. Furthermore, examine the following examples, which show that the target of clefting must be bare NPs:

- (20) a. pizza-o tabeta no wa $[\text{NP } \text{John}]$ de wa nakatta
 pizza-ACC ate COMP TOP COP TOP NEG-PAST
 'It was not John that ate pizza'
- b. * pizza-o tabeta no wa $[\text{John-ga}]$ de wa nakatta
 pizza-ACC ate COMP TOP -NOM COP TOP NEG-PAST
- (21) a. John-ga tabeta no wa $[\text{NP } \text{piza}]$ de wa nakatta
 -NOM ate COMP TOP pizza COP TOP NEG-PAST
 'It was not pizza that John ate'
- b. * John-ga tabeta no wa $[\text{piza-o}]$ de wa nakatta
 -NOM ate COMP TOP pizza-ACC COP TOP NEG-PAST

Assuming that only a single constituent can be the target of clefting, the ungrammaticality of (20b) and (21b) can be straightforwardly explained: bare NPs and K cannot form a constituent, which follows from the phrase structure of Japanese and the bare NP-movement hypothesis.

4.2 Spec-head agreement in Japanese

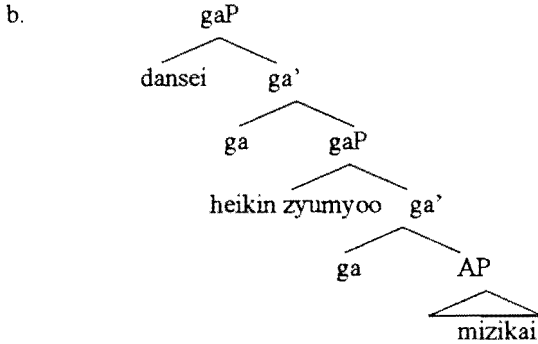
Given the phrase structure of Japanese, I claim that Case features of bare NPs and K can be checked via Spec-head agreement within KP, which is represented as in (22).



However, if Case features of bare NPs and K are checked in configurations such as (22), how can intrinsic Case features of T and ν be checked in Japanese? Recall here that F&T suggest that Japanese T lacks a nominative Case feature and that Japanese ν lacks an accusative Case feature, but V has an inherent Case feature. Adopting the idea, we can now explain the subject-object asymmetry in “Case-marker drop” as follows: (4b) is ruled out because the nominative Case feature of the bare NP cannot be eliminated due to the lack of the nominative Case particle. On the other hand, (5b) is well-formed because, unlike Japanese T, V has a Case feature and the Case feature of V can contribute to the checking operation, although it is inherent: after V moves to ν in LF, the bare NP moves to “Spec ν P” and the Spec-head relation can be established as in English accusative Case feature-checking.

If this is true, we can also explain how nominative Case features of multiple NPs can be checked in Japanese: nominative Case features of multiple NPs can be checked via one-to-one Spec-head agreement within the recursive KP as in (23b).^{vi}

- (23) a. [dansei-ga [heikin zyumyoo-ga mizikai]
 male-NOM average lifespan-NOM is short
 ‘It is men that their average lifespan is short’



Since K can be merged freely as long as it is in non θ -position, recursive structures such as (23b) is allowed in Japanese and one-to-one Spec-head agreement can be established between multiple nominative NPs and their associated nominative Case particles.

5. Concluding Remarks

In this paper, assuming the restrictive theory of Spec-head agreement, I have argued that Case features of NPs can be checked via one-to-one Spec-head agreement in Japanese. The analysis proposed here indicates that the parametric difference between English and Japanese regarding multiple nominative constructions is reducible to the following parameters:

(24)

FCs	English	Japanese
K	no K	<i>ga, o</i>
T	nominative Case feature	no nominative Case feature
v	accusative Case feature	no accusative Case feature

Since English has no K, the recursive structures such as (23b) is totally impossible and thus multiple nominative constructions are also impossible because Case features of multiple NPs cannot be eliminated via one-to-one Spec-head agreement in English. Furthermore, the proposed analysis suggests that Japanese has a functional category that English completely lacks, namely, a Case category K, which is totally opposite to the claim made by Fukui (1986).

Notes

¹I am grateful to Brian Agbayani, Naoki Fukui, James Huang, Kazue Takeda, ~~Siu-Wing~~ Wing Tang and Akira Watanabe for helpful comments and suggestions. All remaining inadequacies are, of course, my own.

²As Chomsky (1998) suggests, Case features can be eliminated by the “probe-goal” relation, which I will ignore here. The relevant question to be asked here is whether the probe-goal relation also applies to Japanese and can eliminate the uninterpretable Case features of NPs under feature matching. The answer seems to depend on whether or not Japanese has a “complete” set of ϕ -features (cf. Fukui 1986 and Kuroda 1988, where it is suggested that Japanese lacks agreement features). I will not pursue it here and keep it pending for future research.

³I will not adopt the theory of “multiple feature checking” (Chomsky 1995 and ~~Ura~~ Ura 1994, 1996), in which Case features can be eliminated via one-to-many Spec-head agreement. For conceptual arguments against it, see Hoshi (1999).

⁴The ungrammaticality of (i) shows that the particle “dropped” in (5b) is not the topic particle *wa* because the topic particle is semantically incompatible with wh-elements (Kuno 1973b):

- (i) *John-ga nani-wa katta no?
 -NOM what-TOP bought Q
 ‘What did John buy?’

⁵Notice here that K is head-initial, which seems incompatible with the usual assumption that Japanese is a head-final language. Adopting Saito and Fukui’s (1998) analysis, where they argue that Spec-head agreement forces Spec position to be in the left, I argue that the K is forced to be head-initial because of the adjacency condition stated in (14). Later we will see that the small *v* is also head-initial in Japanese since it contributes to Spec-head agreement in LF.

⁶Here I ignore projections of C and T.

⁷I will not discuss how exactly it can be derived. There seem to be two possibilities: one is that along the lines of Kuno’s (1973a) “subjectivization”, the multiple nominative constructions can be derived via movement of bare NPs. The other possibility is that adopting the idea suggested by Saito (1982), nominative subject NPs can be directly inserted in Spec_{CP}. For the detailed discussion, see Hoshi (1999).

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Tokoro as a Relational Noun

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1 Introduction

In this paper, I will discuss the Japanese "Counter-Equi NP" (henceforth "CENP") construction shown in (1):

- (1) Keisatsu-wa [doroboo-ga nigeru]-tokoro-o tsukamae-ta.
police-TOP burglar-NOM escape-occasion-ACC arrest-PST
"The police arrested the burglar on the occasion on which s/he was trying to escape."

The Japanese CENP construction in (1) is quite similar to the so-called "internally headed relative clause" (henceforth, "IHRC") construction in that an NP within the embedded *tokoro*-clause is also interpreted as an argument of the matrix clause. For example, in (1), the NP *doroboo* "burglar" within the embedded clause is interpreted as the object of the matrix verb *tsukame* "arrest".

The standard approach to this construction (Harada 1973, Tsubomoto 1991, Mihara 1994, Murasugi 1995, and Hoshi 1996) assumes that, as shown in (2), the *tokoro*-clause in (1) is simply a circumstantial adverbial clause, and that there is a matrix non-overt pronoun "pro" as the object of the matrix verb *tsukamae* "arrest".

- (2) Keisatsu-wa [doroboo-ga nigeru]-tokoro-o pro tsukamae-ta.
police-TOP burglar-NOM escape-occasion-ACC arrest-PST
"The police arrested the burglar on the occasion on which s/he was trying to escape."

An alternative analysis was proposed by Nakau (1973), and has not been seriously considered since the initial appearance of the standard analysis (Harada (1973) and the others cited above). Under Nakau's analysis, the *tokoro*-clause is simply a complement of the matrix verb. I will refer to the standard analysis as the Adverbial Clause Hypothesis and Nakau's analysis as the Complement Clause Hypothesis.

In this paper, I follow Nakau's Complement Clause Hypothesis and argue against the Adverbial Clause Hypothesis, taking the *tokoro*-clause in (1) to be an object of the matrix verb *tsukame* "arrest".

2 Problems with the Nakau (1973) Analysis

2.1 Problems

Arguing against Nakau's (1973) analysis, Harada (1973) assumes that the *tokoro*-clause is an adverbial clause, and that there is a matrix object in deep structure which would be "PRO" or "pro" in the Principles and Parameters framework. Harada's (1973) assumptions are motivated by the following three phenomena.

First of all, the matrix verb places a selectional restriction on the NP embedded within the *tokoro*-clause, which is interpreted as the object of the matrix verb.

- (3) *Keisatsu-wa [ame-ga hut-te-iru]-tokoro-o tsukamae-ta.
 police-TOP rain-NOM rain-ing-occasion-ACC arrest-PST
 "The police arrested rain on the occasion on which it was raining."

When an embedded NP appears within the *tokoro*-clause which cannot semantically be an object of the matrix verb *tsukamae* "arrest", the sentence is ruled out, as shown in (3). Thus, the nature of the embedded NP affects the grammaticality of sentences such as (1) and (3). However, since this kind of selectional relation is normally observed in local relations, such as that between a verb and its complement, the phenomenon in (3) seems to suggest that there should be, in addition to the *tokoro*-clause, a matrix (non-overt) object NP as complement of the matrix verb.

There are at least two other phenomena which seem to pose a problem for the Complement Clause Hypothesis. Those involve floating quantifier and secondary predicate facts. When a floating quantifier or a secondary predicate expression appears in the matrix clause, each seems to be able to modify an embedded NP within the *tokoro*-clause. This is illustrated respectively in (4) and (5):

Floating numeral quantifier

- (4) Keisatsu-wa [doroboo-ga nigeru]-tokoro-o sannin
 police-TOP burglar-NOM escape-occasion-ACC three people

tsukamae-ta.

arrest-PAST

"The police arrested three burglars on the occasion on which they were trying to escape."

Secondary predicate

- (5) Keisatsu-wa [doroboo-ga nigeru]-tokoro-o hadakade
 police-TOP burglar-NOM escape-occasion-ACC naked

tsukamae-ta.

arrest-PAST

"The police arrested the burglar naked on the occasion on which he was trying to escape."

It is standardly assumed that floating quantifiers and secondary predicate expressions must be in a local relation with a licenser such as mutual c-command (or m-command). If this is true, then these phenomena seem to pose problems for the Complement Clause Hypothesis. Under the Complement Clause Hypothesis, the potential licenser would be within the *tokoro*-clause, and would thus not be entitled to be a local licenser of the floating quantifier and the secondary predicate.

3 Puzzles for the Adverbial Clause Hypothesis

Though the Adverbial Clause Hypothesis appears to allow a unified account of the phenomena discussed in sections 2.1. and 2.2., there are also phenomena which pose problems for the Adverbial Clause Hypothesis. Such problems come from Case-matching, as pointed out previously by Kuroda (1992) and Case-alternations.

First of all, in the CENP construction, the particle attached to the *tokoro*-clause must be identical with the structural Case particle assigned to the object by the matrix verb, as shown in (7) and (9):

- (6) Taro-wa Hanako-o/*ni tatai-ta.
 TOP ACC/DAT hit-PST
 "Taro hit Hanako."

- (7) Taro-wa [Hanako-ga hashit-te iru]-tokoro-o/*ni
 TOP NOM run-ing occasion-ACC/DAT
 tatai-ta.
 hit-PST
 "Taro hit Hanako on the occasion on which she was running."
- (8) Taro-wa Hanako-ni/*o at-ta.
 TOP DAT/ACC meet-PAST
 "Taro came across Hanako."
- (9) Taro-wa [Hanako-ga hashit-te iru]-tokoro-ni/*o
 TOP NOM run-TE be-occasion-DAT/ACC
 at-ta.
 come across -PAST
 "Taro came across Hanako while she was running."

As shown in (6), the verb *tatak* "hit" assigns Accusative Case to its object. Thus, when the *tokoro*-clause appears with the verb *tatak* "hit", the *tokoro*-clause must also take an Accusative Case marker, as shown in (7). Similarly, the verb *at* "meet" assigns Dative Case to its object, as shown in (8), and the *tokoro*-clause appearing with this verb must also take a Dative Case marker, as shown in (9).

Second, when the potential morpheme *-are* is attached to the matrix verb, the particle *-o* attached to the embedded *tokoro*-clause exhibits an alternation between Accusative and Nominative Case. In other words, because of the potential morpheme, the Case for the object can surface as Nominative Case, as shown in (10):

- (10) Keisatsu-wa [sono-doroboo-ga nigeru]-tokoro-ga
 police-TOP the-burglar-NOM escape-occasion-NOM
 tsukamaer-are-ta.
 arrest-POT-PAST
 "The police could arrest the burglar while he/she was trying to escape."

This Case alternation is commonly observed in the object assigned Accusative Case in Japanese.

The above phenomena pose problems for the Adverbial Clause Hypothesis. The above phenomena explicitly suggest that the particle attached to the *tokoro*-clause of the CENP construction is related to structural Case, which is in turn related to the matrix verb. The Adverbial Clause Hypothesis cannot give a unified account of the above data, since it takes the *tokoro*-clause to simply be an adverbial clause, and assumes that the particle *o* attached to the *tokoro*-clause is not at all related to the structural Case of the matrix verb.

4 Proposal

In this paper, I follow Nakau's (1973) Complement Clause Hypothesis, and argue that the *tokoro*-clause in the CENP construction is in fact an object of the matrix verb. Regarding the Complement Clause Hypothesis, a question naturally arises as to how it accounts for the problematic data presented in section 2 above, which seem to suggest the existence of a matrix "pro" in addition to the *tokoro*-clause.

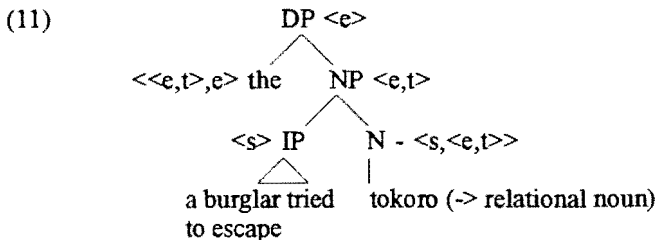
I would like to claim that a solution to this problem lies in the properties of the head noun, namely, *tokoro* "occasion". Adapting Heim and Kratzer's (1998) analysis of E-type pronouns, I propose that the head noun *tokoro* of the CENP construction is a relational noun, and assume that it can have a denotation of a relation. Under this analysis, in (1), for example, *tokoro* will have the denotation of the relation (or function) $[x \in D. y \in D. x \text{ is a participant/participants in a situation of } y]$. Furthermore, also following the analysis of Heim and Kratzer, the whole *tokoro*-clause denotes "the (unique) participant (or participants) in the situation of the embedded clause."

Before going into more details, I will discuss in the next section the analysis of E-type pronouns given by Heim and Kratzer (1998).

4.1 The *tokoro*-clause

For the analysis of the *tokoro*-clause in example (1), I adapt the approach to E-type pronouns by Heim and Kratzer (1998). Specifically, I propose that the head noun *tokoro* in the CENP construction is a relational noun, and that it can have the denotation of a relation. Furthermore, I assume that the whole *tokoro*-clause denotes "the (unique) participant (or participants) in the situation of the embedded clause."

In Heim and Kratzer's analysis of E-type pronouns, they assume a type of relation-denoting non-overt variable R, which is specified by an utterance context. Concerning the CENP construction, I assume that *tokoro* is a relational noun, as illustrated in (11):



Specifically, I assume that *tokoro* in (11) denotes the relation (or function) [$x \in D, y \in D, x$ is a participant/participants in a situation of y]. In other words, *tokoro* is assumed to denote a function of type $\langle s, \langle e, t \rangle \rangle^2$. In the same manner as the analysis of E-type pronouns by Heim and Kratzer, the semantic denotation of the relational noun *tokoro* first takes the embedded IP, which is of type $\langle s \rangle$, as an argument. Furthermore, it maps the denotation of the embedded clause, type $\langle s \rangle$ to the denotation of the NP, type $\langle e, t \rangle$.

We now turn to the local tree in (11) which consists of the DP and its daughters *the* and NP. In this local tree, the NP expresses a property of type $\langle e, t \rangle$ and not a relation of type $\langle s, \langle e, t \rangle \rangle$. Following Heim and Kratzer, I assume that *the* denotes a function of type $\langle \langle e, t \rangle, e \rangle$. This denotation maps the denotation of the NP, type $\langle e, t \rangle$, to the denotation of the DP, type $\langle e \rangle$. As a result, as mentioned at the beginning of this section, the whole *tokoro*-clause denotes "the (unique) participant (or participants) in the situation of the embedded clause".

4.2 *Tokoro* and the Inalienable Possession Construction

In the analysis which I have proposed, the relational noun status of the *tokoro*-clause is crucial. A question arises as to whether we have any empirical evidence or motivation for this assumption.

The motivation for the relational noun status of the noun *tokoro* comes from the comparison between the Korean Inalienable Possession Construction and one Japanese construction which has never been well discussed in prior research. I will refer to this Japanese construction as the Quasi-CENP construction.

The Korean Inalienable Possession (henceforth, "KIP") Construction given in (12) is characterized by the fact that both the body-part NP and the Possessor NP act like objects. Furthermore, those two NPs must stand in an inalienable possessional relation.

- | | | | | |
|------|-----------------------------|--------------|-------------|--------------|
| (12) | John-i | Mary(PO)-lul | phal(BP)-ul | ttayryessta. |
| | NOM | ACC | arm-ACC | hit |
| | "John hit Mary on the arm." | | | (Yoon 1990) |

The KIP Construction (and Inalienable Possession Constructions in general) exhibits some peculiar properties. In prior research, it has been argued that such properties are more or less related to properties of the so-called "body-part" noun. The property of the inalienable body-part noun is that it takes a possessor argument, as discussed in Authier (1988) and Tellier (1988), among others. Thus, the body-part noun in the Inalienable Possession Construction is, in a

sense, a relational noun whose semantic value depends on the semantic value of the possessor (de Jong (1987), Yoon (1990), among others).

When we turn to the noun *tokoro*, what is interesting is that, in Japanese, there is a construction in which the noun *tokoro* is used and, furthermore, which behaves syntactically in a way quite similar to the KIP Construction. The construction is given in (13):

- (13) Keisatsu-wa doroboo-o [nigeru]-tokoro-o tsukamae-ta.
 police-TOP burglar-ACC escape-occasion-ACC arrest-PAST
 "The police arrested the burglar on the occasion during which he/she was trying to escape."

I refer to this construction as the Quasi-CENP construction.

In the Quasi-CENP construction in (13), an NP corresponding to a CENP "internal head" of the *tokoro*-clause (*doroboo* "burglar" in (13)) appears as a matrix object, preceding the *tokoro*-clause. In our discussion, *tokoro* is assumed to be a relational noun like the body-part noun in the KIP Construction in that the noun *tokoro* has a possessor or a participant argument of the situation expressed by the embedded clause. In (13), the NP *doroboo* "a burglar" is assumed to correspond to the possessor NP of the KIP Construction. In this case, whose situation is expressed depends on the semantic value of the possessor or participant argument.

If my assumptions about examples like (13) is right, then the Quasi-CENP Construction can be considered a kind of Inalienable Possession Construction. This would predict that the syntactic behavior peculiar to the KIP Construction should also be observed in the Quasi-CENP construction. This prediction is borne out

To observe this behaviour, note, first of all, that in the KIP Construction, the object NPs must stand in a relation of inalienable possession, as illustrated in (14). This property can also be observed in the Quasi-CENP construction, as shown in (15):

- (14) John-i Mary(PO)-lul phal(BP)-ul ttayryessta.
 NOM ACC arm-ACC hit
 "John hit Mary on the arm." (Yoon 1990)
- (15) Keisatsu-wa doroboo-o [nigeru]-tokoro-o tsukamae-ta.
 police-TOP burglar-ACC escape-occasion-ACC arrest-PAST
 "The police arrested the burglar on the occasion during which he/she was trying to escape."

In (14), I assume that the KIP possessor NP corresponds to the participant NP of the Quasi-CENP construction. In (15), the participant object *doroboo*

"burglar" must be a participant of the event expressed by the *tokoro*-clause. If the participant object is not a unique participant of the event expressed by the *tokoro*-clause, or if the event of the *tokoro*-clause is not the participant's event, then the sentence is ruled out:

- (16) *Keisatsu-wa Hanako-o [Jiro-ga nigeru]-tokoro-o tsukamae-ta.
 police-TOP ACC NOM escape-occasion-ACC arrest-PAST
 "The police arrested the burglar on the occasion during which he/she was trying to escape."

Second, every KIP Construction with multiple Accusative objects has a genitive counterpart, as shown in (17) and (18):

- (17) Mary-ka John-ul tali-lul cha-ess-ta.
 NOM ACC leg-ACC kick-PST-DEC
 "Lit. Mary kicked John's leg."
- (18) Mary-ka John-uy tali-lul cha-ess-ta.
 NOM GEN leg-ACC kick-PAT-DEC
 "Lit. Mary kicked John's leg."

In (18), *John-uy* "John-GEN" corresponds to the NP marked by the Accusative Case marker, namely *John-ul* "John-ACC" in (17).

The Quasi-CENP Construction also has a genitive counterpart in the KIP Construction, as shown in (19) and (20):

- (19) Keisatsu-wa doroboo-o [nigeru]-tokoro-o tsukamae-ta.
 police-TOP burglar-ACC escape-occasion-ACC arrest-PAST
 "The police arrested the burglar on the occasion during which he/she was trying to escape."
- (20) Keisatsu-wa doroboo-no [nigeru]-tokoro-o tsukamae-ta.
 police-TOP burglar-GEN escape-occasion-ACC arrest-PAST
 "The police arrested the burglar on the occasion during which he/she was trying to escape."

The participant object *doroboo-o* "burglar-ACC" in the Quasi-CENP Construction can also be expressed by the genitive NP *doroboo-no* "burglar-GEN".

Third, in the KIP Construction, the possessor NP can be a passive subject when the matrix sentence is passivized, but not the possessee (Yoon (1990), Cho (1998)), as illustrated in (21) and (22):

- (21) John-i Mary-eyuyhay tali-lul cha-i-ess-ta.
 NOM by leg-ACC kick-PASS-PST-DEC
 "John's leg is kicked by Mary."
- (22) *Tali-ka Mary-eyuyhay John-ul cha-i-ess-ta.
 Leg-NOM by John-ACC kick-PASS-PST-DEC
 "John's leg is kicked by Mary."

In (21), the possessor *John* is the subject of the passive sentence, and (32) is grammatical. In contrast, (22) is ungrammatical with the possessee *tali* "leg" acting as passive subject.

The same pattern is observed in the Quasi-CENP Construction, as illustrated in (23) and (24):

- (23) Doroboo-wa (keisatsu-ni) [nigeru]-tokoro-o tsukamaer-are-ta.
 burglar-TOP police-by escape-occasion-ACC arrest-PASS-PST
 "The burglar was arrested (by the police) on the occasion during which he/she was trying to escape."
- (24) *[nigeru]-tokoro-ga (keisatsu-ni) doroboo-o tsukamaer-are-ta.
 escape-occasion-NOM police-by burglar-ACC arrest-PASS-PST

It is grammatical for the participant NP *doroboo* "burglar" to serve as subject of the passive sentence, as shown in (23). On the other hand, when the *tokoro*-clause, which is assumed to correspond to the possessee NP, is the subject of the passive sentence, the passive sentence is ruled out.

Fourth, in the KIP Construction, the possessor NP must c-command the body part NP (Yoon 1990), as shown in (25) and (26):

- (25) Mary-ka John-ul tali-lul cha-ess-ta.
 NOM ACC leg-ACC kick-PST-DEC
 "Mary kicked John's leg."
- (26) *Mary-ka tali-lul John-ul cha-ess-ta.
 NOM leg-ACC ACC kick-PST-DEC

In (26), since the possessor NP *John* does not c-command the body part NP *tali* "leg", the sentence is ruled out.

The Quasi-CENP Construction also exhibits the same kind of pattern seen in the KIP Construction, as shown in (27) and (28):

- (27) Keisatsu-wa doroboo-o [nigeru]-tokoro-o tsukamae-ta.
 police-TOP burglar-ACC escape-occasion-ACC arrest-PST
 "The police arrested the burglar on the occasion during which he/she was trying to escape."
- (28) *Keisatsu-wa [nigeru]-tokoro-o doroboo-o tsukamae-ta.
 police-TOP escape-occasion-ACC burglar-ACC arrest-PST

In (38), since the participant NP *doroboo* "burglar", which is assumed to correspond to the possessor NP of the KIP Construction, does not c-command the *tokoro*-clause, the sentence is ruled out in the interpretation in which the person who was trying to escape was the burglar.

Drawing on the above similarities of syntactic behavior between the KIP Construction and the Quasi-CENP Construction, I argue for the basic assumptions made in this section regarding the Quasi-CENP Construction, and assume that *tokoro* is a type of relational noun.

5 Syntactic Support for the Proposed Analysis

The proposed analysis, which assumes that the *tokoro*-clause is a complement of the matrix verb, allows a unified account of Case-matching and Case-alteration phenomena in the CENP construction, which have posed problems for the Adverbial Clause Hypothesis.

Under my proposal, the *tokoro*-clause is syntactically simply a complement of the matrix verb, and structural Case related to the matrix verb is assigned to the *tokoro*-clause. Therefore, the Case particle attached to the *tokoro*-clause must match the structural Case which is assigned by the verb to its complement. Furthermore, it exhibits Case-alteration when the *tokoro*-clause appears in a context where a Case-alteration occurs.

6 Response to the Questions from the Adverbial Clause Hypothesis

As discussed above, the proposed hypothesis assumes that the *tokoro*-clause has the denotation "the participant in the situation of the *tokoro*-clause". This analysis can give a unified account of the problems which have been posed for the Complement Clause Hypothesis.

First of all, regarding the selectional restriction problem, since the matrix *tokoro*-clause can have the denotation of "the participant", a theta-role of the

matrix verb such as the THEME argument of the verb *tsukamae* "arrest" can be assigned to the complement *tokoro*-clause.

Second, under the proposed analysis, the matrix *tokoro*-clause can also license secondary predicates and floating numeral quantifiers. Since the matrix *tokoro*-clause has the denotation "the participant" and since it can also stand in a mutual c-command (or m-command) relation with a secondary predicate or a floating numeral quantifier, it can license them.

7 Conclusion

In this paper, I have argued that, following the idea of Nakau (1973), in the CENP construction, the *tokoro*-clause is the complement of the matrix verb. Furthermore, I have proposed that *tokoro* is a type of relational noun, which denotes the relation $[x \in D, y \in D, x \text{ is a participant/participants in a situation of } y]$. Under this analysis, the whole *tokoro*-clause denotes "the (unique) participant (or participants) in the situation of the embedded clause."

This approach allows a unified account of the problems which the traditional Complement Clause Hypothesis has faced, namely, the selectional restriction problem and the licensing problems of floating numeral quantifiers and secondary predicates. Under this analysis, the reference of the matrix *tokoro* clause is related to the reference of an internal head. This reference of the matrix *tokoro*-clause can satisfy the selectional restriction which arises, and can license secondary predicates and floating numeral quantifiers.

Furthermore, the proposed Complement Clause Hypothesis lacks the problems with Case-matching and Case-alternations, which arise for the Adverbial Clause Hypothesis. These are avoided under the proposed analysis, since the *tokoro*-clause is syntactically the complement of the matrix verb, and since the particle attached to the *tokoro*-clause is a structural Case marker.

Notes

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² I assume that "s" expresses the semantic type of situation.

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Control and A-Movement*

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1 Background

In this study, we are concerned with Hornstein's (1999) A-movement analysis of obligatory control (OC), particularly with the fact that Hornstein's analysis does not distinguish raising from OC (Section 2), and subject-control from object-control. Assuming its overall correctness, we will try to salvage Hornstein's proposal, but only with limited success (Section 3). We will conclude that the A-movement analysis of OC has both conceptual and empirical difficulties.

The distributional similarity between OC-PRO and A-traces of raising has long been observed (Rosenbaum 1967, Postal 1971, 1974, Chomsky 1973/77, for example).¹ In his Minimalist reinterpretation of OC, Hornstein (1999) tries to recapture the distributional similarity of PRO and A-traces, by analyzing PRO as an A-trace. For example, (1a), a typical OC, involves A-movement (Copy) of *Bill*, as in (1b):

- (1) a. John persuaded Bill_i [PRO_i to leave]
b. John persuaded Bill [Bill to leave]

Below, we will refer to this analysis as *A-movement analysis of OC*. This analysis is claimed, by Hornstein (1999), to naturally derive a cluster of properties of OC-PRO in English, and to explicitly express the referential dependency of OC-PRO within a framework without indices (Chomsky 1993, 1995). Further, Hornstein's treatment of OC, if successful, will render unnecessary the control theory as an independent module of grammar, thereby reducing unwanted redundancy in grammar. For this reason, Hornstein's analysis of OC deserves close examination. Due to the space limitation, Hornstein's (1999) proposal will not adequately reviewed here; instead, throughout this paper, readers' familiarity of his proposal is presumed.

The A-movement analysis of OC, though very attractive, has a number of problems. In this study, we will consider the issue that the A-movement analysis of OC fails to predict the contrast between the raising and OC, both being A-movement of the embedded subject to a matrix position.² Consider (2).

- (2) a. John₁ seems to be here <=> John₁ seems [____₁ to be here]
 b. *John₁ is illegal to park a car <=> John₁ is illegal [____₁ to park a car]³

The A-movement analysis of OC does not distinguish the two cases in (2), since both sentences involve A-movement of the embedded subject to the matrix subject, i.e., raising-to-subject.

While the problem concerning (2) may constitute sufficient grounds to reject Hornstein's proposal, we acknowledge the advantages of his proposal as well. Given the lack of alternative Minimalist proposals of OC, it is worth-while to try to salvage Hornstein's proposal. In section 4, we will conclude that there are rather serious problems in the A-movement analysis of OC.

2 Control vs. Raising

Consider, again, the contrast in (2).

- (2) a. John₁ seems to be here <=> John₁ seems [____₁ to be here]
 b. *John₁ is illegal to park a car <=> John₁ is illegal [____₁ to park a car]

Assuming the correctness of the A-movement analysis of OC, the A-movement of *John* must offend something in (2b). Under the Minimalist apparatus, the most likely candidate is a violation of Minimality: i.e. movement to an illegitimate site.⁴ Let us suppose that (2b) indeed involves A-movement to an illegitimate landing site, the matrix subject.⁵ Note that the obligatory controller of the PRO in the *illegal* class adjectives is the experiencer PP, not the matrix subject, as in (3a).⁶

- (3) a. It is illegal for John₁ [____₁/^{*}ARB to park the car here].
 b. Mary₂ seems to John₁ [____₁/^{*}1/2 to have parked the car here].
 c. It is illegal [PRO_{ARB} to park the car here].
 d. It is illegal (for pro/John)₁ [PRO₁ to park the car here].

In (3a/b), we observe that (i) the embedded subject in (3b) is attracted by the matrix subject not by the experiencer PP, thus, *seem* is a raising-to-subject (RS) predicate;

and (ii) the embedded subject in (3a) is attracted by the experiencer, thus, *illegal* is a raising-to-object (RO) predicate. In other words, (3) may be seen as parallel to (4).

- (4) a. It is illegal for John₁ [_{___}₁/₂ to park the car here].
 b. Mary₂ persuaded John₁ [_{___}₁/₂ to park the car here].
 c. Mary₂ seems to John₁ [_{___}₁/₂ to have parked the car here].
 d. Mary₂ promised John₁ [_{___}₁/₂ to park the car here].

Viewed as such, the A-movement analysis of OC can begin to distinguish the raising and OC cases in terms of subject- vs. object-control, an independently motivated distinction.⁷

Consider (4a/b). *John* in (4a) moves to the experiencer PP, the closest attractor; movement skipping this position results in a relativized minimality effect, as in (4b).⁸ The absence of minimality effects in RS (4c/d) indicates that their matrix object/experiencer positions, which are presumably closer to the embedded subject, do not attract an NP. Within the Minimalist framework, this must be explained in terms of the lack of a relevant — movement triggering — feature in the direct object of *promise* and the experiencer/goal of *seem*, thus making the matrix subject the closest attractor of *Mary*. We will explore this possibility in the following section, though with considerable difficulty.

To sum up, we have tried to salvage Hornstein's analysis of OC by treating RS cases as subcases of subject-control and OR cases as those of object-control. In other words, to borrow Pesetsky's (1987) words, we have "followed the well-known ploy of reducing one difficult problem to another." Naturally, at this point, we could explore many other alternatives. Rather, we will stay on the course we have taken thus far, and examine the status of subject-/object-control in the A-movement analysis of OC. It turns out that we face even a larger problem.

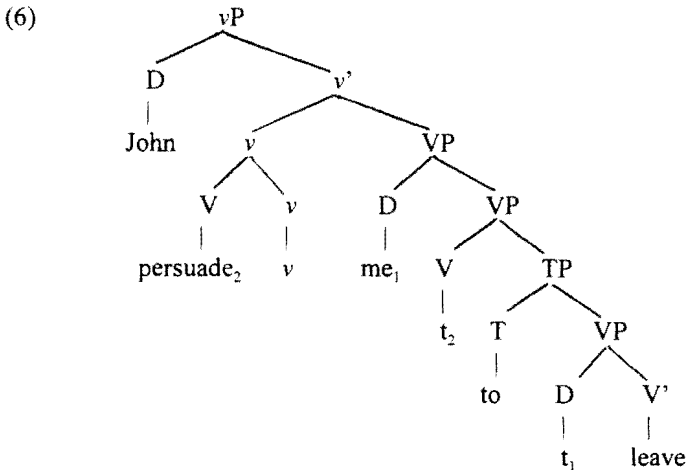
3 Subject-/Object-Control

In the previous section, I have suggested that the contrast in (2) be regarded as a sub-case of subject-/object-control; i.e., *illegal* is an object-control predicate involving RO, whereas *seem* is a subject-control predicate involving RS. It is imperative, then, for the A-movement account of OC to account for subject-/object-control. It turns out that Hornstein's discussion on this matter is quite brief.

Object control (RO) is straightforwardly predicted by the A-movement approach. (5) illustrates the relevance of the Minimal Distance Principle (MDP).

- (5) a. John₁ hopes/expects/wants [___₁ to leave]
 b. John₁ persuade Bill₂ [____{1/2} to leave]
 c. John₁ promised Bill₂ [____{1/2} to leave]

Hornstein (1999) states that the MDP “bears a striking resemblance to the Minimal Link Condition (MLC)” (p. 76), which follows immediately under a movement analysis. To be more concrete, given the derivational approach to phrase structure building and binary operation of Merge (Chomsky 1994, 1995), let us assume a kind of VP-shell with V-raising to a light verb *v* (Larson 1988, 1990, Hale and Keyser 1991, 1993, Chomsky 1995, among others), as in (6).



Persuade takes the infinitival TP as its complement. Then, the embedded subject *me* A-moves to the closest D position to check the EPP-feature (and, presumably, θ -feature), and subsequent V-raising to the light verb will yield the object control configuration.

Note, however, that this same account rejects the existence of *promise*-class predicates, since they do not exhibit the MDP effect. Hornstein states that “subject control (e.g., in *promise* constructions) appears to be marked and emerges rather late in the acquisition process (see Chomsky 1969)” (Hornstein 1999, p. 76). In other words, Hornstein treats subject-control (RS) cases as marked exceptions, thus outside of the domain of his control theory.⁹ Under the approach we are considering here, however, we cannot use the same explanation. Certainly,

promise-class verbs are arguably small in number; they could be individually learned, as Hornstein implies; however, raising predicates are reasonably large in number, thus not nearly as exceptional as *promise*-class predicates.

What could we say about subject-control within the A-movement analysis of OC, if we were not to grant the status of exception? Following the logic of the A-movement account, subject-control must involve RS, where the closest attractor for the embedded subject is the matrix subject; the theme/experiencer position of a RS predicate does not attract the embedded subject NP. At this point, I fail to find any convincing answer as to how this can be done; nor can I find any plausible answer in the existing literature. What follows are some potential directions.

For example, a RS verb may be merged with the direct object (NP)/experiencer (PP) before entering the rest of phrase structure; thus the direct object/experiencer is not visible to Attract. (This is essentially Larson's (1991) solution to a similar problem). However, we do not see any motivation for such a merger pattern for RO predicates. A similar line is to assume the insertion of the object/experiencer after RS, thus the embedded subject is the closest available NP for the matrix [Spec, IP] at the time of A-movement of the embedded subject. Again, we fail to see any compelling reason for such a counter-cyclic insertion of NP/PP. Alternatively, one could posit a complex internal structure of the RS predicates where phonetically null embedded subject moves to the an attractor lower than the object/experiencer. More concretely, following Williams (1980), Chierchia (1995) expresses the subject control of *try* as "John tries to have the property of winning."

- (7) a. John₁ tries O_j [PRO_j to win]
 (John tries to have the property of winning)
 b. try (john, λx win(x))
 c. John₁ promised Bill₂ O_j [O_j to win],
 (where O is a PF-deleted copy of *John*)

Likewise, for *promise*-type predicates, we might posit a position for the λ -operator that is c-commanded by the direct object/experiencer; the operator establishes the referential dependency to the subject, presumably, via predication; thus, the MDP effect is observed. Naturally, such an analysis is not very Minimalist in spirit. Further, such an operator position receives no syntactic motivation. In short, none of the alternatives we have just considered are particularly attractive, due to the lack of independent empirical motivations.

There is another factor to consider: namely, relevance of θ -roles to control (See Bresnan 1982, Jackendoff 1972, 1997, Sag and Pollard 1991, Chierchia 1983, 1995, among others, but *contra* Mohanan 1983). Consider (8).

- (8) a. John₁ promised Mary₂ [___₁ to leave]
 b.?John₁ promised Mary₂ [___₂ to be allowed to leave]
 c. Mary₂ was promised [___₂ to be allowed to leave]
 d. John₁ persuaded Mary₂ [___₂ to leave]
 e. John₁ persuaded Mary₂ [___₁ to be allowed to leave]
 f. John₁ asked Bill₂ [___₂ to be examined by a psychiatrist]
 g.*John₁ asked Bill₂ [___₁ to be forced to leave]

Unlike the standard pattern, object-control is observed with *promise* (8b), and subject-control, with *persuade* (8e). This reversal of subject-/object-control is not due to the presence of a passive infinitival complement, as the ungrammaticality of (8g) indicates. Rather, (8) may be taken as evidence that PRO interpretation is a “complex function of the semantics of the main verb and the subordinate clause” (Jackendoff 1997). Jackendoff suggests, following the insight of Sag and Pollard (1991), that “all the verbs and nominals [that allow this kind of reversal] have a semantic requirement that their complements denote a volitional action...” (Jackendoff 1997).

More concretely, Bresnan (1982) proposes two *promise*'s with two distinct θ -structures.

- (9) a. To commit oneself to do a certain action for someone's benefit.
 b. John promised Mary to go.
 c. To commit oneself to transfer an abstract benefit to somebody.
 d. John promised Mary that she would be invited.

Following Bresnan's position, Chierchia (1984) argues that the former *promise* is a Source-control predicate, whereas the latter is essentially a Goal-control predicate. In case of (8b), “the latter θ -structure is ‘superimposed’ in the former *promise* which is thereby turned into a goal-control predicate” (Chierchia 1984).¹⁰ While “superimposition” of θ -structures is an exotic notion for Minimalism, the relevance of different θ -roles involved for the identification of OC controller seems clear.¹¹

In short, OC must be made sensitive to both the θ -roles borne by the controller and that of PRO. Under the A-movement account of OC, A-movement itself must be sensitive to the θ -role of the attractor and the attracted; when it is from a passive complement of the relevant type (e.g. *allowed*, *permitted* and the like) only a certain θ -role bearer attracts a certain θ -role bearer (Goal or Source), as suggested by Chierchia. This is precisely the suggestion by Jackendoff (1997).

- (10) Control theory, which is part of binding theory, cannot be stated without access to the interior structure of lexical entries and to the composed conceptual structure of subordinate clauses, possibly even including material contributed by coercion.

This is the position that we must take within Minimalism, if OC indeed involves A-movement, and if subject-control and the phenomena discussed in (8) fall into the domain of control theory. As a first, and crude, approximation, let us state the following:

- (11) a. Control predicates attract certain θ -features.
 b. The direct object/experiencer of an RS predicate does not attract agentive role bearer.

Granted, (11) is not a particularly elegant solution, since we are complicating movement rule — how Attract works — thereby losing the much desired generality and simplicity of the theory, and since the analysis appears to be rather descriptive, without offering much insight into why a certain position attracts a certain θ -role holder.

On the other hand, thematic correlation of the controller and controlled — Theme control being the most well-known — has long been observed (Bach 1982, Jones 1985, Williams 1980, among others).¹² Then, if control theory is reduced to A-movement, this correlation will demand an explanation, which demands some complication somewhere in grammar. Further, it is also important to note that there are very few alternatives available of subject-/object-control within the A-movement analysis of OC.

4 Conclusion

In this preliminary study, we set out assuming, as a working hypothesis, the correctness of the A-movement analysis of OC proposed by Hornstein 1999. It is important to keep in mind that we have only focused upon the contrast in (2), without extensively examining other aspects of Hornstein's proposal; therefore, this study cannot evaluate the overall correctness of his A-movement analysis of OC as a whole. However, even within the scope of this study, the analysis has a number of problems.

One obvious weakness in the A-movement analysis of OC is its inability to distinguish raising from OC cases. We then explored a possibility of treating the

contrast as subcases of subject-/object-control: i.e., RS and RO cases. In turn, in order to adequately describe RS and RO cases, it is crucial for an analysis of OC to be sensitive to the θ -structure of both the matrix predicate and that of PRO; therefore, the θ -structure of both the controller and the controlled must be relevant to Attract.

At this stage of the research, I am reluctant to speculate whether or not such complication of Attract is acceptable or necessary; we must wait for further empirical study on this matter. However, it seems clear that the suggestion made here — i.e., Attraction (for Control phenomena) be made sensitive to certain kind of θ -features — goes against Chomsky's (1995, 1999) view that computational system C_{HL} is a rather "dumb" system. Thus, if the line of reformulation suggested here is not suitable for the overall architecture of grammar, then the A-movement analysis of OC will be left without an account of *promise*- and *seem*-class predicates; thus, the analysis may not be salvaged.

In conclusion, first, subject-control phenomena deserves further investigation within the Minimalist framework. Second, if any theory of subject-/object-control must be sensitive to the θ -structures of the predicates involved, as Jackendoff (1997) argues, then the A-movement theory of OC must accommodate it as well. Finally, the A-movement analysis of Control, though it is elegant, seems to demand a fair amount of elaboration to the Minimalism theoretical apparatus. In that sense, the analysis fails to accomplish its goal: viz., grammatical downsizing. Whether or not such complication is empirically justifiable remains to be seen.

Endnotes

*. I am indebted to Howard Lasnik and Timothy J. Vance for their guidance and comments. I am also grateful to Norbert Hornstein for offering me some comments and an unpublished manuscript. My gratitude also extends to the organizers, G. Goodall in particular, and the participants of the 1999 WECOL.

1. In an earlier framework (cf. Chomsky 1973/77, 1976/77), raising and Control are both handled under the Equi-NP Deletion transformation rule. Within the GB-framework, PRO and A-traces are classified as distinct types of empty category for a theory-internal reason: namely, the difference with respect to the θ -hood of their antecedents. Chomsky has been consistently against movement into a θ -position, without strong empirical motivations, to the best of my knowledge. Thus, an empty category is a PRO if its antecedent is in a θ -position, and A-trace, otherwise (Chomsky 1977, 1981, 1982, 1986). The distributional similarity of PRO and A-traces are derived from the binding theory. See Lasnik 1992, however, for a discussion against the reduction of Control into Binding Condition A.

2. This problem is not clearly acknowledged in Hornstein 1999, but only briefly mentioned, in footnote 35, where the contrast in (i) is given, without a discussion, and simply refers to his (1998) work.

- (i) a. Mary's desire [PRO to win]
 b. Mary's appearance [t to win]

Norbert Hornstein (personal communication) admits the problem that the A-movement analysis of OC faces regarding (2), and that OC and Raising must be somehow distinguished. He suggests that Control may involve some sort of incorporation of I to C, while raising does not. While the suggestion is somewhat sketchy — thus, there being a good chance of my misrepresenting his contention, — I suspect that obligatory incorporation of I to C for OC Control will demand CP configuration for Control cases, while IP configuration is sufficient for Raising, thus capturing Stowell's (1982) generalization, namely, co-occurrence of OC Control, yet-to-happen reading, and the presence of C in the clause. Raising, on the other hand, lacks the yet-to-happen reading, and presumably IP.

However, this type of analysis (Stowell 1982, Martin 1995, among others) incorrectly predicts the yet-to-happen reading in null operator (or missing object) constructions, even though OC is involved (See Kawai 1992). The motivation for such an obligatory incorporation of I to C for Control Case is not clear, however; in the absence of motivation, it seems to remain a description of the problem, not unlike the alleged short-coming of the null Case-based account of raising and OC.

3. In Hornstein's notation, we have a copy of the A-moved item in the embedded subject position. However, following Lasnik, I have argued against the copy theory of A-movement, (Kawai forthcoming). (See Lasnik 1999 for evidence against the copy theory of A-movement). Therefore, I will use a theory-neutral notation '____' to indicate the tail of the chain, and indices to explicate referential dependencies.

4. An alternative is available; we may incorporate the proposal of null Case (Chomsky and Lasnik 1993 and Martin 1995). This will allow us to distinguish the 'raising' type predicates from 'control' type predicates.

- (i) a. $I_{[-control]}$ has null Case.
 b. $I_{[-control]}$ does not have null Case.
 (ii) Each NP bears one and only one Case feature.

With (i) and (ii), the A-movement analysis of OC correctly predicts the contrast in (2); *John* in (2a) checks only the matrix nominative feature, whereas *John* in (2b) cannot check both the null Case of the embedded I^0 and the nominative Case of the matrix I^0 , thus the movement of the latter violates Greed.

However, Hornstein explicitly rejects null Case on the following grounds. First, null Case is designed to fit only one expression — PRO. Second, only nonfinite T^0 can check/assign it. Hornstein observes that "the Case properties of PRO and nonfinite T are constructed to exactly fit the observed facts. Were the data otherwise, the theory would change accordingly. This comes close to restating the observations: PRO appears in the [Spec, IP] of a nonfinite T" (Hornstein 1999, p. 75). Third, the Case-theoretic account requires a rather elaborate PRO module. That is, null Case does not contribute to the identification of the antecedent of PRO, thus requiring another module for it. The Minimal Distance Principle (MDP) has been invoked for this reason. However, Hornstein observes the striking similarity between MDP and the Minimal Link Condition (MLC), a condition on movement/chain. And, fourth, OC PRO can appear in a position other than [Spec, IP]. To the extent that Hornstein's criticism is correct, the re-introduction of null Case in the account of the distribution of PRO is undesirable.

5. This is a metaphorical way of putting it. Under the economy principles, such movement does not take place. For the ease of exposition, I will continue to use this GB (Affect α)-metaphor of making a *wrong move*.

6. A brief disclaimer is in order. The Control theories in the GB-framework generally regard the control in (3) as non-obligatory Control (Manzini 1983, Koster 1984, for example) since it allows PRO_{ARB} interpretation as in (3c), and such obligatory controller as in *John* in (3a) does not c-command PRO. However, Epstein (1984) argues that PRO_{ARB} is in fact a case of obligatory control of PRO by

experiencer *pro* (3d), a position of which I take in this study. Here, I assume that in (16c) the command relation holds between the controller and PRO since the entire for-NP functions as a controller, rather than NP alone.

7. Naturally, with this approach, we cannot account for the well-known differences between control and raising. See Martin 1995, for example.

8. I remain neutral regarding how to capture this effect.

9. The Control theories within the GB-framework do not fare much better, either. Within the GB framework, Control Theory (see Chomsky 1980, Koster 1984, Manzini 1983, for example) was very close to restatement of the fact. For example, Chomsky (1980) stipulates [+SC] (subject control) feature for the subject Control predicates. Manzini's Control theory (1983) does not distinguish subject from object Control; the appropriate antecedent is supposedly identified on the semantic grounds, although no concrete semantic condition is proposed. See also Jones 1985, Mohanan 1983 for critiques of the GB approaches.

Note that we might be tempted to incorporate Manzini's strategy: i.e., A-movement RS and RO are equally acceptable, by somehow making the predicate internal subject and object equidistant from the embedded subject. Then, the burden shifts as to why subject-/object-Control exists, since the theory equally accepts both cases. If we appeal to some surface interpretive rule for the identification of the proper antecedent, then we are effectively reintroducing an independent module for Control, thus one of Hornstein's stated goal — simplification of grammar — fails.

10. Chierchia (1984) uses (i) as an example, but the point remains the same.

- (i) a. John promised Mary to be allowed to wash herself.
- b. Mary was promised to be allowed to wash herself.

11. Jackendoff (1997) suggests that it is "interesting to speculate that part of the solution to the switches of control in [(8)] is that a rule of coercion is operating in the interpretation of these clauses. For example, (8b') "has an approximate paraphrase, 'Someone promised [Mary] to *bring it about that* [Mary] would be allowed to leave' and a similar paraphrase is possible for [(8e)]. These being the two cases in which control is not as it should be, it may be that a more general solution is revealed more clearly once the presence of the coerced material is acknowledged."

12. Noting the familiar observation that an overt PP argument of *tough* class adjectives are the obligatorily controller, Jones (1985) suggests a θ -role of the PP argument as *Account*, following Jackendoff's (1972) and Nanni's (1978, 1980) insights.

- (i) Account: The expected Agent of a costly activity associated with the Theme.
- (ii) a. * The book_i cost John_i \$5.00 [PRO_i to serve as a library copy]
- b. The book_i cost John_i \$5.00 [PRO_i to return to the library]
- c. The book cost John \$5.00 [for his son to destroy the book]

In (iia), *John* is the Account holder. *John* is not a Goal, since *the book* does not ultimately stay with him, nor is he a mere Source, since his involvement for further action is implied. Jones observes that when the Account role holder is present, it must be the controller (iia/b), unless, of course, the embedded subject is overtly expressed (iic). In other words, there are cases where a certain θ -role implies further activity by this role bearer. Though far from being an analysis, Jones's observation above has some bearing on Control and θ -roles.

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Phonological Constraints and Transfer in L2 Learners

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1. Introduction

This study investigates how English-speaking learners of the Korean language attempt to produce Korean lax, tense, and aspirated stop consonants, and how Korean-speaking learners of English attempt to produce unfamiliar English consonant sounds. It is well known that L2 learners identify L2 sounds based on their L1 phonological system (Weinreich 1968, Catford 1965, Valdman 1976, Flege 1987, Hammarberg 1990, Flege and Wang 1990). Thus, it is supposed that L2 learners in the early stages replace unfamiliar sounds with the sounds of their native language. However, it is supposed that L2 learners easily acquire L2 sounds which their native language has.

This study claims that the replacement of L2 sounds with L1 sounds is caused by constraint transfer of marked features from a learner's native language. Direct Optimality Theory (DOT) (Golston 1996) represents a word or a segment with the constraint violability of pure markedness. Each marked feature is a violated constraint with a ranking. This violated constraint is transferred when L2 learners learn unfamiliar sounds in the target language. English-speaking learners of Korean transfer English violated constraints of marked features for Korean sounds when they learn Korean, while Korean-speaking learners of English transfer Korean violated constraints of marked features for English sounds.

2. Substitution in Unfamiliar Sounds of L2

2.1. Korean and English consonants

Korean makes a three-way distinction between lax, tense, and aspirated stop consonants and a two-way distinction between lax and tense fricative consonants in the onset position in Ex (1).¹

Ex (1) Korean Consonant Distinction: Stops

[pul] 'fire'	[tal] 'moon'	[cokʰ] 'foot'	[ki] 'energy'
[pʰul] 'grass'	[tʰal] 'mask'	[cʰokʰ] 'candle power'	[kʰi] 'height'
[pʰul] 'horn'	[tʰal] 'daughter'	[cʰokʰ] 'page'	[kʰi] 'meal'
[sal] 'flesh'	[sʰal] 'rice'		

For example, labial stop consonants are contrastive between the voiceless labial consonant in initial word position as in the lax stop [pul] 'fire,' the aspirated stop [pʰul] 'grass,' and the tense stop [pʰul] 'horn.' Alveolar fricatives also contrast between the lax [sal] 'flesh' and the tense [sʰal] 'rice' in initial word position. English, on the other hand, only produces the aspirated stop in word initial position and does not show any contrast between lax, tense, and aspirated consonants.²

2.2. Sound substitution in L2 learners

It is often observed that adult second language learners substitute one or more sounds of their native language for one or more sounds of the target language. This phenomenon occurs when L1 learners transfer a similar sound to their L2 (Hancin-Bhatt 1994; Flege 1992). Native speakers of Korean learning English tend to make such substitutions (Park 1990, 1992). If this is true, it is supposed that native speakers of English learning Korean also replace Korean sounds with English sounds.

Weinreich 1953 and Lado 1957 have attempted to explain sound transfer by contrastive analysis. When L1 inventories do not contain L2 sounds, learners tend to replace L1 sounds for L2 sounds that are positioned close to each other on a phonetic chart. Hancin-Bhatt (1994) has indicated, however, that such an analysis does not necessarily produce the right output. For example, according to contrastive analysis, Korean lax, aspirated, or tense alveolars [t, tʰ, tʰ] can be substituted for English [ð] since the voiced interdental fricative [ð] is equidistant from all three Korean alveolars [t, tʰ, tʰ]. Nonetheless, Korean

speakers replace only Korean lax voiced alveolar [t̚], and not aspirated or tense alveolar [t] for English [ð].

The Feature Competition Model (Hancin-Bhatt 1994) proposes that sound transfer occurs when a prominent feature, via feature competition, determines the association with the L1 sound. In this model, all features have different prominence in a given sound inventory. A feature's prominence is decided by relating the number of sound distinctions a particular feature makes in an underlying representation to the total number of sounds in the language's inventory after eliminating redundant features and unmarked feature specifications from the underlying representation (Hancin-Bhatt 1994:252-253). According to Park (1990, 1992), Korean phoneme inventory and underspecification are described in Table (1).

(1) Korean Phoneme Inventory and Underspecification Table

	p	p ^h	p'	t	t ^h	t'	s	s'	c	c ^h	c'	k	k ^h	k'
Place	L	L	L									D	D	D
Spread		+			+		+			+			+	
Constricted			+			+		+			+			+
Continuant							+	+	V	V	V			

L = Labial

D = Dorsal

V = a Contour Unit

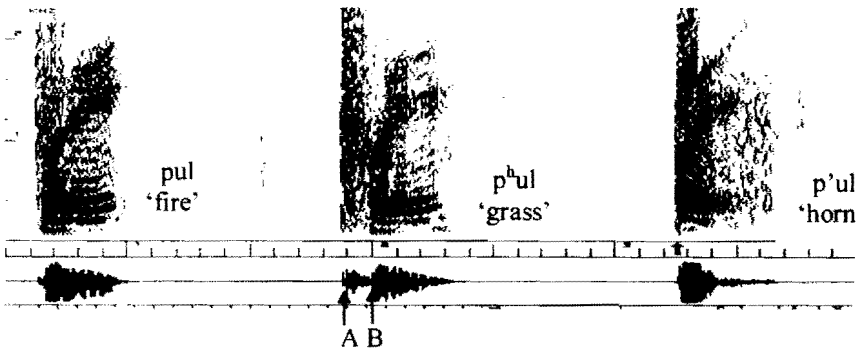
Underspecification states that in Korean [spread], [constricted] and [continuant] have the same prominence according to Hancin-Bhatt's calculation of a feature's prominence (1994:253) because they have the same number of feature specifications in underlying representation. The place features [labial] and [dorsal] also have the same prominence because they have the same number of feature specifications as shown in Table (1). This means that native Koreans when learning English may potentially replace English labiodental [f] with Korean aspirated, or tense [p] since these are the sounds that contain the marked feature [labial] and have the same prominence. However, Korean speakers replace English [f] only with Korean aspirated [p^h].

Park (1990, 1992) makes the claim that native Koreans learning English make phoneme replacement errors.³ However, it seems that learners not only replace L2 phonemes with L1 phonemes but also replace L2 allophones with L1 allophones. Thus, this study claims that Korean learners replace English sounds with Korean sounds in the early stages of learning as follows:

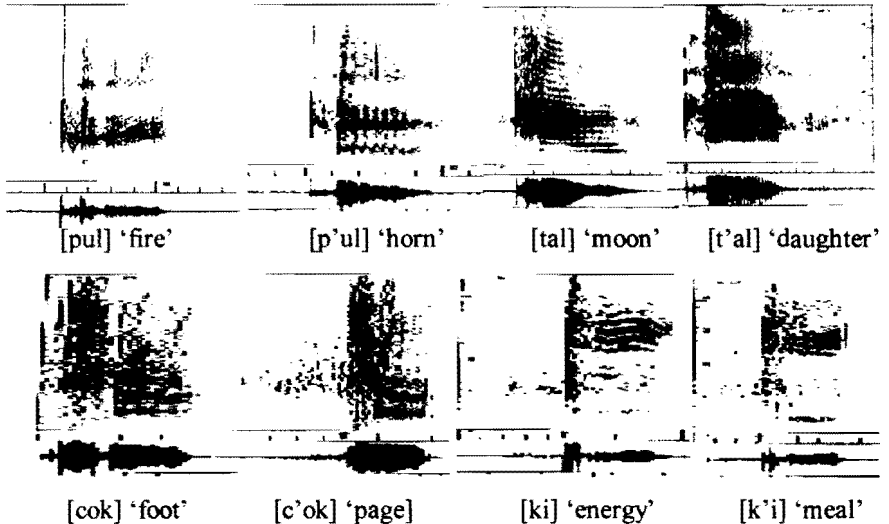
(2) Sound Errors of Korean-speaking English Learners

English		Korean	English		Korean
[f]	→	[p ^h]	[ð]	→	[t̚]
[v]	→	[ɸ]	[θ]	→	[s] or [s'] ⁴
[z] [ʒ] [dʒ]	→	[ç]			

Native speakers of English learning Korean also made errors by substituting their native sounds for L2 sounds. In this study, pronunciation of Korean lax, aspirated, and tense stops were taught to two groups. Five subjects learned Korean labial and alveolar stops, and the other five subjects learned Korean palatal and velar stops. Subjects were native speakers of English who were undergraduate students at the University of South Carolina. After modeling pronunciation of the words given in Example (1) for periods ranging from three minutes to 20 minutes (average 5 minutes), I recorded their pronunciations and analyzed them using a sound spectrograph. Korean native speakers clearly distinguish between lax, tense and aspirated bilabials in Spectrum (1). However, as shown in spectrum (2), native speakers of English learning Korean tend to substitute aspirated consonants for both Korean lax and tense consonants. Aspiration is shown in Korean [p^hul] 'grass' of Spectrum (1). In the aspirated sound, the vocal folds remain relaxed for a longer period of time and produce friction rather than a periodic signal (Oliver 1993:84-85). This is shown by the waveform between A and B in [p^hul] of Spectrum (1). Although there are variations among subjects, they transfer their native sounds for L2 sounds. Subjects substituted English aspirated stops for Korean lax and tense stops as shown in spectrum (2).

Spectrum (1) Lax [p], aspirated [p^h] and tense [p'] in Korean Native Speakers

Spectrum (2) Lax [p, t, c, k] and tense [p', t', c', k'] in English-speaking Korean Learners



The sound errors of English-speaking Korean learners are given in (3).

(3) Sound Errors of English-speaking Korean Learners

Korean	English	Korean	English
[p, p']	→ [p ^h]	[ɸ]	[b]
[t, t']	→ [t ^h]	[ɸ]	[d]
[c, c']	→ [tʃ]	[ɸ]	[dʒ]
[k, k']	→ [k ^h]	[ɸ]	[g]

3. Phonological Constraints in Direct Optimality Theory

3.1. Direct optimality theory

In DOT, each morpheme is represented with partial description of surface forms in terms of markedness and constraint violations. Since DOT requires the underspecification of phonological representations (Kiparsky 1982, Archangeli 1984, Steriade 1987), only markedness is represented with violations. However, unmarked structures are not specified because those structures cannot be

represented as marked constraint violations.⁵ For example, Korean words [pul] ‘fire,’ [p^hul] ‘grass,’ and [p^ul] ‘horn’ are represented in (4).

(4) Phonological Representation of Korean Labial Stops in DOT

a. [pul] ‘fire’

NoStop	NoLabial	NoRound	NoHigh	AlignLat
R	R	R	R	R

b. [p^hul] ‘grass’

NoStop	NoLabial	NoAspir	NoRound	NoHigh	AlignLat
R	R	R	R	R	R

c. [p^ul] ‘horn’

NoStop	NoLabial	NoTense	NoRound	NoHigh	AlignLat
R	R	R	R	R	R

The first row represents the marked constraints. Each *R* in the second row denotes a marked constraint violation of a morpheme. The word [pul] ‘fire’ has the marked constraint features [NoStop], [NoLabial], [NoRound], [NoHigh] and [AlignLat]. This word is differentiated from the word [p^hul] ‘grass’ which has an additional marked feature constraint [NoAspir.], and from the word [p^ul] ‘horn’ which has another additional marked feature constraint [NoTense].

Alignment Theory (McCarthy & Prince 1993) says that all features occur in word-initial. When a feature occurs next to the first nucleus, it violates the alignment constraint of the feature seen in Align Lateral. The dotted line [---] says that there are no constraint rankings between them.

3.2. Constraint transfer in sound substitution of L2 learners

3.2.1. Korean Constraint Transfer to English

Korean has the lax, aspirated, and tense labials in word-initial and onset position, but does not have English [f]. The common marked features for these three consonants are [+labial] and [-voice]. The distinctive feature for the aspirated labial [p] is [+aspirate] and for the tense labial [p] is [+tense]. English [f] not only has the features [+labial], [-voice] but also the feature [+continuant]. Korean maps [+aspirate] into [+continuant] because [+aspirate] encompasses [+continuant]. In the same way, Korean speakers learning English have the features [+labial], [-voice] but not the marked feature [+continuant] and they substitute the aspirated [p] for English [f] because they observe and transfer Korean constraints. In Table (5), the first and the last rows represent the marked

constraint features for Korean aspirated [p^h] and English [f]. The left edge column lists possible candidates as a realized form. The shaded area represents irrelevant marked constraint features.

(5) English [f] and Korean [p^h]

Korean [p ^h]	NoStop	NoVoless	NoAspir	NoLabial	
[p]	R	R		R	
[p ^ʰ]	R	R		R	
☞ [p ^h]	R	R	R	R	
English [f]		NoVoless	NoCont	NoLabial	NoStrid

English [f] has the most similar constraint violations of marked features with the Korean aspirated [p^h]. Thus, Korean-speaking English learners replace English [f] with Korean aspirated [p^h] because this sound has similar constraint violations as their native language.

English [v] is substituted for Korean lax voiced [ɸ]. In Table (6), the symbol [*] represents constraint violations for phonological processes and the exclamation mark [!] denotes that the violation is critical.

(6) English [v] and Korean [ɸ]

Korean [ɸ]	Voicing	NoLabial	NoStop		
[p]	*!	R	R		
☞ [ɸ]		R	R		
[p ^ʰ]	*!	R	R		
[p ^h]	*!	R	R		
English [v]	Voicing	NoLabial		NoCont	NoStrid

Although English [v] could be replaced by Korean aspirated [p^h] in that Korean aspirated [p^h] has the marked feature [+labial], and the marked feature [+aspirate] which encompasses [+continuant], learners do not substitute Korean aspirated [p^h] for English [v] because the feature [+voice] is more highly ranked than the marked feature [+aspirate]. In the same way, English interdental voiced fricative [ð] is replaced by Korean lax voiced alveolar stop [ɸ̣].

In Table (7), Korean speakers replace English [z, ʒ, dʒ] with Korean voiced lax palatal stop [ç].

(7) English [z, ʒ, dʒ] and Korean [ç]⁶

Korean [ç]	Voicing	NoStop	NoBack	NoCor			
☞ [ç]		R	R	R			
[çʰ]	*!	R	R	R			
[ç ^b]	*!	R	R	R			
English [z, ʒ, dʒ]	Voicing			NoCor	No- Cont	No- Stric	NoAnt

English [θ] is replaced by Korean lax [s] or tense [sʰ] in (9).⁷ Korean speakers in the Chung-Puk and Kyung-Sang dialects do not have a distinction between lax [s] and tense [sʰ] (Im 1995:282, Sung 1995:424). In these dialects, the marked constraints of this non-distinction are transferred to L2 sounds when a Korean speaker learns English. Thus, the optimal outputs are lax [s] or tense [sʰ] for English theta [θ].

(8) English [θ] and Korean [s, sʰ] in the Chung-Puk and the Kyung-Sang Dialects

Korean [s, sʰ]	NoFricative	NoCor	NoCont	NoVoless	
☞ [s]	R	R	R	R	
☞ [sʰ]	R	R	R	R	
[tʰ]		R	R	R	
English [θ]		NoCor	NoCont	NoVoless	NoStrid

Constraint transfer is also observed in the phonological processes of Korean speakers learning English. In Korean, [l] and [r] are banned in the onset position of a word in Ex (2). Korean speakers pronounce ?[lakwən] as [nakwən] 'paradise' although [l] does occur in the coda position as in the word [pal] 'foot.'

Ex (2) Lateral Nasalization

?[lakwən]	[nakwən]	'paradise'
?[loin]	[noin]	'old man'

?[radio]	[naʒio]	'radio'
?[ramyən]	[namyən]	'ramyun'

Lateral Nasalization requires that laterals become a nasal in word-initial position.⁸ This constraint is transferred when Korean speakers learn English. The English word *radio* can be realized as [naʒio] because the marked constraints of Korean are more respected than the marked constraints of English in (9).

(9) *radio*

	LatNas	NoLow	AlignCor	NoVoice	NoHigh	NoRound
[raʒio]	*	R	R	R	R	R
☞ [naʒio]		R	R	R	R	R

In Korean, palatalization occurs for [s] before [j] or [i]. Thus, Korean speakers tend to pronounce English *sociology* as [soʃialidʒi] rather than [socialidʒi], indicating further that Koreans transfer their native language constraints when they learn English.

Ex (3) Palatalization

[siʒe]	[ʃiʒe]	'watch'
[sihəm]	[ʃihəm]	'exam'
[socialidʒi]	[soʃialidʒi]	'sociology'
[si.ai.ei]	[ʃi.ai.ei]	'C.I.A.'
[si:liŋ]	[ʃi:liŋ]	'ceiling'

This Korean palatalization process is directly transferred to the L2 learners in the beginning level when they learn English. Thus, it can be represented as follows:

(10) *ceil*

	Palatal	NoCont	NoCplxOn	NoCor	NoStrid	NoHigh	AlignLat
[si:l]	*	R	R	R	R	R	R
☞ [ʃi:l]		R	R	R	R	R	R

3.2.2. English Constraint Transfer to Korean

The survey showed that English-speaking Korean learners pronounced Korean lax and tense stop consonants with English aspirated stop consonants. This seems to be that learners transfer the constraints of their native language when they learn Korean.

English has the aspirated bilabial sound [p^h] before vowels and the non-aspirated bilabial sound [p] after [s]. When English speakers learn Korean, they transfer the aspirated sound [p^h] for Korean lax [p] and tense [p'] because they transfer the features [+labial], [-voice] and the marked feature [+aspirate] from their native language. However, since the non-aspirated [p] only occurs after [s], English speakers do not replace it for lax or aspirated [p] because Korean does not have a complex onset combined with [s]. English has the features [+labial], [+aspirate] and [-voice] for the aspirated bilabial [p^h], but does not have the marked feature [lax] for Korean lax bilabial [p] nor the marked feature [tense] for Korean tense bilabial [p'] in the onset position in (11).

(11) Korean [p, p'] and English [p^h]

English [p ^h]	NoStop	NoLabial	NoCont	NoVoless	
[b]	R	R			
[f]		R	R	R	
[p ^h]	R	R	R	R	
Korean [p, p']	NoStop	NoLabial	NoAspir	NoVoless	NoTense

English also does not have the lax alveolar and the tense alveolar [t] of Korean. These sounds are replaced with the aspirated alveolar [t^h] in word-initial position in (12).

(12) Korean [t, t'] and English [t^h]

English [t ^h]	NoStop	NoCor	NoVoless	NoCont	
[t ^h]	R	R	R	R	
[d]	R	R			
[θ]		R	R	R	
Korean [t, t']	NoStop	NoCor	NoVoless		NoTense

Korean has lax, aspirated, and tense palatal stops [c, c^h, c'] which do not exist in English. These sounds are replaced by English voiceless post-alveolar affricate [tʃ] which is observed in the onset position of [tʃi:p] 'cheap' in (13).

(13) Korean [c, c'] and English [tʃ]

English [tʃ]	NoCor	NoAnt	NoDelRel	NoVoless	
☞ [tʃ]	R	R	R	R	
[z]	R				
[ʒ]	R	R			
[ʃ]	R	R		R	
Korean [c, c']	NoCor	NoBack		NoVoless	NoTense

Korean voiced lax palatal stop [c] is realized as English affricate [dʒ] because it has the marked features [+voice] and [+del rel] which distinguish voiceless post-alveolar [tʃ] and voiced post alveolar fricative [ʒ] in (14).

(14) Korean [c] and English [ʒ]

English [dʒ]	NoCor	NoAnt	NoVoice	NoStrid	NoDelRel		
[ʒ]	R	R	R	R			
☞ [dʒ]	R	R	R	R	R		
[z]	R		R	R			
[tʃ]	R	R		R	R		
Korean [c]	NoCor		NoVoice			No-Stop	No-Back

Korean lax [k] and tense [k'] are replaced with English aspirated [k^h] by English-speaking Korean learners in (15).

(15) Korean [k, k'] and English [k^h]

English [k ^h]	NoStop	NoDorsal	NoVoless	NoCont	
☞ [k ^h]	R	R	R		
[g]	R	R			
[ŋ]	R	R			
Korean [k, k']	NoStop	NoDorsal	NoVoless		NoTense

Korean voiced stops [p, t̚, k̚] are replaced with English [b, d, g] because they share the marked constraint feature [+voice]. For example, English [b] has the marked feature [+labial] and [+voice]. Since these marked features are transferred to an L2 sound, English-speaking Korean learners pronounce English [b] for Korean voiced labial [p] in (16).

(16) Korean [p] and English [b]

English [b]	NoStop	NoLabial	NoVoice	
[p]	R	R		
[f]		R		
[p ^h]	R	R		
[v]		R	R	
☞ [b]	R	R	R	
Korean [p]	NoStop	NoLabial	NoVoice	NoLax

In the same way, English-speaking Korean learners pronounce English [d] for Korean voiced [t̚], and English [g] for Korean voiced [k̚].

4. Conclusion

This study showed that L2 learners transfer the constraints of marked features from their native language when they learn L2 sounds. Native speakers of Korean replace English sounds with Korean sounds based on the marked constraint violations and phonological process constraints. Native speakers of English tend to replace Korean sounds such as lax and tense consonants with English sounds when they learn Korean. In the early stages, they tend to produce the aspirated consonants instead of the lax and the tense consonants in word initial position. Direct Optimality Theory shows that each marked feature that is a violated constraint with a ranking and with constraints for phonological processes is directly transferred to an L2 sound. This is observed in the sound substitution both of Korean-speaking English learners and English-speaking Korean learners.

Notes

¹Aspirated and tense stops, and fricatives are neutralized and unreleased in final word position and in front of the other consonants. For example, /pak'/ 'outside' and /sos-ta/ 'rise' are realized as [pak^h] and [sot^ht'a] respectively. This study only involves word initial and onset position of Korean consonants which show a three-way distinction between lax, tense, and aspirated consonants.

²It is also true that stop consonants after [s] is not aspirated. However, this is not relevant to this study because Korean does not allow consonant clusters having [s] plus a consonant and English consonant clusters are separated by a vowel insertion when Korean learners learn English in early stages.

³Park (1990, 1992) originally cites phoneme substitution errors from Yi (1986). The phoneme replacement errors are as follows:

English Target Phoneme	Interlanguage
/f/	/p ^h /
/k/	/p/
/θ/, /š/	/s/
/z/, /ž/, /dž/	/c/
/ð/	/t/
/ʒ/ = /ʒ/	/dž/ = /dʒ/

⁴It is also true that English [θ] is sometimes replaced with Korean [s'] (Paik: 1991, Park: 1992). When Korean learners pronounce the English writer, *Henry D. Thoreau* [θ], they pronounce [s'orou] rather than [sorou]. This can be explained with non-distinction between the lax fricative [s] and the tense fricative [s'] in the Kyung-Sang Dialect (Im:1995:282) and the Chung-Puk dialect (Sung 1995:424). Some speakers in the Kyung-Sang Dialect do not distinguish between [sal] 'flesh' and [s'al] 'rice.' On the other hand, some speakers using the Chung-Puk dialect and the standard dialect pronounce [sonaʒi] 'shower' with [s'onakʒi].

⁵The unmarked structures are the absence of a coda or the presence of the onset and nucleus and so on according to Golston (1996:714).

⁶Although Kim (1987) does not show that Korean palatal stops are [-continuant], Park (1990, 1992) says that they have the feature [continuant].

⁷In DOT, the variation can be explained with two optimal outputs having the same constraint violations like Standard Optimality Theory (Prince and Smolensky 1993).

⁸When laterals come before a high front vowel [i] or a glide [j], the laterals are deleted.

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Case-Deletion in Korean

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1 Introduction

In Korean there are overt Case markers, but the Case markers may be deleted, as illustrated by (1a-b). However, it is not the case that Case deletion is permitted in every construction. As shown by (2a-b), deletion of Case markers may cause ungrammaticality.

- (1) a. Cikum Mary- $\{ka, \emptyset\}$ kongpwuha-nikka, coyonghi-hay.
now Mary-(nom) study-because, be quiet
'Be quiet. because Mary is studying now.'
- b. Mary-ka Con- $\{ul, \emptyset\}$ cohahan-tanun-kes-un motun salam-i
Mary-nom John-(acc) likes-comp-fact-top all people-nom

alkoissta.
know
'Everybody knows that Mary likes John.'
- (2) a. Cikum Mary- $\{ka, * \emptyset\}$ Con-ul mana-koiss-unikka, ...
Now Mary- $\{nom, * \emptyset\}$ John-acc meet-prog-because
'(Intended) Because Mary is meeting John now, ...
- b. Mary- $\{lul, * \emptyset\}$ Con-i cohahanikka, ...
Mary- $\{acc, * \emptyset\}$ John-nom like-because
'(Intended) Because John likes Mary, ...

The difference between (1) and (2) lies in adjacency: the Caseless arguments in (1a-b) are adjacent to their predicates, while the Caseless arguments in (2a-b) are not. It seems that the argument adjacent to a predicate may be Caseless, while the non-adjacent argument must be marked by a Case-marker.¹

In addition to the adjacency constraint, there are other types of constraints on Case deletion. For example, there is a contrast between purely quantificational

DP and non-quantificational DP. (3) shows that not every DP permits the deletion of the nominative Case marker.

- (3) a. Sey salam- $\{i, \emptyset\}$ wassni?
 three men- $\{\text{nom}, \emptyset\}$ came 'Did three men come?'
 b. Con- $\{i, \emptyset\}$ wassni?
 John- $\{\text{nom}, \emptyset\}$ came 'Did John come?'
 c. $\{\text{nwukwu}, \text{nwu-ka}\}$ wassni?
 $\{\text{Someone}, \text{someone-nom}\}$ came 'Did someone come?'
 d. Ku salam- $\{i, \emptyset\}$ wassni?
 The man - $\{\text{nom}, \emptyset\}$ came 'Did the man come?'
- (4) a. Motun salam- $\{i, ??\emptyset\}$ wassni?
 all men- $\{\text{nom}, ??\emptyset\}$ came 'Did all men come?'
 b. Taypwupwun-uy salam- $\{i, ??\emptyset\}$ wassni?
 most-poss men - $\{\text{nom}, ??\emptyset\}$ came
 'Did most men come?'
 c. Semyeng-uy haksayng- $\{i, ??\emptyset\}$ wassni?
 three-poss students- $\{\text{nom}, ??\emptyset\}$ came
 'Did three of students come?'

The DPs in (3) are either referential or weak, and those DPs permit Case deletion. In contrast, the DPs in (4) are purely quantificational, and the purely quantificational DPs must have a Case marker. (5-6) display that deletion of the accusative Case marker patterns with that of the nominative Case marker.

- (5) a. pro sey salam- $\{\text{ul}, \emptyset\}$ manassni?
 pro three men - $\{\text{acc}, \emptyset\}$ met 'Did you meet three men?'
 b. pro Con- $\{\text{ul}, \emptyset\}$ manassni?
 pro John- $\{\text{acc}, \emptyset\}$ met 'Did you meet John?'
 c. pro nwukwu- $\{\text{lul}, \emptyset\}$ manassni?
 pro someone- $\{\text{acc}, \emptyset\}$ met 'Did you meet someone?'
 d. pro ku salam- $\{\text{ul}, \emptyset\}$ manassni?
 pro the man- $\{\text{acc}, \emptyset\}$ meet 'Did you meet the man?'
- (6) a. pro motun salam- $\{\text{ul}, ??\emptyset\}$ manassni?
 pro all men- $\{\text{acc}, ??\emptyset\}$ meet 'Did you meet all men?'
 b. pro taypwupwun-uy salam- $\{\text{ul}, ??\emptyset\}$ manassni?
 pro most-poss men- $\{\text{acc}, ??\emptyset\}$ meet
 'Did you meet most men?'
 c. pro seymyeng-uy haksayng- $\{\text{ul}, ??\emptyset\}$ manassni?

pro three-poss student -{acc, ??Ø} meet
 'Did you meet three of students?'

Thus far, we have seen two phenomena on Case deletion: (i) the adjacency condition, and (ii) the quantificational DP/the non-quantificational DP contrast regarding Case deletion. The purpose of this paper is to account for those phenomena.

2 Incorporation and Case Dropping

Let us start with the question of why the Caseless argument must be adjacent to the predicate. I propose that the Caseless DP adjacent to a predicate is a DP incorporated into the predicate, and the incorporated DP is not subject to the Case filter, which is roughly understood as 'every argument must be Case-marked'. (7a-b) support the claim that the incorporated nominal is not Case-marked.

- (7) a. Mary-nun kyoswu-i-ta.
 Mary-top professor-be-indicative
 'Mary is a professor'
 b. Mary-nun kyoswu-ka an-i-ta.
 Mary-top professor-nom not-be-indicative
 'Mary is not a professor'

As illustrated by (7a-b), the predicate nominal *kyoswu* 'professor' is not Case-marked in the affirmative sentence, while the same predicate nominal is Case-marked in the negative sentence. This disparity can be explained by the incorporation approach. The copula *i* is a bound morpheme, and the predicate nominal *kyoswu* 'professor' must incorporate into the copula *i*.

- (8) a. [_{VP} [kyoswu] i]
 └───┘
 b. [_{VP} [kyoswu] an i]
 └───┘

When the sentence is negated, however, the predicate nominal cannot incorporate into the copula, because it is separated by the negative morpheme *an*, and *an* incorporates into the bound morpheme *i*. This leads us to conclude that the incorporation allows Case deletion. If we topicalize the predicate nominal

3 The LF Position of Caseless DPs

Now let us consider the LF position of the Caseless DP in Korean. The Korean sentence in (12a) does not show the scope ambiguity, unlike its English counterpart. This suggests that there is no QR in Korean.

- (12) a. *nwukwunka-ka nwukwuna-lul cohahanta.*
 Someone-nom everyone-acc likes
 'Someone likes everyone'
 b. Someone likes everyone.

If there is no QR, and if the Caseless DP does not move for Case checking, we expect that the scope of the Caseless DP does not extend to TP. This expectation is borne out. In (13a) the nominative Case marker may be deleted. It is because *nolaypwuluta* 'sing' is a stage-level predicate, and *Mary* is referential. However, Case deletion is not permitted in (13b). The only difference between (13a) and (13b) is that (13b) has an adjunct phrase containing PRO.

- (13) a. *Mary_i-{ka, ∅} nolaypwules-ni?*
Mary-{nom, ∅} sang-Q
 'Did Mary sing?'
 b. *PRO_i chwumchwu-myense, Mary_i-{ka, ??∅} nolaypwules-ni?*
PRO dancing-while, Mary-{nom, ??∅} sang
 'Did Mary sing while dancing?'

It seems that Case cannot be deleted in (13b), because the Caseless *Mary* cannot serve as a controller of PRO.

- (14) [_{TP} [_{VP} [_{PRO_i} chwumchwu-myense][_{VP} $\overbrace{Mary_i-\{ka, *\emptyset\}}^{\wedge}$ nolaypwules]]] T]

Let us say that the Case-marked *Mary-ka* undergoes LF-movement to T. Then the scope of *Mary* extends to T, and *Mary* c-commands PRO. Thus, the Case-marked *Mary* can be a controller for PRO. It seems that the Caseless *Mary* cannot undergo a covert movement at LF, and it cannot c-command PRO at LF. Hence (13b) is ungrammatical. It is not surprising that the Caseless DP does not move to T, because the Case marker has all the features required by T.

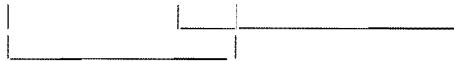
In sum, the incorporated DP must be inside VP at LF; the incorporated DP

does not undergo LF-movement, as we have seen in (14). Now the question raised at the outset of this paper boils down to the following question: why cannot the purely quantificational DPs stay in the predicate internal position, and why cannot the subject of the individual-level predicate stay in the predicate internal position?

4 Theta Role Assignment and the Mapping Principle

According to the Minimalist Program proposed by Chomsky (1995), both the subject and the object have theta positions and Case/Agreement positions. The subject is generated inside VP and moves to the SPEC of TP for Case checking, and the object, just like the subject, moves to the Case/Agreement position.

(15) a. [TP Subj [T T [UP Obj [UP Subj [U' U [VP likes Obj]]]]]]

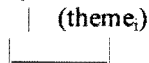


b. [TP John [T T [UP Mary [UP John [U' U [VP likes Mary]]]]]]

Under this analysis, there are (at least) two copies of a subject and an object, but only one of them must be interpreted, just as only one of them is pronounced. The question is which copy is interpreted. Let us investigate whether there is a principled way to provide an answer to the question.

Quite a few linguists (Williams (1981, 1987, 1995) among others) assume that the theta role assignment is a process of index sharing. According to this view, through theta role assignment the theta role and its argument are co-indexed and form an anaphoric relation.

(16) John_i arrived.



This proposal is based on the idea that the theta role is a variable, and the semantic value of the theta variable is determined by the argument sharing the index of the variable. There are (at least) two ways of fixing the value of a variable, as shown by (17). One is to bind the variable x , and the other is to specify it.

- (17) a. $\lambda x[\dots x \dots]$ (John) (binding) b. For some x , x is John. (specification)

Thus, it is quite natural that there are two views about the relation between an argument and its theta role—a theta variable. The binding method and the specificational method are illustrated by (19a-b) respectively. In (19a) the theta variable x is bound by *John*, and in (19b) it is specified by *John*.³

- (18) John arrived.
 (19) a. $\lambda x[x$ arrived] (John) (bound variable)
 b. x arrived and x is John (specification)

Specification is a symmetric relation in that the variable and its specifier may be transposed, but binding is an asymmetric relation, since the variable and its binder cannot be switched.

- (20) a. x came & $x = DP$ a'. $DP = x$ & x came
 b. $\lambda x[x$ came] (DP) b'. $*\lambda DP [DP$ came] (x)

I propose that the different anaphoric relations must be represented in a different c-command relation. More exactly speaking, the symmetric anaphoric relation requires a mutual c-command relation, while the asymmetric anaphoric relation requires an asymmetric c-command relation.

- (21) a. If two anaphoric expressions form a symmetric relation (specificational relation), they must c-command each other.
 b. If two anaphoric expressions form an asymmetric relation (bound variable relation), the binder must asymmetrically c-command the variable.

This amounts to saying that the VP-internal copy requires a specificational relation, while the VP-external copy requires a bound variable relation.

With this in mind, let us go back to the question: which copy must be interpreted. The referential DPs may form a specificational relation. This means that the VP-internal copy may be interpreted, when the DP is referential.

- (22) a. [_{TP} Mary [_{VP} Mary ponders]] b. x ponders and $x =$ Mary

The weak quantifiers like *someone* may also form a specificational relation, given that the weak quantifier is a variable, as Heim (1982) argues. If *some student* is a variable—if it is interpreted as ' x such that x is a student', then (23a)

is interpreted as (23b).

- (23) a. [_{TP} some student [_{VP} some student ponders]]
 b. x ponders & $x = y$ such that y is a student.

Thus, the weak DP may be interpreted at the VP-internal position. However, the quantificational expression *every student* cannot constitute a specificational relation.

- (24) a. Every student ponders.
 b. * x ponders & x is every y such that y is a student.

(24b) is ill-formed, since x denotes an individual, whereas *every y such that y is a student* is a set of sets of individuals. That is, it is anomalous to say that *some x is every y* . This suggests that the VP-internal copy of a strong DP cannot be interpreted.

Now let us consider whether the referential DP and the weak DP may stay outside VP. (25) is ambiguous in two ways.

- (25) John likes his mother, and Bill does too.

The second conjunct may have the interpretation that Bill likes John's mother (the non-sloppy reading) or that Bill likes Bill's mother (the sloppy reading). The sloppy and non-sloppy reading are represented as (26a-b) respectively.

- (26) a. John [λx (x likes x 's mother)] and Bill does [λx (x likes x 's mother)]
 too (sloppy)
 b. John [λx (x likes his mother)] and Bill does [λx (x likes his mother)]
 too (non-sloppy)

As is shown by (26a-b), on the sloppy reading, *his* is a variable bound by *John*, and with the non-sloppy reading the anaphoric relation between *John* and *his* is cospecificational.

The bound variable interpretation is available only if the antecedent is strong in the sense of Barwise and Cooper (1981). The following sentence provides evidence that the antecedent of the bound variable link must be strong.

- (27) a. Some marijuana growers will destroy their crop or else their neighbors will.
 b. Some marijuana growers [λx (x will destroy x 's crop)] or else their

- neighbors [λx (x will destroy x's crop)]
 (sloppy, bound variable anaphora, 'some vs. others' reading)
 c. Some marijuana growers [λx (x will destroy their crop)] or else their
 neighbors [λx (x will destroy their crop)]
 (non sloppy, cospecificational, maximality effect)

(27a) is ambiguous: the pronoun *their* may either be interpreted as a bound variable, which gives rise to the sloppy reading in (27b), or a cospecificational anaphora, which gives the non-sloppy interpretation in (27c). According to Sells (1985), on the non-sloppy reading, the so-called maximality effect shows up, and it means that all marijuana growers will get their crops destroyed, one way or another, and with the sloppy reading, *some* has the 'some vs. others' reading so that (27a) means that some growers, not all growers will lose their crops. The 'some vs. others' reading is strong. We have seen that the referential DP, which is strong, may make a bound variable relation. Therefore, it can be said that the antecedent of a bound variable anaphora must be strong. If it is correct, we are led to conclude that the weak quantifiers cannot occur in the predicate-external position. To recapitulate, the following mapping principle follows from the semantics of theta role assignment:

- (28) (i) the quantificational DP must asymmetrically c-command a theta variable, since it must form a bound variable relation,
 (ii) the weak DP and its theta role must c-command each other, since it must form a specificational relation,
 (iii) the referential DP may either asymmetrically or mutually c-command its theta role, since it may form both a specificational and a bound variable relation.

(28) amounts to saying that (i) the purely quantificational DP must be in the predicate external position, (ii) the weak DPs must be in the predicate-internal position, and (iii) the referential expressions may be either in the predicate-internal position or in the predicate-external position.

5 Solution

Now it is quite straightforward why there is a disparity regarding Case deletion between the purely quantificational DP, on the one hand and the referential DPs and the weak DPs on the other. The Caseless DP must be incorporated into the VP-internal position. The incorporated DP and the theta variable mutually c-

command each other, hence they must constitute a specificational relation with the theta variable.

(29) [V(x) & x = Caseless DP]

It is quite straightforward that the referential DP may form a specificational relation with the theta variable. For instance, (30a) is represented as (30b).

(30) a. [_{VP} Mary wassta]
 Mary came
 b. [x came & x = Mary]

Thus, the referential DPs are permitted to incorporate into their predicates and drop their Case. The weak DPs also form a specificational relation with the theta variable, if the weak DP is a variable, as Heim (1982) argues. Thus, they are permitted to delete the Case marker.

(31) a. [_{VP} nwukwunka wassta]
 someone came
 b. [x came & x = y such that y is a person]

However, the purely quantificational DPs like *every man* cannot constitute a specificational relation with a theta variable x on account of type mismatch: x is of an $\langle e \rangle$ type, while *every man* is $\langle \langle e, t \rangle t \rangle$.

(32)a. [_{VP} motun haksayng wasse]
 every student came
 b. $*\exists x$ [came(x) & x = every student]

Consequently, (32b) is an ill-formed LF. Since the purely quantificational DP cannot form a symmetric relation with its predicate, it cannot stay in the VP-internal position, and it may not be Caseless. To sum up, (i) the Caseless DPs must be inside VP at LF, (ii) the VP-internal DPs must form a specificational relation with the theta variable, (iii) the strongly quantified non-referential DPs cannot have the specificational relation, while the weak DPs and the referential DPs may have the relation, (iv) therefore only the referential and weak DPs permit Case deletion.

There is one exception to the generalization that a truly quantified DP does not permit Case deletion: the *wh*-phrase. The *wh*-phrase may be Caseless, if it is adjacent to a predicate.

In (ib) ' / ' stands for the rising tone.

2. Or we may say that the incorporated DP is not an argument but a part of predicate, hence it is not subject to the Case filter.

3. The binding method is the one traditionally advocated by lots of linguists. In fact, the specificational method has been rarely used. Recently, Larson and Sgall (1995) provide an explicit analysis by making use of the specificational method.

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NPs or Zero Anaphora: Referential Management by Advanced Japanese as a Second Language Learners

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1 Introduction

The present study focuses on Japanese as a second language (JSL) of American English speakers and investigates whether they use noun phrases (NPs) more often than zero anaphora, or vice versa, when compared with the native Japanese speakers. It begins with a description of zero anaphora in Japanese followed by a brief review of the literature. It then proceeds to a general description of the present study. After an analysis of the data is presented, possible explanations regarding the choice between NPs and zero anaphora are postulated.

2 Zero Anaphora in Japanese

As Shibatani (1990:360) states, in comparison to English, Japanese is highly elliptical in both speech and writing. Consider the following example in Japanese:

- (1) A: Kinoo \emptyset yuuhan nani tabeta?
 ‘What did (you) eat for dinner?’
 B: \emptyset sakana o tabeta na.
 ‘(I) ate fish.’

In (1), neither A nor B expresses a subject pronoun (marked as \emptyset); *you* and *I* are implicit respectively, but the referent of each pronoun is recoverable in this context. However, the sentences in (1) would be ungrammatical if pronouns containing similar meaning were to be omitted in English. Such ellipsis has

been frequently observed in the discourse of Japanese. In the present study, zero anaphora is defined as follows:

Zero anaphora refers to the non-use of a referential expression, either in the subject or object position, whose referent is potentially recoverable based on prior discourse, the context of the conversation, or general knowledge (Williams 1988:340).

3 Previous Research

A number of studies on the use of referential expressions by second language (L2) learners have reported some differences in referential choice between L2 learners and native speakers. Some studies show that L2 learners tend to use NPs more often than zero anaphora, and others report the frequent use of zero anaphora by L2 learners, when compared with the native speakers. Tomlin (1990) examined the data produced by 30 advanced L2 learners of English in an on-line narrative production task and found differences in narrative production between the learners and native speakers of English: The L2 learners used NPs exclusively in their narrative productions. Fakhri (1989) found that L2 learners of French increasingly used structurally marked elements such as NPs and avoided unmarked elements such as zero anaphora as the period after completing a French class got longer. Similarly, Polio (1995) found that among L2 Chinese learners with three levels of proficiency whose native languages were English and Japanese, all used NPs more frequently than native speakers of Chinese. To the contrary, Williams (1988) found that two groups of non-native English speakers, L2 learners and speakers of Singapore English (an institutionalized variety of English), frequently used more zero anaphora than native speakers.

In summary, research reviewed above shows that there are two conflicting views regarding the choice of referential expressions of L2 learners: one is that L2 learners tend to use NPs more often than native speakers do and the other is that L2 learners tend to overuse zero anaphora, compared to native speakers. However, few SLA studies have investigated differences in the choice of referential expressions of JSL learners. This study attempts to close that gap.

4 The Present Research

4.1 Subjects

A total of six subjects participated in this study: four male JSL learners who are

enrolled in a fourth-year Japanese reading class at an American university, one female English-Japanese bilingual student enrolled in the same class, and one female native speaker of Japanese. Table 1 describes the years of experience in learning Japanese of the six subjects and their time spent in Japan.

Table 1
Japanese Learning Experiences and Living Experience in Japan

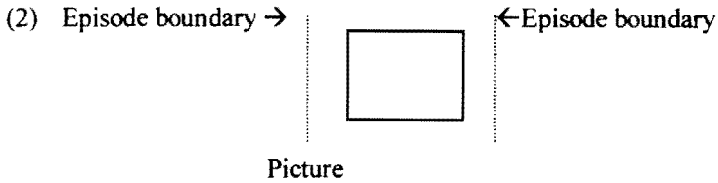
Subject	Learning Experience	Living Experience
A	3 and a half years	1 month studying Japanese
B	5 years	9 months studying Japanese
C	5 years	2 months studying Japanese and 2 months working
D	2 years and 7 months	2 months studying Japanese
E	Bilingual speaker (Japanese and English)	Born and lived in Okinawa until graduation from high school.
F	Native speaker	26 years

As shown in Table 1, the learning experience of each subject varies from two years and seven months to more than 20 years. Moreover, all the subjects have at least one month's experience living in Japan with a Japanese family, during which time they were exposed to a fair amount of Japanese input.¹ Note that I treat subject E as a native speaker, which means that there are two native Japanese subjects in this study.

4.2. Procedure

The subjects are asked to describe pictures which were taken from a picture book called *Frog in Winter* by Velthuijs (1992). In the story, a frog, the main character, walks around one cold winter day meeting his friends, a goose, a pig, and a rabbit. The reason I chose this picture book is that the sequence of the story is well described by illustrations and the content of the story is not overly complex. In addition, more than one character appears in some pictures, which provides the opportunity for the use of a number of expressions, adding an interesting dimension and making this book very appropriate for this referential choice experiment.

In order to collect the data, I detached each picture from the book one by one in advance. As a result, a total of twenty-one episode boundaries are arbitrarily created in this study. Diagram (2) illustrates this technique:



As shown in (2), the episode boundaries exist at both sides of each picture. During the session, the subjects are shown pictures one by one without looking at the previous one. Later, utterances were transcribed for analysis.

4.3 Units for analysis

Based on Saul (1986), I categorized the referential expressions in this study.

(3) Referential Expressions

- a. Singular full NPs:
kaeru 'frog'; *ahiru* 'goose'; *buta* 'pig'; and *usagi* 'rabbit'
- b. Plural NPs:
kaeru to usagi 'frog and rabbit'; *usagi to buta* 'rabbit and pig'; *buta to ahiru* 'pig and goose'; *buta to usagi to ahiru* 'pig, rabbit, and goose'; and *buta to usagi to ahiru to kaeru* 'pig, rabbit, goose, and frog'
- c. Quantified definite nouns:
minna 'everyone'
- d. Zero anaphora related to a, b, and c above.

For investigating their choice of referential expressions, I utilized the notion of hits and misses as defined by Saul (1986). These notions are defined in (4).

(4) Definitions of Hits and Misses

- a. Hits
If the referents mentioned for the first time after an episode boundary are coded by NPs or if the referents previously mentioned

within an episode boundary are coded by zero anaphora, they are counted as hits.

b. Misses

If the referents mentioned for the first time after an episode boundary are coded by zero anaphora or if the referents previously mentioned within an episode boundary are coded by NPs, they are counted as misses.

Based on Saul (1986), misses are further categorized into two types: the inter-episode zero anaphora and the intra-episode NP. In (5), the definitions of the two misses are described:

(5) Definitions of Inter-episode Zero Anaphora and Intra-Episode NPs

- a. Inter-episode zero anaphora refers to an anaphora used by the speaker in the episode boundary for the first time.
- b. Intra-episode NPs refer to an NP used by the speaker within one episode after the first mention of the same referent.

This distinction helps to determine the types of mistakes which subjects made.

Example (6) shows how I analyze the use of NP and zero anaphora based on these definitions:

(6) JSL learner B: Episode 14

de moo ichi do **kaeru** ga yoru mitai ni etto ie kara dete etto yuki ga futteite etto **kaeru** ga totemo samusoo desu.

‘And once again, **the frog** went out, probably at night, and it was snowing, and well, **the frog** looks like it is freezing.’

In (6), the first *kaeru* ‘frog’ was considered a hit because this was its first occurrence in episode 14, but the second *kaeru* ‘frog’ was considered a miss because this was its second mention within episode 14. Furthermore, the second *kaeru* ‘frog’ was considered an intra-episode NP.

5 Analysis

5.1 Hits and misses

Table 2 shows that both JSL learners and native speakers produced hits more than 80 % of the time; they used NPs for referents which occurred for the first time after an episode boundary and used zero anaphora for referents which had already mentioned within an episode 84.6 % of the time on average.

Table 2
Frequency of Hits and Misses

	JSL learners	Native speakers
Hits	189/217 (87.1%)	92/115 (80.0%)
Misses	28/217 (12.9%)	23/115 (20.0%)

However, Table 2 also shows that the native speakers produced misses more frequently than the JSL learners--- 20.0 % for native speakers and 12.9 % for JSL learners. The results are represented graphically in Figure 1. These misses are analyzed further In the following section.

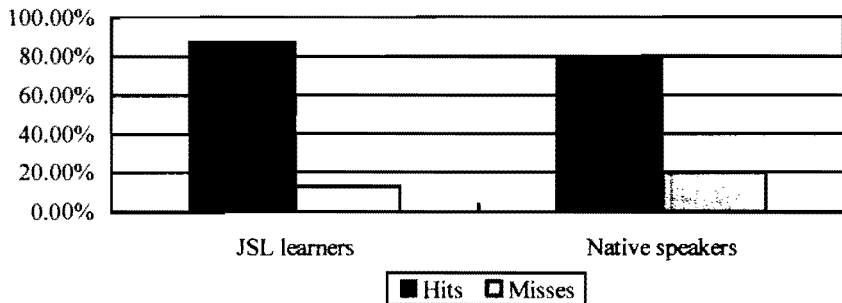


Figure 1. Hits and Misses

5.2 Comparison of misses

Table 3 shows the frequency of inter-episode zero anaphora and intra-episode NPs produced by the JSL learners and native speakers:

Table 3
Two Types of Misses

	JSL learners	Native speakers
Inter-episode zero anaphora	5/28 (17.9%)	17/23 (74.0%)
Intra-episode NP	23/28 (82.1%)	6/23 (26.0%)

As shown in Table 3, the JSL learners produced intra-episode NPs more often than the native speakers (82.1% for the JSL learners, and 26%, respectively). The table also shows that the native speakers produced inter-episode zero anaphora more often than the JSL learners (74% and 17.9%). Figure 2 shows that the pattern is completely opposite for both sets of speakers. The probable causes of these differences are explained in the following sections.

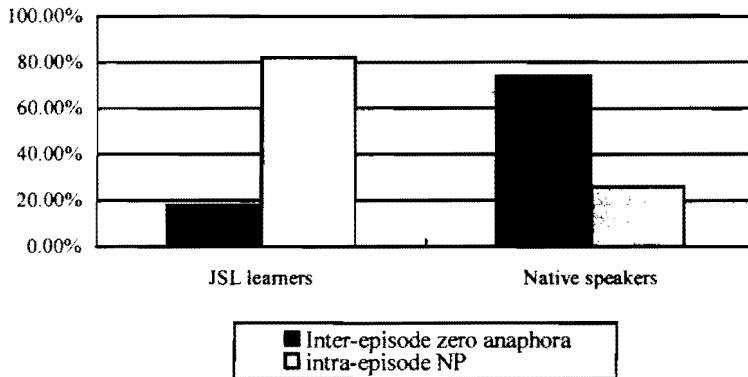


Figure 2. Two Types of Misses

5.3 Analysis of intra-episode NPs

I found four conditions under which the use of intra-episode NPs were used: for repair, after non-narrative comments, for ambiguity resolution, and for the avoidance of complex sentences. The conditions are defined in (7):

- (7) a. Repair: correction by the speaker of that which is being self-corrected (Schegloff, Jefferson, & Sacks, 1977).
 b. Non-narrative comments: refer to evaluative discourse by the narrator (Tomlin, 1987).

- c. Ambiguity resolution: when a narrator finds that something which was said might create ambiguity and resolves the problem by defining the subject, using a full NP (Tomlin, 1987).
- d. Avoidance of complex sentences: the breaking up of a complex sentence into two simple sentences each of which uses a full NP.

The total number of misses for each condition are shown in table 4:

Table 4
Conditions

Conditions	JSL learners	Native speakers
Repair	7	3
Non-narrative comments	4	2
Ambiguity resolution	5	1
Avoidance of complex sentences	7	0

As shown in Table 4, seven NPs used by the JSL learners and three NPs used by the native speakers fall into the repair category. Four intra-episode NPs used by the JSL learners and two intra-episode NPs used by the native speakers appeared after non-narrative comments. Five of the intra-episode NPs used by JSL learners and one of the intra-episode NPs used by the native speakers were the result of ambiguity resolution. Seven of the intra-episode NPs used by the JSL learners were the result of avoidance of complex sentences. Example (8) and (9) illustrate repair and non-narrative comments, respectively:

(8) JSL learner D: Episode 5

un **ahiru**, kono **ahiru** wa, sukeeting shite- shiteimasu.
'Yes, a goose, this goose, is doing skating.'

(9) Native speaker F: Episode 1

kore wa **kaeru** san desu ne. **kaeru** san wa soshite beddo ni
suwarikomimashita.
'This is a **frog**, isn't this? And **the frog** sat on the bed.'

In (8), JSL learner D says *ahiru* 'goose' twice. The purpose of this is to define 'this goose' rather than any goose by adding *kono* 'this', which is a kind of repair. In (9), native speaker F used an intra-episode NP *kaeru* 'frog' after making a non-narrative comment, which was the confirmation of a picture.

(10) illustrates ambiguity resolution.

(10) Native speaker E: Episode 8

kondo wa Ø chigau tokoro de, anoo, yuki no ue aruitete **buta** san ni atte
buta san ga nanika kaeru san ni itemasu nanka.

‘This time, (the frog) is walking on the snow and comes across a **pig**, and
the **pig** seems to be saying something to the frog.’

In (10), native speaker E used *buta* ‘pig’ twice; she used this in both the first clause and the second clause. Here, *buta* ‘pig’ is a new subject in addition to the subject frog. There are now two subjects in the second clause, and the narrator had to state *buta* ‘pig’ in order to show that the subject that she was talking about was indeed *buta* and not *kaeru* ‘frog’. Otherwise, the subject of the second clause might be understood as being the same subject which was expressed as a zero anaphor in the first clause, that being *kaeru* ‘frog’.

(11) illustrates the avoidance of complex sentences.

(11) JSL learner C: Episode 10

to juuban me wa sono kaeru wa etto usagi o miteru. Sono usagi ga
hashitteru n desu.

‘And in the 10th (picture), the frog is, well, looking at the **rabbit**.
The **rabbit** is running.’

(12) Native speaker E: Episode 10

... ano genki na **usagi** kun anoo hashitteru tokoro o kaeru ga mitemansu.

‘... well, the frog is seeing the cheerful **rabbit** running.’

In (11), JSL learner C added another narration for episode 10 after giving one narration: *sono kaeru wa etto usagi o miteru*, ‘the frog is, well, looking at the rabbit.’ In contrast, in (12), native speaker E has merged two simple sentences: ‘a rabbit is cheerfully running,’ and ‘a frog is looking at the rabbit.’

I consider the reason that only JSL learners showed the pattern in (10) is due to the fact that they were not proficient in Japanese to a sufficient degree to produce modifier clauses such as native speakers were able to do. Since they were unable to produce complex sentences, their strategy was to break up a sentence into two simple sentences and use full NPs each time in order to convey the meaning clearly.

5.4 Analysis of inter-episode zero anaphora

Regarding inter-episode zero anaphora, I found that the two native speakers in this study used zero anaphora at the same episode boundaries—2, 4, 8, and 15. In boundaries 2 and 4 especially, only one character appeared in the sequence. Consider example (13):

(13) Native speaker F: Episode 2

E kore wa asa kana, ano kumottette, ano \emptyset mado akete, tori ga iru kara...

‘Well, this may be (the scene of) the morning. Well, it is cloudy, and well, (**the frog**) opened the door, and there is a bird ...’

In (13), native speaker F used a zero anaphora for *kaeru* ‘frog’, which is the referent first-mentioned in episode 2. In other words, in spite of the episode boundary, F used a zero anaphora for a full NP to refer to the first-mentioned referent.

To the contrary, none of the JSL learners produced such an inter-episode zero anaphor except for subject D, who did so in a manner similar to that of the native speakers between episodes 2 and 3.

This result would indicate that the JSL learners were more constrained by an induced boundary (picture boundary). I consider that their performance is due to the cognitive limitation that the JSL learners faced; they could not examine the broader story structure because of the difficulty of dealing with the task right in front of them, using a second language. At the same time, the native speakers were able to look at natural discourse boundaries; they easily grasped the flow of the story as well as the natural story boundaries.

6 Conclusion/Discussion

In this study, as pointed out in some previous studies (Fakhri, 1989; Polio, 1995; Tomlin, 1990), I found that L2 learners used NPs more often than native speakers. Furthermore, a close investigation of the types of misses which were made by the L2 learners and the native speakers revealed some differences in the use of referential expressions; only L2 learners used the intra-episode NP to avoid producing complex sentences, while, only native speakers produced inter-episode zero anaphora in episode boundaries if the same character

reoccurred.

These findings may highlight constraints on the processing abilities of L2 learners. The L2 learners did not produce complex sentences such as those which include subordinate structures because of their limited language processing abilities. For the very same reason, the L2 learners could not recognize natural episode boundaries which were hidden among pictures in the same way as the native Japanese subjects. As a result, they used NPs for the same referent within an arbitrarily-created episode boundary and after a natural boundary for the first time.

In past studies, it is speculated that the overuse of NP by second language learners would be the result of discourse strategies of L2 learners to ensure coherent and complete understanding by a listener (Tomlin 1990) and a communicative strategy to avoid ambiguity in a sentence (Fakhri 1989; Polio 1995). However, whether or not the overuse of NPs of L2 learners in this study is the result of such discourse strategies remains for future studies.

Lastly, I will conclude by stating some points that can be improved on in future studies. First, I did not control the time for observing each picture. It seems that depending on the length of the time for the observation, the subjects have a chance to add another narration to the picture. Thus, it would appear that by controlling time, different results might be produced. Second, due to the unequal number of subjects between the two groups as well as the small number of subjects, the results of this study did seem to lack generalizability. Thus, more subjects, in all groups, are desirable to generalize the results. Third, since I only examined advanced JSL learners, the inclusion of other levels of JSL learners might be interesting in that I might be able to discover how these JSL learners develop their referential management ability in Japanese discourse. I leave these points for future research.

Notes

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† According to the class instructor, the four male students could be roughly divided into two groups in terms of their current proficiency level, that is, A and B are more proficient than C and D.

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Relativized Mapping Hypothesis and the Interpretation of Bare Plurals

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1. Introduction

Since Diesing (1992) proposed that there should be a systematic mapping from syntax to semantics (i.e., Mapping Hypothesis), several linguists have tried to show that a crucial syntactic node corresponding to the nuclear scope in Heim's (1982) tripartite semantic representation is either VP (Diesing 1992) or IP (Kiss 1996). What I want to point out in this type of mapping algorithm, which I will call strict Mapping Hypothesis in general, is that the mapping is too accidental (or descriptive at most) to account for what it really means to say that the syntactic node, VP or IP, should be mapped into the nuclear scope in the semantic representation.

In this paper, I propose an alternative, the Relativized Mapping Hypothesis (I, II), where the mapping is not strictly defined but relativized in two senses; first, depending on the inherent property of predicates (i.e., the existence of eventuality),¹ and second, relying on the aspectual property of events (i.e., [+/-quantificational]). Specifically, this paper will examine bare plurals staying inside sentential complements denoting events, which exhibit two different types of interpretations. The Relativized Mapping Hypothesis will eventually show that the varied interpretations of bare plurals can be obtained through the event-dependent function $F(e)$ (c.f. Higginbotham 1983, Parsons 1990, Ramchand 1996), which allows us to define the nuclear scope as the theta-binding domain of Tense originally proposed by Higginbotham (1985) and adopted by Li (1987).

2. Event-denoting Sentential Complements and the Mapping Hypothesis

2.1 The strict Mapping Hypothesis

Heim's (1982) restricted-quantifier analysis for indefinites divides the logical representations into three interpretation parts: an unselective quantifier, a restrictive clause, and a matrix clause (or the nuclear scope). This is exemplified in (1b), where bare plurals are bound as indefinites (c.f. Carlson 1977).

- (1) a. Most pigs have wings.
 b. Most_x [x is a pig] x has wings

Inspired by this semantic partition, Diesing (1992) proposes a strictly defined mapping algorithm, according to which material (i.e., indefinites) inside the VP should be mapped into the nuclear scope, whereas material outside the VP should fall into a restrictive clause. She further assumes with Heim (1982) that there is a default existential closure that binds any variables that remain inside the nuclear scope, resulting in an existential interpretation, to avoid vacuous quantification.

With this background, Diesing (1992) predicts that bare plurals associated with stage-level predicates² are interpreted ambiguously (i.e., existential or generic), since she assumes that subject bare plurals of stage-level predicates are supposed to be mapped into either [Spec, IP] or [Spec, VP]. In contrast, bare plurals with individual-level predicates have only a generic reading, since subject bare plurals of individual-level predicates are base-generated in [Spec, IP] and thus should stay in that position even at LF. Diesing (1992) therefore hypothesizes that the varied interpretations of bare plurals associated with two different types of predicates are drawn from the following syntactic environments, respectively:

- (2) Bare plurals with stage-level predicates
 a. [_{IP} *Firemen*_i are [_{VP} *t_i* available]]. (generic reading)
 b. Gen_x [x is a fireman] x is available
 c. [_{IP} *t_i* are [_{VP} *Firemen_i* available]]. (existential reading)
 d. ∃_x [x is a fireman] x is available
- (3) Bare plurals with individual-level predicates
 a. [_{IP} Linguists [_{VP} PRO know French]]. (generic reading)
 b. Gen_x [x is a linguist] x knows French

Though Diesing's Mapping Hypothesis seems to succeed in showing us that the interpretation part of syntax, LF, directly communicates with a pure

semantic interpretation level (i.e., the semantic representation level), and explains an asymmetry between two types of predicates, one may still address the following question: why should, for instance, the syntactic node VP be accidentally mapped into the nuclear scope in the semantic representation? I will start out with several data sets related to stage-level predicates, all of which would be incorrectly predicted within the strict Mapping Hypothesis.

2.2 Bare plurals in event-denoting sentential complements

If we seriously take Diesing's proposal as it stands, bare plurals staying inside sentential complements should be interpreted in the same way as they are in simple sentences. More specifically, bare plurals staying inside IP-complements would be expected to have both readings (i.e., existential and generic), due to the two potential subject positions, whereas bare plurals placed in VP-complements would have only an existential reading in Spec of VP, which corresponds to the nuclear scope. However, this prediction simply fails as we can see in the following data.

First, note the existentiality of bare plurals bound inside perception verb complements (PVCs):

- (4) a. Sara saw [_{VP} *soldiers* leave]. (Stowell 1983)
 b. Sara saw [_{IP} *soldiers* leaving]. (Johnson 1988, Milsark, 1988)
 c. sara-ka [_{NP} [_{IP} *pyengsatul-i ttena-nun*]-kes]-ul poassta. (Lee 1998)
 Sara-Nom soldiers-Nom leave-Asp-nominal-Acc saw

Following Diesing's (1992) Mapping Hypothesis, the bare plural *soldiers* in (4a) should have only an existential reading, whereas the same bare plural in (4b) should be allowed to have a generic as well as an existential reading, since the IP-complement in (4b) provides a perfect syntactic environment (i.e., Spec of IP and Spec of VP) for both readings. However, this is not true. Both sentences in (4a, b) are interpreted only existentially. Furthermore, bare plurals in Korean perception verb complements such as (4c), which are analyzed as NPs directly dominating IPs, due to the aspectual marker *-nun* 'ing' and the event-denoting nominalizer *-kes* [+N] (c.f., Im 1974, Lee 1998), seem to have the same interpretation as that of its English counterparts, i.e., only an existential reading, once again problematic for the Strict Mapping Hypothesis.

Now, consider Korean and Japanese event-reporting clauses.

- (5) a. *mary-ka* [_{NP} [_{IP} *totwuktul-i* *cip-eyse* *nao-nun*]-*kes*]-*ul* *capassta*.
 Mary-Nom thieves-Nom house-from come out-Asp-nominal-Acc caught
 ‘Mary caught an event that thieves were coming out of the house.’
 (Literal translation)
 ‘Thieves were coming out of the house, and Mary caught.’ (them).
 (Intended meaning)
- b. *hanako-ga* [_{NP} [_{IP} *taroo-ga* *ringo-o* *katte-kita*]-*no*]-*o* *tabeta*.
 Hanako-Nom Taro Nom apple(s)-Acc buy-came-nominal-Acc ate
 ‘Hanako ate an event that Taro bought an apple/apples.’ (Literal)
 ‘Taro bought an apple/apples, and Hanako ate (it/them).’ (Intended)

As was the case in (4c), both bare plurals *totwuktul* ‘thieves’ in (5a) and *ringo* ‘apples’ in (5b) are located inside event-denoting NPs dominating IPs (see Ohara (1994) for more discussion on Japanese event-reporting clauses), and yet allows only an existential reading, which is not expected by Diesing (1992).

Before moving on to the next data set, one thing to be pointed out with the Korean examples given in (4c) and (5a) and the Japanese data in (5b) is the fact that bare plurals, which somehow appear to stay in different syntactic categories (i.e., VPs and IPs) in the English counterparts, can be said to stay inside NPs denoting events. We can conjecture from this observation that there might be some relationship between the existentiality of bare plurals and the event-denoting NPs.

The conjecture seems to be on the right track even from a current semantic point of view: the Neo-Davidsonian semantic analysis of events (Higginbotham 1983, Parsons 1990, Kratzer 1996, Ramchand 1996).

In particular, Higginbotham (1983) emphasizes that event-denoting sentential complements *s*-selected by the perception verb *see* actually show the semantic behavior of noun phrases, in fact, of indefinite descriptions of individual events, although probably sentential from the point of view of surface syntax. And thus, he suggests that the perception verb complement in (6a) be analyzed as in (6b), which is further formalized as in (6c):

- (6) a. John saw [_{VP} soldiers leave].
 b. John saw [_{NP} an event of leaving by soldiers].
 c. John saw [_{∃e}: leave (soldiers, e)]

As can be seen in (6c), in the absence of other sources of event quantification, the event variable in question is existentially bound, with scope as narrow as possible. If this is the case, the existentiality of bare plurals staying inside the events,⁴ i.e., the event-denoting NPs in Korean syntax, (4c) and (5a), appears to

be simultaneously brought into the scope of existential quantification as the relevant events are bound by a default existential closure. On the basis of this idea, what I claim in the next section is that quantification over bare plurals associated with stage-level predicates is actually achieved through events, i.e., the event-dependent function $F(e)$, which is different from quantification over bare plurals associated with individual-level predicates in that the latter is directly applied to individuals, whereas the former is not.

Returning to data against Diesing (1992), I provide a data set that contrasts sharply with the data we have seen in (4). That is, in (7a) the bare plural *soldiers* shows up inside a bare VP-complement, and yet unlike Diesing's prediction, it is interpreted ambiguously, either generic (habitual) or existential readings possible.

- (7) a. Clinton made [_{VP} *soldiers* smoke].
 b. Clinton-i [_{NP} [_{CP} [_{IP} [_{VP} *pyengsatul-i* dambay-lul piwu]]-key]]-hayssta.
 Clinton-Nom soldiers-Nom cigarette-Acc smoke-Comp(cause)-did

Of course, it is completely natural that Korean bare plurals like *pyengsatul* 'soldiers' should have both readings when they appear in Korean causative verb complements, which are usually analyzed as having an event-denoting NP-shell (Im 1974, Kang 1988) containing a full sentential projection, CP, based on the general assumption that the Korean causative morpheme *-key* is a complementizer. This is interesting precisely because the previously observed bare plurals staying inside event-denoting NPs (i.e., (4c) and (5)) are all interpreted as existential only.

Now, the problem at hand seems to be not just a matter of uncovering a specific syntactic category (e.g., VPs in Diesing (1992)) to be mapped into the nuclear scope, but a matter of accounting for why such a specific category, if any, should play such a crucial role in the syntax.

3. The Relativized Mapping Hypothesis (I)

Before directly jumping into an explanation for the data given in the previous section, I first suggest, along the lines with Li (1987) and Ramchand (1996) that generic/existential quantification over bare plurals should be applied in a different way (i.e., relativized), depending on the type of predicates (i.e., individual-/stage-level) they are associated with. In particular, in the case of a bare plural associated with a stage-level predicate, the genericity (habituality)/existentiality of the bare plural is not directly obtained by

quantifying over the bare plural, but through a relevant event, in which the bare plural participates.

The idea of the relativized application of quantification is supported by Partee (1991), who shows that D-quantification (by determiner quantifiers like *every* and *most*) and individual-level predication favor quantifying over individuals (or entities), while A-quantification (by adverbial-like quantifiers such as *usually*, *always*, and some other auxiliaries) and stage-level predication favor quantifying over events. Consider the contrast in interpretation between (8a) and (8b):

- (8) a. *Almost every* woman who *owns* a dog talks to it.
 b. *Almost always*, if a woman *sees* dog, she talks to it.

According to Partee's (1991) judgment on these data, we seem strongly inclined to count women, not woman-dog pairs in (8a), where we have both D-quantification and an individual-level predicate. Sentences like (8b) have exactly the opposite pattern, having A-quantification and a stage-level predicate. In this case, we seem to be much more inclined to count woman-dog pairs, or events (or episodes) of a woman seeing a dog, even if the same woman has occurred in a number of different episodes. A possible paraphrase of this reading is, "On almost all occasions on which a woman sees a dog, she talks to it."

A different application of quantification over indefinites is suggestive even with respect to the interpretation of bare plurals, contra Diesing (1992). Under this view, I propose the Relativized Mapping Hypothesis (I).

(9) The Relativized Mapping Hypothesis (I)

When bare plurals are associated with individual-level predicates, quantification should be applied directly to the relevant individuals, whereas when bare plurals are associated with stage-level predicates, generic/existential quantification should be applied first to the relevant events, rather than directly to the bare plurals involved.

What is important at this point is that any algorithm controlling a mapping from the syntax to the semantics should definitely be the one guaranteeing the Relativized Mapping Hypothesis (I), especially the event-dependent function $F(e)$,³ where the interpretation of bare plurals with stage-level predicates is determined through events. In the next section, I will propose the Relativized Mapping Hypothesis (II) as a new mapping algorithm by elaborating and incorporating two existing ideas: Higginbotham's (1985) theta-binding over an E(vent)-position and Portner's (1991) s-selection of semantic type of events.

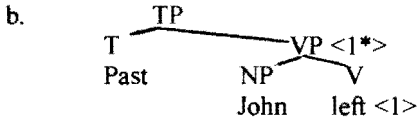
4. The Relativized Mapping Hypothesis (II)

4.1 The domain of theta-binding as the nuclear scope

By extending the notion of theta-binding over an E-position, proposed by Higginbotham (1985), I will show that the nuclear scope for an existential closure in the semantic representation can be understood as a theta-binding domain of Tense, whose formation crucially depends on the property of events, [+/-quantificational] (c.f., Portner 1991).

Higginbotham (1985) suggests that as far as tensed clauses are concerned, the position *E* (or event-role) of the thematic grid of the verb is discharged at the point where Infl (or Tense) meets (theta-binds) VP, which is one of four possible ways of discharging a theta-role. This is illustrated as in (10):

(10) John left.



The sentence in (10) would mean that there is some past object which is an event of “John leaving.” One interesting point noticed in his claim is that the interpretation of this type of theta-binding is existential generalization over an E-position. If this is the case, the theta-binding domain of the event “John leaving” would be the domain of Tense, TP, which in turn corresponds to the nuclear scope in the semantic representation to be interpreted as existential. This is necessarily construed since the process of theta-binding is now understood as existential generalization, according to Higginbotham (1985).

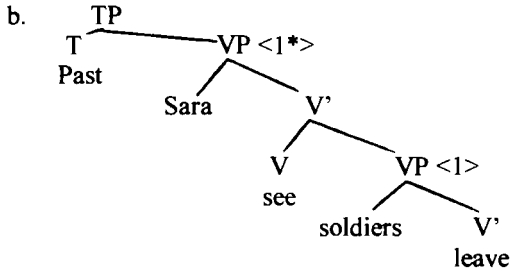
Based on this idea, I propose the Relativized Mapping Hypothesis (II), which guarantees that the varied interpretations of bare plurals associated with stage-level predicates are obtained through the event-dependent function, F(e).

(11) The Relativized Mapping Hypothesis (II)

If a theta-binding domain of an event position is formed, then material inside the theta-binding domain should be mapped into the nuclear scope in the semantic representation, otherwise it should be bound outside the theta-binding domain by an abstract *always*-like quantifier (e.g., *Gen*), side by side with the relevant events being bound by the generic operator, *Gen*.

The existentiality of bare plurals staying inside perception verb complements denoting events (i.e., VPs and IPs, in English, and NPs in Korean), which were illustrated in (4), can be obtained as follows:

(12)a. [_{TP} Sara saw [_{VP} *soldiers* leave]].



In (12), the e(vent)-role of the VP complement, i.e., *leaving*, is the only role not saturated at the VP-level, which I assume is theta-identified with the e-role of the matrix VP, i.e., *seeing*, since the e-role introduced by the embedded verb *leave* should be theta-bound by the same tense element (i.e., matrix Tense) binding the e-role of the matrix VP, due to the absence of its own Tense (c.f., Hoekstra 1992, Kratzer 1996).⁵ And thus, the domain of theta-binding for both the matrix e-role and the complement e-role in (12) would be the same one: the domain of the matrix Tense, which is mapped into the nuclear scope in accordance with the Relativized Mapping Hypothesis (II) in (11). This analysis will eventually bring a variable introduced by the bare plural *soldiers* participating in the event of *leaving* into the nuclear scope, as the relevant event variable itself is mapped into the nuclear scope.

The same analysis accounts for the existentiality of bare plurals located inside the Japanese and Korean event-reporting clauses, which I have shown in (5).

4.2 Property of events and the Relativized Mapping Hypothesis (II)

In the previous section, I have explained why the bare plurals staying inside sentential complements denoting events (e.g., perception verb complements and event-reporting complements) can have an existential interpretation. The mapping process from the syntax to the semantics in the Relativized Mapping Hypothesis (II) is not accidental as far as the nuclear scope is defined in terms of the domain of theta-binding over events, in which e-roles are discharged by Tense. Now, let me call our attention to the conditional phrase in (11), “If a theta-binding domain of an event position is formed ...,” with which I intend to

imply that the formation of theta-binding over an E-position should be restricted by the aspectual property (i.e., +/-quantificational) of the event involved. Consider the contrast noticed in (13):

- (13)a. Clinton saw [soldiers (**always*) run].
 b. Clinton made [soldiers (*always*) run].

What I am trying to argue with this contrast in (13) is that the theta-binding domain can be formed if and only if the aspectual property (i.e., internal structure of events in Meulen and Rooryck's (1991) terminology) of the event s-selected by a matrix verb is [-quantificational]. In (13a) the perception verb *see* s-selects for a nonquantifiable single event, and thus allows the theta-binding domain to be formed, since no quantifiers like *always* are allowed inside the complements to *see*. In contrast, the causative verb *make* in (13b) seems to take a quantifiable event, more accurately a quantifiable property of the event, as well as a nonquantifiable single event as its complement. In the syntax, nonquantifiable events are sometimes realized in the head of aspectual phrase, AspP, as a typical progressive morpheme *-ing* in English and *-nun* in Korean (c.f., Chierchia 1995), which is illustrated in (14):

- (14)a. [_{TP} Sara saw [_{AspP} *soldiers* leaving]].
 b. [_{TP} sara-ka [_{NP} [_{AspP} *pyengsatul-i ttena-nun*]-kes]-ul poassta.
 Sara-Nom soldiers-Nom leave-Asp-nominal-Acc saw

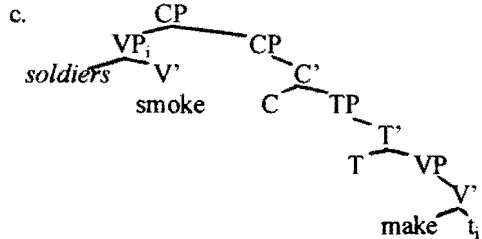
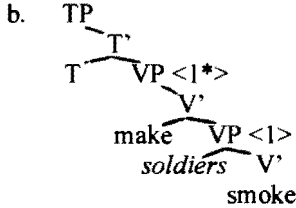
Regarding the properties of events selected by a matrix verb, I further assume with Portner (1991) that selection can be understood as a consequence of semantic type, and that adjunction type of topicalization is forced when a type of $\langle e, t \rangle$ expression is in a position of type $\langle e \rangle$, where e is the type of basic entities of the ontology, and t is the type of propositions. Theta-binding over an E-position then relies on the internal quantificational structure of events, i.e., [+/- quantificational], and only [-quantificational] events, i.e., those semantically translated as $\langle e \rangle$ type, but not $\langle e, t \rangle$ type, can be theta-bound by Tense, forming a domain of theta-binding over the event, resulting in an existential interpretation.

If this is the case, the perception verb *see*⁶ is, I assume, translated as s-selecting only for a constant of type $\langle e \rangle$ (i.e., entities such as individuals and nonquantifiable events) as its complements.

Now, turning to the bare plurals placed inside causative verb complements, (7), and once again, assuming that the causative verb *make* can take both [-quantificational] $\langle e \rangle$ type and [+quantificational] $\langle e, t \rangle$ type events as its

complements, the varied interpretations of bare plurals staying inside different types of events are obtained in the following syntactic environments:

(15) a. [_{TP} Clinton made [_{VP} *soldiers* smoke]. (either existential or generic)



What is important here is that the events selected by the causative verb *make* can be ambiguously translated by constants of either type $\langle e, t \rangle$ or $\langle e \rangle$, and that the domain of theta-binding is formed only when Tense theta-binds over the events of type $\langle e \rangle$, not over the events of type $\langle e, t \rangle$, as in the case of (15b). If a different type of events such as $\langle e, t \rangle$ type meets with Tense, it gives rise to the application of adjunction type of topicalization, forcing the event-denoting phrases (e.g., VPs, IPs, or NPs) to escape from the potential theta-binding domain of T, and being bound by an abstract *always*-like quantifier outside TP, which is the case in (15c).

5. Conclusion

In this paper, I introduced a new mapping hypothesis, i.e., the Relativized Mapping Hypothesis (I and II), for the varied interpretations of bare plurals located inside different types of event-denoting sentential complements. Within this new framework, the mapping from syntax to semantics is no longer accidental, and the nuclear scope can be derived from the theta-binding domain of Tense. Moreover, The Relativized Mapping Hypothesis is considered as the representation of the event-dependent function $F(e)$ in the syntax. Further research will be needed to prove that the analysis proposed here can be extended to the interpretation of bare plurals showing up in simple matrix sentences.

Notes

1. In this paper, I imply *eventualities* in the sense of Bach (1986) when I simply mention *events*, which do not merely include action verbs, but also stage-level predicates in general.
2. Following Milsark (1977), Carlson (1977), and Kratzer (1989), I assume that stage-level properties are the ones of stages (i.e., temporary properties at a particular time and place) and individual-level properties are the ones of individuals (i.e., somewhat enduring or unique properties), and that stage-level predicates have an abstract Davidsonian spatiotemporal event argument, whereas individual-level predicates lack this argument.
3. Kim (1991) also argues for the same type of function, in which arbitrary null pro is understood as a function from situations to relevant persons. However, she does not provide any syntactic details for this function.
4. Another nontrivial question at hand is why the bare plurals staying inside the events are primarily interpreted as existential, i.e., being bound in the scope of default existential closure, which is proposed by Heim (1982) and adopted by Diesing (1992). A clue to this underlying (or default) quantification over events may come from the “kinship” between existentiality and nonspecificity suggested by Enc (1991). I will leave this issue for further research.
5. According to Safir (1993), if two event places are in the immediate scope of the same [+/-tense] Infl, then they are contemporaneous with respect to the specification of tense, which is exemplified like this: [TP Carmen [T: T-Past [VP E-saw [VP Emma [V: E-kiss Peter]]]]]. Given this cotemporality of the two events, I suggest to extend Hoekstra’s (1992) theta-structure to the effect that theta-identification is admissible even in the case of two distinctive events but controlled by the same tense element, which ultimately chains together two events, resulting in event identification proposed by Kratzer (1996). Refer to those two papers for details about theta-structure and event identification.
6. For our purposes, I will limit my concern only to the narrow sense of perception reports, i.e., neutral perception reports, but not taking epistemic perception reports into account (see Barwise (1981) for details).

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Defective Intervention Effects and Locality in Agree/Move

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1. Introduction

In the recent Minimalist discussion, the operation of feature checking has been eliminated in accordance with more basic operations. The Economy principle is much highly restricted in such a way to bar PF-vacuous overt movement and limit effect on PF as well as to reduce search space for computation. In Chomsky (1998), the operation Attract is replaced by Agree, which establishes a relation between a lexical item LI and a feature F in some restricted space. Features cannot move or be attracted. By Agree, the uninterpretable features of probe and goal are deleted and erased, if possible.

This paper examines various possible derivational instantiations of this program. In the course of discussing its detailed mechanism, we are concerned particularly with the role of Case and its relation to Agree and Merge. Case makes the goal active, able to delete the probe or to select a phrase for Merge. But, if structural Case has already been deleted, the phrase P(G) is unable to move, nor does it allow the effects of feature matching around it. It can thus be expected that when Merge or Agree takes place, the uninterpretable structural Case of goal of T's probe is necessarily involved in the operations. There are, however, cases in languages where the EPP-feature, Case and phi-feature agreement have different counterparts to them, and even where defective items do not bar feature matching. In this paper, we explore the possibility that Merge or Move can take place independently of uninterpretable features.

2. The EPP-feature and the Structural Case

Let us begin with a review of the proposals of Chomsky (1998). To see how they work, suppose that a derivation reaches to (1), where *t*₀ merges with *v*P, projecting it to TP.

- (1) [TP to [_{VP} be a man in the garden]]

If the expletive *there* still remains in the Numeration, there are two possible derivations: *there* Merge or *a man* Move, both of which are illustrated in (2a) and (2b), respectively.

- (2) a. [TP there to [_{VP} be a man in the garden]]
 b. [TP a man_i to [_{VP} be t_i in the garden]]

The possibility of (2b) can, however, be eliminated in many possible ways. Collins (1997) proposes ‘Chain Formation Principle,’ which requires that movement be implemented in such a way to form a complete chain, not just to satisfy Last Resort. According to Collins, Move of *a man* to [Spec, T] in (2b) is barred, simply because it does not form a complete chain in the sense that the moved LI *a man* cannot have all its features checked off at the target position.

Poole (1995) proposes the notion of ‘Total Checking,’ putting focus on both the items participating in checking relations. Given that *to* has a minimal feature complement, only [person] feature for T_{def}. Total Checking requirement cannot be satisfied by Move of *a man*, but by Merge of *there*. This is because *a man* has a full complement of phi-features, whereas *there* is assumed to carry a minimal feature, i.e. [person] feature.

The proposals described above now correctly account for the grammaticality contrast between (3a) and (3b), in which the verb *seem* and T have subsequently merged at the stage of (2).

- (3) a. There_i seems [_α t_i to be a man in the garden]
 b. *There seems [_α a man_i to be t_i in the garden]

In Chomsky (1995, 1998), it is proposed that the grammaticality of (3) depends on the fact that Merge always wins over Move (MoM) by means of the Economy consideration. Chomsky argues that it is basically so because Move triggers more operations than the combination of its subcomponents, Merge and Agree. In addition to Merge and Agree, Move requires the operation of Identify as well. At stage α of the derivation in (3a), the uninterpretable EPP-feature of T is satisfied by Merge of *there* in [Spec, T]. Agree deletes the uninterpretable [person] feature of T_{def} but not the uninterpretable [person] feature of *there* due to the requirement in (4).¹

- (4) Only a probe with a full complement of phi-feature is capable of deleting the feature that activates the matched goal.

By (4), the [person] feature of *there* remains undeleted and thus is visible to further operation. Move of *there* further to [Spec, T] can have the EPP-feature of the matrix T satisfied. All other uninterpretable features on T and *a man* are erased by means of Agree between them.

Suppose now that a derivation has constructed the structure of (5), having merged T with the copular-headed phrase.

(5) T be elected an unpopular candidate

In (5), there are three kinds of uninterpretable features in this structure: (i) the phi-set on T, (ii) the EPP-feature of T, and (iii) the structural Case of the associate. The phi-set of T as a probe seeks a goal, namely, “matching” features that establish agreement. The full complement of phi-feature on T and the structural Case of *an unpopular candidate* erase under matching. The EPP-feature requires that something be merged in [Spec, T] and the Case feature identifies *an unpopular candidate* as a candidate for such merger.

In both cases of (3) and (5), the EPP-feature of T is satisfied by “pied-piping” of a phrase P(G) determined by the uninterpretable feature of the goal, i.e. [person] feature for EXPL *there* Merge in (3) and the Case-feature for Merge of non-EXPL *an unpopular candidate* in (5).

This is also shown in Kirundi a Bantu language.

(6) Kirundi (Ndayiragije (1999: (45) & (46)))

- a. Abanyêshule *ba-â-bonye* uwo mwarimu
 students nom-past-foc-see-perf that teacher
 ‘Students saw that teacher.’
- b. Uwo mwarimu *a-â-bonye* abanyêshule.
 that teacher nom-past-see-perf students
 ‘The students saw that teacher.’
- c. Uwo mwarimu *a-â-ra-bon-u-ye* abanyêshule.
 that teacher nom-past-foc-see-pass-perf by students
 ‘That teacher was seen by students.’

In the canonical SVO order of (6a), the subject bears the nominative Case and agrees with the verb. The OVS sentence of (6b), formed from the SVO sentence, shows that the fronted object has the nominative Case feature, as expressed by the nominative Case marker *a-* on the verb. The passive construction of (6c) also shows the nominative Case marker on the verb, as in the OVS sentence. Under the system of Chomsky (1998), the EPP-feature of T is satisfied by the fronted object in the OVS sentence (6b) and in the passive sentence (6c), both of which

have the uninterpretable Case-feature.

Let us examine the following sentences, where the fronted object, rather than the logical subject, agrees with the verb.

- (7) Dzamba (Givon (1979))
 i-mukanda i-tom-aki oPoso.
 the-letter it-send-past by Poso
 'The letter was sent by Poso.'
- (8) Kinyarwanda (Kimenyi (1980))
 Igitabo cyi-ra-som-a umuhuugu.
 Book it-pres-read-asp boy
 'The book is being read by the boy.'
- (9) Kilega (Kinyalolo (1991))
 Maku ta-ma-ku-sol-ág-a mutu wéneéné.
 6beer neg-6-prog-drink-hab-fv person alone
 'Beer is not usually drunk by a person alone.'

Ura (1996) proposes that in the OVS sentences, the object moves overtly to [Spec, T] for agreement via the inner Spec of *v*, where its accusative Case feature is checked off. On the other hand, the nominative Case of T is licensed by the subject at LF.

Since there is no distinctive Case morphology in these language, it is not clear at all whether the object has the nominative or accusative Case, but Ura's account is at least not compatible with Chomsky's way of having the EPP-feature satisfied in that if the object has its Case feature already checked off at [Spec, *v*], then it does not have an uninterpretable feature which can serve to determine the phrase P(G) for 'pied-piping'. Thus the OVS order is not expected to be derived under Ura's system. This problem appears to be handled by Ndayiragije (1999), if we simply assume that the fronted objects in these languages have the nominative Case, as in Kirundi (6).

Another possible way out of this problem is to argue that the objects have not moved to [Spec, T].

- (10) Kannada (Siewierska (1984) and Goodall (1993))
- a. Krishnanu-indu Ramu- ϕ ko-pattu-nu.
 -3s-inst -nom kill-pass-past
 'Rama was killed by Krishna.'
- b. Rama-nannu kollalayita.
 -acc-3s kill-pass-past
 'Rama was killed.'

(11) Nepali (Bandu (1973) and Goodall (1993))

- a. Tx' kut'-i-is
 you hit-pass-2ps-past
 'You were hit.'
- b. Tx'-lai kut'-I-ic
 You-acc hit-pass-3ps-masc-past
 'It was hit you.'

In the Dravidian language Kannada, the fronted object can have the nominative or accusative Case, depending on the passive morpheme on the verb. It appears that the passive morpheme *padu-* requires the nominative Case for the fronted object. For an account for the contrast of Case for the fronted object, Goodall (1993) basically assumes that NP movement occurs not just for Case, but for an abstract agreement requirement on T that requires that some lexical item LI occupy its Spec position. He analyses this contrast in such a way that only in (10a) does the object with the nominative Case move to [Spec, T].

In the light of this, the lack of accusative Case and the agreement on the verb of the Nepali sentence in (11a) implies that the object has moved to [Spec, T]. The presence of accusative Case and the third person agreement on the verb in (11b) indicate that it remains in object position. According to Goodall's account the accusative Case marked object moves at LF for agreement with T. Here also arises a problem similar to Ura's problem that the object has already checked off its accusative Case, so that there is no uninterpretable feature to determine the phrase P(G) for agreement with T at LF.

Let us now consider some cases of locative inversion.

(12) Chichewa (Bresnan & Kanerva (1989))

- ku-mu-dzi ku-na-bwér-á a-lendô-wo.
 17-3-village 17-past-come-ind 2-visitors-2-those
 'To the village came those visitors.'

Bresnan & Kanerva (1989) argue that in locative inversion constructions of Chichewa, the locative phrase occupies the subject position. Japanese also has syntactic properties similar to those of Chichewa.

(13) Japanese (Kuno (1973))

- ano yama-ni ookina ki-ga ar-u.
 that mountain-on big tree-nom exist-pres
 'On that mountain exists a big tree.'

Kuno (1973) and Tateishi (1991) suggest that in (13), the locative phrase occupies the subject position, arguing that the postposition *-ni* attached to the locative phrase can be alternatively marked as nominative *-ga*, as in (14).

- (14) *ano yama-ga ookina ki-ga ar-u.*
 that mountain-nom big tree-nom exist-pres
 ‘On that mountain exists a big tree.’

Here again, Merge of the locative phrase *ano yama-ni* ‘on that mountain’ in [Spec, T] should not be guaranteed, because the locative PP does not have an uninterpretable Case feature.

It is thus concluded that the phrase P(G) for Merge is not determined necessarily by the goal of T’s probe. The EPP-feature should delete after all by Merge, but Merge takes place independently of Agree.²

3. The EPP-feature and the Inherent Case

In the Minimalist Program, structural Case is taken to be an uninterpretable feature, to be deleted during the derivation. On the other hand, inherent Case is taken to belong to a different component of the language faculty, such that it is assumed not to activate the phi-set of probe.

In Icelandic double object constructions, either the indirect or the direct object can be passivized.

- (15) a. *Bokin var gefin okkur.*
 Book-the (nom) was (3p) given us (dat)
 b. *Okkur var gefun bokin.*
 Us (dat) was(3p) given book-the (nom)
 ‘We were given books.’

As Frompton (1995) suggests, the direct object *bokin* ‘books’ in (15a) moves to the subject position and its phi-features agree with the phi-features of T. In (15b), however, the indirect object *Okkur* ‘us’ moves and Agree still takes place between the nominative object and T.

Chomsky (1998), following Sigurdson (1996), suggests that a dative quirky inherent Case has an additional structural Case, rendering it activate Agree. *Okkur* ‘us’ can thus merge in [Spec, T], where it becomes immobile, having its structural Case erased. If the dative quirky subject has an additional structural Case, then feature matching is expected to occur between the dative subject and T as a partial fulfillment of the definition of Move. As the Icelandic examples

show, however, feature matching takes place somewhere else.

In Georgian, this sort of agreement can be observed.

(16) Georgian (Harris (1984))

- a. *me* *mašivne* *momeconet* *tkven.*
 me-dat *immediately* *I-liked-you(pl)-ind* *you(pl)-nom*
 ‘I liked you immediately.’
- b. *Gelas* *uqvarvar* (*me*).
 Gelas-dat *he-loves-me-ind* *I-nom*
 ‘Gelas loves me.’

It appears in (16) that the dative Case-marked *me* ‘me’ and *Gelas* move to the subject position, where their phi-features agree with the phi-features on the verb. For this derivation to be possible, the dative subject has to be assigned an additional structural Case. If this is on the right track, it is reasonable to assume that Icelandic dative quirky Case does not have an additional structural Case for Agree, whereas Georgian dative Case does have one. This choice is presumably clear, depending on whether feature matching actually takes place between the dative subject and T.

In English, passivization applies only to the indirect object.

- (17) a. John gave Mary a book.
 b. Mary was given a book.
 c. *A book was given Mary.

This is what we expect because the indirect object is, in traditional terms, adjacent to the verb *gave*, thereby being assigned a structural Case, whereas the direct object is given a default inherent Case, based on the theta-relation. Under our analysis proposed above, (17b) is derived in such a way that the EPP-feature of T is satisfied by Merge, and the structure Case of *Mary* is realized as the nominative Case, depending on the interpretable feature of the probe, i.e. the finiteness of tensed T in this case. In (17c), on the other hand, the direct object *a book* has only an inherent Case, such that it is invisible to Move.

Interestingly, however, this does not hold in Korean.

(18) Korean

- a. *Chelswu-ka* *Inho-eykey* *chayk-ul* *cwuessta.*
 -nom -dat books-acc gave
 ‘Chelswu gave Inho books.’
- b. **Inho-ka* *chayk-ul* *cwuecyessta.*
- c. *Chayk-i* *Inho-eykey* *cwuecyessta.*

As Lee & Park (1995) point out, passivization is allowed only to the direct object *chayk-ul* 'books.' (18) indicates that in Korean, the structural Case is assigned only to the direct object, enabling it to be visible to Agree.

It has been suggested that the dative subject in Korean and Japanese occupy the subject position.³ The dative subject, however, does not agree with the verb.

(19) Korean

- a. halmeni-m-i sayngcwuy-ka *mwusep-ta/mwusewu-si-ta.
 grandmother-hon-nom rat-nom fear-dec/fear-hon-dec
 'Grandmother fears rats.'
- b. halmeni-m-eykey sayngcwuy-ka mwusep-ta/*mwusewu-si-ta.
 grandmother-hon-dat rat-nom fear-dec/fear-hon-dec
 'Grandmother fears rats.'

(20) Japanese

- a. sensei-ga tola-ga *kowai-i/o-kowai-i.
 Teacher-nom tiger-nom fear-pres/hon-fear-pres
 'The teacher fears the tiger.'
- b. sensei-ni tola-ga kowai-i/*o-kowai-i.
 Teacher-dac tiger-nom fear-pres/hon-fear-pres
 'The teacher fears the tiger.'

Rather, the agreement may occur between the nominative object and the verb, as in (21).

(21) Korean

- na-eykey khi-ka cakun sensayng-nim-i mwusewu-si-ta.
 I-dat height-nom short teacher-hon-nom fear-hon-dec
 'I fear teachers who are short.'

It is thus assumed that the dative subject does not have a structural Case, but it moves.

4. Raising and Locality

Let us consider the following sentence in English.

- (22) a. *John_i believes [_α t_i to be [t_i clever]]
 b. *It_i seems [_α that t_i was told John [that Bill ...

The ungrammaticality of (22) is due to the fact that *John* in (a) sentence and *it* in (b) sentence have their uninterpretable Case features already erased at stage of α in the derivation, such that they are not activated to Agree with the matrix T.

(23) *John seems [that it was told t [that Bill ...

In (23), *John* moves to [Spec, T] of the higher clause. Since *John* has the structural Case, rendering it active to Agree, we wrongly expect that agreement can take place between *John* and the phi-features of the matrix T. In order to rule (23) out, Chomsky (1998) proposes the defective intervention constraint, by which an element, which becomes inactive after feature matching, but still visible to Agree, cannot intervene between probe and goal.

Chomsky's account, however, raises a question of how *a man* in (24) wins over *me* in Agree.

(24) a. A man_i seems to me [t_i to be in the garden]
 b. There_i seems to me [t_i to be a man in the garden]

In both cases, *me* is defective in that its Case feature has been deleted. Given that in (25), *her* is understood as disjoint in reference with *Mary*, *me* in (24) is should be expected to exhibit the defective intervention effects for Agree.

(25) *It seemed to her_i that Mary_j had left.

In French, it appears that the DP experiencer blocks raising of the embedded subject over to the matrix clause. Rouveret and Vergnaud (1980) claim thus that in (26a), raising of *Jean* is barred because of the intervening experiencer DP *Marie*.

(26) French (Boeckx (1999))
 a. *Jean_i semble à Marie [t_i être malade]
 Jean seems to Marie to-be ill
 'Jean seems to Marie to be ill.'
 b. Jean_i semblait à Marie [t_i être malade]
 Jean seemed to Marie to-be ill
 'Jean seemed to Marie to be ill.'

As Boeckx (1999) points out, however, (26a) considerably improves when we replace the present tense of the matrix verb, as in (26b). She argues that the degraded status of (26a) comes from 'phonological noise.' French then looks

like English in that the inherently Case-marked experiencer DP does not bar raising.

Korean is similar to English and French. As (27b) shows, the experiencer DP does not prevent the embedded subject from raising to the matrix clause.

(27) Korean

- a. haksayngtul-eykey Kim sensayng-kkeyse ceyl hayngbukha-si-n
 students-dat teacher-non(hon) most happy-hon-pres
 kes kath(-*usi)-ta
 comp seem(-hon)-dec
 'It seems to students that the teacher is happy.'
- b. Kim sensayng-kkeyse haksayngtul-eykey ceyl hayngbukha-si-n
 teacher-non(hon) students-dat most happy-hon-pres
 kes kath(-*usi)-ta
 comp seem(-hon)-dec
 'The teacher seems to students to be happy.'

The DP experiencer in Italian and Icelandic differs from that of English and French in that the experiencer blocks raising.

(28) Italian

- a. *Gianni_i sembra a Maria [t_i essere stanco]
 seems to Maria be ill
 'Gianni seems to maria to be ill.'
- b. Gianni_i gli sembra a Maria [t_i essere stanco]
 'Gianni seems to maria to be ill.'

(29) Icelandic

- a. *Ólafur_i hafði virst þeim [t_i vera gáður].
 has seemed to them be intelligent
 'Olaf seemed to them to be intelligent.'
- b. Ólafur_i hafði virst [t_i vera gáður].
 has seemed be intelligent
 'Olaf seemed to be intelligent.'

For the grammaticality contrast between languages, Boeckx claims that the full DP experiencer in English, French and possibly Korean is inherently Case-marked with features invisible to the probe, whereas the full DP experiencer in Italian and Icelandic is structurally Case-marked, being a potential goal.

In this paper, we propose instead that in some languages, an inherently Case-

marked NPs behave like structurally Case-marked NPs. This is borne out in Serbo-Croatian, which has many verbs with the lexical property of licensing Case other than accusative, hence presumably inherent Case, on their complements.

(30) Serbo-Croatian (Stjepanovič (1997))

- a. Slikao je Samprasa I Ivanišević a za vrijeme meča dednog protiv drugog.
'He photographed Sampras and Ivanisevic (acc) during each other's matches.'
- b. Pomogao je Samprasu I Ivaniševiću za vrijeme meča jednog protiv drugog.
'He helped Sampras and Ivanisevic (dat) during each other's matches.'

Stjepanovič (1997) proposes that inherently Case-marked NPs in Serbo-Croatian are just as high as structurally Case-marked NPs. Her account of the possible binding relation involved in (30b) is that like the structural accusative Case in (30a), the inherent dative Case-marked NP moves to a higher position, where it can bind the reciprocal in the adverbial clause.

5. Conclusion

We have observed many instances of the locality condition on feature matching and the role of Case in the Activation Theory, and raised some problems concerning the EPP-feature, agreement, and their interrelationship. It has been found that in some languages, Merge/Move takes place with no agreement. For this, we proposed that adding a structural Case to the dative quirky inherent Case works only when there occurs agreement, because the structural Case is strongly expected to force feature matching. This line of argument is similar to Boeckx and Jackendoff in that the EPP-feature triggers 'edge effects,' based on the intuition that lexical entries have the PF-LF pairing which has to be harmonized throughout the derivation, and also that there is some other way of driving phonological effects, independent of the EPP-feature.

Notes

¹ As Uriagereka (1999) points out, at stage α of the derivation, *there* serves as a probe and the [person] feature on T should not delete since *there* does not have a full complement of phi-feature. This should cause problems when the long-distance agreement of T and its goal (its associate) is established, as the [person] feature on T_{def} should function as a defective blocker. We will not

address this issue in detail.

² Concerning the EPP-feature in the discussion of the Minimalist Program, Boeckx (1999) suggests that it is the equivalent of Jackendoff's index relating syntactic and PF-representations, arguing that it is motivated at the interface. See Jackendoff (1997) for the details.

³ This is supported largely by the fact that the dative subject binds the reflexive which only allows subject-orientation. See O'Grady (1991), Ura (1996), and Kwon (1999) for the details.

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Tonal Alignment in Standard Korean: The Case of Younger Generations

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1. Introduction

In this study, we examine the phonetic details of how it is that the pitch melody of the Accentual Phrase in Seoul Korean gets synchronized with the segmental material. Our interest in this topic was spurred not only by a general interest in the mechanisms whereby different autosegmental tiers are associated with one another, but more particularly in the Korean case by the realization that tonal alignment seems to be a factor in the perception of stress (Lim, 1999). This paper, then, is one part of a more comprehensive investigation as to how Korean speech sounds become organized into prosodic units.

1.1 Alignment of f₀ peaks with segmental strings

As Ladd (1983, 1996) points out, one of the most obvious phonetic properties of tonal association is the alignment in time of tonal events such as an fundamental frequency maximum (F₀-peak) in relation with the syllable. According to Ladd (1996), **alignment** is defined as a phonetic property of the relative timing of events in the f₀ contour and events in the segmental string, while **association** is the abstract structural property of ‘belonging together’ in some way (p. 55). He also cautions us that association by itself makes no specific predictions about alignment. For example, if a high tone is associated with a particular prominent syllable, the peak may be early in the syllable or late, or indeed it may be outside the temporal limits of the syllable. In other words, when we mention the association of edge tones such as ‘phrase tone’ and ‘boundary tone’ with certain segments, edge tones do not necessarily have to occur phonetically at the very

edge of a domain. Rather, such tones are commonly realized in the general vicinity their associated boundary (Ladd 1996: 286:Notes). For this reason, Pierrehumbert and Beckman (1988) propose to associate such edge tones with nodes in a tree rather than with 'edge' elements in the segmental string. However, this is not to say that tonal alignment cannot be specified. Bruce's (1977) analysis of Swedish word accent shows that the peak of Accent 1 is always aligned earlier with respect to the accented syllable than that of Accent 2. Thus, Bruce claims that it is a precisely aligned peak, not a rise or fall, that is the most reliable correlate of word accent in Swedish. As he says, 'reaching a certain pitch level at a particular time is the important thing, not the movement' (Bruce 1977:p. 132).

1.2 Alignment of f0 peaks in the Accentual Phrase

Accentual phrases (henceforward AP's), by definition, are defined primarily by tonal marking. In Japanese, according to Pierrehumbert and Beckman's (1988) model, there are two types of tonal marking which work together to indicate a level of grouping larger than individual lexical items. The first type of tonal marking is that of accent. Some Japanese words exhibit a minimal contrast in the location of a sharp fall in fundamental frequency, thus requiring the lexical specification of a pitch fall (HL) to occur at the end of a particular syllable. In addition to lexically-specified pitch marks, the AP is also indicated by two delimitative peripheral tones, an initial phrasal high (H) and a final boundary Low (L%) (Pierrehumbert and Beckman 1988: 126). As was suggested by Bruce's work, Pierrehumbert and Beckman formulated specific rules concerning the association of peaks (H) and valleys (L) in AP. The rules concerning the in phrase initial high are of most interest here. In non-accent initial words with a monomoraic first syllable, the phrasal H links to the second mora of the phrase. When the first syllable is bimoraic (has a long vowel or a coda sonorant), it links to first mora. In phrases with an initial accented syllable, no phrasal H is apparent.

According to Jun's (1993, 1998) model of Korean prosodic structure, there is a similar prosodic level marked by the tonal pattern which she calls an AP. As with Japanese, the Korean AP is a tonally demarcated unit which can contain more than one lexical word. However, the Korean AP is different from its Japanese counterpart in that there are no apparent lexical contrasts in accent location in Seoul Korean. Thus, the only tones indicating the extent of the AP are initial and final delimitative tones. According to her model, then, accentual phrases in Seoul Korean are rather similar to those in Japanese words which have no lexically marked accent.

In Jun's model, the delimiting tonal pattern of the Seoul AP are either Low-High-Low-High (LHLH) or High-High-Low-High (HHLH). The AP-initial tone is determined by the laryngeal features of the phrase initial segment, aspirated and fortis consonants requiring a following H. Of the four tones, the first two are initial tones claimed to associate with the two initial syllables of an AP and the last two are final tones associated with the two final syllables of an AP. (See the tone-mapping rule in Jun 1996.) When an AP has more than four syllables, all of the tones are realized as is illustrated in (1) and (2). But when the number of syllables is less than the number of tones, one of the tones becomes obscured, resulting in LLH(or HLH), or LHH(or HHH) or LH(or HH) as in (3). (1 – 3 are adapted from Jun & Oh, 1996; see also de Jong, 1989).

(1) 4 syllables



σ σ σ σ
L H L H]_{AP}

(2) 5 syllables or more



σ σ σ σ σ
L H σ L H]_{AP}

(3) 1-3 syllables



σ σ σ
L (HL) H]_{AP}

The cases in (2) and (3) indicate that the relationship between the syllables and the tones is far from straightforward. The case in (2) illustrates tonal underspecification. Jun (1998) points out that when an AP is longer than four syllables, the syllables between the third and the antepenult of the AP get their surface fundamental frequency contour by interpolation between the initial H tone on the second syllable and the L tone on the penult (p. 194). The situation in (3) indicates a case where two posited tones do not seem to be aligned with any particular syllable.

The purpose of this study is to investigate how it is that the high which is associated with the marking of the AP gets aligned with the first syllables. Since there are no lexical specifications which require the alignment of a tone with a particular syllable, it is unclear sort of alignment is likely to occur.

2. Hypotheses

Previous studies have disagreed concerning exactly how the high tones are aligned with the segmental material. Koo (1986) and Jun (1993, 1998) propose that it is realized on the second syllable while de Jong (1994) reports that it

could be realized near the offset of the first syllable. Lee and Kim (1997) observe that, for some speakers, the initial H is sometimes (27-40%) realized on the third syllable in a five syllable AP. Lim (1999) showed that the alignment to some extent depends on the internal syllable structure of the first syllables. Based on these observations, we formulated the following hypotheses about the alignment of the initial.

- Hypothesis A: The phrasal H tone is aligned with the onset of the first syllable.
- Hypothesis B: The phrasal H tone is aligned with the onset of the second syllable.
- Hypothesis C: The phrasal H tone is aligned with the onset of the phrase.
- Hypothesis D: (Like Japanese) the alignment of phrasal H tone is sensitive to syllable weight. For light syllables, H aligns with the second syllable; for heavy syllables, on the first syllable.
(Light syllable: CV syllable; Heavy syllable: CVC syllable)

3. The Experiment

3.1 Subjects

The first author and one male native speaker of Standard Korean served as subjects. They were both in their late twenties and neither had any reported speech or hearing disorders.

3.2 Stimulus Material

In this experiment, stimuli included three syllable words composed of heavy and light syllables as in Table 1. All of the words began with a sonorant consonant which is expected to have an initial low tone. Hence, each word exhibited a rise to the phrasal H tone at the beginning.

(4) Table 1: Stimuli

	Syllable Weight	Words	Gloss
1	L.L.L	Ma.na.gwa	Managua
2	L.H.L	Ja.jang.ga	A lullaby
3	L.H.H	Ma.gam.nal	A deadline
4	L.L.H	Na.ma.dam	Ms. Nah
5	H.H.H	Mal.jang.nan	A joke
6	H.L.L	Man.da.ra	The title of a film
7	H.L.H	Kang.ma.dam	Ms. Kang
8	H.H.L	Man.dam.ga	A comedian

(H: heavy syllable; L: Light syllable)

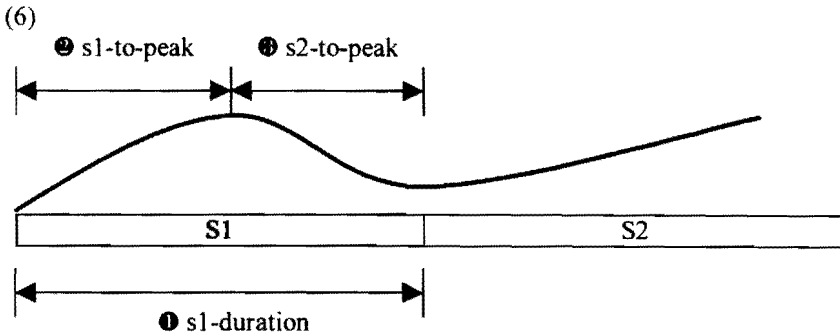
3.3 Procedures

Subjects were instructed to read the test words five times at a normal conversational speech rate. The words were presented in Korean orthography using index cards. Before recording, subjects practiced randomly ordered test words to familiarize themselves with the materials. Stimuli were read within carrier phrases as follows.

- (5)
- | | |
|--|------------------------------------|
| / <u>ma.na.gwa</u> . a.cu. ye.ppo.yo/ | “A city Managua is so beautiful.” |
| / <u>ja.jang.ga</u> . bul.ro.cu.se.yo/ | “Please sing a lullaby (for me).” |
| / <u>ma.gam.nal</u> ci.nat.sso.yo/ | “The deadline is over.” |
| / <u>na.ma.dam</u> a.cu. ye.ppo.yo/ | “Ms. Nah is so beautiful.” |
| / <u>mal.jang.nan</u> . ha.ci.ma.se.yo/ | “Stop joking me around.” |
| / <u>man.da.ra</u> . a.cu. cae.mi.it.sso.yo/ | “The film Mandara is so exciting.” |
| / <u>kang.ma.dam</u> a.cu.ye.ppo.yo/ | “Ms. Kang is so beautiful.” |
| / <u>man.dam.ga</u> toe.go.si.po.yo/ | “(I) want to be a comedian.” |

3.4 Measurements

Three time measurements were taken from the recordings using *SoundScope* implemented on a Mac. The first is the onset of the vowel in the first syllable. The second is the onset of the vowel in the second syllable. The third is the timing of the highest fundamental frequency in the initial part of the word. Fundamental frequency was determined using an autocorrelation routine. These three measures were combined to yield three variables, 1) the duration of the initial syllable (s1-duration), 2) the latency of F0 peak from the onset of the first syllable (s1-to-peak), and 3) the latency of the F0 peak from the onset of the second syllable (s2-to-peak). These measures are illustrated in (6).



3.5 Predictions

Given the four hypotheses presented in section 2, we would expect to find the following relationships between these three measures.

- Hypothesis A: we expect no correlation between s1-duration and s1-to-peak, since the peak is realized a fixed duration from the onset of the syllable. If the peaks are timed proportionally within the syllable, one might expect a weak regression with a slope less than one. In addition, one would also expect the peak to normally occur within the first syllable. Regardless of this, there should be a negative correlation between s1-duration and s2-to-peak. This is because we have subtracted a durational offset from both measures.
- Hypothesis B: there should be a positive correlation s1-duration and s1-to-peak, since both measures indicate the time of the onset of the first syllable from the 'true' alignment point at the beginning of the second syllable. This correlation should disappear if the peak latency were calculated from the onset of the second syllable, so s2-to-peak should not correlate with s1-duration.
- Hypothesis C: the results should be the same as for Hypothesis A, except that there should be no correlation between s1-duration and s1-to-peak.
- Hypothesis D: we should expect a combination of Hypothesis A for heavy syllables and Hypothesis B for light syllables.

These predictions are summarized in Table 2.

(7) Table 2: Predicted regression results

	Latency of initial H from 1 st syllable onset		Latency of initial H from 2 nd syllable onset	
	Light	Heavy	Light	Heavy
Hypo. A	No	No	Negative	Negative
Hypo. B	Positive	Positive	No	No
Hypo. C	No	No	Negative	Negative
Hypo. D	Positive	No	No	Negative

Examining the data graphically, we can illustrate these results by plotting s1-to-peak against s1-duration, yielding the patterns illustrated in Figure 1.

(8)

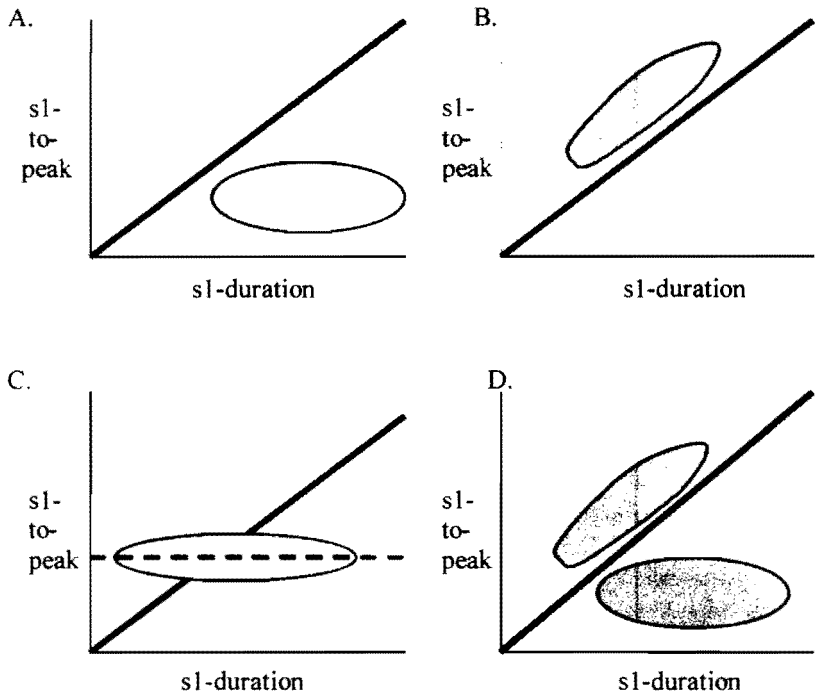


Figure 1. Schematic illustrations of predicted results under each hypothesis

In each graph, the area below the diagonal indicates peaks which appear in the first syllable; the area above the diagonal indicates peaks later than the first syllable. In A (upper left), latencies fall within the first syllable duration and hence are below the $x=y$ diagonal. In B (upper right), latencies parallel the $x=y$ function, since they are a fixed distance from the onset of the second syllable. In C (lower left), latencies may or may not be above or below the $x=y$ function. What is important here is that the latency be a fixed duration from the onset of the phrase, and hence syllable durations will have no effect on it. In D (lower right), heavy and light syllable tokens will behave differently, essentially a combination of the two upper figures (A and B).

4. Results

To test these hypotheses, the latency of the peak from the onset of the first and second syllable was regressed against the duration of the first syllable. The results of these analyses are summarized in Table 3.

(9) Table 3: Results of regression analyses

SP: Speaker * $p < 0.05$		Latency of initial H from 1st syllable onset		Latency of initial H from 2 nd syllable onset	
		Light	Heavy	Light	Heavy
SP1	R^2	.062	.083	.238*	.547*
	M	+.315	-.378	-.686	-1.378
SP2	R^2	.196*	.173*	.001	.542*
	M	+1.022	-.724	+.022	-1.724

The results differ for the two speakers. For speaker 1, the pattern conforms neatly to Hypothesis A or C, suggesting that the H is aligned with the onset of the first syllable. For speaker 2, however, Hypothesis D seems to be right. In tokens with light initial syllables, peaks seem to be aligned with the second syllable, while in tokens with heavy initial syllables, peaks seem to be aligned with the first syllable.

Closer inspection of the data, however, reveals additional complications to this picture. Figure 2 plots the data for speaker 1. It is clear the data falls into two groups, one which clusters parallel to the x-axis centered around 200 ms. This section of the data would indicate a fixed latency of 200 ms from the beginning of an utterance, as suggested by Hypothesis A and C. However, there is a second cluster of data which is parallel and approximately 100 ms higher than the $x=y$ function, a pattern which is indicative of Hypothesis B. What

determines the contents of each is not immediately obvious. The lower group is preponderantly composed of heavy syllables, though several heavy syllables also appear in the upper group. Similarly, the upper group is composed primarily of light syllables, though many light syllables also appear in the lower group. This pattern of results suggests that Hypothesis D (weight sensitivity) is on the right track, but it is only statistically apparent in this speaker's data.

(10)

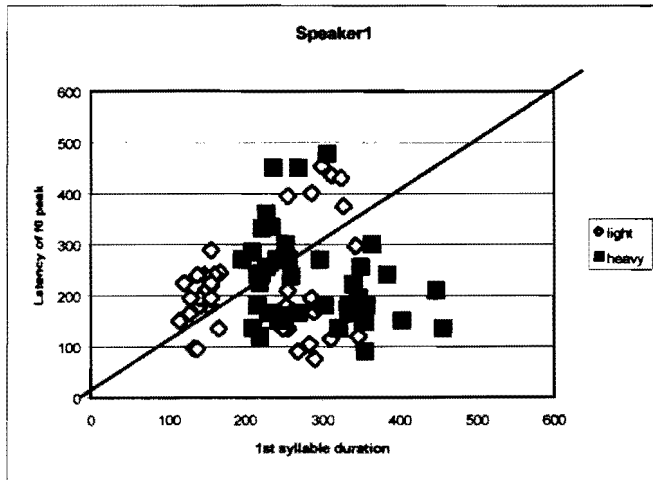


Figure 2. Latency of F0 peak from onset of first syllable plotted against first syllable duration for subject 1

Figure 3 plots the data for speaker 2. As the regression results indicated, there is a pattern of the light syllable tokens lying parallel and above the $x=y$ line. Also, heavy syllable tokens do not seem to show much sensitivity to the duration of the first syllable. There is one peculiarity to this data, however. The peaks in the heavy syllable tokens nearly always appear in the second syllable, even though they are supposed to be aligned with the first syllable.

(11)

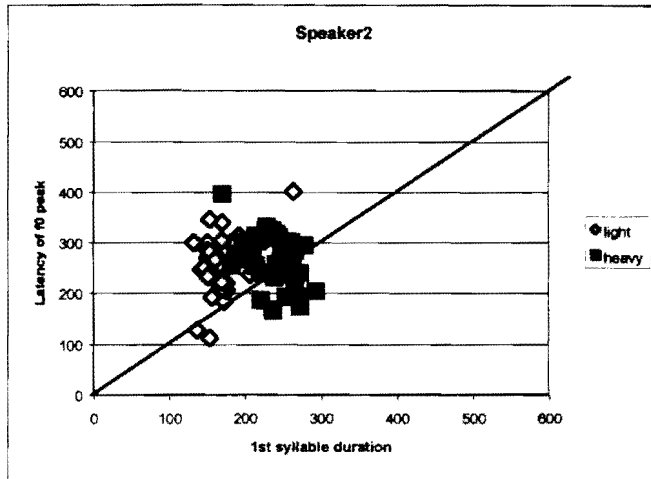


Figure 3. Latency of F0 peak from onset of first syllable plotted against first syllable duration for speaker 2

5. Discussion and Conclusion

Current results are pretty preliminary due to the small number of speakers, however, some points can be drawn from the current data. Both of the speakers did seem to show a difference between tokens with light and tokens with heavy initial syllables. In speaker 2, these differences were consistent enough to yield different results in the correlation analysis for the two groups. In speaker 1, two different groups, roughly corresponding to the results of a weight-sensitive rule did appear. One group shows first syllable alignment, and the second group shows second syllable alignment. However, these two groups were not exclusively inhabited by tokens with heavy and light syllables respectively, but rather some light syllables group with heavy syllables in showing a pattern of first syllable alignment, and some heavy syllables group with light syllables in showing second syllable alignment. Why these exceptional forms occur, whether due to lexical or segmental differences, is a question for future research. Also, the difference between these two subjects might also be due to a more

limited range of durational variability in subject 2's data. Future work employing a more systematic variation in tempo should be able to determine whether the differences in the regression analyses are an artifact of tempo differences.

One further portion of the current results bears comment, and that is the fact that most of the tokens, especially for subject 2, exhibit a peak on the second syllable, even when the initial syllable is heavy. Thus, if the current results are to be seen as indicative of a weight-sensitive alignment rule, one must still say something concerning the difference between first and second syllable alignment. Second syllable alignments occur very close to the onset of the syllable, generally within 100 ms; first syllable alignments tend to be more on the order of 200 ms. This asymmetry seems to indicate a tension between two sorts of factors. The first is association of the high tone with the accentual phrase, here marked by a salient rise in fundamental frequency at the beginning of the phrase. This rise will require that the high tone be some distance from the beginning of the phrase. The second factor is that of coordination of the tones with the segmental material. Here we find that such high tones can appear quite late in the phrase, some of them appearing as far as 450 ms after the beginning of the phrase. These cases each, however, always involve an exceptionally long first syllable. Hence, while the pitch peak may not appear too close to the onset of the phrase, a late occurrence is permissible, and may occur when an appropriate alignment point is quite late.

These results taken together, then, suggest that initial high-tones in Seoul Korean may be in a state of transition or fluctuation between durationally fixed AP markers associated with the initial edge and tones associated with internal syllables. What is particularly intriguing about these results is that the association with the internal syllables is weight sensitive, however, in a messy way. What this suggests is that weight-sensitive rules, such as are common for stress assignment in such languages as Arabic and Latin, can arise when a phrase-level phenomenon with a fixed time lag gets switched into a segmentally associated phenomenon. Since heavy syllables, having either long vowels or more segmental material, take more time, the temporal alignment of an event with a fixed time lag will be different for heavy than for light syllables. In the Seoul case we have examined here, it seems that the fixed time lag would place the phrasal high tone very close to the onset of the second syllable, where it currently tends to align. In heavy syllables, which are typically longer in duration, the tonal event tends to fall in the initial syllable, where it currently tends to align.

Much more needs to be done in examining the alignment of initial tones in Korean. We trust that such research will be very profitable for understanding the relationship between phrase-level markers and internal segmental material.

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A Dilemma in the Ga/No Conversion

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1 Introduction

Since Harada (1971), the Japanese ga/no conversion phenomenon has been extensively discussed. This case conversion takes place in a sentential modifier of a nominal, as shown in (1).

- (1) a. John-ga kuru kanoosee
-NOM come probability
'the probability that John will come'
b. John-no kuru kanoosee
-GEN come probability
'the probability that John will come'

However, this does not happen elsewhere, as shown in (2).

- (2) a. John-ga kita (to omou).
-NOM came that think
'(I think that) John came.'
b. *John-no kita (to omou).
-GEN came that think
'(I think that) John came.'

Recently, two important analyses of this case alternation phenomenon have been proposed: Miyagawa (1993, 1997) and Watanabe (1996).

Miyagawa (1993, 1997) proposes that the genitive Case is checked in DP SPEC. Thus, the NP marked genitive moves to DP SPEC out of the sentential modifier. Watanabe (1996) proposes that the genitive Case is checked in IP SPEC. Thus, the NP marked genitive stays inside the sentential modifier.

The purpose of this paper is to point out a dilemma that the two analyses face, and to propose a new analysis by examining sentential modifiers of nominals in old Japanese. We show that the genitive Case is checked by the head D, as in

Miyagawa (1993, 1997), but the NP marked genitive does not move out of the sentential modifier, as in Watanabe (1996).

The organization of this paper is as follows. Section 2 reviews Miyagawa's and Watanabe's analyses, and points out a dilemma that both analyses face. Section 3 examines sentential modifiers of nominals in old Japanese, and proposes a new analysis. Section 4 discusses implications of this analysis. Section 5 concludes this paper.

2 Previous Analyses and the Dilemma

2.1 Miyagawa (1993, 1997)

Miyagawa (1993, 1997) proposes that a genitive subject raises to DP SPEC in LF based on the scope ambiguity exhibited by examples such as (3b).

- (3) a. John-ka Mary-ga kita kanoosee-ga 50% izyoo da.
 -or -NOM came probability-NOM over be
 i. 'The probability that John or Mary came is over 50%.'
 ii. *'The probability that John came or the probability that Mary came is over 50%.'
- b. John-ka Mary-no kita kanoosee-ga 50% izyoo da.
 -or -GEN came probability-NOM over be
 i. 'The probability that John or Mary came is over 50%.'
 ii. 'The probability that John came or the probability that Mary came is over 50%.'

The subject of the sentential modifier is marked nominative in (3a) and genitive in (3b). He reports that (3b) is ambiguous, while (3a) is not. (3a) has the reading in which the noun kanoosee 'probability' takes scope over the nominative subject John-ka Mary 'John or Mary'. On the other hand, (3b) not only has this reading, but it also has another reading in which the genitive subject John-ka Mary 'John or Mary' takes scope over the noun kanoosee 'probability'. Based on this fact, Miyagawa proposes that while the NP marked nominative stays inside the IP, as in (4a), the NP marked genitive moves to DP SPEC in LF, as in (4b).

- (4) a. [DP [IP NP-NOM VP] NP D]
 b. [DP NP-GEN [IP ↓ VP] NP D]

In (4a) the nominative NP is c-commanded by the head noun, while in (4b) the genitive NP c-commands the head noun. Thus, (3b) has an additional reading in which the genitive NP takes scope over the head noun.

Note that the genitive NP cannot simply be base-generated in DP SPEC, as in (5), in which the sentential modifier contains a *pro* that corresponds to the genitive NP.

- (5) [DP John-no [IP *pro* kuru] kanoosee]
 -GEN come probability
 'the probability that John will come'

This is because under this analysis, examples such as (6) would be generated.

- (6) *[DP John-no [IP Mary-ga kuru] kanoosee]
 -GEN -NOM come probability
 '*John's probability that Mary will come'

In (6) the subject of the sentential modifier is realized as a nominative NP, and the example is ungrammatical. Thus, the genitive NP cannot be base-generated in DP SPEC.

2.2 Watanabe (1996)

Watanabe (1996) proposes that the genitive subject has a disguised form of nominative Case, and moves to IP SPEC at LF to undergo Case checking, while the Nominative subject moves to IP SPEC in overt syntax. Thus, both the nominative and genitive subject are in IP SPEC at LF, as shown in (7).

- (7) a. [DP [IP NP-NOM VP] NP D] (at LF)
 b. [DP [IP NP-GEN VP] NP D] (at LF)

See Watanabe (1996) for the precise analysis.

2.3 The Dilemma

The dilemma arises from the fact that (3b) is scopally ambiguous, while (3a) is not. Under Miyagawa's analysis, the genitive NP is extracted from the sentential modifier, as shown in (4b). Stowell (1981) and Grimshaw (1990) argue that sentential modifiers are adjuncts. Thus, as pointed out by Watanabe (1996), (4b)

would be incorrectly predicted to be ungrammatical, since extraction of a phrase from adjuncts lead to ungrammaticality in general,

Watanabe's analysis, however, cannot account for the scope ambiguity in (3b), since he assumes that the NP marked genitive stays within the sentential modifier, just like the NP marked nominative. Therefore, neither analysis can account for examples like (3) without a problem.

3 Old Japanese

It is known that sentential modifiers in old Japanese are slightly different from those in modern Japanese. In this section, we show that the difference plays an important role in resolving the dilemma mentioned above.

Predicates in sentential modifiers in old Japanese take an attributive form called rentaike. On the other hand, predicates that are not in sentential modifiers take a conclusive form called shuushike. Thus, the auxiliary verb nari 'to be' takes its conclusive form in (8a), and its attributive form in (8b).

- (8) a. ...kokoroe-turu-**nari**.
learn-ASP-be
'I have learned.'
(Uji shuui monogatari: ebusshi Yoshihide)
- b. sanzun bakari-**nar**u hito...
three-sun about-be man
'the man who is about 9 cm tall.'
(Taketori monogatari: ama no hagoromo)

Note that the conclusive form and attributive form cannot be alternated.

Let us then consider sentential modifiers of nouns that have a subject. Consider the examples in (9).

- (9) a. tuki-no ide-tara-n yo
moon-GEN appear-ASP-seem night
'a night when the moon seems to have appeared.'
(Taketori monogatari: ama no hagoromo)
- b. hito-no kaka-suru hotoke
man-GEN draw-make Buddha
'(a picture of) Buddha which people make [him] draw'
(Uji shuui monogatari: ebusshi Yoshihide)

In these examples, the subjects are marked genitive. In old Japanese, subjects are not morphologically marked nominative in root structures, as shown in (10).

- (13) [DP [IP tuki-no ide-tara-n] [NP yo] D]
 moon-GEN appear-ASP-seem night
 'a night when the moon seems to have appeared.'

In (13) the sentential modifier is in DP SPEC. This is not implausible, since the attributive form of the predicate is a nominal. On the other hand, it is not clear exactly where the NP marked genitive *tuki* 'moon' is in overt syntax: it can be either in IP SPEC or VP SPEC. Since the positioning of the genitive subject is not relevant in the following discussion, let us assume that it is in IP SPEC in overt syntax without discussion. Let us now consider how the two nominals are licensed.

First, consider how the Case feature of the attributive form of the predicate is checked. In old and modern Japanese, a predicate merges with a tense morpheme in a tensed clause. Thus, in (13) the attributive form of the predicate *n* 'seem' merges with the tense morpheme in INFL. Since agreement/checking takes place between a head X and (a head of) an element in the checking domain of X, in (13) the head D can check the Case feature of the attributive form of the predicate. Checking domain is defined as follows in Chomsky (1993). In (14), the checking domain of X (X_1 and X_2) is {UP, ZP, WP, H} and whatever these categories dominate.

- (14)
- ```

 XP1
 / \
 UP XP2
 / \
 ZP1 X'
 / \ / \
 WP ZP2 X1 YP
 / \
 H X2

```

Second, let us consider how the genitive Case feature of the NP in (13) is checked. In (13) the NP marked genitive is in the SPEC of INFL, whose maximal projection is in the SPEC of D. Given the definition of checking domain, the head D can check the genitive Case feature of the NP in (13). Thus, the genitive NP is checked in situ, and remains in the same position at LF.

Given this, we can assume that sentential modifiers of nominals with a genitive subject in modern Japanese have the same structure as the one in old Japanese. Thus, examples such as (1b) have the structure in (15).

- (15) [DP [IP John-no kuru] [NP kanoosee] D]  
           -GEN come probability  
           'the probability that John will come'

In (15) the head D checks the Case feature of the attributive form of the predicate and the genitive Case feature of the NP in the sentential modifier.

Let us then consider the structure of sentential modifiers of nominals with a nominative subject in modern Japanese. To do so, it is worth taking a look at the old Japanese again. As stated above, in sentential modifiers of nominals, subjects that are not marked genitive have not been attested. Thus, the example in (13) is considered ungrammatical if the subject of the sentential modifier does not have any morphological realization of Case, that is, the subject is abstractly marked nominative, as in (16).

- (16) \*[DP [IP tuki ide-tara-n] [NP yo] D]  
           moon-NOM appear-ASP-seem night  
           'a night when the moon seems to have appeared.'

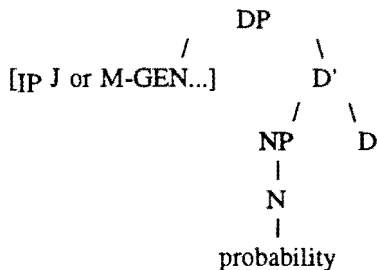
Let us consider what is wrong with (16). D can check the Case feature of the attributive form of the predicate. However, the attributive form of the predicate should not be able to check the nominative Case feature. Otherwise, the example in (16) and all root structures with a nominative subject and an attributive form of a predicate would be grammatical. Thus, (16) suggests that even in modern Japanese, the structure in (16) is ungrammatical. Note that in modern Japanese, nominative Case is morphologically realized as *ga*. Thus, the modern Japanese counterpart of (16) is schematically represented as (17).

- (17) \*[DP [IP NP-ga predicate(attributive)] [NP N] D]  
           -NOM

The question then arises as to why a nominative subject is allowed in sentential modifiers of nominals in modern Japanese. The answer lies in the fact that in modern Japanese the apparent attributive/conclusive distinction of a predicate has been lost. As stated above, the attributive form of a predicate must be licensed by D. However, if in modern Japanese, the apparent morphological attributive/conclusive distinction is lost, and the predicate in a sentential modifier of a nominal can take its conclusive form, as well as its attributive form, the predicate can be the conclusive form in (17). Given this, there is no reason to assume D for (17), since the conclusive form is not a nominal. Then, a nominal modified by a sentence with a nominative subject is an NP rather than



(20)



In (19), in which the subject of the sentential modifier is nominative, the N kanoosee 'probability' c-commands the NP John-ka Mary 'John or Mary.' On the other hand, the latter does not c-command the former due to the IP node. Thus, the fact that (3a) only has the reading that the noun takes scope over the nominative subject is correctly accounted for.

Let us turn to (20), in which the subject of the sentential modifier is genitive. At first sight, (20) would incorrectly predict that there would be no scope interaction between the noun and the genitive NP, since neither of them c-commands the other due to the D' and IP nodes.

Note, however, that in (20), D agrees with the genitive subject in its checking domain. The question is whether the genitive subject can be interpreted at the position of D. If it can, the scope ambiguity of (3b) is expected, since D and N c-command each other.

To address the question, let us consider wh-questions in English. In (21), the wh-phrase moves to the checking domain of the [+Q] COMP, namely, CP SPEC.

(21) I wonder [CP what C [IP John bought t]].

Note that because of the SPEC-head agreement between the COMP and the wh-phrase, it can be said that the wh-phrase takes scope at the [+Q] COMP. Given this, it is not implausible to assume that the element that agrees with the head in the checking domain may take scope either at that position or at the head. If this is the case, in (20), the genitive subject may take scope at the head D. Then, the D and N c-command each other, and the scope ambiguity of (3b) is correctly accounted for.

Thus, the proposed analysis correctly accounts for the scope facts in (3), and the dilemma has disappeared.

## 4 Implications

The above analysis has two interesting implications in the system of feature checking. The first implication is that there is an asymmetry in feature checking between a checker and a checkee. In Japanese, a tensed clause must have a nominative NP, which suggests that a tense feature and a nominative Case feature are closely related. Consider the potential construction in Japanese in (22).

- (22) a. John-ga eego-ga hanas-eru.  
           -NOM English-NOM speak-can  
           'John can speak English.'
- b. John-ga eego-o hanas-eru.  
           -NOM English-ACC speak-can  
           'John can speak English.'
- c. John-ni eego-ga hanas-eru.  
           -to English-NOM speak-can  
           'John can speak English.'
- d. \*John-ni eego-o hanas-eru.  
           -to English-ACC speak-can  
           'John can speak English.'

In the potential construction, the object of the verb can be marked nominative or accusative, as shown in (22a-b). Interestingly, the subject can be marked dative, as long as one other NP is marked nominative, as shown in (22c-d). Thus, the data in (22) suggest that the tense feature must be licensed by a nominative Case feature.

However, the example in (15), reproduced here as (23), does not fit this generalization under the proposed analysis.

- (23) [DP [IP John-no kuru] [NP kanoosee] D]  
           -GEN come probability  
           'the probability that John will come'

In (23) the sentential modifier is tensed, but does not have a nominative NP. Yet, the example is grammatical. Thus, (23) indicates that a genitive Case feature as well as a nominative Case feature can license a tense feature.

Note, however, that a tense feature cannot license a genitive Case feature, as shown in (2b), reproduced here as (24).



- (24) \*John-no kita (to omou).  
 -GEN came that think  
 '(I think that) John came.'

Thus, it turns out that a genitive Case feature can check a tense feature, but not vice versa. Hence, there is an asymmetry in feature checking between a checker and a checkee.

The second implication is that multiple checking by a single head is allowed. It was argued above that in old Japanese, a head D can check the Case feature of the attributive form of the predicate and the genitive Case feature of the NP in a sentential modifier. Thus, multiple checking by a single head is possible in principle. Suppose then that modern Japanese has kept the mechanism of multiple checking by a single head. Then, it automatically follows that modern Japanese also has the multiple nominative construction, as shown in (25).

- (25) Bunmee koku-ga dansee-ga heekin jumyoo-ga mizikai.  
 civilized country-NOM make-NOM average life span-NOM short  
 'In civilized countries, men's average life span is short.'  
 (Kuno (1973))

As mentioned above, the tense and nominative Case features are closely related. Thus, provided that multiple checking by a single head is possible in principle, each nominative Case feature in (25) is checked by a tense feature, and so the existence of the multiple nominative construction in Japanese comes as no surprise.

## 5 Conclusion

To conclude, we have shown that the dilemma of the *ga/no* conversion phenomenon in modern Japanese is solved by closely examining sentential modifiers of nominals in old Japanese. To be precise, we argued that the genitive subject of a sentential modifier is licensed in situ by D, while the nominative subject of a sentential modifier is licensed by the INFL in the modifier.

We also discussed two implications of the present analysis in the mechanism of feature checking: 1) that there is an asymmetry in feature checking between a checker and a checkee; and 2) that multiple checking by a single head is possible in principle.

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## Texts

*Taketori monogatari*: written during the late 9th to the early 10th century, published by Shogakukan, Tokyo, in 1972.

*Uji shuui monogatari*: written in the early 13th century, published by Shogakukan, Tokyo, in 1972.

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# Implications of Tough Movement

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## 1 Introduction

There have been three approaches to the Tough construction in (1).

(1) John is tough/hard/easy to please.

Rosenbaum (1967), Postal (1971), Postal and Ross (1971), and Chomsky (1973), among others, propose the NP-movement analysis; Ross (1967) and Lasnik and Fiengo (1974) propose the deletion analysis; and Chomsky (1977) and Chomsky (1982), among others, propose the wh-movement analysis.

Under the NP-movement analysis, (1) is transformationally related to (2).

(2) It is tough/hard/easy to please John.

Thus, (1) is derived from the underlying structure (3) by moving the NP John to the matrix subject position.

(3) \_ is tough/hard/easy to please John

Under the deletion analysis, (1) and (2) are independent sentences, and the underlying structure of (1) is (4).

(4) John<sub>i</sub> is tough/hard/easy [PRO to please John<sub>i</sub>]

In (4) the matrix NP John is base-generated in that position. The deletion rule deletes the second occurrence of John, deriving (1).

Finally, under the wh-movement analysis, the matrix subject is base-generated, as in the deletion analysis, but a wh-phrase/null operator base-generated in the complement position of the verb moves to the SPEC of CP adjacent to the Tough predicate, as shown in (5).

- (5) John is tough/hard/easy [CP WH<sub>i</sub>/Op<sub>i</sub> [IP PRO to please t<sub>i</sub>]]

The purpose of this paper is to reexamine these three analyses, and to defend the NP-movement analysis. Then, the implications of the NP-movement analysis are considered in the current framework of linguistic theory.

The organization of this paper is as follows. Section 2 reexamines Lasnik and Fiengo's (1974) arguments against the NP-movement analysis. It is shown that their arguments are not complete, given the Japanese Tough construction. Section 3 shows that the deletion and wh-movement analyses make incorrect predictions for certain data, and concludes that only the NP-movement analysis is correct. Section 4 considers the implications of the NP-movement analysis in terms of Chomsky's (1995) Minimalist Program. Section 5 concludes this paper.

## 2 Arguments Against Tough Movement

Lasnik and Fiengo (1974) provide some initially convincing arguments against the NP-movement analysis of the Tough construction. To illustrate, let us review a representative set of data against the movement analysis. Lasnik and Fiengo find a restriction on the subject of the Tough construction. That is, the subject must not be indefinite. Thus, there is a clear contrast between (6a) and (6b).

- (6) a. John would be easy to kill with a gun like that.  
 b. \*Someone would be easy to kill with a gun like that.

In (6a) the subject is a definite NP John, and the example is grammatical, while in (6b) the subject is an indefinite NP someone, and the example is ungrammatical. Note, however, that the It-pleonastic counterparts of (6a) and (6b) are both grammatical, as shown in (7a) and (7b), respectively.

- (7) a. It would be easy to kill John with a gun like that.  
 b. It would be easy to kill someone with a gun like that.

This suggests an inadequacy of the NP-movement analysis, since under the analysis, (7b) (without it) is an underlying structure for (6b), and the movement of someone to the subject position should be allowed. Thus, along with several other sets of data, they conclude that the Tough construction is not derived by movement.

Instead, they propose a deletion analysis for the construction. Thus, the underlying structures for (6a) and (6b) are (8a) and (8b), respectively.

- (8) a. John<sub>i</sub> would be easy to kill John<sub>i</sub> with a gun like that.  
 b. Someone<sub>i</sub> would be easy to kill someone<sub>i</sub> with a gun like that.

Then, John and someone in the second occurrence are deleted by a deletion rule, and (6a) and (6b) are derived. Note that the ungrammaticality of (6b) is due to the general constraint that indefinites cannot be the deep subject of predicates denoting characteristics. Consider the examples in (9).

- (9) a. Someone left.  
 b. \*Someone was tall.

In (9a), the predicate leave denotes action, and an indefinite subject is allowed, while in (9b), the predicate be tall denotes a characteristic, which does not allow an indefinite subject. Given this, the ungrammaticality of (6b) directly follows.

However, Lasnik and Fiengo's argument against the NP-movement analysis is challenged by the Tough construction in other languages like Japanese. Their argument is based on the assumption that Tough predicates in the Tough construction and those in the It-pleonastic counterparts are identical. However, Japanese data show that these predicates are different. Consider the examples in (10).

- (10) a. John-ga yorokobase-yasui.  
           -NOM please-easy  
           'John is easy to please.'  
 b. John-o yorokobaseru-no-wa, yasasii.  
           -ACC please-COMP-TOP easy  
           'It is easy to please John.'

(10a) corresponds to the Tough construction in English, and the Tough predicate is yasui 'easy'. (10b) corresponds to the It-pleonastic counterpart, and the Tough predicate is yasasii 'easy'. Thus, there are two Tough predicates in Japanese for each Tough predicate in English. Note that the two predicates cannot be interchanged, as shown in (11).

- (11) a. \*John-ga yorokobase-yasasii.  
           -NOM please-easy  
           'John is easy to please.'

- b. \*John-o yorokobaseru-no-wa, yasui.  
 -ACC please-COMP-TOP easy  
 'It is easy to please John.'

Furthermore, the restriction on the subject of the Tough construction observed in English also applies to the Japanese Tough construction. Compare (10a) with (12) below.

- (12) \*Dareka-ga yorokobase-yasui.  
 someone-NOM please-easy  
 '\*Someone is easy to please.'

Note that the counterpart of (10b) is grammatical, just as in English. Consider (13).

- (13) Dareka-o yorokobaseru-no-wa, yasasii.  
 someone-ACC please-COMP-TOP easy  
 'It is easy to please someone.'

Thus, the Tough construction and the It-pleonastic counterpart in English behave exactly like those in Japanese. This suggests that even in English, a Tough predicate in the Tough construction and the phonologically identical predicate in the It-pleonastic counterpart are two different predicates. If this is the case, it is impossible to transformationally relate the Tough construction and the It-pleonastic counterpart, as argued by Lasnik and Fiengo (1974).

However, provided that the Tough construction is independent of the It-pleonastic construction, the question still remains as to whether or not the Tough construction involves movement of the object of the verb. Thus, Lasnik and Fiengo's argument against the NP-movement analysis is not complete.

### 3 Tough Movement as NP-Movement

This section examines Lasnik and Fiengo's (1974) deletion analysis and Chomsky's (1982) wh-movement analysis, and points out their problems. Then it is shown that these problems do not arise under the NP-movement analysis, arguing for the NP-movement analysis.

Let us start by examining the deletion analysis. The deletion analysis faces a problem in the examples in (14).

- (14) a. \*John is easy to believe (that) Bill killed.

- b. \*Bill is easy to believe (that) killed John.

In (14a-b) the matrix subjects John and Bill are the logical object and the subject, respectively, of the verb kill in the tensed clause, and these examples are ungrammatical. Lasnik and Fiengo (1974) state that application of the deletion rule is blocked by general constraints, such as the Tensed-S Condition (TSC).

However, the TSC does not block A'-movement, such as wh-movement, as shown in (15).

- (15) a. Who does John believe (that) Bill killed?  
 b. Who does John believe killed Bill?

Then, the question immediately arises as to why the deletion rule is subject to the TSC, while A'-movement is not. Thus, unless the TSC effect of the deletion rule is derived on independent grounds, the deletion analysis of the Tough construction is not well supported.

Let us turn to the wh-movement analysis. Chomsky (1982) proposes the null operator movement analysis of the Tough construction, in which the null operator undergoes A'-movement to the SPEC of CP adjacent to the Tough predicate. Then, the examples in (14) are problematic for this analysis, since the null operator could successfully move to the SPEC of CP in each example, and the examples would be incorrectly predicted to be grammatical.

Furthermore, as pointed out by Levine (1984), there is a case in which positing a null operator for the Tough construction would incorrectly lead to ungrammaticality. Consider the examples in (16).

- (16) a. John is hard to introduce to my friend.  
 b. Who is John hard to introduce  $t_i$  to  $t_j$ ?

(16b) is derived from (16a), and the example is grammatical. However, if there is a null operator in the SPEC of the embedded clause, as in (17), (16b) would be incorrectly ruled out as a violation of Chomsky's (1973) Subadjacency Condition or Rizzi's (1990) Relativized Minimality, just as in the case of (18).

- (17) [CP who<sub>j</sub> is [IP John<sub>i</sub> hard [CP Op<sub>i</sub> [IP PRO to introduce  $t_i$  to  $t_j$ ]]]]

- (18) ?Who<sub>j</sub> did John wonder who<sub>i</sub> Mary introduced  $t_i$  to  $t_j$ ?

Thus, the wh-movement analysis cannot be maintained.

On the other hand, the problems that arise from the deletion analysis and the wh-movement analysis do not arise from the NP-movement analysis. First, the

NP-movement analysis correctly predicts the ungrammaticality of (14a-b). It is known that NP-movement is constrained by the TSC. Thus, passivization, an instance of NP-movement, is impossible out of a tensed clause, as shown in (19).

- (19) a. It is believed (that) Bill killed John.  
 b. \*John is believed (that) Bill killed.  
 c. \*Bill is believed (that) killed John.

Both (10b-c) are derived from (19a). In (19b-c) the matrix subjects John and Bill are the logical object and the subject, respectively, of the verb kill in the tensed clause, and these examples are ungrammatical. Thus, if the Tough construction involves NP-movement, the ungrammaticality of (14a-b) follows.

Second, the NP-movement analysis also correctly predicts (16b) to be grammatical. This is because movement of who does not run afoul of the Subjacency Condition or Relativized Minimality, as shown in (20).

- (20) [CP who<sub>j</sub> is [IP John<sub>i</sub> hard [IP PRO to introduce t<sub>j</sub> to t<sub>i</sub>]]]

Therefore, only the NP-movement analysis provides straightforward accounts for the data considered above. Thus, we conclude that the Tough construction is best analyzed as involving NP-movement.

Given this conclusion, the example in (21a) is derived from (21b) by moving the NP John to the matrix subject position.

- (21) a. John is easy to please.  
 b. \_ is easy [PRO to please John]

The question immediately arises as to why John needs to move to that position, since it could check its Case feature against the verb please. Note that given (22), the verb please should check the Case feature of the object.

- (22) It is easy to please him.

Then, such a movement would violate the Principle of Last Resort (Chomsky (1986)), and (21a) would be incorrectly ruled out.

Note, however, that the predicate easy in (21) and that in (22) are two different predicates, as shown with the Japanese data in (10), reproduced here as (23).

- (23) a. John-ga yorokobase-yasui.  
 -NOM please-easy



- 'John is easy to please.'
- b. John-o yorokobaseru-no-wa, yasasii.  
 -ACC please-COMP-TOP easy  
 'It is easy to please John.'

Consider (23a) in more detail. The verb yorokobaseru 'please' is adjoined to the Tough predicate yasui 'easy', forming a complex predicate. Also, the subject is marked Nominative, and cannot be marked Accusative, as shown in (24).

- (24) \*John-o yorokobase-yasui.  
 -ACC please-easy  
 'John is easy to please.'

This indicates that the Tough predicate in (23a), but not in (23b), absorbs the Case checking/assigning ability of the verb, just like the passive morpheme. Given this, the Tough predicate easy in (21), but not in (22), should also absorb the Case checking/assigning ability of the verb.

The question then arises as to how the absorption takes place in the English Tough construction, in which the Tough predicate and the embedded predicate do not form a complex predicate, unlike in Japanese. To answer this, let us consider (25a), which is derived from (25b).

- (25) a. He is easy to please.  
 b. \_ is easy [PRO to please he]

In (25b) the pronoun is marked Nominative, and moves to IP SPEC in overt syntax. Then, the Accusative Case feature of the verb please remains unchecked. If nothing else happens, (25a) would be incorrectly ruled out. However, if Accusative Case is checked at LF in English, as argued in Chomsky (1993, 1995), among others, in (25a) the Accusative Case feature can move to the Tough predicate in LF, and is checked off. Thus, the examples in (25a) and (21a) are correctly ruled in.

The hypothesis that a Tough predicate checks Case in LF accounts for a difference between the Tough construction and the passive construction, both of which are now assumed to involve NP-movement. That is, an intransitive verb may appear in the complement of the Tough predicate, while an intransitive verb cannot be passivized in English, as shown in (26-27).

- (26) a. The place is easy to visit.  
 b. The place was visited.

- (27) a. The place is easy to go to.  
 b. \*The place was gone to.

If a Tough predicate checks Case in LF, in (27a), the Oblique Case feature of to moves to the Tough predicate in LF, and is checked off. Thus, (27a) is correctly ruled in. On the other hand, in (27b), the intransitive verb go is passivized. Since passive forms of intransitive verbs are disallowed in English, (27b) is excluded. Moreover, in (27b), the Oblique Case feature of to remains unchecked, which also contributes to the ungrammaticality of (27b). Therefore, the hypothesis that a Tough predicate checks Case in LF correctly predicts the difference between (27a) and (27b).

#### 4 Implications

If the NP-movement analysis is correct, then it has some implications to the theory of grammar, which we will consider below. Under the NP-movement analysis, (28) is derived from (29) by moving John to the matrix IP SPEC position.

(28) John is easy [PRO to please t].

(29) \_ is easy [PRO to please John]

The first implication is that given the Attract-F hypothesis proposed in Chomsky (1995), the Tough construction suggests that checking of a Case feature requires an identical Case feature, rather than a D-feature. Attract-F is defined in (30).

(30) Attract-F

The target K attracts F if F is the closest feature that can enter into a checking relation with a sublabel of K.

In (28) John moves across PRO to the matrix IP SPEC. Suppose that the matrix INFL has a Nominative Case feature which needs to be checked. If Case feature checking requires a D-feature, Attract-F would attract the D-feature of PRO in (29), and the example would be incorrectly ruled out. On the other hand, if the checking of a Case feature requires an identical Case feature, Attract-F can legitimately attract the Nominative Case feature of John, ignoring the D-feature and null Case feature (Chomsky and Lasnik (1993)) of PRO, and the

example is correctly predicted to be grammatical. Thus, the checking of a Case feature requires an identical Case feature, rather than a D-feature.

One may argue, however, that the grammaticality of (28) suggests that PRO does not have a D-feature, so that (28) is correctly predicted to be grammatical under the hypothesis that checking of a Case feature requires a D-feature, rather than a Case feature. However, examples such as (31) suggest that this may not be correct.

(31) John is easy for Mary [PRO to please  $\downarrow$ ].

In (31) the NP Mary is the antecedent of PRO. If the semantic content of PRO is identical to its antecedent, PRO should have a D-feature, just as its antecedent does. Then, under the assumption that checking of a Case feature requires a D-feature, (28) would be incorrectly ruled out. Thus, checking of a Case feature requires an identical Case feature, rather than a D-feature.

If this is correct, it has a further implication on the nature of a checked feature. Consider the superraising example in (32), which is derived from (33).

(32) \*John seems that it is certain  $\downarrow$  to come.

(33)  $\_$  seems that it is certain John to come

In (33) the Nominative Case feature of it and the INFL are properly checked. If a Case feature were deleted at the point of checking, and checking of a Case feature requires an identical Case feature, in (33) the matrix INFL could attract the Nominative Case feature of John, and example (32) would be incorrectly ruled in. Thus, the fact that (32) is ungrammatical suggests that a Case feature is visible even after it is checked, and is subject to Attract-F until the derivation reaches the point of Spell-Out.

If this is correct, it has another implication on the nature of a checked feature. Consider the examples in (34).

(34) a. John seems [t to come].  
b. \*John seems [ $\downarrow$  will come].

(34b) is ungrammatical. It has the representation in (35) before John has moved.

(35)  $\_$  seems [John will come]

In (35), the Nominative Case feature of the embedded INFL is checked by a Nominative Case feature of John. Now, if the Nominative Case feature of John

were visible even after being checked, the matrix INFL could attract it, and (34b) would be incorrectly ruled in. Thus, the fact that (34b) is ungrammatical suggests that a checked feature either resists movement, or it loses the ability to check a feature.

Second, (28) further suggests that the constraint that derives the Relativized Minimality effects (Rizzi (1990)) must be stated in terms of features, as in Chomsky (1995), rather than positions, as in Rizzi (1990). This is because the position of PRO in (28) is an A-position, and the position-based Relativized Minimality would incorrectly block the movement of John across PRO. On the other hand, under the feature-based Relativized Minimality, that is, Attract-F, the movement is licit, provided that checking of a Case feature requires an identical Case feature. Thus, (28) constitutes one piece of evidence for the feature-based Relativized Minimality, hence, Attract-F.

Third, the Tough construction suggests that one NP can receive more than one theta-role. Remember that the subject of the Tough construction must not be indefinite. Consider again the examples in (6), reproduced here as (36).

- (36) a. John would be easy to kill with a gun like that.  
 b. \*Someone would be easy to kill with a gun like that.

(36b) is ungrammatical, since the matrix subject is indefinite. Interestingly enough, this restriction does not apply to the passive construction. Compare the data in (37) with that of (38).

- (37) a. Someone took advantage of Mary.  
 b. Advantage was taken of Mary.
- (38) a. It is easy to take advantage of Mary.  
 b. \*Advantage is easy to take of Mary.

In this paper, we have argued that the Tough construction involves NP-movement, just like the passive construction. However, there is a contrast between (37b) and (38b). This situation is expected if the subject of the passive construction is not a theta-position, as is generally assumed, and the subject of the Tough construction is a theta-position. Thus, if the subject of the latter construction is incompatible with restrictions on the theta-role provided by the Tough predicate, that is, if the subject is indefinite, the example results in ungrammaticality, as in (36b) and (38b).

If this is correct, the NP-movement analysis of the Tough construction suggests that the subject NP gets two theta-roles: one from the verb, and the

other from the Tough predicate. This in turn gives support to Boskovic's (1994) argument that movement into theta-positions is allowed.

Fourth, if the NP-movement analysis is correct, it suggests that Burzio's (1986) generalization is not an accurate generalization of the nature of verbs in human language. Burzio's generalization is shown in (39).

(39) Burzio's Generalization

A verb (with an object) Case-marks its object if and only if it theta-marks its subject.

Consider (28), reproduced here as (40).

(40) John is easy [PRO to please t].

In (40), the verb please does not Case-mark the object John, which has a Nominative Case feature. Nonetheless, the verb theta-marks its subject PRO. Thus, (40) does not fall under Burzio's generalization, which suggests that it is not an accurate generalization about the nature of verbs in human language.

Fifth, and finally, if the proposed analysis is correct, it suggests that NP-movement does not leave a trace. Suppose that in (40) a trace is created in the object position of the verb. Supposing it is an anaphor, it violates Condition A of the Binding theory, since it is not A-bound in its local domain, due to the existence of PRO. On the other hand, supposing it is a variable, it violates Condition C of the Binding theory, since it is A-bound by John. Thus, the fact that (40) is grammatical suggests that there should not be a trace created by NP-movement, or that NP-movement does not create a chain.

This conclusion raises an interesting question as to whether other types of movement leave a trace, or create a chain. Maki, Niinuma, and Ueda (1999) argue that feature movement does not create a chain. Further, based on conceptual arguments, Maki and Ueda (1999) claim that wh-movement must be undone in LF, so that there is no chain created by wh-movement at LF. If all these arguments turn out to be correct, a new theory of grammar will emerge, that is, a chainless grammar. See Maki, Niinuma, and Ueda (1999) and Maki and Ueda (1999) for the detailed arguments.

## 5 Conclusion

To conclude, we have argued for the NP-movement analysis of the Tough construction. If this analysis is correct, it implies 1) that checking of a Case feature requires an identical Case feature, rather than a D-feature, 2) that

Relativized Minimality must be defined in terms of features rather than positions, 3) that movement into a theta-position is allowed in principle, 4) that Burzio's (1986) generalization is not an accurate generalization of the nature of verbs in human language, and 5) that NP-movement does not leave a trace.

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# Projection of Direct Objects

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The existence of two distinct structural positions for the direct object has been argued for in languages such as Hindi, Turkish, Persian and Scottish Gaelic. In all of these approaches, the different structural positions give rise to distinct semantic interpretations. In this paper, I show that Eastern Armenian provides clear evidence for two object positions, displaying a strong correlation between case morphology, specificity, phrasal stress pattern and adjacency to the verb.

## 1 Case Morphology in Eastern Armenian

Eastern Armenian (EArmenian) is a verb-final Indo-European language. The direct objects can be classified into four distinct categories based on NP type and case morphology as shown in the examples below. Sentence (1) contains a definite object, which consists of a noun carrying an overt accusative morpheme. If the object lacks overt case morphology, such as the one illustrated in (2), it is interpreted as an indefinite (*a book/books*). The presence or absence of accusative case, however, does not correspond to the definiteness of the NP as the examples containing quantified indefinite objects in (3) clearly suggest. Quantified indefinites consist of a numeral, an optional classifier and a noun, and may appear with or without overt case morphology.<sup>1</sup>

(1) Ara-n      girk-ə      ayr-ets      *definite*  
Ara-Nom    book-Acc    burnt  
              'Ara burnt the book.'

(2) Ara-n      girk              ayr-ets      *bare indefinite*  
Ara-Nom    book              burnt  
              'Ara burnt a book/books.'

- (3) a. Ara-n mi girk ayr-ets *quantified indefinite (without case)*  
 Ara-Nom one book burnt  
 'Ara burnt a book.'
- b. Ara-n mi girk-ə ayr-ets *quantified indefinite (with case)*  
 Ara-Nom one book-Acc burnt  
 'Ara burnt one book/one of the books.'

## 2 Two Object Positions

### 2.1 Adverbs

It is generally agreed upon that adverbs occupy a fixed position in the phrase structure and can thus be used to test the relative position of other elements in the clausal structure. Consider the following examples involving sentential adverbs and definite direct objects bearing overt accusative case. As shown in (4b), the sentential adverb is allowed to intervene between the direct object and the main verb of the sentence.

- (4) a. Ara-n *vst'ah* ays girk-ə k'-k'arta  
 Ara-Nom certainly this book-Acc Part-read/3sg  
 'Ara will certainly read this book.'
- b. Ara-n ays girk-ə *vst'ah* k'-k'arta  
 Ara-Nom this book-Acc certainly Part-read/3sg  
 'Ara will certainly read this book.'

In contrast to the definite object, the bare indefinite may not be separated from the verb. The following sentences involve indefinite objects that do not bear overt case morphology. The example in (5a) shows a sentential adverb preceding the indefinite. But as the example in (5b) indicates, when the adverb appears between the indefinite object and the verb, the sentence becomes ungrammatical. This sentence is felicitous only with a focus stress on the object, which gives rise to a contrastive reading.

- (5) a. yerexa-ner-ə *havanabar* hetzaniv k'-ksh-en  
 child-Plur-Nom probably bicycle Part-ride-3pl  
 'The children will probably ride a bicycle/bicycles.'



|                         |                 |                  |                  |
|-------------------------|-----------------|------------------|------------------|
| b.* <i>yerexa-ner-ə</i> | <i>hetzaniv</i> | <i>havanabar</i> | <i>k'-ksh-en</i> |
| child-Plur-Nom          | bicycle         | probably         | Part-ride-3pl    |

The fact that sentential adverbs may separate the case-marked objects from the verb but are disallowed from appearing between the bare indefinites and the verb clearly suggests that the two object types occupy different structural positions. Furthermore, sentential adverbs have been argued to occupy a position that is high in the clausal structure. These adverbs are considered to be outside of the VP domain, generally licensed either by the Complementizer or the Inflectional heads (Potsdam 1999). The fact that these adverbs can appear between the accusative objects and the verb indicates that the overtly case-marked direct objects are also outside of the VP projection. On the other hand, objects without an overt case morpheme are not allowed to separate from the verb by sentential adverbs and remain in the preverbal position, which is good indication that the bare indefinites are VP-internal arguments.

Other constituents may also intervene between the case-marked direct object and the verb but are unable to appear between the bare object and the verb. The sentences below exemplify such cases with intervening instrumentals (6) and full postpositional phrases (7).

- (6) a. *Siran-ə dʊr-ə banali-ov bats-ets*  
 Siran-Nom door-Acc key-Instr open-Aor/3sg  
 'Siran opened the door with a key.'
- b. ?\**Siran-ə dʊr banali-ov bats-ets*<sup>2</sup>  
 Siran-Nom door key-Instr open-Aor/3sg
- (7) a. *Siran-ə t'un-ə əvs ashak'ert'-i het' varts-ets*  
 Siran-Nom house-Acc this student-Gen with rent-Aor/3sg  
 'Siran rented the house with this student.'
- b. ?\**Siran-ə t'un əvs ashak'ert'-i het' varts-ets*  
 Siran-Nom house this student-Gen with rent-Aor/3sg

Similar behavior is attested with quantified indefinites. If the indefinite appears with overt case morphology as in (8), the sentential adverb may separate the direct object from the main verb. But as the sentence in (9) indicates, the adverb is not allowed to intervene between the caseless object and the verb without giving rise to a contrastive reading.

- (8) Ara-n mi k'atv-in *ənthanrap'es* k'erak'r-um er  
 Ara-Nom one cat-Acc usually feed-Imp was  
 'Ara usually used to feed one of the cats.'
- (9) \*Ara-n mi girk *ənthanrap'es* k'art-um e  
 Ara-Nom one book usually read-Imp is

These results indicate that objects with overt accusative case pattern together regardless of the definiteness of the noun phrase, and the two indefinite types that lack overt case morphology display a similar pattern. The behavior of the direct objects with respect to the adverbs suggests that the two object types occupy different structural positions. The bare object is inside the VP whereas the case-marked object appears external to the Verb Phrase.

## 2.2 Stress Pattern

Additional support for the existence of two structural positions for the direct objects is provided by the sentential stress patterns in EArmenian. Transitive sentences containing case-marked objects display a phrasal stress pattern that is distinct from transitive sentences with bare indefinites. When the direct object appears with overt case morphology, the main stress of the sentence is assigned on the verb. This is illustrated in (10) where the arguments receiving the main stress are in uppercase. Note that (10a) represents a definite object, and (10b) contains a case-marked quantified indefinite. In the sentences in (11), on the other hand, the objects do not bear case. In all instances, the indefinite object is stressed.

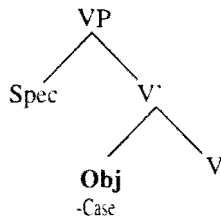
- (10) a. Ara-n girk-ə AYR-ETS  
 Ara-Nom book-Acc burn-Aor/3sg  
 'Ara burnt the book.'
- b. menk yerek' yerk'u shish gini-n VERCHATSr-ETS-INK  
 we-Nom yesterday two bottle wine-Acc finish-Aor-3pl  
 'We finished two bottles of the wine yesterday.'
- (11) a. Ara-n GIRK gn-ets  
 Ara-Nom book buy-Aor/3sg  
 'Ara bought a book/books.'
- b. k'at'u-ner-ə norits mi MUK' brn-ets - in  
 cat-Plur-Nom again one mouse catch-Aor-3pl

'The cats caught a mouse again.'

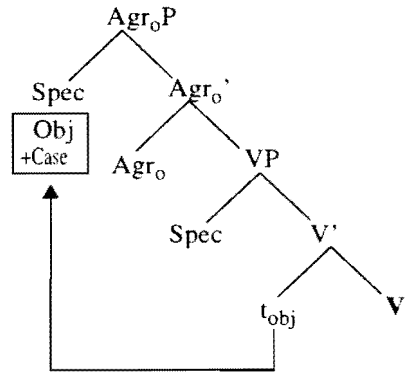
Cinque (1993) argues that the assignment of Nuclear Stress is determined by the syntactic structure of the sentence since the main stress appears on the most deeply embedded constituent in the clause. Thus, in the case of head-final languages, such as EArmenian, the main stress of the sentence is expected to fall on the object that appears to the left of the verbal element as illustrated with the bare indefinite in (11). Since Cinque's analysis predicts that the most deeply embedded constituent within the sentence will receive the nuclear stress, if the object is inside the VP, it will be the recipient of the main stress. On the other hand, if there is no other element within the verb phrase but the verb itself, then the prominent stress will be assigned to the verb as was the case in (10). This is illustrated in the configurations in (12).

(12)

a.



b.



Hence, when the direct object does not carry any case, it stays within the VP as shown in (12a). The caseless object is the most deeply embedded element in the clause and receives the nuclear stress. The case-bearing object, however, appears outside of the VP as illustrated in (12b). I suggest that the object appears in the specifier of the Agreement Projection (Agr<sub>o</sub>P) since certain languages, such as Hindi, display overt agreement on the verb with case-marked objects (Mahajan 1990). In this configuration, the verb is the most deeply embedded element and thus receives the main stress.

### 2.3 Case-marking and Interpretation

The correlation between case-marking and the semantic interpretations found in the object NPs has been noted in a number of languages. For instance, Enç (1991) remarked that in Turkish, object NPs with overt accusative case are always specific whereas NPs appearing without the accusative case are obligatorily interpreted as nonspecific. Enç (1991) provides a definition for the semantic interpretation of specificity based on the link of the NP to the previously established domain of discourse. If an element is specific, then the link is usually one of inclusion; the referent of the NP is a *subset* of the already established domain of discourse. An important distinction between specific and nonspecific elements is that specificity presupposes existence, whereas nonspecific NPs assert an existence.

Consider the sentences in (13). The indefinite object in (13a) doesn't carry an accusative case morpheme, and it receives a nonspecific interpretation. This sentence suggests that Ara is trying to catch a horse, any horse will do. The indefinite in (13b), however, bears accusative case, and it refers to a particular horse that Ara is trying to catch. Hence the indefinite in (13b) is interpreted as a specific object.

- (13) a. Ara-n ashxat'-um e mi hat' dzi brni  
 Ara-Nom try-Imp is one CL horse catch-Subj/3sg  
 'Ara is trying to catch a horse.'
- b. Ara-n ashxat'-um e mi hat' dzi-in brni  
 Ara-Nom try-Imp is one CL horse-Acc catch-Subj/3sg  
 'Ara is trying to catch a horse.'  
 ➤ 'There is a horse such that Ara is trying to catch it.'

Accusative case-marking on the quantified indefinites can also mark a partitive reading as exemplified in the contrast below:

- (14) a. k'at'u-n mi mk'-an brn-el e  
 cat-Nom one mouse-Acc catch-Perf is  
 'The cat has caught a mouse/one of the mice.'
- b. k'at'u-n mi muk' e brn-el  
 cat-Nom one mouse is catch-Perf  
 'The cat has caught a mouse.'

Suppose a context in which the cat has been chasing some mice for a while. The case-marked direct object in (14a) would then refer to a mouse from this presupposed set of mice, namely that the cat has caught one of the mice that it had been chasing. (14b), on the other hand, does not allow for such a reading; it is about some mouse or other (there is no pre-established set of mice in the discourse).

Since definites always receive a strong interpretation, we naturally expect definite object NPs to always carry the accusative case. This expectation is borne out, as illustrated in the following three examples involving Proper Names, Pronouns, and demonstrative NPs, respectively.

- (15) Ara-n Siran-in hampuyr-um e  
 Ara-nom Siran-Acc kiss-Imp be-Present/3sg  
 'Ara is kissing Siran.'
- (16) Ara-n iren hampuyr-um e  
 Ara-nom her/him(Acc) kiss-Imp be-Present/3sg  
 'Ara is kissing her/him.'
- (17) Ara-n ays girk-ə k'artats-el e  
 Ara-nom this book-Acc read-Perf be-Present/3sg  
 'Ara has read this book.'

Without the accusative case marking, these sentences are ungrammatical:

- (18) \*Ara-n Siran hampuyr-um e  
 Ara-nom Siran kiss-Imp be-Present/3sg
- (19) \*Ara-n ir hampuyr-um e  
 Ara-nom her/him(Gen) kiss-Imp be-Present/3sg
- (20) \*Ara-n ays girk k'artats-el e  
 Ara-nom this book read-Perf be-Present/3sg

Enç points out that the specific/nonspecific categorization parallels the distinction between "strong" and "weak" determiners proposed by Milsark (1977). Namely, if an NP contains a strong determiner, it is specific and if the determiner of the NP is weak, then it can be interpreted as either specific (including partitive) or nonspecific. If EArmenian case-marking does in fact correspond to the specificity of the object, the object NPs with strong determiners should always bear overt case morphology while those containing weak determiners could appear with or without accusative case. We have already

seen that definite descriptions follow this pattern (examples (15) - (17)). The following sentences further confirm this contrast.

Universally quantifying indefinites often behave like specific elements<sup>3</sup>. In EArmenian, the universal quantifiers *amen* (=all) or *amen mi* (lit: all one = each) need to appear within an object NP that has been marked for case.

- (21) a. Yes *amen grk- er -ə*      *k'artats-el*      *em*  
           I all    book-Plur-Acc    read-Perf      be-Present/1sg  
           'I have read all the books.'
- b. \*Yes *amen grk-er*      *k'artats-el*      *em*  
           I    all    book-Plur    read-Perf      be-Present/1sg

Consider the following sentences containing object NPs with the weak determiner *mi kani* (=a few/several). The sentence in (22a) shows the nonspecific reading of the direct object NP; note that the object does not bear accusative case. In the corresponding sentence in (22b), however, the direct object appears with overt case and it is interpreted as a partitive, i.e. receives specific reading.

- (22) a. *Ara-n mi kani hat' girk e ar-el*  
           Ara-Nom one few CL book is buy-Perf  
           'Ara has bought a few books.'
- b. *Ara-n mi kani hat' grk-er -ə arten k'artats-el e*  
           Ara-Nom one few CL book-Plur-Acc already read-Perf is  
           'Ara has already read a few of the books.'

Additional evidence for the relation between overt case morphology and strong interpretation comes from *wh*-elements. Pesetsky (1987) argues that certain *wh*-phrases of the form *which N* are D-linked (or discourse linked). This notion seems to correspond to Enç's specificity reading<sup>4</sup>. As expected, *which N* phrases always carry the accusative case in object positions in EArmenian as illustrated in (23). This is in contrast to other *wh*-phrases which behave like the weak determiner NPs, in that they can appear with or without overt case as shown in (24).

- (23) a. *Ara-n vor girk-ə k'art-ats*  
           Ara-Nom which book-Acc read-Aor/3sg  
           'Which book did Ara read?'

- b.\*Ara-n vor girk k'art-ats  
 Ara-Nom which book read-Aor/3sg
- (24) a. Ara-n inch k'art-ats  
 Ara-Nom what read-Perf  
 'What is Ara reading?'
- b. Ara-n inch-ə k'ar-tats  
 Ara-Nom what-Acc read-Aor/3sg  
 'What did Ara read?'
- ☛ 'Which part did Ara read?'

(23a) consists of an object in the form of *which N*, that bears the accusative case. As shown in (23b), the case is obligatory on this DP. The sentences in (24) also contain *wh*-phrase objects. These *wh* DPs have the option of appearing with or without the case morpheme. (24a) simply inquires about what Ara is reading. The interpretation is similar to the English question given in the translation. In (24b), the question can be translated as "which part did Ara read?". The presupposition is that Ara read something and there is a pre-established domain of referents that the *wh*-DP is linked to. Hence, the accusative case is forcing a partitive reading as in "which one (of the sections/books) did Ara read?".

The data discussed clearly point to a correlation between case morphology and the specificity reading of the direct objects. The table below illustrates the generalizations obtained about the behavior of the direct objects in EArmenian.

|                 | overt case | verb adjacency requirement | object position | semantic interpretation |
|-----------------|------------|----------------------------|-----------------|-------------------------|
| definite object | yes        | no                         | VP-external     | specific                |
| bare indefinite | no         | yes                        | VP-internal     | nonspecific             |
| quantified      | yes        | no                         | VP-external     | specific                |
| indefinite      | no         | yes                        | VP-internal     | nonspecific             |

### 3 Frameworks for Two Object Positions

The phenomenon of two distinct object positions has been argued before in the literature. Studies on various languages (Enç 1991 and Kural 1992 on Turkish, Mahajan 1990 on Hindi, Karimi 1996 on Persian, to name a few) have pointed to

the existence of two object types with distinct case morphology. The data also show that the two object types occupy different positions in the phrase structure. Moreover, the different case-marking on these object NPs correlates with the specificity readings obtained.

Several frameworks have been proposed to account for the crosslinguistic data. The common motivation of these studies has been to link the semantic and syntactic properties of case in a principled way. The EArmenian data discussed in this paper are compatible with these frameworks. Diesing (1990) develops the Mapping Hypothesis, which provides a mapping of the syntactic clause structure into a level of semantic interpretation. This partitioning allows the syntactic structure of the sentence to be mapped into an interface level in which the semantic interpretation of arguments is applied. Hence, according to the Mapping Hypothesis, an argument receiving a specific reading is located outside the VP. Nonspecific arguments, however, remain internal to the Verb Phrase. De Hoop (1992) also argues for two distinct structural positions. In de Hoop's analysis, weak NPs (i.e., existential) receive what she calls *weak case*. This is, in a sense, a default structural case assigned to the object at its D-structure position. The strong NPs, however, receive a *strong case* in their S-structure configuration. Thus, for the data in EArmenian, strong case would be the overt accusative case, whereas weak case would refer to the bare case or the lack of overt case.<sup>5</sup>

#### 4 Against an incorporation analysis

It has been suggested in the literature that the caseless NP incorporates into the verb (Enç 1991, Kornfilt 1997, Borer 1994, de Hoop 1992 among others). In this paper, however, I argue against a syntactic incorporation analysis in EArmenian.

The main argument against the syntactic incorporation of the bare object into the verb comes from the stress patterns observed. In EArmenian, the main stress at the word level is on the last syllable as illustrated in (25). But as the example in (26) shows, the main stress of a sentence carrying a bare object falls on the object itself and not on the verb. If the object had been incorporated into the verb in syntax, we would expect the main stress to fall on the last syllable of the object-verb construction, which is certainly not the case.

- (25) a. inknazohutyún      'self-sacrifice'  
       b. grat`axt`ák        'blackboard'



- (26) Ara-n gírġ k'artats  
 Ara-Nom book read/3sg  
 'Ara read a book/books.'

In addition, (27) shows that the auxiliary clitic (which appears on the most prominent element in the clause) can intervene between the object and the verb by cliticizing on the bare object.

- (27) Ara-n gírġ e k'artum  
 Ara-Nom book is reading  
 'Ara is reading a book/books.'

## 5 Conclusion

I have argued for two distinct structural positions for the direct objects in EArmenian. The data involving requirements for verb-adjacency in the presence of intervening material in syntax (such as sentential adverbs), phrasal stress pattern and semantic interpretation strongly suggest the existence of two distinct positions for case-marked and caseless objects. These results show a striking parallel with the crosslinguistic data. It was proposed that direct objects appearing with an overt case morpheme at surface structure are in a projection outside of the VP (Agr<sub>o</sub>P). These DPs are interpreted as specific elements. Objects that do not bear overt accusative case, however, remain within the VP projection; they receive a weak or nonspecific interpretation. In addition, I have argued against a syntactic incorporation analysis of the caseless objects. Instead I follow de Hoop (1992) in suggesting that the bare object receives a *weak* or default case within the VP.

## Notes

1. Throughout this paper, the following abbreviations were used in the examples: Nom=nominative, Acc=accusative, Gen=genitive, Instr=instrumental, Aor=aorist, Subj=subjunctive, Imp=imperfective, Perf=perfective, Part=particle, Plur=plural, CL=classifier.
2. This sentence is completely grammatical if the indefinite object is interpreted as focused. The same comment holds for (7b).
3. See Section 4.2. Enç (1991).
4. This is noted by Enç (1991).
5. Borer (1994) and Ramchand (1997) provide an analysis with two different structural positions for the direct object which correlate with the aspectual properties of the predicate. EArmenian case-marking, however, is not related to the aspect of the predicate (Megerdumian 1999).

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# Another Look at "Possessor Raising"

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## 1 Introduction

The purpose of this paper is to investigate an argument structure of "**possessor raising**" constructions [PRC] in Korean and to explain their case alternations, illustrated in (1a)-(1c):

- (1) a. John-i                haksayng-uy        son-ul  
      John-NOM        student-GEN        hand-ACC  
      cap-ass-ta.  
      catch-PAST-DEC  
      'John caught the student's hand'.
- b. John-i                haksayng-ul        son-ul  
      John-NOM        student-ACC        hand-ACC  
      cap-ass-ta.  
      catch-PAST-DEC  
      'John caught the student by the hand'.
- c. Nay-ka    ku    mwune-lul        tali-lul  
      I-NOM    the    octopus-ACC        leg-ACC  
      kkuth    pwupwun-ul    cokum-ul        cal-lass-ta.  
      end      part-ACC        bit-ACC        cut-PAST-DEC  
      'I cut the octopus on the end part of the leg a bit'.  
      (O'Grady 1991)

Examples (1b,c) have been analyzed as involving "possessor raising" or "possessor ascension". It has long been realized that "possessor raising" may apply more than once within a clause as in (1c) and that it may apply only when there is an inalienable (i.e. part-whole) relationship between the possessor and the possessed item (or possessum) (see Kim 1990, Gerdts 1991, and O'Grady 1991, among many others). This semantic restriction is illustrated by the contrast between (2a) and (2b):

- (2) a. Kay-ka                    haksayng-ul            tali-lul    mwul-ess-ta.  
          dog-NOM                student-ACC            leg-ACC    bite-PAST-DEC  
          'The dog bit the student on the leg'.
- b. \*Kay-ka                    haksayng-ul            kapang-ul  
          dog-NOM                student-ACC            bag-ACC  
          mwul-ess-ta.  
          bite-PAST-DEC  
          'The dog bit the student on the bag'.

It is important to note that both the possessor and possessum NPs in (1b,c) have to receive nominative case under passivization with the help of an inchoative auxiliary *ci* 'become', as shown in (3b,c):

- (3) a. \*Haksayng-i son-ul                    capa-ci-ess-ta.  
          student-NOM    hand-ACC    catch-PASS-PAST-DEC
- b. Haksayng-i    son-i                    capa-ci-ess-ta.  
          student-NOM    hand-NOM    catch-PASS-PAST-DEC  
          'The student was caught by the hand'.
- c. Ku mwune-ka                    tali-ka    kkuth  
          the octopus-NOM                leg-NOM                end  
          pwupwun-i                cokum-i                cala-ci-ess-ta.  
          part-NOM                bit-NOM                cut-PASS-PAST-DEC  
          'The octopus was cut on the end part of the leg a bit'.  
          (Heechul Lee personal communication)

PRCs have attracted considerable attention in major grammatical theories including **GB** (e.g. Choe 1987, Kim 1990, Yoon 1990, Lee 1992, Maling and Kim 1992), **LFG** (e.g. Hong 1992), and **Relational Grammar [RG]** (e.g. Gerdts 1991), since they deviate considerably from the canonical linking pattern for a transitive clause. However, none of them explain why "possessor raising" (or "possessor ascension") occurs in Korean only when the possessed item is inalienably possessed by the possessor.

The rest of this paper is organized as follows. Section 2 provides a summary of **Role and Reference Grammar [RRG]** (Van Valin and LaPolla 1997), a grammatical framework adopted in this paper. Section 3 proposes an entailment-based account of PRCs such as (1b) and extends this proposal to (1c). Section 4 shows that both PRCs and **adversative passive constructions [APC]** receive a natural treatment within the framework of RRG. Section 5 goes on to handle "possessor raising" from dative-marked NPs. Conclusions are drawn in Section 6.

## 2 Theoretical Framework

RRG is a version of parallel structure grammar with a multi-tiered lexical representation (cf. Bresnan 1994, Jackendoff 1997). I will focus on its linking theory, which includes verbal semantics, grammatical relation assignment, and case assignment within its scope.

### 2.1 Semantic structure

RRG assumes two levels of semantic representation, **logical structures [LS]** and **macroroles [MR]**, as an important component of verbal semantics. These two ingredients are the basis of the RRG theory of case assignment (Van Valin 1991; cf. Nakamura 1999).

LSs are based on the theory of verbal semantics à la Vendler (1967), which classifies verbs into four aspectual classes, **state**, **activity**, **achievement**, and **accomplishment** (cf. Dowty 1979):

Table 1: Classification of Verbs

| <u>Verb Class</u> | <u>Logical Structure</u>                                |
|-------------------|---------------------------------------------------------|
| STATE             | <b>predicate'</b> (x) or (x, y)                         |
| ACTIVITY          | <b>do'</b> (x, [ <b>predicate'</b> (x) or (x, y)])      |
| ACHIEVEMENT       | INGR <b>predicate'</b> (x) or (x, y)                    |
| ACCOMPLISHMENT    | BECOME <b>predicate'</b> (x) or (x, y)                  |
| CAUSATIVE         | 'P' CAUSE 'Q', where 'P' and 'Q' are<br>LSs of any type |

These decompositional analyses consist of a small number of primitive predicates (e.g. INGR, BECOME, CAUSE) which represent the causal-aspectual content of verb meaning and a set of constants in boldface plus prime (e.g. **dead'**, **open'**, **see'**, **do'**). 'INGR' represents instantaneous change, while 'BECOME' encodes change over some temporal span. There is no special indicator which marks state verbs, whereas all activity verbs contain the generalized activity predicate **do'**. The other classes of verbs are derived from state verbs and activity verbs.

It is important to note that thematic relations are not theoretical primitives in RRG, but are only shorthands for particular argument positions in the decompositional representations of verbs. They enable an explicit and motivated characterization of thematic relations as in Table 2:

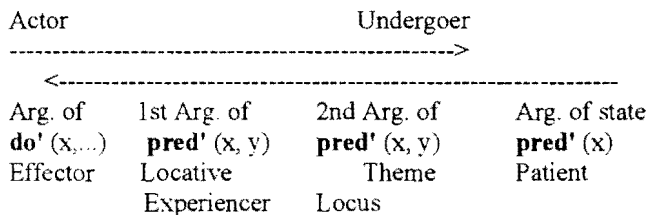
Table 2: Thematic Relation Assignment

|                       |                                             |            |         |
|-----------------------|---------------------------------------------|------------|---------|
| 1. STATE VERBS        |                                             |            |         |
| A. Locational         | <b>be-at'</b> (x, y)                        | x=locative | y=theme |
| B. Non-locational     |                                             |            |         |
| 1. State or condition | <b>predicate'</b> (x)                       | x=patient  |         |
| 2. Perception         | <b>see'</b> (x, y)                          | x=exp.     | y=theme |
| 3. Cognition          | <b>believe'</b> (x, y)                      | x=exp.     | y=theme |
| 4. Possession         | <b>have'</b> (x, y)                         | x=locative | y=theme |
| 2. ACTIVITY VERBS     |                                             |            |         |
| A. Uncontrolled       |                                             |            |         |
| 1. Single argument    | <b>do'</b> (x, [ <b>predicate'</b> (x)])    | x=effector |         |
| 2. Two arguments      | <b>do'</b> (x, [ <b>predicate'</b> (x, y)]) | x=effector |         |
|                       |                                             | y=locus    |         |
| B. Controlled         |                                             |            |         |
|                       | <b>DO</b> (x, [ <b>predicate'</b> (x,...    | x=agent    |         |

MRs are generalizations across the argument-types found with a variety of verbs and consist of **actor** and **undergoer**. Actor refers to a participant who has control over his/her action and prototypically affects or influences another participant, while undergoer is a participant who is causally affected or influenced by another participant and often undergoes a change of state. Actor and undergoer correspond to the two primary arguments of a transitive verb, either one of which may serve as the single argument of an intransitive verb. These generalized semantic roles subsume a number of LS arguments for syntactic purposes (e.g. passivization) and act as the interface between LSs and grammatical relations. Unlike Dowty's (1991) **proto-roles**, MRs are actual semantic relations which grammatical rules may refer to.

The association between these two levels of semantic roles is constrained by (4) and (5):

(4) **Actor-Undergoer Hierarchy [AUH]:**



(5) **Default Macrorole Assignment Principles [DMAP]:**

- a. Number: the number of macroroles which a verb takes is **less** than or equal to the number of arguments in its LS:
  1. If a verb has two or more arguments in its LS, it will take two macroroles.
  2. If a verb has one argument in its LS, it will take one macrorole.
- b. Nature: for verbs which take one macrorole:
  1. If the verb has an activity predicate in its LS, the macrorole is actor.
  2. If the verb has no activity predicate in its LS, the macrorole is undergoer.

(4) is adapted from a standard thematic hierarchy and indicates how likely a LS argument is to be realized as actor or undergoer. (5a) determines the number of macroroles a verb receives when there is no advance specification of the number of macroroles.

On the other hand, (5b) is designed to handle **split intransitivity** (Van Valin 1990; cf. Perlmutter 1978, Burzio 1986). It roughly states that if an intransitive verb has an activity predicate in its LS, e.g. **do'** (x, [**walk'** (x)]), **do'** (x, [**swim'** (x)]), the macrorole is an actor; otherwise, e.g. BECOME **melt'** (x), INGR **popped'** (x), it is an undergoer.

## 2.2 Grammatical relations and case assignment

RRG takes a very different approach to grammatical relations from GB/RG/LFG. It assumes no grammatical relation similar to direct or indirect object; it only refers to the notion of **syntactic pivot**. This is comparable to the traditional notion of subject in some respects, but it arises from a neutralization of macrorole distinctions for syntactic purposes.

For illustration, it is helpful to examine participial relative clauses in English, illustrated in (6a)-(6d):

- (6) a. The man buying the green hat is a friend of mine.
- b. The man falling down the stairs is a friend of mine.
- c. The man hit by the robber stayed in the hospital.
- d. The old man swimming in the heated pool is my father.

(6a) shows that when both an actor and undergoer arguments are available, the actor argument has priority for undergoing participial relativization. Furthermore, (6b)-(6d) show that the head noun can be an actor or undergoer argument if it is the single argument of an intransitive verb (S). These data indicate that those head nouns subsume the actor argument of a transitive verb (A) and S and thereby neutralize the semantic distinction between actor and undergoer:

- (7) NPs which may undergo participial relativization (A, S <---> O)
- |            |                                                    |
|------------|----------------------------------------------------|
| A:         | actors in transitive constructions                 |
| S:         | actors or undergoers in intransitive constructions |
| Derived-S: | undergoers in passive constructions                |

This grouping is captured by the hierarchy in (8a), which gives rise to syntactic accusativity. Likewise, (8b) is responsible for syntactic ergativity, which groups the undergoer argument of a transitive verb (O) and S to the exclusion of A. Finally, (8c) holds in Acehnese, an Austronesian language with no syntactic construction which involves either type of grouping (Durie 1987):

- (8) **Pivot Accessibility Hierarchy [PAH]:**
- |    |             |                   |                 |
|----|-------------|-------------------|-----------------|
| a. | Accusative: | Actor > Undergoer | (e.g. English)  |
| b. | Ergative:   | Undergoer > Actor | (e.g. Dyirbal)  |
| c. | Neither:    | No ranking        | (e.g. Acehnese) |

Given this consideration, we may assume the following set of case assignment rules, which refer to (8a) (Van Valin 1991):

- (9) Case Assignment Rules (Accusative):
- a. The highest-ranking macrorole argument receives NOMINATIVE case.
  - b. The other macrorole argument receives ACCUSATIVE case.
  - c. Non-macrorole arguments receive DATIVE as their default case.



### 3 Proposal: Entailment Condition & Semantic Coanalysis

#### 3.1 "Possessor raising" from accusative-marked NPs

The goal of this section is to explain why "possessor raising" has a semantic restriction, i.e. why it may apply in (1b, 2a), but not in (2b). This semantic restriction remains stipulated in the previous literature. As a point of departure, let's compare (1b) with (2b) in terms of logical structure. (10a) and (10b) are the LSs of (1b) and (2b), respectively:

- (10) a. [do' (John, ø)] CAUSE [INGR **caught'** (student's hand)]  
 b. [do' (dog, ø)] CAUSE [INGR **bit'** (student's bag)]

What distinguishes (10a) from (10b) is that (10a) entails another LS (11a), since we cannot say that John caught the student's hand, but he did not catch him/her. In contrast, (10b) does not entail (11b):

- (11) a. [do' (John, ø)] CAUSE [INGR **caught'** (student)]  
 b. [do' (dog, ø)] CAUSE [INGR **bit'** (student)]

Entailment as used here is semantic, since it is based on our knowledge that the hand is a permanent part of our body. It is also worth mentioning that the entailment holds at the level of argument structure. Since (10a) entails (11a), we may propose (12), a combination of (10a) and (11a), as the LS of (1b):

- (12) a. [do' (John, ø)] CAUSE [INGR **caught'** (student's hand)]  
 b. [do' (John, ø)] CAUSE [INGR **caught'** (student)]

(12) shows that both the possessor and possessum occupy the same argument slot, i.e. the argument of a one-place state predicate **caught'**.

(13) is a summary of my proposal in this paper:

- (13) a. **Entailment Condition:** PRCs such as (1b) establish a pairing of two or more LSs which are related through a chain of entailment.  
 b. **Semantic Coanalysis:** These coordinated LSs exist in parallel, and they are associated with the MR tier independently.



#### 4 Adversative Passive Constructions

We have seen that passivization of transitive PRCs with the help of *ci* yields multiple-nominative constructions such as (3b,c). However, a different situation arises when the transitive verb is combined with an inflectional suffix *hi*; it becomes possible to mark the possessum NP with either nominative or accusative case, as demonstrated by (17):

- |      |    |                                       |          |                     |
|------|----|---------------------------------------|----------|---------------------|
| (17) | a. | Haksayng-i                            | son-i    | cap-hi-ess-ta.      |
|      |    | student-NOM                           | hand-NOM | catch-PASS-PAST-DEC |
|      | b. | Haksayng-i                            | son-ul   | cap-hi-ess-ta.      |
|      |    | student-NOM                           | hand-ACC | catch-PASS-PAST-DEC |
|      |    | 'The student was caught by the hand'. |          |                     |

The contrast between (3) and (17) has generated much discussion. Constructions such as (17b) have traditionally been termed APCs. (17a,b) are apparently in free variation, but Kim (1990), Hong (1992), Maling and Kim (1992), and others observed that they involve different semantics. The question is how to capture their insights in RRG terms.

As a point of departure, it is important to notice that the morphological passive construction may function as an imperative when the possessum NP receives accusative case as in (17a) (Park 1994). This is demonstrated by the contrast between (18a) and (18b):

- |      |    |                                 |          |                |
|------|----|---------------------------------|----------|----------------|
| (18) | a. | John-eykey                      | son-ul   | cap-hi-ela.    |
|      |    | John-DAT                        | hand-ACC | catch-PASS-IMP |
|      | b. | *John-eykey                     | son-i    | cap-hi-ela.    |
|      |    | John-DAT                        | hand-NOM | catch-PASS-IMP |
|      |    | 'Get your hand caught by John'. |          |                |

The contrast between (18a) and (18b) suggests that the subject of (17b) is in control of his/her action, while the subject of (17a) is not. This hypothesis is further corroborated by (19), which indicates that adverbs such as *ilpule* 'on purpose' may occur in (17b), but not in (17a):

- |      |    |                     |            |            |          |
|------|----|---------------------|------------|------------|----------|
| (19) | a. | Haksayng-i          | John-eykey | ilpule     | son-ul   |
|      |    | student-NOM         | John-DAT   | on.purpose | hand-ACC |
|      |    | cap-hi-ess-ta.      |            |            |          |
|      |    | catch-PASS-PAST-DEC |            |            |          |

- b. \*Haksayng-i          John-eykey          ilpule          son-i  
 student-NOM John-DAT          on.purpose          hand-NOM  
 cap-hi-ess-ta.  
 catch-PASS-PAST-DEC  
 'The student on purpose got his hand caught by John'.

(19) shows that the student is construed as being in control of his/her action when the possessum NP receives accusative case. This, in turn, means that the inflectional suffix *hi* is semantically ambiguous: the suffix in (17a) serves the same function as *ci* in (3b), while it involves causative semantics in (17b). From this, we may propose (20) as the LS of (19a):

- (20) [do' (s, ø)] CAUSE [[do' (J, ø)] CAUSE [INGR **caught'** (hand)]

The AUH and DMAP dictate that the macrorole assignment proceeds in (19a) in the manner of (21). Application of the set of case assignment rules in (9) to (21) correctly yields the case frame in (19a):

- (21) [do' (s, ø)] CAUSE [[do' (J, ø)] CAUSE [INGR **caught'** (hand)]

|          |          |           |
|----------|----------|-----------|
| Effector | Effector | Patient   |
| Actor    | Non-MR   | Undergoer |

## 5 Extension

I have so far concentrated on "possessor raising" from accusative-marked NPs, but what is peculiar about Korean is that it may apply to dative-marked NPs as well. Both (22) and (23) involve an entailment relationship as found in (1b):

- (22) a. Nay-ka Yumi-uy phal-ey cwusa-lul noh-ass-ta.  
 I-NOM Yumi-GEN arm-DAT shot-ACC give-PAST-DEC  
 b. Nay-ka Yumi-eykey phal-ey cwusa-lul noh-ass-ta.  
 I-NOM Yumi-DAT arm-DAT shot-ACC give-PAST-DEC  
 'I gave Yumi a shot on the arm'. (Maling and Kim 1992)
- (23) a. John-i kongcang-uy chango-ey ka-ss-ta.  
 John-NOM factory-GEN storeroom-DAT go-PAST-DEC  
 b. John-i kongcang-ey chango-ey ka-ss-ta.  
 John-NOM factory-DAT storeroom-DAT go-PAST-DEC  
 'John went to the factory's storeroom'. (Gerds 1995)

For the purpose of illustration, let's consider whether or not (1) (3) may incorporate (22), whose LS is given in (24a):

- (24) a. [do' (I, ø)] CAUSE [INGR **have'** (Yumi's arm, shot)]  
 b. [do' (I, ø)] CAUSE [INGR **have'** (Yumi, shot)]

(24a) entails (24b), since we cannot say that 'I gave a shot on Yumi's arm, but I did not give it to Yumi'. Since (24a) and (24b) are linked with the macrorole tier independently, we may assume the following macrorole assignment: *Nay* 'I' and *cwusa* 'shot' in (22) receive an actor and undergoer status, since *Nay* 'I' is the highest-ranking argument (effector), while *cwusa* 'shot' is the lowest-ranking argument (theme). *Yumi-uy phal* 'Yumi's arm' in (24a) has no choice but to become a non-macrorole, since it cannot be actor or undergoer. This means that *Yumi* and *phal* 'arm' are associated with the same non-macrorole. This macrorole assignment renders both of them eligible to receive dative case as in (22b). An analogous account holds for (23b) as well.

## 6 Conclusion

I have argued in this paper that (13) accommodates not only "possessor raising" from accusative-marked NPs, but also "possessor raising" from dative-marked NPs. What is noteworthy about (13) is that it explains why PRCs such as (1b,c) have to bear multiple-nominative case frames under passivization with the help of *ci* 'become'. Combining a transitive verb with the inflectional suffix *hi* yields two different case frames as in (17), but I have shown that they involve different LSs and different macrorole assignments and therefore pose no problem for (13) (see Nakamura 1997 for an analogous, entailment-based account of light-verb constructions in Korean).

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# Why Typology Doesn't Matter to Grammatical Theory\*

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## 1. Introduction

Since the term 'typology' is not always used consistently, I should clarify at the very beginning how I plan to use it throughout this paper. Quite simply, it is the study of the distribution of grammatical elements in terms of their relative frequency (as in Table 1) and implicational relationships (as in Table 2):

| Word order | Languages |    |
|------------|-----------|----|
|            | Number    | %  |
| SOV        | 180       | 45 |
| SVO        | 168       | 42 |
| VSO        | 37        | 9  |
| VOS        | 12        | 3  |
| OVS        | 5         | 1  |
| OSV        | 0         | 0  |
| Total      | 402       |    |

Frequencies of basic constituency orders (Tomlin 1986: 22)

Table 1

|       | VSO | SVO | SOV |
|-------|-----|-----|-----|
| Prep  | 6   | 10  | 0   |
| Postp | 0   | 3   | 11  |

Correlations between word order and adposition order (Greenberg 1963)

Table 2

Given that definition, my title might seem nothing less than shocking. Indeed, it has implications that I feel obligated to disassociate myself from immediately. The first is the possible implication that there is no need for grammatical theorists to undertake the intensive investigation of as many languages as possible. Indeed there is such a need, both for an appreciation of the range of processes that the languages of the world can manifest and for testing candidate universals that have been mooted on the examination of one or a small number of languages. After all, no investigation of a single language, no matter how thorough, could answer the question of whether overt *Wh*-Movement is subject to locality conditions if that language happened not to have overt *Wh*-Movement! Second, I am not going to argue that typology lacks theoretical interest or importance. If typological generalizations are (in the relevant sense) 'real', then they are in need of explanation.

What will I be arguing then? Quite simply that it is not the job of grammatical theory per se to explain typological generalizations. Take the correlation in Table 2, a correlation that Japanese upholds and Persian violates. I will argue that the theory of UG does not encode the fact that the grammar of Japanese is in some sense more common, consistent, natural, desirable, etc. than the grammar of Persian. As a corollary, grammars are not evaluated more highly if they are more common or more consistent. That is, I am arguing against the idea that there exist markedness or other types of implicational relationships among parameter settings by which typological generalizations might be derived. Likewise, there is no correlation between how 'simple' a grammar is and how common it is. To summarize in one pithy slogan:

(1) UG characterizes the notion 'possible human language', not the notion 'probable human language'.

I will argue instead that many if not most typological generalizations fall out from a theory of language processing.

In pursuing such a line of argumentation, I will be going against quite the opposing trend in the community of generativist scholars. My sense is that typological generalizations have been increasingly regarded as relevant in the generativist community. The historical record, certainly, bears out such an idea. Most linguists would point to the publication of Joseph Greenberg's paper 'Some universals of language with special reference to the order of meaningful elements' (Greenberg 1963) as marking the birth of modern typological studies. The first reference to this paper that I am aware of in the generative literature is a passage from Chomsky's *Aspects of the theory of syntax* that can only be regarded as deprecatory:



Insofar as attention is restricted to surface structures, the most that can be expected is the discovery of statistical tendencies, such as those presented by Greenberg (1963). (Chomsky 1965: 118)

As the following more recent quote indicates, however, Chomsky now has taken a very different position on the intrinsic interest of typological generalizations:

There has also been very productive study of generalizations that are more directly observable: generalizations about the word orders we actually see, for example. The work of Joseph Greenberg has been particularly instructive and influential in this regard. *These universals are probably descriptive generalizations that should be derived from principles of UG.* (Chomsky 1998: 33; emphasis added)

It is the last sentence of the more recent Chomsky quote that I will be disputing here.

The paper is organized as follows. Section 2 outlines the ‘Greenbergian correlations’, the most robust cross-linguistic generalizations put forward in the literature. In §3, I outline why it has come to be expected among many generative linguists that UG might play a role in the explanation of these correlations. Section 4 demonstrates that this expectation has not been fulfilled. Section 5 argues that the correlations have an extragrammatical explanation, and §6 is a brief conclusion.

## 2. The Greenbergian correlations

The central presupposition underlying what follows is that there do indeed exist valid typological generalizations in need of explanation. Such is not self-evidently true. As I argue at length in Newmeyer (1998a: ch. 6), it is by no means obvious that the cross-linguistic generalizations that can be gleaned from any sample, no matter how large, of presently-existing languages are robust enough to be regarded as brute facts in need of explanation. And worse, many such generalizations that have appeared (and are cited) in the literature are not even based on large samples. I do not believe, however, that there is any dispute that the most uncontroversially reliable typological generalizations are a subset of those that have grown out of the seminal Greenberg paper alluded to above. While the paper proposed several dozen typological universals, those that immediately attracted the greatest deal of attention and inaugurated the most extensive research program are the ones that correlate the basic order of subject, object, and verb with other grammatical features. Even though Greenberg worked with a convenience sample of only 30 languages, some of the correlations that he noted seemed too striking to be accidental. Consider, for

example, the correlation between word order and adposition order in Table 2 above. Greenberg's sample contained 6 languages with VSO order, all of which were prepositional; 13 SVO languages, which were overwhelmingly prepositional; and 11 SOV languages, all postpositional. Such correlations, it was widely agreed, could not be due to chance.

The most exhaustive survey of typological correlations coming out of the Greenberg paper is Dryer (1992). Based on a study of 625 languages, Dryer found the statistically significant correlations of VO and OV order that are represented in Table 3.

| VO correlate                       | OV correlate                       |
|------------------------------------|------------------------------------|
| adposition - NP                    | NP - adposition                    |
| copula verb - predicate            | predicate - copula verb            |
| 'want' - VP                        | VP - 'want'                        |
| tense/aspect auxiliary verb - VP   | VP - tense/aspect auxiliary verb   |
| negative auxiliary - VP            | VP - negative auxiliary            |
| complementizer - S                 | S - complementizer                 |
| question particle - S              | S - question particle              |
| adverbial subordinator - S         | S - adverbial subordinator         |
| article - N'                       | N' - article                       |
| plural word - N'                   | N' - plural word                   |
| noun - genitive                    | genitive - noun                    |
| noun - relative clause             | relative clause - noun             |
| adjective - standard of comparison | standard of comparison - adjective |
| verb - PP                          | PP - verb                          |
| verb - manner adverb               | manner adverb - verb               |

Correlation pairs reported in Dryer (1992)

Table 3

In the remainder of this paper, I will regard the generalizations expressed in Table 3 as facts in need of explanation and refer to them as 'the Greenbergian correlations'.

### 3. Typological generalizations and generative grammar

The central goal of generative grammar from its inception has been to characterize the notion 'possible human language'. The vocabulary of theoretical primitives, conventions for formulating rules, etc. of the theory are chosen with the view in mind of excluding from the very possibility of formulation any

process outside of the definition of 'natural language'. For example, it would be just as simple, if not more so, for a language to form questions by regularly inverting the order of all the words in the corresponding declarative than by fronting some particular constituent of the declarative. UG, however, prohibits the former option by its failure to provide a mechanism for carrying out such an inversion operation. That is, the following rule type, while perhaps simple and elegant in the abstract, is not allowed by UG:

$$(2) \quad W_1 - W_2 - W_3 - \dots - W_n \quad \longrightarrow \quad W_n - \dots - W_3 - W_2 - W_1$$

The question naturally arises, then, about the theoretical treatment of grammatical processes that are not fully excluded from UG, but rather are, in some pretheoretical sense 'unnatural', that is, unlikely to occur in the grammars of very many languages. In phonology typology has acted as a guide to theory construction from early on. In the earlier chapters of *The Sound Pattern of English* (Chomsky and Halle 1968), the naturalness of a phonological rule was considered essentially as the inverse of the number of distinctive feature specifications needed to formulate it. That is, the design of UG provided an evaluation metric such that natural processes (say, those embodying natural classes of elements) were 'easier' to state, and hence valued more highly, than unnatural ones. The problem, addressed in chapter 9 of that book, was that feature counting alone did not suffice to distinguish typologically natural processes from typologically unnatural ones. For example, all other things being equal, no more feature specifications are required for a language to unround all rounded back vowels than to unround all rounded front vowels. Yet, the former process is extremely rare cross-linguistically, while the latter relatively common. Hence Chomsky and Halle introduced a set of *marking conventions* into the theory, which tied naturalness to evaluation. The natural unrounding process would be cost free in terms of the metric, while the unnatural one would be counted. These conventions were further developed in Kean (1975).

Now, as any generative theoretician would freely acknowledge, typological distribution cannot serve *in and of itself* as a factor determining the principles of UG and the relative markedness of rules and principles provided by UG. Typological generalizations belong to the domain of E-language, that is, aspects of language 'understood independently of the properties of the mind/brain' (Chomsky 1986: 20). Our minds/brains, after all, have no clue as to the typological status of any aspect of any element of our mental grammars. The relationship between typological generalizations and I-language, 'some element of the mind of the person who knows the language' (p. 22), is necessarily quite indirect.

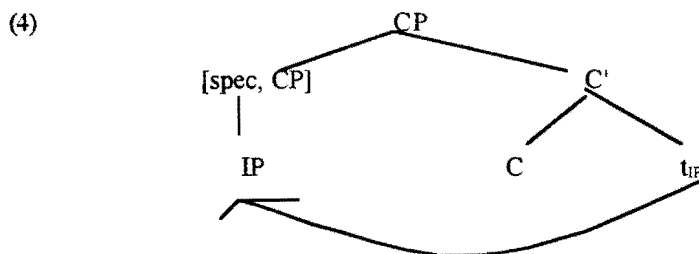
Nevertheless, there has been a guiding assumption that there is no significant gap between the notions '*typologically significant generalization*' and

'linguistically significant generalization'. That is, generative grammarians have generally taken it for granted that if investigation of the grammatical properties of a reasonably large set of languages leads to the discovery of a pervasive and profound structural pattern in those languages, then there is probably something mentally 'preferable' about that pattern, and this mental preference should be reflected by UG being organized to 'favor' that pattern. As a case in point, consider the treatment of Chinese phrase structure in Huang (1994). Oversimplifying a bit, Chinese is consistently head-final, except for the rule expanding  $X'$  to  $X^0$ . If the head is verbal (i.e. a verb or a preposition), then the head precedes the complement. Huang captured this situation by a phrase-structure schema that complicates the X-bar schema somewhat:

- (3)
- |    |      |                   |                             |
|----|------|-------------------|-----------------------------|
| a. | $XP$ | $\longrightarrow$ | $YP X'$                     |
| b. | $X'$ | $\longrightarrow$ | $YP X'$                     |
| c. | $X'$ | $\longrightarrow$ | c'. $X^0 YP$ iff $X = [+v]$ |
|    |      |                   | c". $YP X^0$ otherwise      |

So, deviation from typological naturalness is reflected by a more complex grammar.

The appeal to grammar-complicating extra statements to capture typological rarity is particularly developed in work based on Kayne's 'antisymmetry hypothesis' (Kayne 1994). Kayne develops a very restrictive theory of Universal Grammar allowing movement only to the left. The book contains discussion of a number of typological generalizations that appear to follow from the hypothesis. For example, in general COMP-final languages do not allow *wh*-Movement. Kayne provides an explanation: final complementizers arise from movement of IP into [spec, CP], thereby denying *Wh*-Movement a landing site.<sup>1</sup>



Now, some languages, like Vata, do have final COMP with *Wh*-Movement to the left. Kayne sketches some remarks on how such languages will have more complex grammars in this regard.

Cinque (1996) sets out to explain a large set of typological generalizations in Kayne's framework. For example, Kayne predicts that no language will have both N-Dem and Num-N. But some languages, including Berber, Hebrew, Welsh, and Zapotec, do have this correlation. Cinque posits an extra movement of demonstratives for these languages.

Kayne and Cinque are hazy on the formal mechanism for evaluating grammars so that more typologically grammars manifest themselves as more complex. In general, one has posited implicational relations among parameter settings for this purpose. For example, Travis (1989: 271) calls attention to eight possible orderings of the verb, direct object NP, complement PP ('PP<sub>1</sub>'), and adjunct PP ('PP<sub>2</sub>')

(5) Word orders:

- a. PP<sub>2</sub> PP<sub>1</sub> NP V
- b. PP<sub>2</sub> PP<sub>1</sub> V NP
- c. PP<sub>2</sub> NP V PP<sub>1</sub>
- d. PP<sub>2</sub> V NP PP<sub>1</sub>
- e. PP<sub>1</sub> NP V PP<sub>2</sub>
- f. PP<sub>1</sub> V NP PP<sub>2</sub>
- g. NP V PP<sub>1</sub> PP<sub>2</sub>
- h. V NP PP<sub>1</sub> PP<sub>2</sub>

Travis proposed three separate parameters to allow for the possibilities in (5a-h), which she designated 'headedness', 'direction of theta-role assignment', and 'direction of case assignment'. If these three parameters were independent, then all eight orderings would be predicted to exist, by virtue of the combinations of settings illustrated in Table 4.

|    | HEADEDNESS | THETA | CASE  | LANGUAGE          |
|----|------------|-------|-------|-------------------|
| a. | final      | left  | left  | Japanese          |
| b. | final      | left  | right | Chinese (future)  |
| c. | final      | right | left  | *                 |
| d. | final      | right | right | Chinese (present) |
| e. | initial    | left  | left  | Kpelle (past)     |
| f. | initial    | left  | right | *                 |
| g. | initial    | right | left  | Kpelle (present)  |
| h. | initial    | right | right | English           |

Combinations of the headedness, direction of theta-role assignment, and direction of case assignment parameters (Travis 1989)

Table 4

However, no language manifesting (c) and (f) appears to exist, nor is there evidence that such a language ever existed. Travis therefore proposed implicational relations among these 3 parameters whose effect is not only to predict (c) and (f) impossible, but to characterize the unmarked 'expected' situations to be (a) and (h), where the three parameters conspire to keep *all* complements on the same side of the head.

Many linguists have felt there to be a degree of circularity in the claim that some feature of grammar (a violation of X-bar, a special parameter setting) is more 'marked' than another. The problem is that markedness is concluded from cross-linguistic rarity, but then cross-linguistic rarity is explained in terms of markedness. With this problem in mind, David Lightfoot has suggested that claims of markedness require independent motivation:

For specific proposals concerning marked values to entail testable claims, these claims will have to hold in an 'external' domain, a domain other than that of the distribution of morphemes or grammatical well-formedness. Claims to explanatory adequacy will have to be grounded in such domains. Natural candidates for such a domain wherein markedness proposals make empirically testable claims are language change and acquisition. (Lightfoot 1979: 76-77)

What is the empirically testable claim about language acquisition that follows from a markedness proposal? The null hypothesis is that '[t]he "unmarked case" can be understood as the child's initial hypothesis about language (in advance of any data) ...' (Williams 1981: 8). In terms of grammatical development, '[w]e would expect the order of appearance of structures in language acquisition to reflect the structure of markedness in some respects...' (Chomsky 1981: 9).

If the order of acquisition is a function of the markedness of the construct being acquired and claims of markedness are based on part on cross-linguistic frequency, then we would naturally expect that early-acquired constructs would be cross-linguistically frequent. And indeed, two prominent specialists in the field of language acquisition have drawn just such a conclusion:

[I]n determining which notions are encoded in a language's morphology, the child is faced with a formidable search problem ... [B]y imposing a weighting on the child's hypotheses, one could account for the large disparities in the prevalence of various grammatical encodings in the world's languages, and in the speed of acquisition of various encodings by children. (Pinker 1984: 168-171)

One intriguing possibility is that the relative accessibility for children of alternative schemes for partitioning meaning in a given conceptual domain is correlated with the *frequency with which these schemes are instantiated in the languages of the world*. ... It is plausible that relative frequency is correlated with 'ease' or 'naturalness' for the human mind. (Bowerman 1985: 1306).

So, we have arrived at the following hypotheses linking typological generalizations to aspects of I-language:

- (6) a. Cross-linguistically frequent properties of language are reflected by correspondingly simple (unmarked) properties of grammars.
- b. Cross-linguistically frequent properties of language are acquired early by the child.
- c. Cross-linguistically frequent properties of language are diachronically stable.

If (6a-c) were correct, then typology would indeed be relevant to grammatical theory in two complementary ways. First, we could appeal to grammatical theory to explain the typological distribution of any particular feature of language. Second, the typological distribution of a feature of language would serve as a reliable heuristic for the correct grammatical analysis of that feature. However, as we will see in the following section, (6a), at least, is not correct (for reasons of space there will be no discussion of language acquisition or language change).

#### **4. The failure of UG to cast light on typological patterning**

In this section I will question the assumption driving the marriage of grammatical theory and language typology, namely that optimal grammars necessarily reveal profound cross-linguistic patterns of the distribution of grammatical elements.

Let us begin by looking more deeply at the Kayne and Cinque attempt to capture typological generalizations. If the generalizations that they set out to explain were exceptionless, then we would have no problem saying that their accounts were successful. But they are not exceptionless. For example, as noted, some languages, despite the null hypothesis provided by Kayne's theory, do allow nouns to precede demonstratives and number words to precede nouns. As noted, this typologically dispreferred ordering requires that demonstratives undergo an extra movement. Now, that may very well be the correct analysis. But Cinque provides no explanation for why only 10% of the world's languages (let us say) have this extra movement. Nor does it follow — as far as we are told — from any other facts about the languages that have it. It could just as easily have been the case that 80% of the world's languages have the extra movement, thereby vitiating the typological generalization entirely.

Now Kayne and Cinque might reply that the more 'extra movements', the greater the degree of typological rarity. So the extra movement of demonstratives might be appealed to to explain why the dispreferred correlation

is so rare. But such a tack would go against Kayne's own assumptions. Kayne has all languages start out with specifier-head-complement order. Complement-head order derives from the movement of the complement to the left over the head. If so, then SOV languages have more complicated grammars than SVO languages. But typologists agree that complement-head order is more frequent in the world's languages than head-complement order. So for Kayne, extra movement correlates with a *more* common grammar.

The more deeply one looks, the more problematic is the idea that there exists a simplicity metric such that the 'simpler' grammar is the more cross-linguistically frequent one. A word of caution is in order, however. There is no theory-independent way of characterizing one proposed grammar of a language as being 'simpler' than another. However we can compare two grammars (or at least corresponding subparts of two grammars) in terms of simplicity, so long as both are formulated within the same set of theoretical assumptions. The more complex grammar will have an extra rule of some sort, the same number of rules, but with more of them 'marked', and so on. And by hypothesis, the more complex grammar will represent a cross-linguistically rarer state of affairs.

For one reasonably well-studied phenomenon, this prediction is false. The simpler grammar is far rarer cross-linguistically than the more complex one. The phenomenon is 'preposition-stranding', illustrated in (7a-b) for English. In (7a) *Wh*-Movement has extracted and fronted the object of *to*, leaving the bare preposition behind. In (7b) NP-movement has taken *Mary*, the underlying object of the preposition *to*, and moved it into subject position, stranding the preposition:

- (7) a. Who did you talk to?  
b. Mary was spoken to.

Stranding is extremely rare cross-linguistically. In fact, it is attested only in the Germanic family (though not in German itself) and in some varieties of French. Surely, then, if a typologically rare state of affairs were to be represented by a more complex grammar, we would expect a grammar with stranding to be vastly more complicated in relevant respects than one without. Such is not the case, however. In GB terms, grammars without stranding can be captured by generalization (8a), those with stranding by (8b):

- (8) a. NON-STRANDING LANGUAGES: The lexical categories N, V, and A are proper governors. The lexical category P is not a proper governor.  
b. STRANDING LANGUAGES: All four lexical categories are proper governors.



When P is not a proper governor, extraction of its object is impossible, since the resultant trace would be ungoverned. A properly governing preposition, however, allows extraction and may therefore occur 'stranded' on the surface.

It is difficult to imagine how a grammar incorporating (8a) could be regarded as simpler than one incorporating (8b). Aside from the pure (and nonexplanatory!) stipulation that it is the unmarked state of affairs in UG for P not to properly govern, there is no natural reason why P should be exceptional in this respect. Like other lexical categories, it assigns theta-roles, Case, and along with N, V, and A, it can be characterized by the distinctive features  $\pm N$ ,  $\pm V$ .

To be sure, there is no dearth of analyses of stranding that *do* complicate the grammars of languages that have it. For example, in one popular approach (Hornstein and Weinberg 1981), P is never a proper governor. In languages that allow stranding, prepositions have the ability to overcome this defect by undergoing 'reanalysis' with an adjacent verb, thereby creating a complex verb that can properly govern the trace of movement, as shown in (9a-b):

- (9) a. You talked<sub>PP</sub> [to who] > You<sub>v</sub> [talked to] who > Who<sub>i</sub> did you<sub>v</sub> [talk to] e<sub>i</sub>?  
 b. e was spoken<sub>PP</sub> [to Mary] > e was<sub>v</sub> [spoken to] Mary > Mary<sub>i</sub> was<sub>v</sub> [spoken to] e<sub>i</sub>

The reanalysis approach to preposition stranding is riddled with problems, however. A number of tests show that, in general, the reanalyzed material does not behave as a single lexical item. For example, reanalysis would have to be assumed to create utterly implausible lexical items, such as *walk across Europe in* and *pay twice for*, as in (10a-b):

- (10) a. Which shoes did you [walk across Europe in]? (Jones 1987)  
 b. Which of the two knives did you [pay twice for]? (Inada 1981)

Furthermore, as noted in Koster (1986), Gapping does not treat the verb-preposition complex as a verb (11a-b), nor does Heavy NP Shift (12a-b). Even more problematically, reanalysis demands the possibility of Extraposition out of a lexical item, as in (13) (Levine 1984), and, as pointed out by Hornstein and Weinberg (1981), in the very article in which reanalysis was first proposed, it demands mutually incompatible analyses, as in (14a-b), where *Wh*-Movement and Passive have applied in the same sentence:

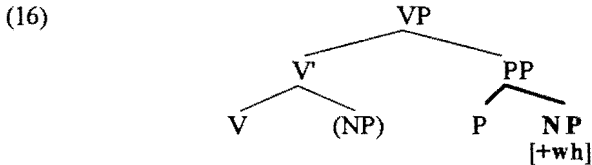
- (11) a. \*John looked at Mary and Bill \_\_\_ Sue.  
 b. John looked at Mary and Bill \_\_\_ at Sue.  
 (12) a. John looked at [the woman he loved] very often.  
 b. John looked very often [at the woman he loved]

- c. \*John looked at very often [the woman he loved].
- (13) What did you [talk to that guy \_\_\_\_ about] \_\_\_\_ who was here yesterday?
- (14) a. Which problems has Harry been [[talked to] e about] e?  
b. Who would you like to be [[sung to] e by] e?

Let us therefore abandon a reanalysis approach to stranding and adopt in its place the proposal first put forward, I believe, in Jones (1987) that P is a proper governor in English and other stranding languages. If such is correct, it is predicted that within V', V and P need not be adjacent. As the sentences of (15) illustrate, this is indeed the case:

- (15) a. Who did you give all those books about golf to?  
b. Which burner did you leave the pot on?

The most interesting prediction of this analysis is that stranding should be possible with the extraction of NP from PP *adjuncts* to VP, i.e. in situations like (16):



Extraction of the bold-faced *wh*-phrase leads to the crossing of only one barrier, the PP itself. As predicted, then, sentences like (17a-d) are grammatical:

- (17) a. Which shoes did you walk across Europe in?  
b. Which ball park did Ruth hit the most home runs in?  
c. Which knife shall we use to cut the turkey with?  
d. Which red-headed man is Mary standing beside?

To summarize, preposition stranding does not pay for its rarity by requiring complex rules for its formulation in grammars that license it. Even within the same general framework of theoretical assumptions, the more complex grammar is not necessarily the more cross-linguistically rare grammar.

Kayne's ingenious explanation of why COMP-final languages tend to lack *Wh*-Movement is quite exceptional. In general, grammar-internal explanations of typological correlations have been pure stipulation. Let us consider another Greenbergian word order correlation. It has long been known that verb-final languages are much less likely to exhibit *Wh*-Movement than VO languages, but

much more likely to have sentence-final question particles. Table 5 from Dryer (1991: 455-466) provides the data supporting such an idea:<sup>2</sup>

|                   | V-final | SVO | V-initial |
|-------------------|---------|-----|-----------|
| <i>Wh-in situ</i> | 71      | 42  | 16        |
| Final Q particles | 73      | 30  | 13        |

Proportion of languages with *wh-in situ* and final question particles,  
by word order type (Dryer 1991)  
Table 5

The root of the typological correlation between verb finality, lack of *Wh*-Movement, and final question particles has been on the generative research agenda for almost three decades. But let us ask how this correlation might be handled within the Minimalist Program (MP). I can think of no nonstipulative means for doing so. Basic clause structure is assumed to be universal, with differences in surface order due to differences in the strength of particular features. Now, the problem is to explain why a weak *wh*-feature on C (preventing overt *Wh*-Movement) would correlate with whatever feature or combination of features are responsible for surface SOV order. None come to mind. The problem of the typological associates of *Wh*-Movement is particularly difficult to explain vis-à-vis surface VSO languages. As Table 5 shows, verb-initial languages are far more likely to have *Wh*-Movement than SVO languages (not to mention verb-final languages). Why should this be? Since Emonds (1980), the predominant position has been that such languages 'start out' as verb-medial, but have a raising of the verb (for a recent account, see McCloskey 1996). Let us say, following the account presented in Marantz (1995: 372-373), that such movement is driven by strong V-features of T and/or AGR in the context of weak N-features for these functional heads. The question then is why this constellation of features would correlate *even more strongly* with strong *wh*-features on C (thereby guaranteeing overt *Wh*-Movement) than with the alternative feature strengths associated with T and AGR that 'preserve' SVO order. I cannot imagine how such a correlation might be derived, given any mechanisms accepted as intrinsic to generativist theory.

In short, we have a robust typological generalization that seems not to follow from independently motivated principles of UG.

## 5. Explaining the Greenbergian correlations

If grammatical theory per se cannot explain the Greenbergian correlations, then what can? The answer is a theory of language processing. That is, the theory of

grammar does not specify in any sense what correlates with what. But we still need to explain the fact that some grammars are more common than others and that some correlations are more common than others. The reason is, in a significant number of cases, that such grammars are easier to process. This idea has been developed by Hawkins (1994) in a comprehensive theory of the influence of processing considerations on grammar. The central parsing principle that Hawkins proposes is called 'Early Immediate Constituents' (EIC) and is stated as follows (p. 77):

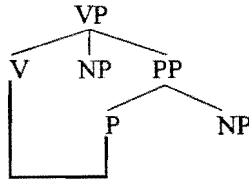
(18) Early Immediate Constituents (EIC)

The human parser prefers linear orders that maximize the IC-to-non-IC ratios of constituent recognition domains (CRD).

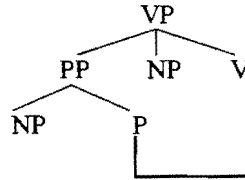
A 'constituent recognition domain' for a particular phrasal mother node M consists of the set of nodes that have to be parsed in order to recognize M and all of the ICs of M.

So consider how Hawkins derives the result that VO languages to be prepositional and OV languages to be postpositional. There are four logical possibilities, illustrated in (19a-d): VO and prepositional (19a); OV and postpositional (19b); VO and postpositional (19c); and OV and prepositional (19d):

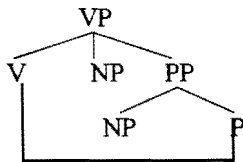
(19) a.



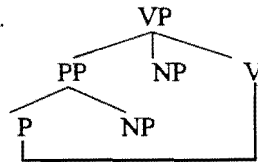
b.



c.



d.



Assuming that both NPs are two words long, in (19a) and (19b), the two typologically preferred structures, only 4 words have to be processed in order to identify the constituents of VP. But in (19c) and (19d), 6 must be processed. Furthermore, the longer the object of the prepositional phrase gets, the more

processing will be necessary for (19c) and (19d), while that for (19a) and (19b) will remain the same. Analogous demonstrations can be made for other Greenbergian correlation pairs.

The correlation between verb-finality and lack of *Wh*-Movement also lends itself to a parsing explanation. Hawkins (1995) notes that heads, in general, are the best identifiers of their subcategorized arguments. If one hears the verb *give*, for example, one is primed to expect two associated internal arguments, one representing a recipient and the other an object undergoing transfer. On the other hand, a human NP might or might not be a recipient and an inanimate NP might or not be an object undergoing transfer. Hence, if arguments precede their heads, as they do in SOV languages, extra cues are useful to identify their thematic status. Such can be accomplished by keeping them contiguous to the head (that is, by restricting their movement possibilities) and / or by endowing them with case marking that uniquely identifies their thematic role or helps to narrow down the possibilities.

In other words, the Greenbergian correlations are not at root facts provided by grammars. They are encoded in grammars only to the extent that to whatever degree the properties of grammars are a response to the pressures exerted by the mechanisms of language processing.

It is generally assumed, I believe, that parsing-dictated orderings of elements are a feature of surface order, rather than deep order. (One thinks of parsing-dictated rightward movements of heavy objects and relative clauses.) Therefore, if typological generalizations have a parsing motivation, then we should expect more typological consistency at the surface level than at the deep level. Such an expectation, is in direct contradiction, of course, to the dominant idea that it is at an abstract level of structure at which X-bar principles or parameters of head directionality are stated. In fact, the parsing prediction is correct. The Greenbergian correlations are more robust at surface levels than at deep levels of grammar.

Let us begin with German and Dutch. These languages are typologically peculiar in two different ways. First, while virtually all generativists agree that they are underlyingly head-final in VP (see Bach 1962; Koster 1975; Bennis and Hoekstra 1984), they are uncontroversially head initial in other phrases. Second, a 'V2 rule' is responsible for VO order in main clause declaratives, while leaving intact OV order in embedded sentences. What this means is that in German and Dutch we find greater typological consistency at the surface, where VO order dominates by far in actual discourse (given the frequency of main clause declaratives), than at D-structure, where OV order clashes with post-head complements for N, P, and A.

There is another respect in which typological generalizations seem to be more robust on the surface than at a deep level. If we eliminate reorderings of elements whose principal function seems to be to place 'heavy' elements at the

periphery of the clause, it is my impression that deeply inconsistent languages overwhelmingly allow variant surface order that fulfill the Greenbergian correlations, while deeply consistent languages much less frequently allow variant surface orders that violate them. For an example of the former case, consider Persian. That language is deeply inconsistent in the same sense that German is — of the four major phrasal categories, only VP is head-final. However, on the surface Persian allows a number of reorderings of S, V, and O, subject to purely grammatical conditions. For example, a direct object followed by the specificity marker *râ* can move freely within the verb phrase (for full discussion, see Karimi 1989). In other words, Persian *does* have head-initial VPs. Japanese illustrates the latter case. While that deeply consistent SOV language does indeed manifest surface orders of OSV and SVO, these orders occur, I believe, only as a result of ‘scrambling’, where it is not clear that we have an instantiation of Move- $\alpha$ . A number of linguists have put forward arguments, quite strong ones in my opinion, that the repositioning that we find in scrambling lacks many of the hallmarks of a transformational rule (see Lee 1992; Bayer and Kornfilt 1994; Kiss 1994; Neeleman 1994).

The above discussion has presupposed an approach to syntax containing a level of D-structure over which grammatical generalizations can be formulated. The recent trend in principles-and-parameters work toward ‘minimalist’ models lacking such a level fails as well to provide a nonstipulative theory-internal explanation of the Greenbergian correlations. The MP, which provides no ‘basic order’ among grammatical elements or would have all languages being underlyingly SVO (Kayne 1994), must capture cross-categorical generalizations (and exceptions to these generalizations) by means of relations holding among feature strengths. So the correlations would presumably be captured in terms of the strength of the features that check object case. Under one realization of this possibility, if the case features of N, V, A, and P are weak, we would get head-complement order, if strong, then complement-head order. Marked inconsistency might be derivable by allowing the features associated with the functional projections of these categories to differ (e.g. a strong feature for N, but a weak one for V).

There are two problems with such an approach for our concerns, one identical to those faced by models containing a level of D-structure and one unique to the structure of minimalism. As far as the former is concerned, if any argument for a D-structure order of elements in GB carries over to an argument for a derivationally-prior order in the MP, as I assume that it does, then the MP fails as well to capture the generalization that surface order, rather than deep order, is the best predictor of the Greenbergian correlations. But another problem arises in the MP as a result of its inability to distinguish base orders of grammatical elements from transformationally-derived orders. Consider a language which manifests all the Greenbergian correlations with OV order and to which a

principled GB account would, indeed, assign a SOV D-structure order. Let's say that this language allows SVO order as a marked variant under extremely restrictive grammatical conditions. In GB the marked order would be transformationally derived and hence theoretically distinguishable from the basic SOV order. But there is no mechanism internal to the MP (novel stipulations aside) that would distinguish the feature-driven SOV order from the equally feature-driven SVO order. Hence the MP would fail to capture the 'essential SOV-ness' of this language.

## 6. Conclusion

I have argued that typological generalizations are not encoded in grammars, either directly or indirectly. That is, there is no set of principles or parameters internal to a theory of UG from which cross-linguistic facts can be derived. It is not surprising, therefore, that attempts to provide UG-internal explanations for them have been failures. Nor is it surprising that there appears to be no correlation between the typological status of a grammatical feature and the order of appearance of that feature in child language. The task of explaining the most robust typological generalizations, the 'Greenbergian correlations', falls not to UG, but to the theory of language processing. In short, it is the task of grammatical theory to characterize the notion 'possible human language', but not the notion 'probable human language'. In this sense, then, typology does not matter to grammatical theory.

## Notes

\*Portions of this paper have appeared in Newmeyer (1998b) and are reprinted with permission.

<sup>1</sup> But see Bayer (1999) for a critique of Kayne's analysis.

<sup>2</sup> The figures in the 'Final Q particles' row give the proportion of final question particles out of the total number of final and initial particles. Languages with no question particles at all, or those whose particles occur nonperipherally, are not counted.

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# Two Levels of Depictives in English

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## 1. Introduction

Depictive Predication Constructions (DPCs) involve two types, Subject Oriented Depictive (SOD) and Object Oriented Depictive (OOD), distinguished by which NP is predicated in the syntactic structure. It is a SOD if the subject of a depictive predicate is a sentential subject; it is an OOD if the subject of a depictive predicate is a direct object. However, I argue that this distinction is not sufficient in that it does not reflect how much they differ in terms of theta role distinctions. In this paper, instead of the old distinctions, I call the former an Agent-Oriented Depictive (AOD) and the latter a Theme-Oriented Depictive (TOD) because the distinction can clearly differentiate the two types of depictives of English. The distinctive properties between AODs and TODs will be explained by Event-based theory.

## 2. Depictive Predication Construction

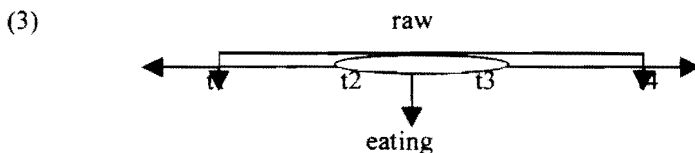
### 1.1. Depictive predicates

A Depictive predicate (D-predicate) describes the state of its predication subject at the time that an event caused by the matrix verb occurs. It has been believed that the Depictive Predication Construction (DPC) involves two types, namely, the Subject-Oriented Depictive (SOD) and the Object-Oriented Depictive (OOD), as illustrated in (1)-(2). For example, (1a) is a SOD in that the predicate *drunk* is predicated of the subject NP *Tom*, while (2a) is a OOD in that the predicate *fresh* is predicated of the object NP *my beef*. I use the convention of underlining the predication subject and italicizing the depictive predicate.

- (1) a. Tom sat on the bench *drunk*.  
b. Mary sang a song *tired*. (SOD)
- (2) a. Tom ate the beef *raw*.

- b. Mary brought her food *cold*. (OOD)

The DPC indicates that the event denoted by the matrix predicate is contemporaneous with the state denoted by the D-predicate. Take (2a) as an example. It denotes that the event of eating is contemporaneous with the state of rawness; the state of rawness holds for the whole eating process. Suppose that eating occurs from  $t_2$  to  $t_3$  and the state of rawness holds true from  $t_1$  to  $t_4$ , as illustrated in (3). Consequently, in (2a), there is no instance that the beef was not raw, when Tom ate the beef.



D-predicates have been analyzed as adjuncts in that they never contribute to the thematic structure of the verb. For example, in (2a), there is no thematic relationships between the matrix predicate, *ate* and the D-predicate, *raw*. However, their occurrences are not entirely free in that only certain type of predicates license the DPC, to which I will now turn.

## 2.2. Two types of depictive predicates.

### 2.2.1. agent-oriented depictives (AOD)

It has long been recognized that there is a selectional restriction between an adjunct (i.e., adverb) and an argument; in particular, some adverbs (such as intentionally, reluctantly, willingly) may only construe those subjects that can bear agentivity (Jackendoff, 1972; McConnell-Ginet, 1982; Zubizarreta 1987). Consider the following examples from Wyner (1998:337).

- (4) a. The antibiotic killed the infection.  
 b. \* The antibiotic reluctantly killed the infection  
 c. The scientist reluctantly killed the infection

According to Wayer, the sentences in (4b) and (4c) show that the adverb *reluctantly* requires an argument that bears an agentive thematic role. That is, (4b) is ruled out because the subject does not support the thematic restriction, while (4c) is acceptable because the restriction holds. Given this, consider the sentences in (5).

- (5) a. John met his boss *drunk*.  
 b. John left the room *angry*.  
 (6) a. \* John feared the lion *drunk*.  
 b. \* John knew Mary *young*.  
 c. \* John owned the house *young*.

The sentences in (5) are fine because the predication subjects have agentive thematic roles. In contrast, the ungrammaticalities of the sentences in (6) can be simply explained in terms of the distinction between Individual Level Predicates (ILPs) and Stage Level Predicates (SLPs), following Drubig (1991) and Rapoport (1992). That is, they are unacceptable because the matrix verbs are ILPs. However, there exists the possibility that (6a)-(6c) are bad because the subjects of each D-predicate are not agents. This explanation is possible because the subjects of ILPs tend to be non-agents. In other words, we can say that SODs occur with an agent subject. A long noted test to check agentlike arguments in English is the frame 'what X did..'( see e.g. Jackendoff, 1990). An argument that can stand in X position in this frame is the doer of action. Let us paraphrase the sentences of (6) with this formula. For ease of understanding, D-predicates are omitted.

- (7) a. \* What John did was to fear the lion.  
 b. \* What John did was to know Mary.  
 c. \* What John did was to own the house.

The subjects of (7) are not the agents. Their non-agentivity is also confirmed by Dowty's (1991) proto-agent role test. Dowty argues that the Agent and the Theme (Patient) are not discrete roles but role types, which have a prototypical member and other members that vary from the proto-type; the more proto-agent properties a particular thematic role has, the higher the changes for it to be realized as the subject in the basic verb form. This is an approach that maps thematic roles to syntactic argument positions based on the semantic properties of these roles. An argument that bears the prototypical Agent role entails that the argument has all the properties in (7), whereas an argument with a non-prototypical Agent role bears only some of these agent properties.

- (8) Proto-agent properties  
 a. volitional involvement in the event or state  
 b. sentience and/or perception  
 c. causing an event or state in another participant  
 d. movement (relative to the position of another participant)

- e. exists independently of the event named by the verb.

Under the proto-agent properties, (6) entails that the subject *John* does not have the properties in (7a)-(7c). Take (6a) as an example. The verb *fear* is an experiencer psych verb. The subject *John* of the verb *fear* is an experiencer that undergoes a change of a psychological state, whereas the direct object *the lion* is a stimulus to express a cause of the psychological state of the experiencer. The subject *John* neither causes any event, nor has any involve any volitionality. Then, now consider the sentences in (9).

- (9) a.\*? John received the mail *tired*.  
 b.\* John borrowed some money *hungry*.

The subject *John* is interpreted as a benefactive in (9a) and (9b). That is, they are not agents. Take (9b) as an example. Suppose that John was hungry but he realized that he left his wallet at home when he tried to have lunch. We might describe this situation by saying that when he borrowed some money, he was hungry. However, the situation cannot be expressed by using a corresponding depictive construction, as in (9b). In this sense, I argue that it would be reasonable to call this type of DPC Agent-Oriented Depictive (AOD).

There are cases in which predication subjects do not bear agentive thematic roles, as illustrated in (10).

- (10)a. James arrived *drunk*.  
 b. James appeared *naked*.  
 c. John died *young*.

In the sentences of (10), the predication subjects do not bear agentive thematic roles but theme thematic roles. According to previous analyses, they are the SOD (Subject-Oriented Depictives) in that the predication subjects occupy subject position. However, this analysis does not consider the thematic roles of the predication subject. In my analysis, the sentences are Theme-Oriented Depictives (TOD) based on the thematic roles assigned to theme. In other words, the predication subjects of AOD are not always the sentential subjects.

### 2.2.2. Theme-oriented depictives

Theme-Oriented Depictives (TOD) indicate that the predication subjects bear theme roles from their depictive predicates. Consider the sentences in (11).

- (11) a. Mary ate her bread *stale*.  
 b. Mary drank her tea *cold*.  
 c. Mary presented my paper *unfinished*.  
 d. Mary brought her soup *hot*.

Previously, they were claimed to be Object Oriented Depictives (OODs) in that the subjects of the D-predicates occupy direct object positions. As in the SODs, the OODs do not show what thematic roles are assigned to the predication subjects. The predication subjects, *her bread*, *her tea*, *my paper*, *her soup* bear theme roles from their respective depictive predicates, *stale*, *cold*, *unfinished*, *hot*, respectively. Let us look at more examples.

- (12) a. John presented his painting *unfinished*  
 b. Mary brought her soup *cold*  
 c. James sent his mail *sealed*  
 d. Brian sold his furniture *used*.

In (12a)-(12d), the predication subjects receive theme-roles from their matrix verbs. For example, in (12b), the object NP *her soup* is the theme which undergoes movement by the event of bringing. A similar pattern holds for all the other object NPs in (12). Let us look at these sentences with Dowty's (1991) notion of proto-patient properties.

- (13) Proto-patient properties  
 a. undergo change of state  
 b. incremental theme  
 c. causally affected by another participant  
 d. stationary relative to movement of another participant  
 e. does not exist independently of the event, or not at all.

According to Dowty, the more proto-patient properties it has, the higher the chance for it to be realized as the object. The sentences of (12) entail that the direct objects have proto-patient properties. Consider the sentences in (14).

- (14) a.\* The horror movie frightened Mary *drunk*.  
 b.\* John pleased Mary *drunk*.

The sentences of (14) involve psych verbs (or verbs of psychological state). They express that some stimulus affects an experiencer. English psych verbs show two types of patterns. In one, the stimulus occurs as the subject, while the

experiencer occurs as the object. In the other, the experiencer occurs as the subject, where the stimulus occurs as the subject. The sentences in (14) involve the former case. Take (14a) as an example. Suppose that Mary saw a movie when she was drunk. She might be frightened to see the horror movie, although she was a little senseless by drinking. We might describe the situation by saying that the horror movie frightened Mary, when she was drunk. However, the ungrammaticality of (14a) shows that the situation cannot be described by the DPC. One possible reason is that the direct object NP is not a theme argument. In this sense, I argue that it is more reasonable to call this type of DPC a Theme-Oriented Depictive (TOD). The TOD can explain well the status of its predication subject when a sentence is passivized, as illustrated in (15).

- (15) a. Mary played the piano *untuned* (active)  
 b. The piano was played *untuned* (passive)  
 c. Mary presented her paper *unfinished* (active)  
 d. Her paper was presented *unfinished* (passive)

According to the distinction between a SOD and an OOD, (15a) and (15c) are OODs, while (15b) and (15d) are SODs, although the same entities are predicated of the same depictive predicates. However, if we adopt the two notions, AOD and TOD, such a puzzle disappears: all the sentences in (15) are simply Theme-Oriented Depictives (TODs).

### 2.3. Event argument

The Depictive Predication Construction (mainly TOD) has been assumed to be explained by the distinction between Stage Level Predicate (SLP) and Individual Level Predicate (ILP) (Rothstein, 1985; Drubig, 1991; Pustejovsky, 1991; Rapoport, 1993). The terminology of SLP and ILP comes from Carlson (1977). SLPs (e.g., sick, available, hungry) attribute temporary properties to (a stage of) an individual in a particular time and space, whereas ILPs attribute an enduring or essential property to an individual. The restriction led researchers to believe that DPCs (mainly TOD) are bound by an Event argument (Pustejovsky, 1991; Rapoport, 1992) as follows: the examples of the TOD are from Rapoport (1992).

- (16) a. \*John met his wife *intelligent*  
 b. \*John had his cat *drunk*  
 c. \*John owned the chickens *young*  
 d. \*John ate the snail *brown*

(16a) and (16d) are bad because the depictive predicates are SLPs, whereas (16b) and (16c) are bad because the matrix predicates are SLPs. This indicates that both a matrix predicate and a depictive predicate should be SLPs to license DPC. So, following Pustejovsky (1991) and Rapoport (1992), I assume that the event component (i.e., event argument) is a means of licensing depictive predicates in English because SLPs denote an event, whereas Individual Level Predicates (ILPs) do not.

Previously, Rapoport (1993) has claimed that in the DPC (mainly TOD), a matrix verb denotes an event that causes a change in the affected direct object. However, I propose that her analysis is insufficient. Instead, the DPC is explained well in terms of a temporal feature: duration. The feature of duration ( $\pm$ duration) categorizes idealized situations: some are durative and others are instantaneous (Smith, 1991). This view further explains the difference between the AOD and the TOD in that the event in the TOD should be durative, while the event of the AOD can be both instantaneous and durative. Let us look at the TOD first.

- (17) a. \* I slammed the door *open*.  
 b. \* I smashed the egg *hot*
- (18) a. I played the piano *untuned*.  
 b. I wore my clothes *unbuttoned*.

In (17), the verbs *slammed*, *smashed* are called *break-verbs* (Levin, 1993). The *break-verbs* bring about a change in the affected object NP but do not involve any motion; the events denoted by the verbs are instantaneous, but not durative (Smith, 1991). In contrast, in (18), the verbs *play*, *wear* do not involve any change to the direct object, and they denote an durative event. According to Rapoport(1992), the grammatical judgements should be reversed: the sentences in (18) should be grammatical because the direct objects undergo some change resulting from the events of each matrix predicate, whereas the sentences in (17) should be ungrammatical because there is no change in the direct object, contrary to the fact.

Now let us consider AOD. The temporal feature of duration is not a necessary requirement in the AOD, as illustrated in (19).

- (19) a. James slammed the door *angry*.  
 b. James smashed the egg hot. (cf. (17))
- (20) a. Tom played the piano *drunk*  
 b. Tom pushed the cart *drunk* (cf. (18))



As in the TOD, the AOD is bound by the Event argument. However, as (19)-(20) show, the restriction imposed on the TOD is freer in the AOD because the events can be either durative or instantaneous in the AOD; the events in (19) are instantaneous, whereas the events in (20) are durative.

#### 2.4. Syntactic Licensing of DSP

How are depictive-predicates licensed syntactically? While it is not my purpose to give a detailed structural analysis in general, I would like to explain the difference between AOD and TOD in terms of event structure.

The characteristic of the TOD is that the event denoted by the matrix verb is durative and a depictive denotes a state of the theme argument. Given this assumption, the event structure of TOD is illustrated in (21)-(22).

(21) Theme-Oriented Depictives

- a.  $\lambda e\lambda e'[ \text{Agent}(e,x) \ \& \ \text{CAUSE}(e,e') \ \& \ \text{Theme}(e',y) \ \& \ \text{Throughout}(e',s(y))] \ \& \ s(y)=p]$

(22) THROUGHOUT ( $e' p$ ) is true

iff for every  $t \leq \text{Time}(e')$ ,  $p$  is true at  $t$ , and

iff  $e'$  is extended (there are  $\exists t\exists t'[t \neq t' \wedge t \leq \text{TIME}(e'), t' \leq \text{TIME}(e')]$ )

TOD construction involves two events: the causing event and the caused event. An event ( $e$ ) is the causing event where the causer (agent) causes an object to be involved in another event ( $e'$ ). In such a situation, a TOD characterizes the state of the theme at  $e'$  where the event involving the theme argument is durative. The notation 'THROUGHOUT ( $e, p$ )' expresses that every time point is part of the time of the event ( $e'$ ) and the state denoted by the TOD is true throughout the event ( $e'$ ) by being true during the time period during which the event ( $e'$ ) extends.

Then, let us see how the TOD construction is derived syntactically. I will adopt the semantic representation illustrated in the following example, for the sentence *Mary drank the tea hot*.  $M$  denotes Mary and  $S$  is a variable for three-place relations. Note that existential closure is applied twice. I disregard tense and definitive article here.

(23) a. drank :

$\lambda y\lambda x\lambda e\lambda e' [ \text{Ag}(e)=X, \text{CAUSE}(e,e'), \text{Th}(e')=y, \text{MOVE}(e'), \text{GOAL}(e',x's \text{ mouth})]$

b. that tea : T

c. drank the tea:

$\lambda x \lambda e \lambda e' [\text{Ag}(e)=x, \text{CAUSE}(e, e'), \text{Th}(e')=T, \text{MOVE}(e'), \text{GOAL}(e', x's \text{ mouth})]$

d. hot:

$\lambda S \lambda x \lambda e \lambda e' [S(x)(e)(e'), \text{THROUGHOUT}(e', \text{HOT}(\text{TH}(e')))]$

e. drank the tea hot:

$\lambda x \lambda e \lambda e' [\text{Ag}(e)=x, \text{CAUSE}(e, e'), \text{Th}(e')=T, \text{MOVE}(e'), \text{GOAL}(e', x's \text{ mouth}), \text{THROUGHOUT}(e', \text{HOT}(\text{TH}(e')))]$

f. Existential Closure of the first event argument

$:\lambda S \lambda x \lambda e \lambda e' \exists e' [S(x)(e)(e')]$

$\lambda x \lambda e \exists e' [\text{Ag}(e)=x, \text{CAUSE}(e, e'), \text{Th}(e')=T, \text{MOVE}(e'), \text{GOAL}(e', x's \text{ mouth}), \text{THROUGHOUT}(e', \text{HOT}(\text{TH}(e')))]$

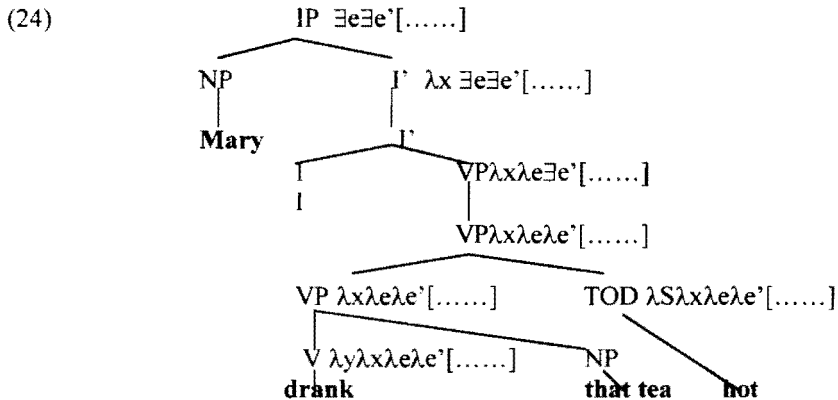
g. Existential closure of the second event argument:  $\lambda S \lambda x \lambda e [S(e)(e')]$

$\lambda x \exists e \exists e' [\text{Ag}(e)=x, \text{CAUSE}(e, e'), \text{Th}(e')=T, \text{MOVE}(e'), \text{GOAL}(e', x's \text{ mouth}), \text{THROUGHOUT}(e', \text{HOT}(\text{TH}(e')))]$

h. Mary = M

$\exists e \exists e' [\text{Ag}(e)=M, \text{CAUSE}(e, e'), \text{Th}(e')=T, \text{MOVE}(e'), \text{GOAL}(e', x's \text{ mouth}), \text{THROUGHOUT}(e', \text{HOT}(\text{TH}(e')))]$

The event composition is interpreted in following steps. TOD is applied after the direct object *the tea* is applied to the verb. Next, an existential closure is applied to bind the first event argument. This is necessary because once the event ( $e'$ ) is bound, the TOD inside the bound event ( $e$ ) should be predicated of the internal argument. Then, existential closure is again applied to bind the second event argument. The derivation is represented in a syntactic tree as follows:



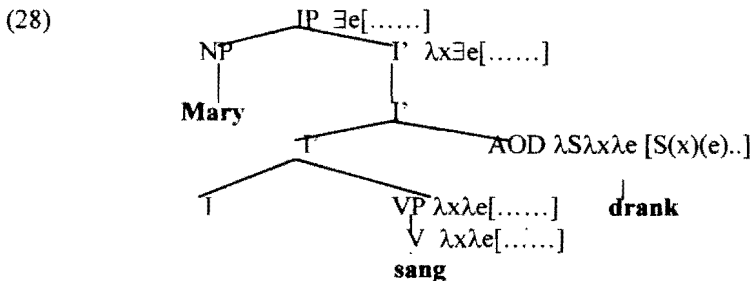
On the other hand, an AOD is characterized by an event denoted by a matrix verb that is either instantaneous or durative. The AOD is illustrated in (25)-(26).

- (25) Agent-Oriented Depictives :  $\lambda e[ \text{Agent}(e,x) \ \& \ \& \ \text{AT}(e, s(y)=p)]$   
 (26)  $\text{AT}(e, p)$  is true iff every  $t \leq \text{TIME}(e)$ ,  $p$  is true at  $t$   
 iff  $p$  is true at  $\text{TIME}(e)$ .

AOD construction involves a single event in which an agent is involved. In such a situation, The AOD characterizes the state of the agent at the event (e) where the state denoted by the AOD is true either at the time point (t) of the event or at during the whole time span of the event. The notation ‘AT(e, p)’ expresses that the state denoted by the AOD is true at every time point that is part of the time of the event(e), or at the time of the event. So, the notation ‘AT(e, p)’ indicates that the event is instantaneous or durative. Given this condition, let us derive the sentence *Mary sang drunk*. I ignore tense here. R is a variable for two-place relation.

- (27) a. sing:  $\lambda x \lambda e[ \text{Ag}(e)=x, \text{sing}(e)]$   
 b. drunk:  $\lambda R \lambda x \lambda e[ R(x)(e), \text{AT}(e, \text{DRUNK}(\text{Ag}(e)))]$   
 c. sing drunk:  $\lambda x \lambda e[ \text{Ag}(e)=x, \text{sing}(e), \text{AT}(e, \text{Drunk}(\text{Ag}(e)))]$   
 d. Existential closure of an event argument:  $\lambda S \lambda x \lambda e \exists e [ S(x)(e)]$   
 $\lambda x \exists e [ \text{Ag}(e)=x, \text{sing}(e), \text{AT}(e, \text{Drunk}(\text{Ag}(e)))]$   
 e. Mary = M  
 f. Mary sang drunk:  
 $\exists e [ \text{Ag}(e)=\text{Mary}, \text{sing}(e), \text{AT}(e, \text{Drunk}(\text{Ag}(e)))]$

The event composition is interpreted in following steps. After AOD is applied to the verb, an existential closure is applied to bind the event argument. Then, an external argument is applied. The derivation is represented as follows:



### 3. Conclusion

In this paper, I have mentioned two points. First, DPCs consist of two types, Agent-Oriented Depictive (AOD) and Theme-Oriented Depictive (TOD). Second, an AOD occurs with events that are either durative or instantaneous, whereas a TOD occurs only with durative events, although they are both bound by an Event argument. The similarities and differences have been analyzed and explained in terms of an Event based theory by applying the thematic roles of predication subjects to the Event argument. Syntactically, they are adjoined hierarchically in that the AOD is adjoined to an Inflection note (at a high level), whereas the TOD is adjoined to a VP (at a low level), consisting two levels of depictives in English.

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# Dynamic Properties of Coarticulation in Native and Non-native Speech<sup>1</sup>

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## 1. Introduction

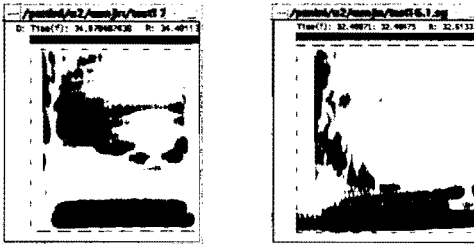
Coarticulation involves deviation of a segment from its target position toward its adjacent segment(s). Coarticulatory effects are often linked to economy of effort in speech production since speakers manage to reduce the overall articulatory movement by that effect (e.g. Lindblom (1983)). An interesting aspect of coarticulation is that the amount of coarticulation is language-specific. It has been suggested that the degree of coarticulation is constrained by the language-specific system of phonological contrasts (Öhman (1966), Manuel and Krakow (1984), Cohn (1988), Manuel (1990), among others). Manuel (1990), for example, suggests that the magnitude of vowel-to-vowel coarticulation in a VCV syllable is constrained by the number and distribution of contrastive vowels in a given language.

This hypothesis leads to the prediction that languages in which back rounded vowel /u/ contrasts with front rounded vowel /y/ display a smaller amount of back vowel fronting in a coronal context than languages in which /u/ does not contrast with /y/ (Flemming (1997)). An earlier study confirmed that the back vowel is more fronted to the coronal context in English which lacks /y/ than in French which has /y/, and showed that English learners of French gradually reduce the degree of coarticulation while producing French /u/ in coronal context (Oh (to appear)).

In the previous study, an absolute undershoot measurement was used as an index of coarticulation degree, calculated by taking differences between the estimated vowel target F2 ( $F2_T$ ) and the vowel F2 in coronal contexts ( $F2_v$ ). This represents static properties of coarticulation in the sense that the measurements include only static parts near endpoints. In addition to these static properties of coarticulation degree, English and French appear to be systematically distinct regarding the shapes of vowel dynamics in a coronal C -

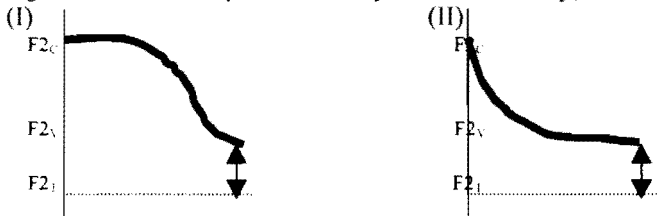
back V syllable. As observed in Figure 1, the vowel contour shapes of English are 'S-shaped' trajectories, while those of French show 'decaying exponential' shape of trajectories. The F2 trajectory in English [du] stays at high F2 values until the midpoint of vowel duration and reaches the steady state of the vowel at a later point of its duration. The F2 trajectory in French [du], in contrast, shows rapid change at early points, and the steady state of the vowel is reached before the midpoint of vowel duration.

Figure 1. Sample spectrograms of [du] in native English (left) and French (right) speech



Suppose a hypothetical situation in which a learner's L1 and L2 speech are like (I) and (II) in Figure 2. According to the static method of quantifying the coarticulation degree, the learner exactly transfers her L1 speech onto L2 and acquires nothing with respect to the coarticulation degree because the  $F2_T$  and  $F2_V$  (hence, absolute undershoot values) are the same between L1 and L2. But the learner is in fact substantially modifying the dynamic shape of the vowel from L1 to L2. An absolute undershoot measurement is thus potentially incomplete because F2 transitions with the same  $F2_V$  values would be treated as equivalent even when their dynamic natures are quite different (see also Crowther (1994)).

Figure 2. Schematic representations of a learner's L1 (left) and L2 (right) production



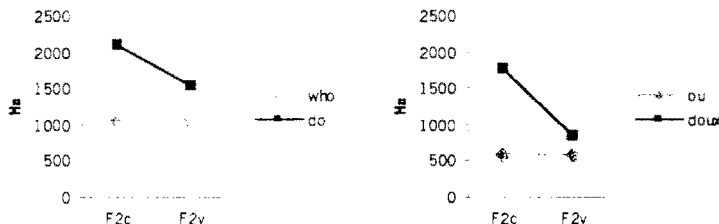
This paper incorporates this distinct transition shape of the entire vowel trajectory as an additional variable to the acquisition effects of coarticulation. The main issues to be explored are; (i) interpretation of the dynamic coarticulatory parameter, (ii) quantification of the distinct transition shapes, (iii) the dynamics in L2 speech, and (iv) relationship between the acquisition of static and dynamic properties regarding coarticulation.

## 2. Static Properties of Coarticulation in Native Speech

Four native American English (mean age 38, range 26 to 51) and four native European French speakers (mean age 37, range 22 to 55) participated in an experiment to provide native values of static and dynamic properties of coarticulation. Three of them were females and one of them male in each language. Speech materials were *Say "who" to me* and *Dites-moi "ou" deux fois* for target estimation, and *Say "do" to me* and *Dites-moi "doux" deux fois* for coarticulation degree. An absolute undershoot value was calculated by the differences between the  $F2_V$  in *who* or *ou* and the  $F2_V$  in *do* or *doux*. The  $F2$  frequency values were determined by picking amplitude peaks from the LPC spectra at the first glottal pulse after the stop release burst and at the steady state of the vowel. When the  $F2$  trajectory displays a U-shape contour in a double-sided coronal context, a minimum  $F2$  value was taken as  $F2_V$ .

As shown in Figure 3, both the estimated target  $F2$  of the vowel [u] and the  $F2_V$  in coronal context were higher in English than in French. The absolute undershoot values were larger in English than in French by approximately 250 Hz.

Figure 3. Static properties of coarticulation in native speech: Mean values of four native English (left) and four native French (right) speakers



In addition to the  $F2_T$ ,  $F2_V$  and absolute undershoot value, the  $F2_C$  was also systematically distinct between English and French, as seen in Figure 3 and in

the spectrograms in Figure 1. French shows lower consonant F2 than English does. The question is whether this low consonant F2 is an inherent characteristic of French coronal consonants or whether this is a result of large consonant variation due to the adjacent vowel. We measured three English speakers' [di] and [du] and French speakers' [di], [dy] and [du] produced in carrier phrases (two males and one female in each language). The results are shown in Figure 4. Notice that the  $F2_c$  values of native English speakers and those of French speakers display a clear contrast: English shows relatively smaller consonant variation, but French shows larger consonant variation due to the adjacent vowel. The mean values of the differences between the  $F2_c$  in [di] and the  $F2_c$  in [du] were 112 Hz in English and 485 Hz in French (see Table 1). Since we do not know the consonantal target values of the two languages, there may still be a difference in the absolute consonant target. However, there is clearly a difference in the amount of variation around that consonantal target. While English shows a large degree of vowel variation due to the adjacent consonant, French shows a larger degree of consonant variation due to the adjacent vowel. A possible explanation of this contrast appears to be that with high demand on the achievement of the target values of the vowel [u], French allows a large amount of consonant variation to avoid otherwise extreme articulatory movement.

Figure 4. Consonant variation due to adjacent vowels: Circles at the endpoints for [di], diamonds for [du] and triangles for [dy]: M for male and F for female speech

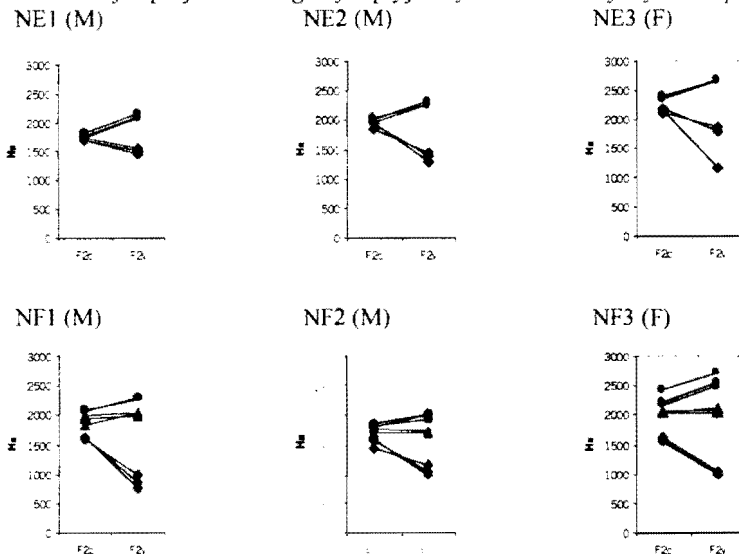




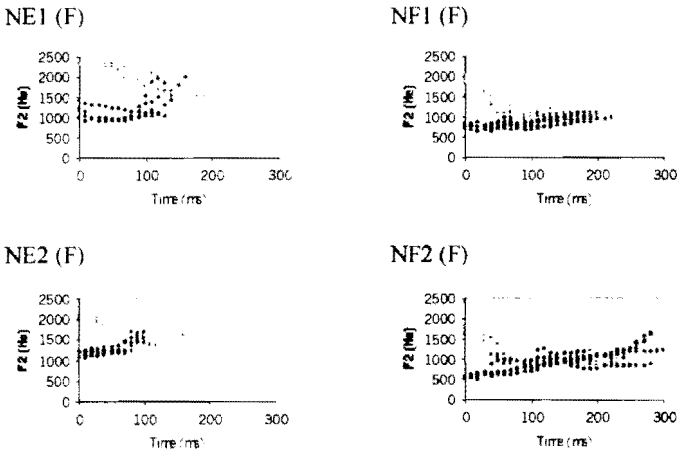
Table 1. Mean values of  $[F2_c(\text{di}) - F2_c(\text{du})]$  in Hz

|         |         |          |          |          |          |
|---------|---------|----------|----------|----------|----------|
| NE1: 60 | NE2: 67 | NE3: 210 | NF1: 453 | NF2: 304 | NF3: 699 |
|---------|---------|----------|----------|----------|----------|

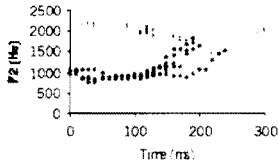
### 3. Dynamic Properties of Coarticulation in Native Speech

As noted earlier, the contour shape of French [du] sharply drops at the beginning of vowel duration and stays quite stable for the rest. The contour of English [du] shows the opposite pattern, staying stable at the high F2 value at the beginning and starting to drop at a later point of vowel duration. There appear to be two possible explanations of this contrast. First, it may be due to distinct vowel inherent dynamics, that is, the vowel is a diphthong in English, but not in French. The second possibility is to interpret the English contour shape as durational maximization of the consonant quality, i.e. high F2. Figure 5 below provides the results of the four native English and four native French speakers. The black dots indicate target vowel contours in English *who* and French *où*, and the gray dots English *do* and French *doux*. The sample points are the measurement of every ten milliseconds via the formant tracking upon the spectrogram that waves+ provides.

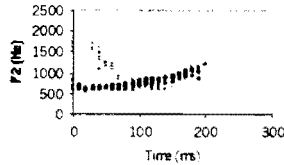
Figure 5. Dynamic properties of coarticulation in native speech: gray dots for *do* or *doux* and black dots for *who* or *où*



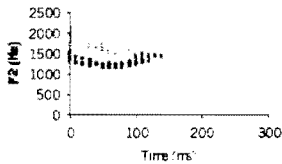
NE3 (F)



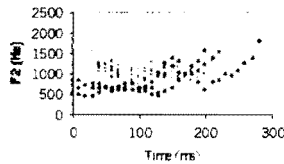
NF3 (F)



NE4 (M)



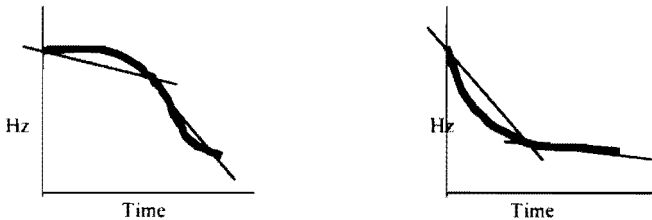
NF4 (M)



If the back vowel in English is a diphthong, one would have observed noticeable falling contour shapes in *who*, but this was not the case as can be seen in the left column black dots of Figure 5. There was no indication of differences between the target vowel trajectory of English and French.<sup>2</sup> So the distinct trajectory shape in English and French [du] appears to be a coarticulation-related dynamic pattern.

The dynamic effects were quantified as follows (suggested by Edward Flemming) and as illustrated in Figure 6: (1) Calculate the slope of the line connecting the  $F2_c$  and the F2 at the midpoint of vowel duration, (2) calculate the slope of the line connecting the F2 at the midpoint and the  $F2_v$ , and (3) take the difference between the first and the second slope value.

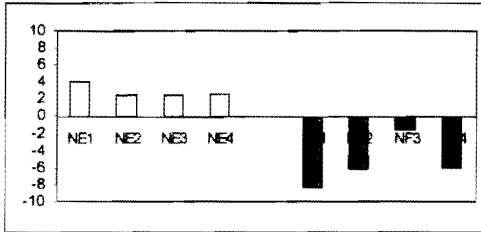
Figure 6. Quantifying the distinct trajectory shapes: Slope change values



The values of this measure relate to qualitatively different trajectory shapes in the way that English-type trajectory will get positive values from larger slope minus smaller slope while French-type trajectory negative values from smaller

slope minus larger slope. As Figure 7 shows, the slope change values of English speakers were all positive while those of French speakers were negative.

Figure 7. Slope change values in native speech



To summarize the coarticulatory patterns of English and French, first the lower vowel target F2 and the smaller degree of absolute undershoot in French were interpreted as resulting from high demand on the achievement of contrastiveness in high vowel space. In addition, French allows a large amount of consonant variation, probably in order to achieve economy of effort in articulatory movement to some degree. The differences in the dynamics can be interpreted as the language-specific durational extension of consonantal or vocalic features. English contour shape is the realization of durational maximization of the consonant quality (i.e. high F2), while French contour shape is the enhancement of the vowel quality (i.e. low F2). If French had started as a slow transition velocity at the beginning, it would have been hard to reach the purposed quite low F2 point of the vowel F2 (Edward Flemming (p.c.)).

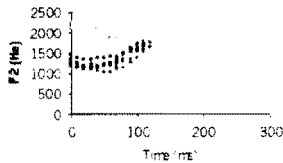
#### 4. Dynamic Properties of Coarticulation in Non-native Speech

Three relatively experienced English learners of French (EF1, EF2 and EF3; mean age 23, range 21 to 25) and three inexperienced learners (EF4, EF5 and EF6; mean age 21, range 21 to 22) participated in an experiment to provide non-native values of French coarticulation. It was relatively straightforward to divide the two extreme groups according to their French experiences. Only the experienced learners had naturalistic exposure to French, and they started to learn French at a younger age than the inexperienced learners. The materials were the same as above used for native speakers. Both groups of learners read English materials first, took a break and then read French materials. To make sure that they switched from one language mode to the other, they read an approximately 120-word story in each language before reading the materials.

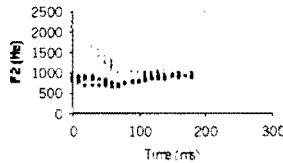
As presented in the left column of Figure 8, the English of this learner group shows patterns similar to that of the NE group. Note that they made noticeable changes for French trajectory shapes, as shown in the right column. The early parts of vowel duration displayed faster drop in F2 values and the later parts slower transition velocity, which is exactly the pattern observed in native French speech (see section 3). Let us briefly consider the individual data. EF1 achieved the lower target F2 and the smaller absolute undershoot value for French. Note, however, that the  $F2_C$  value of this learner is still more like her English rather than a typical French value. The apparently very rapid transition velocity of this speaker's vowel trajectory is due to this maintenance of the high F2 at the consonant release. This was also the case of EF3. Only EF2 notably lowered the  $F2_C$  value as well as the  $F2_V$ , successfully reducing the overall articulatory movement.

Figure 8. Dynamic properties of coarticulation in nonnative speech: Relatively experienced learners

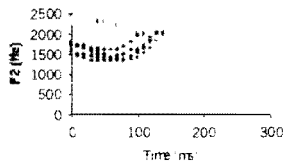
EF1/English



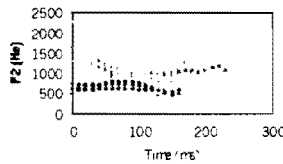
French



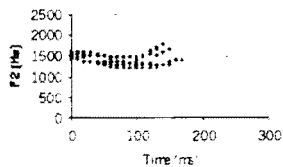
EF2/English



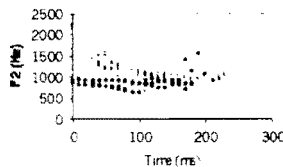
French



EF3/English



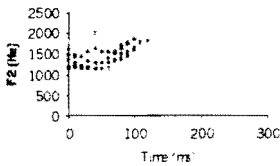
French



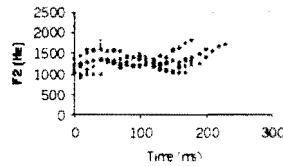
As seen in Figure 9, the inexperienced learners also managed to change the dynamic patterns of vowels from their native language to the target language typical pattern. As for the EF4, the target value for French was not drastically lowered, but the  $F2_V$  in [du] was quite lowered, reducing the undershoot value for French. This learner also showed change in the vowel dynamic pattern. EF5 lowered both the target value and the  $F2_V$ , but did not lower the  $F2_V$  enough, still allowing a great amount of undershoot for French. This learner, however, changed the dynamic pattern quite dramatically. EF6 exhibited a still large amount of undershoot, but the dynamic pattern was slightly modified for French. It is also interesting to note that while all these inexperienced learners show modifications in  $F2_T$ ,  $F2_V$  and/or absolute undershoot to some extent, their  $F2_C$  values were still very high, resulting in great articulatory movement for L2. These also can be observed in Figure 10, which are the sample spectrograms of one experienced (EF1) and one inexperienced (EF4) learner.

Figure 9. Dynamic properties of coarticulation in nonnative speech: Inexperienced learners

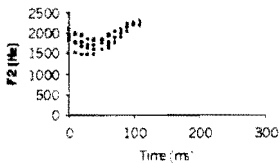
EF4/English



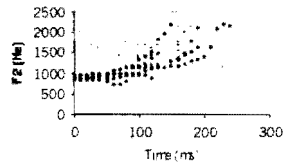
French



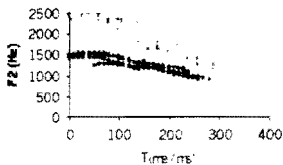
EF5/English



French



EF6/English



French

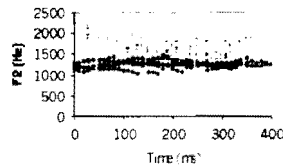
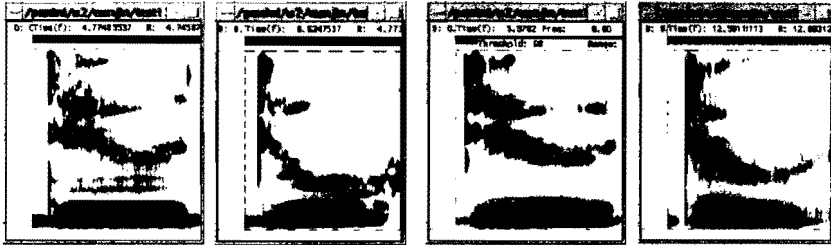


Figure 10. Sample spectrograms of L1 and L2 [du] of EF1 (left) and EF4 (right) EF1/English French EF4/English French



The slope change values of the learner group are summarized in Figure 11, where the white bars indicate native speech and the black bars L2 speech. Noticeably, all the learners showed quite good performance as observed in their changing the slope change values from positive for English to negative for French. Note also that two experienced learners, EF1 and EF3, displayed “over”-performance, showing even lower slope change values (less than  $-10$  point) than those of the native French speakers whose values were all more than  $-10$  (Figure 8 above). However, these hardly can be interpreted as “overshoots” of the target language norms because the lower dynamic values primarily result from their failure to retract the French coronal consonant resulting in still high consonantal F2 frequency. This apparently caused the overall larger articulatory movement in L2 production. If they were successful in retracting the coronal consonant in the context of the back vowel, the slope change values should have been a bit increased and become more similar to the target language typical values.<sup>3</sup>

One more point needs to be made on English speech of EF6; the mean slope change value for English of this speaker was exceptionally negative. It was observed that this speaker produced the vowels with extremely lengthened duration (see Table 2). The longer vowel duration is, the more likely the speaker is to hit the target values (Lindblom (1963)). The case of deviance from the English norms is apparently due to her production of the vowel with extremely long duration.

Figure 11. Slope change values of English and French of Group EF

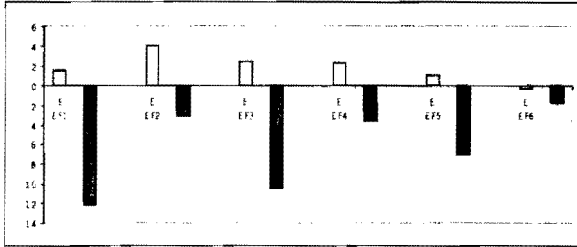


Table 2. Mean duration (in ms)

| EF1 | F   | EF2 | F   | EF3 | F   | EF4 | F   | EF5 | F   | EF6 | F   |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| E   | 170 | E   | 186 | E   | 208 | E   | 208 | E   | 246 | E   | 342 |
| 144 |     | 172 |     | 204 |     | 154 |     | 138 |     | 336 |     |

## 5. Non-dynamics vs. Dynamics in Non-native Speech

Another question raised earlier concerned the relationship between the acquisition of static and dynamic properties of coarticulation. Figure 12 displays the results of learners' absolute undershoot values at the steady states of vowels in English and French. Compare this figure with Figure 11. Note that the French undershoot values of the two inexperienced learners EF5 and EF6 were even larger than the English ones. That is, even though they showed correct changes in dynamics, their non-dynamic coarticulation degrees were far from fitting the L2 patterns. As can be seen in Table 3, the acquisition of  $F2_C$  appears to be even harder and all learners except EF2 had difficulty obtaining appropriate  $F2_C$  value of French. Their French  $F2_C$  values were mostly more than 2000 Hz while those of all the native French speakers were less than 2000 Hz.

Figure 12. Absolute undershoot values of English and French of Group EF

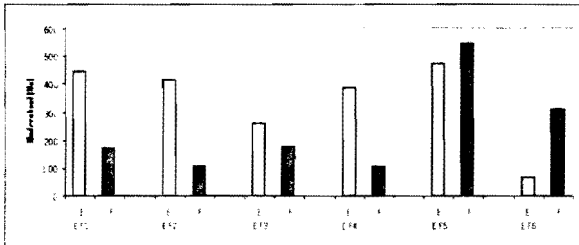


Table 3. Mean values of English and French F2<sub>T</sub>, F2<sub>V</sub> and F2<sub>C</sub> of Group EF (in Hz)

|                 | EF1  |      | EF2  |      | EF3  |      | EF4  |      | EF5  |      | EF6  |      |
|-----------------|------|------|------|------|------|------|------|------|------|------|------|------|
|                 | E    | F    | E    | F    | E    | F    | E    | F    | E    | F    | E    | F    |
| F2 <sub>T</sub> | 1185 | 696  | 1421 | 507  | 1308 | 689  | 1210 | 1080 | 1688 | 852  | 1022 | 1146 |
| F2 <sub>V</sub> | 1632 | 868  | 1834 | 610  | 1569 | 865  | 1594 | 1186 | 2159 | 1399 | 1090 | 1454 |
| F2 <sub>C</sub> | 2170 | 2131 | 2303 | 1611 | 2261 | 2291 | 2103 | 2063 | 2397 | 2233 | 2448 | 2237 |

## 6. Summary and Conclusion

In summary, the lower vowel target F2 and the smaller degree of undershoot in French were interpreted as resulting from satisfying distinctiveness in the front-back dimension of vowel space. French, on the other hand, allows a large amount of consonant variation. It appears to be the case that high demand on the achievement of a vowel complementarily allows a large degree of consonant variation in order to avoid otherwise extreme movement in articulation.

In this study the coarticulatory concept was generalized to include the whole trajectory shape in entire vowel duration, not just the static parts near endpoints. The differences in the dynamics were interpreted as the language-specific durational extension of consonantal or vocalic features. English contour shape is the realization of durational maximization of the consonant high F2, while French contour shape is the enhancement of the vowel low F2. The French-specific exponential trajectory shape seems to be necessary to reach the "planned" quite low F2 point for the back vowel [u] of the language. The results indicated that the L2 learners could encode and retain very detailed dynamic coarticulatory information for their target language speech. Their acquisition scores for L2 dynamic properties of coarticulation were in general higher than the scores for static properties of coarticulation.

Another clear trend in acquisition was that most learners fail to retract the coronal consonant for French, maintaining still high consonantal F2 frequency as in their native speech. This caused "incorrectly" excessive articulatory movement for L2. That is, they were successful in maintaining L2 phonological contrasts, but did not yet succeed in moderately reducing L2 production efforts.

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## Notes

<sup>1</sup> I wish to thank Eve Clark, Beverley McChesney, Rob Podesva, Colleen Richey, the audience at WECOL 99, University of Texas at El Paso and the 138<sup>th</sup> meeting of ASA at Columbus, Ohio, and especially Edward Flemming for useful comments, questions and/or technical help. I am also



grateful to the participants of this experiment for their generous help. I am solely responsible for any remaining errors.

<sup>2</sup> The final rises in F2 in /du/ observed in both languages are transitions to the following coronal, and slight initial falls observed in some English speakers' /hu/ could have a high vowel source.

<sup>3</sup> It would be considered as "overshoot" of the native norms if one achieved the L2 typical values for both F<sub>2c</sub> and F<sub>2v</sub> and steeper transition velocity than native speakers. This problem may be partly overcome by normalizing the slope change value by dividing it by the difference between F<sub>2c</sub> and F<sub>2v</sub> (Edward Flemming (p.c.)).

*Normalized slope change value* = (slope change value) / (F<sub>2c</sub> - F<sub>2v</sub>)

The normalized slope change values of the 'overshoot' learners were indeed within the range of the native French values, and therefore represent the proper acquisition progression better than the simple slope change values.

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# Wh-in-situ and Focus in Japanese\*

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## 1. Against Syntax-based Analysis of Wh-in-situ

Japanese wh-questions have long been analyzed as involving LF movement. Their recent recasting within the Minimalism framework (Watanabe 1992, Yanagida 1996, and Tonoike 1995, 1998) claims that wh-movement in Japanese is "overt," suggesting that syntactic movement of either a null-operator or the question marker *-ka* is involved. For instance, as shown in (1), Watanabe argues that a null-operator with [+wh] feature moves to get its [+wh] feature checked against the [wh] feature of the question particle *-ka*. He argues that this movement is syntactic by citing the contrast in (2).

- (1) [CP [ ] [ ... Op ... ] ka] --> [CP [Op<sub>i</sub>] [ ... t<sub>i</sub> ... ] ka]  
          [+wh]   [wh]                    {+wh}                {wh}

- (2) a. ??Taroo-wa [ Hanako-ga dono tosyokan-kara hon-o  
                  -top.           -nom. which library-from book-acc.  
          karidasi-ta-ka-doo-ka] Ziroo-ni kii-ta-no?  
          check:out-past-or-how-Q       -to ask-past-NO

'??From which library did Taro asked Jiro whether or not Hanako checked out a book?'

- b. Taroo-wa [ Hanako-ga dono tosyokan-kara hon-o  
                  -top.           -nom. which library-from book-acc.  
          karidasi-ta-ka-doo-ka] dare-ni kii-ta-no?  
          check:out-past-or-how-Q who-to ask-past-NO

'Who did Taro ask whether or not Hanako checked out a book from which library?'

Watanabe attributes the lower acceptability of (2a) to a violation of the WH Island Condition (WIC) of “overt” operator movement: a null-operator associated with the wh-phrase in the embedded question (*dono tosyokan-kara*) undergoes overt movement, violating WIC. In contrast, in (2b), the same wh-phrase only undergoes “covert” movement since the higher C position is occupied by the wh-phrase in the matrix sentence (*dare-ni*). This contrast can be accounted for if we assume that WIC is sensitive only to overt movement, just like English.

However, this analysis immediately faces a problem. Compare the cleft counterpart of the sentence in (2a), shown in (3).

- (3) [Taroo-ga [ Hanako-ga t<sub>j</sub> hon-o karidasi-ta-ka-doo-ka]  
       -nom.      -nom.  book-acc. check:out-past-or-how-Q  
 Ziroo-ni kii-ta-no]-wa dono tosyokan-karaj-na-no?  
       -to ask-past-NO-top. which library-from-be.pres-NO  
 ‘Which library is it that Taro asked Jiro whether or not Hanako  
 checked out a book from?’

If overt movement is constrained by WIC, (3) should be excluded.

Note also that, in the Minimalist account, what triggers overt movement is the formal [wh] feature associated with the question particle *-ka*. Hence, Nishigauchi 1990 claims that in (4) there is an “implicit” question marker *-ka*.

- (4) a. Taroo-wa ki-ta-no?  
       -top. come-past-NO ‘Did Taro come?’  
 b. Taroo-wa nani-o kat-ta-no?  
       -top. what-acc. buy-past-NO ‘What did Taro buy?’

However, this claim is untenable: while (4a) allows an explicit *-ka* as illustrated in (5a), (4b) does not as the ungrammaticality of (5b) shows.

- (5) a. Taroo-wa ki-ta-no-ka?  
       -top. come-past-NO-KA  
 b. \*Taroo-wa nani-o kat-ta-no-ka?  
       -top. what-acc. buy-past-NO-KA

In other words, for questions ending with the particle *-no*, wh-questions do not allow the particle *-ka* while yes-no questions marginally accept it.

In fact, the distribution of the question particle is quite restricted. First, it cannot occur directly after the informal form of the verb as in (6a). In contrast, it can

directly follow the formal form (i.e. the form suffixed with the polite suffix *-mas(u)*).

- (6) a. \*Nani-o si-te i-ta-ka?  
       what-acc. do-TE exist-past-KA ‘(intended) What were you doing?’  
 b. Nani-o si-te i-masi-ta-ka?  
       what-acc. do-TE exist-past-KA ‘What were you doing?’

Secondly, in the embedded question, it must occur, irrespective of whether or not it is preceded by the particle *-no*.

- (7) a. Boku-wa [Hanako-ga nani-o si-te i-ta-no-ka] sira-na-i.  
       I-top. -nom. what-acc. do-TE exist-past-NO-KA know-not-pres.  
       ‘I don’t know what Hanako was doing.’  
 b. \*Boku-wa [Hanako-ga nani-o si-te i-ta-no] sira-na-i.  
       I-top. -nom. what-acc. do-TE exist-past-NO know-not-pres.
- (8) a. Boku-wa [Hanako-ga nani-o si-te i-ta-ka] sira-na-i.  
       I-top. -nom. what-acc. do-TE exist-past-KA know-not-pres.  
 b. \*Boku-wa [Hanako-ga nani-o si-te i-ta] sira-na-i.  
       I-top. -nom. what-acc. do-TE exist-past know-not-pres.

The paradigm in (4)-(8) suggests that the question particle *-ka* is not arbitrarily “implicit” as assumed in Nishigauchi. Instead, its occurrence is regulated by a certain principle which has not been discovered by previous generative literature.

## 2. A Semantic Account

So, the question is how we can account for the contrast between (4b) and (5b). In the generative literature, the morpheme *-no* occurring in these questions is quite mistakenly glossed as the question marker with the exception of Fukui 1986, Nishigauchi 1990, and Tonoike 1995. In this paper, I argue that the morpheme *-no* is a spell-out of the adnominal features of the verb.

In Modern Japanese (hereafter, MJ) grammar, no clear morphological distinction is made between the conclusive form (called the *syuusi* form in traditional terminology) and the adnominal form (the *rentai* form). In Old Japanese (hereafter, OJ), in contrast, there was a clear morphological distinction.

Comparison between MJ and OJ reveals that OJ adnominal clause (A-clause for short) is realized as *-no* in MJ. Compare the sentences in (9).

- (9) a. *Makura-no Sousi "Nikuki Mono"*  
 niwakani [[[wazuraF-u] hito-**no** ar-u]-ni...  
 suddenly get:sick-adn. person-nom. exist-adn.-at  
 'Suddenly, (at the sight of) a person who is sick...'
- b. totuzen [[[byooki-no] hito]-ga i-ru-**no**]-ni...  
 suddenly sick-be:adn. person-nom. exist-pres-**NO**-at

Furthermore, even in MJ, there are cases where a bare form of the verb occurs in complement positions as shown in (10).

- (10) a. [Isoi-de nige-dasi-ta]-ni tigai-nai.  
 hurry-TE run:away-start-past-at differ-neg:pres.  
 'It must be that (they) ran away in a hurry.'
- b. [Zibun-no ki-ni i-ru yoo-ni su-ru]-ga i-i.  
 self-gen. feeling-at enter-pres. manner-in do-pres.-nom. good-pres.  
 'Do whatever/however pleases you.'
- c. [Koko-kara tatinoka-za-ru]-o e-nai.  
 this:place-from evacuate-neg.-pres.-acc. be:possible-neg:pres.  
 'There is no other choice but evacuate this place.'

Although the use of the bare form of the verb as complement is not a productive process in MJ, and often the bare form alternates with the verb + *-no*, as in (11), the correspondence suggests that the OJ adnominal form is historically developed into MJ verb + *no* as Horie 1991, 1997 and Kaplan and Whitman 1995 suggest.

- (11) a. [Isoi-de nige-dasi-ta-**no**]-ni tigai-nai.  
 hurry-TE run:away-start-past-**NO**-at differ-neg:pres.
- b. [Zibun-no ki-ni i-ru yoo-ni su-ru-**?no**]-ga i-i.  
 self-gen. feeling-at enter-pres. manner-in do-pres.-**NO**-nom. good-pres.

- c. [Koko-kara tatinoka-za-ru-\*no]-o e-nai.  
 this:place-from evacuate-neg.-pres.-NQ-acc. be:possible-neg:pres.

Note that in OJ, wh-questions were formed with an A-clause.

- (12) a. *Makura-no Soosi, 130 Koden-no On-no Tame-ni*  
 Tenzyau-nado-ni akekure-naki-wori-mo ara-ba, nanigoto-wo-ka  
 palace-so:on-to visit-not-occasion-even exist-if what:thing-acc.-KA  
 omohide-ni **se-mu**.  
 memonto-as do-I:wonder:adn  
 ‘If the time comes when I do not visit the palace, what memonto I  
 wonder can I have?’
- b. *Makura-no Soosi, 83 Syoku-no Onzoosi-ni Ohasimasu Korao*  
 Izuku-ni-ka **sum-u**.  
 where-at-KA live-adn:pres. ‘Where are you living?’

OJ wh-questions do not require the particle *-ka* in the post-clausal position. Instead, *-ka* occurs immediately after a wh-phrase as evidenced in (12). This being the case, how did wh-licensing take place in OJ? Since the particle *-ka* stays in-situ, the recent minimalism assumption that overt wh-movement (or more specifically, null-operator movement) is “triggered” by the [wh] feature cannot be maintained.

Iwasaki 1997 proposes a functional account for OJ adnominal clause constructions. He observes that an OJ adnominal clause represents a “suppressed” assertion. Taking the OJ focus construction, called the *Kakari-musubi* (or Focus Wrap-up: hereafter KM) construction, for example, let me explain this notion. KM is an OJ syntactic device in which an NP marked with a *kakari* particle is presented as a focused element (often for emphatic purposes). When an NP is marked with the particle *-zo*, *-namu*, *-ya*, or *-ka*, the predicate must be in the adnominal form as shown in (13).

- (13) *Kokin Waka Syuu 6:316*  
 ozora-no tsuki no hikari-si kiyoke-reba kage misi  
 broad:sky-gen. moon-gen. light-pt. bright-if shadow see  
 midu-zo madu kohori-keru  
 water-ZO first freeze-recollective:adn.

‘Last night the moonlight in the broad skies was so bright that the waters that reflected it have frozen to translucence first of all.’

The A-clause represents a background statement in which the event is described as unchangeable or presupposed. In (13), non-focus elements are “suppressed” and the *kakari*-NP is “exposed” as the focus. (14) graphically represents the focused KM from (13) by striking out the suppressed assertion.

- (14) ... kage misi midu-zo ~~madu-kohori-keru~~  
 shadow see water-ZO first freeze-recollective:adn

Through the process of suppression, the *kakari* NP, *kage misi midu-zo* ‘the waters that reflected (it)’ is exposed, and is thus interpreted as focused for emphatic purposes. This analysis captures Whitman’s 1996 generalization that KM is an in-situ cleft in which the *kakari* NP is interpreted as focus in-situ.

The same analysis can be extended to OJ wh-phrases: having an A-clause, OJ wh-phrases are also licensed as focus by the process of suppression. Using the same notation, the wh-questions in (12) are represented as in (15).

- (15) a. ... nanigoto-wo-ka ~~omohide-ni-se-mu~~.  
 b. Izuku-ni ka ~~sum-u~~.

In (15), the wh-phrases directly marked by the particle *-ka* receive a focus interpretation through the process of suppression. In this fashion, OJ wh-questions are licensed without movement of the null-operator nor the question particle *-ka*.

### 3. A Cross-linguistic Perspective

Thus far, I have shown that in OJ the focus (i.e. KM) and the wh-question constructions were licensed in an identical fashion. Is this a mere coincidence, only specific to OJ? The answer is overwhelmingly negative.

Perhaps the best-known case in which the wh- and focus constructions appear in an identical syntactic form is Hungarian, as illustrated in (16).

- (16) a. Mari az asztalra tette az edényekett.  
 Mary the ~~table-onto~~ put the dishes-acc.  
 ‘Mary put the dishes on the table.’

- b. Mari mit tett az asztalra?  
 Mary what-acc put the table-onto

‘What was it that Mary put on the table?’ (Horvath 1986)

In Hungarian, both the focus NP and wh-phrase are moved to the pre-verbal position.

Another language which shows this pattern is Garifuna, an Arawakan language spoken in Belize, Honduras, Nicaragua, and Guatemala. Garifuna is a typical VSO language with a very intricate agreement system. The sentences in (17) are transitive declarative sentences.

- (17) a. Chu l-umu-tu mutu ligiya Pam.  
 kiss 3m-tr.-3:f man that:m Pam ‘That man kissed Pam.’  
 b. Aliha t-umu-tu Abby garada.  
 read 3f-tr.-3:f Abby book ‘Abby read the book.’

Garifuna cleft formation involves two operations: i) fronting a focus NP to the sentence-initial position and ii) suffixing a verb with the “imperfect” auxiliary (cf. Munro 1997) *-ba*.<sup>1</sup> Thus, the cleft sentence corresponding to (17a) looks like (18).

- (18) John achuru-ba-nu Mary.  
 John kissed-BA-3:f Mary ‘It is John who kissed Mary.’

The same syntactic and morphological processes occur in Garifuna wh-question formation. A wh-phrase occurs in the sentence-initial position and the verb is marked by the auxiliary *-ba*. A wh-question corresponding to the sentence in (17b) in which the identity of the agent is questioned should look like the one in (19).

- (19) Ka aliha-ba-nu garada.  
 who read-BA-3:f book ‘Who read the book?’

I assume that Garifuna focus and wh-licensing take place in the pre-clausal position. Whatever the syntactic position that focus/wh-phrase is moved to, Garifuna data is significant with respect to focus/wh-licensing in that it involves one extra syntactic operation (movement of focus/wh-phrase to the pre-clausal position) as compared with OJ. At the same time, compared with Hungarian, it involves one extra morphological operation. This implies that languages differ with respect to how focus/wh-licensing is carried out. This is summarized in (20).



## (20) Typology of Wh-licensing as Focus

|              | movement?            | morphological operation? |
|--------------|----------------------|--------------------------|
| Old Japanese | x                    | adnominal form           |
| Hungarian    | pre-verbal position  | x                        |
| Garifuna     | pre-clausal position | auxiliary <i>-ba</i>     |

## 4. MJ Revisited

Typological observation reveals that treating wh-licensing as focus-licensing is not a mere coincidence in OJ. Then, what about MJ? Is MJ wh-licensing radically different from OJ wh-licensing? If so, how different? The answer to this question appears to be both negative and positive. In what follows, I show what has changed and what has not changed.

I showed above that the OJ A-clause corresponds to the MJ verb + *-no* structure. Suppose MJ question sentences ending with *-no* also constitute an A-clause as shown in (21).

- (21) OJ questions: [ ...  $\nabla$ adnominal]  
 MJ questions: [ ... V-*no*]

Then, the paradigm in (4)-(6) can be straightforwardly accounted for by the two assumptions in (22):

- (22) a. the particle *-ka* assigns a focus-index to the phrase in its c-command domain; and  
 b. wh-phrases represent focus

Under these assumption, (5b) can be represented as (23). By (22b), the wh-phrase *nani-o* is marked as F(ocus) and a focus-index is assigned to the *-no* headed clause by the particle *-ka*.

- (23) [Taroo-wa nani-o kat-ta-no]<sub>F</sub>-ka<sub>F</sub>?  
 |  
 F

On the other hand, (4b) should look like (24).

(24) [Taroo-wa nani-o kat-ta-no]?

|  
F

(23) ends up having two foci, which conflict with each other, as a result of focus-indexing. In contrast, no such conflict occurs in (24), since no focus-index is assigned due to the lack of the particle *-ka*. Note also that *-no*-clauses in (23) and (24) are A-clauses. Therefore, just as in OJ, they are subject to suppression; (23) must force the elements assigned a focus-index to be suppressed.

In yes-no questions such as (5a), focus indexing by *-ka* does not cause focus conflict since there is no focus-item inside the question. Wh-questions which have a predicate ending with the polite suffix *-mas(-u)* (cf. (6b)) pose an interesting question, to which I will return shortly.

The assumption in (22a) states that the function of the particle *-ka* has not changed between OJ and MJ. (22b) also states that nothing has changed: in OJ, wh-phrases are focus elements as they are in MJ.

## 5. FB and MC Focus Interpretations

The wh-question of the type (6b) is known to receive a focus interpretation somewhat different from the one in (25).

(25) Nani-o si-te i-ta-n(o) desu-ka?  
what-acc. do-TE exist-past-N(O) be:pres-Q

'What were you doing?', 'What is it that you were doing?'

Kuno 1982 and Takubo 1985 note that the wh-phrase in (6b) receives the "Multiple-Choice" (hereafter MC) focus interpretation (also see Masuoka 1991): the referent of the wh-phrase is chosen from a closed set of alternatives. On the other hand, the "Fill-in-the-Blank" (FB) focus interpretation is assigned to the wh-phrase in (25): the referent of the wh-phrase is chosen from an open set of alternatives. The question in (4b) also yields the FB focus interpretation for its wh-phrase. In this connection, consider the examples in (26).

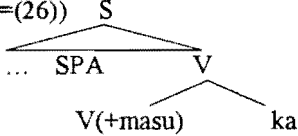
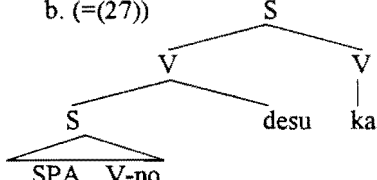
(26) ??Taroo-wa kono tokei-o Hanako-ni ageru-tame-ni kai-masi-ta-ka?  
-top. this watch-acc. -to give-purpose-for buy-polite-past-KA

'Did Taro buy this watch for the purpose of giving it to Hanako?'

The focus interpretation of the subordinate purpose adjunct (SPA) in (26) results in an anomaly because SPA usually does not allow an MC-focus. Note, however, these sentences are simply marginal for reasons I will reveal shortly. In contrast, (27) is fully acceptable. This is because the SPA is considered to be in the context where FB-focus interpretation is assigned.

- (27) Taroo-wa kono tokei-o Hanako-ni age-ru tame-ni kat-ta-no(-desu-ka)?  
 -top. this watch-acc. -to give-purpose-for buy-past-NO(-be-KA)

Following Kuno's 1982 original observation, Takubo 1985 proposes that the FB focus interpretation is given to a constituent within the c-command domain of a scope-bearing element such as *-ka*. In his analysis, which assumes a VP-less structure for Japanese, the c-command domain of *-ka* in (26) is limited to the verb to which *-ka* is adjoined. In contrast, the entire (embedded) clause is in the c-command domain of *-ka* in (27). The relevant structures are given in (28).

- (28) a. (=26)  b. (=27) 

Takubo concludes that when a focus element is within the c-command domain of the question particle *-ka*, FB-focus interpretation is given to a focus element.

Kobayashi 1993 argues against Takubo's structural analysis by citing a case where both questions of the type in (26)-(27) allow FB focus interpretation for SPA.

- (29) (At an elementary school Japanese language class, the teacher is asking the students about the content of the reading passage the students have just read):

T(eacher): Kitune-no Gon-wa, sore-kara, doko-ni iki-masi-ta-ka?  
 'After that where did Gon the fox go?'

S(tudents): Heizyuu-no uchi-desu.  
 'To the house of Heijuu.'

T: Soo desu-ne. 'That's right, isn't it?'

--->a. Gon-wa [kuri-o todoke-ru tame-ni] Heizyuu-nouchi-e iki-masi-ta-ka?

--->b. Gon-wa [kuri-o todoke-ru tame-ni] Heizyuu-nouchi-e it-ta-n desu-ka?

'Is it because Gon delivered chestnuts that he went to Heijuu's house?'

S: Eeto, at, hai soo-desu. 'Ummm, yep, yes, that's right.'

Both (a) and (b) questions in (29) allow FB focus interpretation for SPA. The focus of the question is the proposition of SPA and the proposition denoted by the remainder of the sentence has already been understood by both the questioner (teacher in this case) and the respondent (students). To be specific, it is understood that Gon has gone to Heizyu's house and presupposed from the previous discourse.

Kobayashi's observation is relevant to the present discussion because it shows how presupposition and focus interact in interpreting questions. The question in (29) receives FB focus primarily because the non-focus elements in the sentence are presupposed and therefore suppressed. On the other hand, no structural marking is given to the question in (29) to indicate which proposition is presupposed (and suppressed). The SPA in (29), which do not usually allow a MC focus interpretation, can be interpreted as representing a FB focus given an appropriate context. Hence, these cases result in lower acceptability, but not total ungrammaticality.

The observation above strongly suggests that presupposition which is given either structurally or contextually plays a crucial part in licensing focus. As noted above, the examples (26) which Kuno and Takubo cite are simply marginal sentences. Their acceptability is probably influenced by the lack of contextual implicature as independent sentences. Since *wh*-phrases are subject to the same focus interpretation, it is plausible to assume that *wh*-phrases in Japanese are licensed in-situ as focus.

Another interesting consequence of the current approach is that it straightforwardly accounts for the contrast in (2a) and (3). The WIC-based account cannot capture the contrast. Also, note that (2a) is not particularly bad for some speakers as Haig 1996 points out.

Then, the question is why (3) sounds much better than (2a). The presuppositional part of the cleft sentence in (3) presents two sets of entities: one fits an affirmative description of the event and the other fits a negative description. The *wh*-phrase in the focus position refers to an item included in either the affirmative or negative set. For instance, consider the situation described in (30), which lists the libraries from which Hanako did and did not check out books.

|      |                        |                                         |    |
|------|------------------------|-----------------------------------------|----|
| (30) |                        | whether or not Hanako checked out books |    |
|      | Research Library       | yes                                     |    |
|      | Undergraduate Library  |                                         | no |
|      | East Asian Library     | yes                                     |    |
|      | Health Science Library |                                         | no |
|      | Law Library            |                                         | no |
|      | Children's Library     | yes                                     |    |

In this situation, the question in (3) is felicitous.

On the contrary, no such presupposition is given by the embedded question (*ka-doo-ka* clause) in (2a). In fact, the *wh*-phrase (*nani* 'what') must identify a single item (or a set of items) which simultaneously participates and does not participate in a single event. Therefore, the source of lower acceptability of (2a) is semantic rather than syntactic. Thus, the WIC effect is nullified whenever the speaker can presuppose the existence of two sets of entities, one fitting to an affirmative description and the other, to a negative description of the event. Similar cases are cited in Haig 1996.

To conclude the discussion, in this paper, I have shown that 1) *wh*-licensing in Japanese can be carried out as in-situ-focus, rather than as commonly assumed syntactic operation; 2) there are languages in which *wh*-phrases are licensed as focus; and 3) focus interpretation is greatly influenced by how presupposition is represented either contextually or syntactically. As Haig 1996 argues, syntactic treatment of *wh*-licensing is limited in the range of cases which it explains; semantic and functional considerations offer a straightforward explanation of syntactic phenomenon.

## Notes

\* I would like to thank Shoichi Iwasaki and Kuo-ming Sung for discussion and criticisms for the ideas presented in this paper. All the errors, needless to say, are mine.

1. The auxiliary *-ba* also occurs in future tense sentences, imperative clauses, and 'because' clauses according to the data available to me. It appears that there are two types of *-ba* (Munro p.c.). However, I will leave this issue open.

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# EPP-driven XP Movement in Japanese\*

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## 1. Introduction

In this paper, I would like to examine Alexiadou and Anagnostopoulou (1998; henceforth A and A) and see what their analysis can tell us about a language like Japanese, which they did not discuss in detail. A and A argue that the way the EPP is checked is parameterized: either move/merge XP (raising of a DP in the standard way) or move/merge  $X^0$  (raising of a verb with [+D] agreement morphology). In addition, A and A claim that the languages which choose the latter option have pro-drop, (optional) VSO word order, and no Definiteness Restriction with post-verbal subjects. This option of move/merge  $X^0$  for satisfying the EPP is taken by Celtic, Arabic, Greek, and Spanish. Let's call these languages 'NSLs' (null-subject languages) following A and A. English, on the other hand, satisfies the EPP through move/merge XP and thus does not have any of these properties. Let's call these languages non-NSLs.

Their argument that EPP-checking is parameterized is based on two additional claims. The first claim is that the pre-verbal subject in NSLs is not in an A-position, but in an A'-position (cf. Barbosa 1994 and others). Secondly, they claim that VSO word order in NSLs does not involve an expletive *pro*, which has been standardly assumed (cf. Rizzi 1982). The lack of the Definiteness Restriction (DR effect) is claimed as evidence: VSO order in NSLs shows no DR effect. (Jaeggli 1982, Rizzi 1980, Burzio 1981, Chomsky 1981, Safir 1985, and others) Then, although there is no expletive *pro* in those languages, they claim that the EPP is 'strong,' and it is satisfied in another way, namely, via V-raising. According to A and A, checking the EPP by V-raising is possible in NSLs since the rich verb inflection contains [+D].

What prediction then would A and A make concerning languages like Japanese. Under their system, to be qualified move/merge  $X^0$  languages, verbal agreement is necessarily [+D]. Note that in move/merge  $X^0$  languages, several properties will follow, such as pro-drop, VSO word order, and lack of the DR effect. See the table below which summarizes the patterns discussed so far.

(1)

|          | Pro-drop | VSO | DR effect |
|----------|----------|-----|-----------|
| NSLs     | YES      | YES | NO        |
| Non-NSLs | NO       | NO  | YES       |
| Japanese | YES      | NO  | NO        |

From (1), we can see that Japanese shows some properties from both groups. In terms of pro-drop, Japanese follows the pattern for NSLs, and in terms of VSO word order and the DR effect, Japanese follows the pattern for non-NSLs.

In the sections below, I will examine exactly which option Japanese chooses: either move/merge XP or move/merge X<sup>0</sup>. I will argue that the EPP is always satisfied by subject raising in Japanese. Namely, subject raising is an obligatory and EPP-driven movement. In section 2, I will show that the surface subject position in Japanese is truly spec of IP. In section 3, I will show that subject raising in Japanese is EPP-driven. Unaccusative, passive and multiple nominative construction clearly show that subject raising is not due to Case or agreement reason, but motivated by checking [+D] feature in I<sup>0</sup>. As a consequence, I will further argue that there is no expletive *pro* in Japanese.

## 2. The Surface Position of the Subject in Japanese

In the literature, there are mainly two claims concerning the surface position of the subject in Japanese. One claim is that subjects in Japanese will never move from their base-generated position such as spec of VP and will remain in-situ in the syntax. (cf. Kuroda 1988, Fukui 1986) The other claim, on the contrary, is that subjects in Japanese do move to higher inflectional positions such as spec of IP in syntax. (cf. Ueda 1993, Tateishi 1994) In the following sections, I would like to argue that the latter claim is empirically supported. I will review several pieces of evidence to support the idea that subjects in Japanese do move and check off their relevant Formal Features (FFs) in syntax.

### 2.1 Case-marker drop

First, I will review evidence from the Case-marker drop phenomenon discussed by Ueda (1993). The apparent asymmetry between nominative and accusative Case-marker drop can be convincingly explained by assuming that the subject is in spec of IP, not in spec of VP under the VP internal subject hypothesis (ISH) (cf. Kuroda 1988, Kitagawa 1986, Koopman and Sportiche 1991 and others).



It is well known that there is an asymmetry between subject and object in terms of Case-marker drop in Japanese. Saito (1985) gives basic examples such as (2) and (3).<sup>1</sup>

- (2) Dare-\*(ga) sono hon-o katta no 'Who bought that book?  
 who-nom that book-acc bought Q
- (3) John-ga nani-(o) katta no 'What did John buy?'  
 John-nom what-acc bought Q

In (2), it is shown that when the nominative Case-marker is dropped, the sentence becomes unacceptable, but in (3) the accusative Case-marker can drop; in (3) omission of the accusative Case-marker *o* does not affect the acceptability of the sentence.

Based on this observation, Ueda (1993) claims the syntactic position of the noun phrase is the relevant factor. First, the simple generalization that 'nominative Case cannot drop, but accusative Case can' is not sufficient. There are some cases where accusative Case cannot drop, such as when an object DP bearing accusative Case is scrambled.

- (4) Nani-\*(o) John-ga *t* katta no 'What did John buy?'  
 what-acc John-nom bought Q

Here, the object DP *nani-o* 'what' is scrambled to the sentence initial position from a position adjacent to the verb. After the object is moved, the accusative Case-marker *o* cannot be dropped. In addition, the nominative Case-marker can drop when it is on the object of a stative predicate, namely in nominative object case. (see more on stative predicates in section 3.3)

- (5) John-ga nani-(ga) waku no 'What does John understand?'  
 John-nom what-nom understand Q

From (5), we can see nominative Case-marker can be dropped. From those facts, Ueda (1993) claims that if there is some movement, either A-movement or A'-movement, the Case-marker cannot drop. He formulates this generalization as (6).

- (6) The morphological realization of an abstract Case may be suppressed iff the noun phrase is in a theta-marked position. (11 in Ueda 1993)

The generalization (6) predicts that the Case-marker can be dropped in (3) and (5) since the DPs are in theta-marked positions. Also, Case-marker drop is not possible in (2) and (4) since some kind of movement is involved in those cases, and the DPs move out of their base-generated position. Thus, by (6) the asymmetry between subject and object in terms of Case-marker drop can be explained.<sup>2</sup> If we assume that the subject in Japanese is not in a theta-marked position in syntax, assuming that the subject is generated and theta-marked in spec of VP, the subject in Japanese must then move to a higher position; raising into spec of IP is the most plausible speculation.<sup>3</sup> Thus, the proposal that the subject is in spec of IP allows us to maintain the simple generalization about Case-marker drop in (6).

## 2.2 Floating Quantifier

Further evidence showing that the subject is in spec of IP comes from Floating Quantifiers (Ueda 1993, Miyagawa 1989). In (7), it is shown that sentence adverbs and time adverbs can intervene between a subject and its associated quantifier. Additionally, in (8), direct objects as well as indirect objects cannot intervene between a subject and its associated quantifier. The generalization is shown in (9).

- (7) a. **Gakusei**-ga unwaruku **sannin** sono ziko-ni at-ta  
 student-nom unfortunately three that accident met  
 'Unfortunately, three students were involved in that accident.'  
 b. **Gakusei**-ga kinoo **sannin** hon-o yonde-ita  
 student-nom yesterday three book-acc were reading  
 'Three students were reading books yesterday.'
- (8) a. \***Gakusei**-ga sono hon-o **sannin** yonda  
 students-nom that book-acc three read  
 'Three students read that book.'  
 b. \***Gakusei**-ga Mary-ni sannin tegami-o kaita  
 students-nom Mary-to three letter-acc wrote  
 'Three students wrote letters to Mary.'
- (9) If quantifiers are "floated" from subject noun phrase,  
 i) such adjuncts as sentence adverbs, subject-oriented adverbs, time adverbs, locatives and adverbial clauses may intervene between "floating" quantifiers and the subject noun phrases they modify, but  
 ii) internal arguments and manner adverbs may not. (Ueda 1993)

### 2.3 Distinction between scrambling and DP-movement

To show that (7) is an instance of DP movement and not an instance of scrambling, Ueda used reflexive binding where we can see the difference between scrambling and DP-movement. (10) shows that *zibunzisin* takes a local DP as an antecedent. So a local binder, which is *Mary* can bind this reflexive, but it cannot be bound by *John* in the matrix clause. (11) shows that the scrambled element cannot be qualified as an antecedent of *zibunzisin*. (data taken from Ueda 1993)

- (10) John<sub>i</sub>-ga [Mary<sub>j</sub>-ga zibunzisin<sub>i/j</sub>-o hihansita to] omotta.  
 John-nom Mary-nom self-acc criticized that thought  
 'John thought that Mary criticized herself/\*himself.'
- (11) John<sub>i</sub>-wa [Mary<sub>k</sub>-o zibunzisin<sub>i</sub>-ga t<sub>k</sub> kizutuketa to] omotta.  
 John-top Mary-acc self-nom hurt that thought  
 '(lit.) John thought that himself hurt Mary.'
- (12) \*John<sub>i</sub>-wa [tomodat<sub>k</sub>-ga [zibunzisin<sub>i</sub>-ga warukuti-o iwareta totanni]  
 John-top friend-nom self-nom bad thing was said as soon as  
 [t<sub>k</sub> hitori] nakidasita koto-o] oboeteiru  
 one started crying thing-acc remember  
 'John remembers that a friend of his started crying as soon as self was spoken ill of.'

In (11), *Mary-o* is scrambled from canonical object position, from which it cannot bind the reflexive. However, in (12), we can see that a DP separated by quantifier floating qualifies as an antecedent, and thus it can bind the reflexive. From this analysis, Ueda concludes that floating quantifiers are an instance of A-movement, and the subject raises into spec of IP by A-movement.

### 3. EPP-driven Movement in Japanese

In this section, I would like to show that there is EPP-driven subject movement in Japanese. In addition, the fact that subject raising is EPP-driven forces us to conclude that it always occurs; that movement is obligatory. The structures which I will go are the ones which can involve only one argument, such as unaccusatives and passives. In certain languages it is assumed that in those structures an expletive can be involved, and/or the subject appears in the post-verbal position.<sup>4</sup> We also expect to find another option: a DP raises (move XP) in those structures, instead of inserting an expletive (merge XP). We are

interested in seeing which option Japanese takes in these structures. Another structure I will examine is the multiple nominative construction. In that structure, several nominative-marked DPs occur (see section 3.3).

### 3.1 Unaccusative

In a language such as English, two different word orders are available with unaccusatives, as we see in (13). On one hand, the internal argument may raise to the subject position. On the other hand, it is also possible to fill the subject position with an expletive. Presumably, in (13b) the associate DP will raise at LF to check off any relevant features in such a case.

- (13) a. Three men<sub>i</sub> arrived  $t_i$ .  
 b. There arrived three men.

We have some tests to show that there is DP-raising in unaccusative constructions in Japanese. First, as I have shown previous sections, Case-marker drop can tell whether an element (DP) is in a theta-marked position or not.

- (14) a. San-nin-no otoko-ga Tokyo-ni tuita 'Three men arrived in Tokyo.'  
       3-cl-gen man-nom Tokyo-loc arrived  
 b. Dare-\*(ga) Tokyo-ni tuita-no 'Who arrived (in Tokyo)?'  
       who-nom Tokyo-loc arrived-Q

As shown in (14b), the subject of an unaccusative cannot drop its Case-marker. If there were no DP movement, that is, if it stayed in spec of VP, the Case-marker would be able to be dropped. However, in (14b), unavailability of Case-marker drop clearly shows that there is some obligatory overt DP movement, and that the subject moves out of VP.

### 3.2 Passive

The passive is another construction in which either DP movement to the subject position can occur or an expletive can be inserted to satisfy the EPP. We can use the Case-marker drop test to confirm that there is overt movement of the DP in passive constructions in Japanese.

- (15) a. Sanin-no gakusei-ga Hanako-ni ker-arc-ta  
       3-cl-gen student-nom Hanako-by was kicked  
       'Three students were kicked by Hanako.'

- b. Dare-\*(ga) Hanako-ni ker-are-ta-no 'Who was kicked by Hanako?'  
 who-nom Hanako-by was kicked-Q

As (15b) shows, when the Case-marker is dropped from the subject, the sentence is ungrammatical. This fact confirms that the subject of a passive undergoes overt movement in syntax.

### 3.3 Multiple Nominative Construction

In this section, I would like to examine the multiple nominative construction in Japanese. This construction gives us an idea how Case (and possibly phi-features) works in Japanese clause structure. Especially I would like to argue that among those multiple nominative-marked elements, only one of them has raised out of VP. I will argue that the EPP can explain this fact.

(16) shows a multiple nominative construction in Japanese.

- (16)a. John-ga furansugo-**ga** wakaru 'John can speak French.'  
 John-nom French-**nom** understand  
 b. \*John-ga furansugo-**o** wakaru  
 John-nom French-**acc** understand

What interests us is where each DP with nominative Case-marker is in (16a). We might have three different possibilities; (i) both of them are in subject position (outside of VP), (ii) both of them are within VP, or (iii) the first one is in subject position, and the other is within VP. I will argue that the last option is right.

I will show that nominative-marked DPs are able to check their Case off at LF. It is very important to see this because one might suppose that nominative-marked objects can check their Case off at a different position from nominative-marked subjects. Specifically, I assume that one Case (such as nominative) will be checked off eventually by the same head: a head can be in a checking relation with several elements if there are several elements with appropriate features.<sup>5</sup> Then in a clause, there is one position for nominative Case-marked element(s), and one position for an accusative Case-marked element. As I have shown, only one nominative Case-marked DP is allowed to undergo checking in the syntax. Example (17), introduced by Tada (1992), shows that other nominative Case-marked DPs (or only FFs since it is covert feature raising) covertly raise at LF.

- (17) a. John-ga migime-dake-**o** tumur-eru  
 John-nom right.eye-only-**acc** close-can  
 i) can>only (John can wink his right eye.)  
 ii) \*?only>can (It is only his right eye that he can close.)
- b. John-ga migime-dake-**ga** tumur-eru  
 John-nom right.eye-only-**nom** close-can  
 i) \*can>only  
 ii) only>can  
 'John can close only his right eye.'

There is a scope difference between (17a) and (17b). In (17a), a DP with *dake* 'only' and with an accusative marker cannot have wide scope. However, the same DP with nominative marker must have wide scope. This observation indicates that the FFs of the nominative-marked DP will raise to a higher position (as high as the subject position), presumably for Case checking reasons at LF.

There is another example showing LF raising of nominative Case-marked DPs. In multiple nominative constructions, a nominative-marked DP in object position can control PRO in adjunct clauses, even though PRO proceeds the DP object in terms of linear order, but an accusative marked DP object cannot. (cf. Ono 1998, 1999)

- (18) a. Taro-ga [PRO jikosyokaimo sinai uti kara] Mary-**ga** sukini-natta  
 Taro-nom self-introduce do not before Mary-**nom** like-became  
 'Taro came to like Mary before s/he introduced her/himself.'
- b. Taro-ga [PRO jikosyokaimo sinai uti kara] Mary-**o** sukini-natta  
 Taro-nom self-introduce do not before Mary-**acc** like-became  
 'Taro came to like Mary before he introduced himself.'

Again we can explain this fact if we assume that a nominative Case-marked DP can raise covertly to a position where it can control PRO in the structure, but, an accusative marked DP cannot.

Above, I have shown that elements with the same Case-marker eventually check their Case at the same position. Specifically, the nominative object undergoes covert movement to check its Case feature off. However, two nominative-marked elements are apparently in different surface positions. Next, I will show that there is overt movement in multiple nominative constructions in Japanese by using Case-marker drop phenomenon. Recall that Case-marker drop is allowed only if the element is in a theta-marked position. In (19), we see the Case-marker drop possibilities in multiple nominative constructions.

- (19) a. Taro-ga furansugo-ga wakaru. 'Taro can understand French.'  
       Taro-nom French-nom understand  
       b. Dare-ga nani-ga wakaru-no 'Who can understand what?'  
       who-nom what-nom understand-Q  
       c. \*Dare-ø nani-ga wakaru-no  
       d. Dare-ga nani-ø wakaru-no

Here, the Case-marker of the nominative object can be dropped, while the Case-marker of the subject cannot be dropped. If the generalization that Case-marker drop is possible when the element is in a theta-marked position is true, we can conclude that in multiple nominative constructions, the subject is out of VP, meaning that it overtly moves in the syntax, and that the nominative object remains within VP in the syntax.

So far, I have shown that in multiple nominative constructions in Japanese, there is one nominative-marked element that has to raise overtly. In addition to that, the other nominative marked DP remains inside VP in the syntax, and the FFs will raise at LF. Crucially, this is consistent with the idea that those overt raisings are EPP-driven movement.<sup>6</sup> If they were Case-driven movement (i.e. suppose [+nominative] were strong), for example, we might expect that all nominative-marked DPs would have to raise overtly. However, this is not the case: we can see this clearly from multiple nominative constructions. Thus, it is most plausible to conclude that they are truly EPP-driven movement, so only movement of one DP is required: no more than one, no less than one.

If this conclusion is on the right track, we can also say that Japanese does not have phonetically null expletive.<sup>7</sup> If Japanese had an expletive, it would be possible to insert an expletive to satisfy the EPP. However, we saw that the overt subject raising is obligatory. We did not see any of the options which we saw in (13) for English. It seems that Japanese does not have the options that English has.<sup>8</sup>

#### 4. Concluding Remarks

In this paper, I have mainly shown two things. First, canonical subject position is spec of IP in Japanese. Second, that movement into spec of IP is EPP-driven. Remember that Japanese is pro-drop language, and Japanese does not have an overt expletive. Those properties are characteristic of languages which choose the move/merge  $X^0$  option, such as Greek and Spanish, and in which the EPP

seems to be satisfied by overt V-raising, according to A and A'. How can we analyze those in coherent way?

From the facts I have shown, I would like to emphasize that overt subject raising in Japanese is EPP-driven. As a matter of fact, this supports A and A's idea that the EPP can be strong even in a language without an expletive. As well as Greek and Spanish, Japanese is another instance of this type of language. Obligatory subject raising in Japanese also explains why we do not see the DR effect. Since a post-verbal subject never occurs, we do not see the DR effect in this language.

Finally, in Greek and Spanish, note that a cluster of properties seem to be related to the availability of V-raising. However, the lack of an expletive in Japanese is not related to V-raising. Thus, I can speculate that another property, such as pro-drop, is also related but for some completely different reasons than found in languages such as Greek and Spanish.

## Notes

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<sup>1</sup> For examples such as (2) and (3), a *wh*-phrase such as *dare* is used to disambiguate topic marker drop from nominative marker drop. In Japanese, the topic marker is almost free to drop, but it cannot attach to a *wh*-phrase.

(i) \*Dare-wa sono hon-o katta no 'Who bought that book?'  
 who-top that book-acc bought Q

This incompatibility between a *wh*-phrase and a topic marker is perhaps related to the fact that bare quantifiers cannot be topics, as is found in some Romance languages for example. (c.f. Rizzi 1997)

<sup>2</sup> The generalization (6) works for nominative and accusative Case marker. However, it is not clear how it can explain other Case markers such as topic marker *wa*, which can be dropped relatively freely. I keep the exact nature of Case-marking for further research.

<sup>3</sup> It may be possible to state that Case marker drop is possible when checking occurs covertly, and it is not possible when checking occurs overtly. That is, the object in Japanese checks off its FFs covertly. This object raising at LF is supported by Koizumi (1995) based on different phenomena, such as scope interaction. This idea will not be explored further here.

<sup>4</sup> In some languages, it is possible to use an expletive in other cases, such as the Transitive Expletive Construction (TEC) found in languages such as Icelandic, German, Dutch, Faroese, I, Frisian, and Yiddish.

<sup>5</sup> Here, we may need the multiple specifier analysis proposed by Ura (1996). In his analysis, one head can project multiple specifiers. This enable several nominative marked elements to check off their Case against one head. In this particular nominative object construction, however, we need just one specifier for one DP which overtly raises. For the second DP, since it checks its Case by LF



feature attraction, the feature will be checked by adjoining directly to the head. For a more detailed analysis for multiple specifiers, see Ura (1996) and the works cited there.

<sup>6</sup> There is another possible analysis. In English multiple *wh* question, one and only one *wh* element raises overtly, and the rest remain in situ.

- (i) Who knows what?
- (ii) \*Who, what, knows?

Another analysis can be that nominative Case checking works in the same way as a *wh* operator does, that is, one element has to undergo checking overtly. I will leave this point for further research.

<sup>7</sup> See more detailed discussion regarding an expletive *pro* in Ono (1999).

<sup>8</sup> We have to note that an instance of overt raising does not automatically allow us to conclude that there is no expletive in a language. Like English, some languages have options: either overt raising of DP or inserting an expletive. The important fact here is that overt raising is required in Japanese. There seems to be no option other than an overt raising.

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# Productivity of Korean Partial Reduplication

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## 1. Introduction

Korean partial reduplication is semantically characterized by a lengthening or temporal extension of the base form (Jun 1994: 69). For example, a partially reduplicated form *p<sup>h</sup>adadak*, derived from the base *p<sup>h</sup>adak* that denotes a splash of a fish, creates the image of lengthened splash.

Although considerable research has been devoted to Korean partial reduplication since McCarthy and Prince (1986: 54) introduced a type of Korean partial reduplication as an example of infixational reduplication, no attention has been paid to the productivity of Korean partial reduplication. Previous studies have tended to focus on the analysis of a type of Korean partial reduplication within a specific phonological framework. None of the previous studies have stated about how frequently they occur or how productive they are.

A study of productivity is important in that we can see whether a particular type of Korean partial reduplication is dead or alive. The present study will provide answers to how frequently types of partial reduplication occur through a comprehensive investigation of the partial reduplicated forms listed in Yoo's (1985) *A Reverse Dictionary of Modern Korean* and an experiment. On the other hand, the present study will examine how productive each type of partial reduplication is through an experiment. Consequently, the present study will specify what type of partial reduplication is how productive in what context.

Productivity is a relative and comparative notion, as pointed out in Bauer (1988:57) and Katamba (1993:67). On the other hand, Bybee (1985:132-134) addressed the issue of productivity in a somewhat different way. She argued that, separating "token frequency" from "type frequency" of the instances of alternate processes for expressing the same category, productivity must be connected to high type frequency. The present study will employ the way Bybee (1985) explained productivity, that is, productivity must be connected to high type frequency.

## 2. Korean Partial Reduplication

It is necessary to survey the partially reduplicated forms listed in the dictionary to give a holistic picture of Korean partial reduplication. 3,234 ideophones listed in Yoo's (1985) *A Reverse Dictionary of Modern Korean*, were investigated. The dictionary survey is a preliminary analysis to investigate productivity of Korean partial reduplication, since the dictionary survey provides the basis of the experiment. The dictionary survey will be followed by an experiment.

### 2.1 Dictionary survey

Partially reduplicated forms (PRFs) are usually classified in terms of the shape of the reduplicant and the position of the reduplicant. However, it is necessary to consider epenthesis as a criterion in Korean partial reduplication, since a type of partial reduplication is accompanied by epenthesis. Korean partial reduplication will be analyzed in terms of the shape of the reduplicant, the position of the reduplicant, and epenthesis.

First, Korean partial reduplication can be analyzed in terms of the shape of the reduplicant. The reduplicant takes the shape of C(C)V(C). It must have an onset while codas are optional. Complex onsets are allowed in the reduplicant while complex codas are not. When the reduplicant has a complex onset, the second C must be a glide. Examples showing the shapes of the reduplicant are provided in (1). The underlined and bold-faced string represents the reduplicant. \* stands for a laryngealized obstruent (Ladefoged and Maddieson 1996).

(1) Examples showing the shapes of the reduplicant

| <i>PRFs</i>          | <i>Gloss</i>                 |
|----------------------|------------------------------|
| a. tʃurur <u>ruk</u> | “with an image of dripping”  |
| b. k*wag <u>waŋ</u>  | “with an image of explosion” |
| c. hudakt <u>tak</u> | “in a flurry”                |

As can be seen in the examples, the reduplicant takes the shape of CV as in (1a), CCV as in (1b), or CVC as in (1c). The alternation between [k] and [g] in (1b) and between [d] and [t] in (1c) are due to a phonological rule that plain (unaspirated and unlaryngealized) stops between two vowels become voiced. Voiceless plain stops are not allowed in intervocalic positions in Korean.

Second, Korean partial reduplication can be analyzed in terms of the position of the reduplicant. The reduplicant is prefixed, suffixed, or infix. Examples showing the positions of the reduplicant are given in (2).

(2) Examples showing the positions of the reduplicant

|    | <i>PRFs</i>       | <i>Gloss</i>                |
|----|-------------------|-----------------------------|
| a. | <b>tu</b> duŋcil  | 'with an image of floating' |
| b. | hudak <b>ta</b> k | 'in a flurry'               |
| c. | k* <b>e</b> geŋ   | 'with an image of whining'  |

As can be seen in examples, the reduplicant is prefixed, suffixed, or infix. The reduplicant is prefixed at the left edge of the base in (2a), suffixed at the right edge of the base in (2b), and infix one segment in from the right edge of the base in (2c).

Finally, Korean partial reduplication can be analyzed in terms of epenthesis. The inserted vowel is an unround high back vowel, /ɯ/. The epenthetic vowel occurs at the end of the root form, forming part of the base. Examples showing epenthesis are given in (3), where the inserted vowel is italicized.

(3) Examples showing epenthesis

|  | <i>PRFs</i>                 | <i>Gloss</i>                 |
|--|-----------------------------|------------------------------|
|  | s <sup>h</sup> aru <u>ɯ</u> | 'softly'                     |
|  | pandzir <u>ɯ</u>            | 'with an image of polishing' |

As can be seen in examples, the vowel occurs between the base and reduplicant. The alternation between [l] and [r] is due to a phonological rule that changes a lateral into a flap in intervocalic positions. A single lateral is not allowed in intervocalic positions in Korean.

Five types of partial reduplication are observed in the dictionary. The frequency of each type is provided in (3).

(3) Frequency of types of partial reduplication

| <i>Type</i>                         | <i>f</i> | <i>%</i> |
|-------------------------------------|----------|----------|
| CV, Suffixation, and Epenthesis     | 109      | 66.1     |
| CV, Infixation, and No epenthesis   | 47       | 28.5     |
| CVC, Infixation, and No epenthesis  | 6        | 3.6      |
| CVC, Suffixation, and No epenthesis | 2        | 1.2      |
| CV, Prefixation, and No epenthesis  | 1        | 0.6      |
| Total                               | 165      | 100      |

As can be seen in (3), the CV, suffixation, epenthesis type is the most common among all the types. It accounts for 66.1 % of all PRFs.

PRFs can also be analyzed in terms of the three criteria by which PRFs were classified, that is, the shape of the reduplicant, the position of the reduplicant, and epenthesis. First, the PRFs listed in the dictionary were analyzed in terms of the shape of the reduplicant. The frequency of PRFs in terms of the shape of the reduplicant is provided in (4).

(4) Frequency of PRFs by the shape of the reduplicant

| <i>Shape of the reduplicant</i> | <i>f</i> | <i>%</i> |
|---------------------------------|----------|----------|
| CV                              | 157      | 95.2     |
| CVC                             | 8        | 4.8      |
| Total                           | 165      | 100      |

As can be seen in (4), the percentage of PRFs with CV-shaped reduplicant is by far greater than that with CVC-shaped reduplicant.

Second, the PRFs listed in the dictionary were analyzed in terms of the position of the reduplicant. The frequency of the PRFs in terms of the position of the reduplicant is provided in (5).

(5) Frequency of PRFs by the position of the reduplicant

| <i>Position of the reduplicant</i> | <i>f</i> | <i>%</i> |
|------------------------------------|----------|----------|
| SUFFIXATION                        | 111      | 67.3     |
| INFIXATION                         | 53       | 32.1     |
| PREFIXATION                        | 1        | 0.6      |
| Total                              | 165      | 100      |

As can be seen in (5), the percentage of PRFs with the reduplicant suffixed is greater than that with the reduplicant prefixed or infixes.

Finally, the PRFs listed in the dictionary were analyzed in terms of epenthesis. The frequency of the PRFs in terms of epenthesis is provided in (6).

(6) Frequency of PRFs by epenthesis

| <i>Epenthesis</i> | <i>f</i> | <i>%</i> |
|-------------------|----------|----------|
| EPENTHETIC        | 109      | 66.1     |
| NONEPENTHETIC     | 56       | 33.9     |
| Total             | 165      | 100      |

As can be seen in (6), the percentage of PRFs accompanied by epenthesis is much greater than that of those without epenthesis.

To sum up, PRFs with a CV-shaped reduplicant are more common than those with a CVC-shaped reduplicant. PRFs with the reduplicant suffixed are more common than those with the reduplicant infix or prefixed. PRFs accompanied by epenthesis are more common than those without epenthesis.

On the other hand, it is necessary to examine in what context PRFs are derived. The dictionary survey showed that more PRFs are derived from the disyllabic roots or roots ending with a dorsal or lateral than the others. Therefore, the PRFs listed in the dictionary will be analyzed in terms of syllable type and final consonant of the roots. In doing so, the frequency of the roots from which PRFs are derived will be provided. In addition, the frequency of the roots without PRFs will also be provided to compare the distribution of the two groups, which will give some hints about productivity of Korean partial reduplication.

First, the PRFs listed in the dictionary were analyzed in terms of the syllable count. The frequency of the ideophone roots with PRFs and the ideophone roots without them in terms of the syllable count is given in (7). WITH stands for the ideophone roots with PRFs, while WITHOUT for those without PRFs. The total number in WITH group (165) represents the total number of the roots with PRFs while that in WITHOUT the total number of the roots without PRFs (1658), hence the sum of both numbers means the total number of ideophone roots, that is 1823.

(7) Frequency of the two ideophone root groups by the syllable count

| Syllable count | WITH |      | WITHOUT |      |
|----------------|------|------|---------|------|
|                | f    | %    | f       | %    |
| DISYLLABIC     | 102  | 61.8 | 1473    | 88.8 |
| MONOSYLLABIC   | 63   | 38.2 | 185     | 11.2 |
| Total          | 165  | 100  | 1658    | 100  |

As can be seen in (7), PRFs are derived more frequently from disyllabic roots than from monosyllabic roots.

Chi-square test was conducted to test a significant difference in the distribution of the two data sets. SPSS was employed as a statistical analysis program. The null hypothesis that the distribution in the ideophone roots with PRFs is the same as in those without PRFs with respect to the syllable count was tested at  $\alpha = .05$ . There was a significant difference between the two groups ( $p = .000$ ). It means that PRFs are derived more from monosyllabic roots than expected. It implies that partial reduplication is more productive with monosyllabic ideophone roots than with disyllabic ideophone roots.

Second, the PRFs listed in the dictionary were analyzed in terms of the final syllable. The frequency of the ideophone roots with PRFs and those without PRFs in terms of the final syllable is given in (8).

(8) Frequency of the two ideophone root groups by the final syllable

| <i>Final syllable</i> | WITH     |     | WITHOUT  |      |
|-----------------------|----------|-----|----------|------|
|                       | <i>f</i> | %   | <i>f</i> | %    |
| CLOSED                | 165      | 100 | 1560     | 94.1 |
| OPEN                  | 0        | 0   | 98       | 5.9  |
| Total                 | 165      | 100 | 1658     | 100  |

As can be seen in (8), PRFs are derived only from roots ending with a consonant.

The null hypothesis that the distribution of the ideophone roots with PRFs is the same as in those without PRFs with respect to the final syllable was tested at  $\alpha = .05$ . There was a significant difference between the two groups ( $p = .002$ ). It means that PRFs are derived more from closed ideophone roots than expected. It implies that partial reduplication is more productive with closed ideophone roots than with open ideophone roots.

Third, the PRFs were analyzed in terms of the final consonant class. In Korean, the final syllable ends with only one of the seven consonants: stops [p, t, k], nasals [m, n, ŋ], or a lateral [l]. Laryngealized or aspirated consonants, fricatives, or affricates are not allowed in coda positions. This is due to neutralization occurring in the coda of Korean syllables. The seven consonants are classified into 4 different groups: LABIAL([p, m]), CORONAL([t, n]), DORSAL([k, ŋ]), and LATERAL([l]).

The distribution of the ideophone roots with PRFs was compared to that of the ideophone roots without PRFs. The frequency of the ideophone roots with PRFs and those without them in terms of the final consonant class is given in (9).

(9) Frequency of the two ideophone root groups by the final consonant class

| <i>Final consonant class</i> | WITH     |      | WITHOUT  |      |
|------------------------------|----------|------|----------|------|
|                              | <i>f</i> | %    | <i>f</i> | %    |
| LATERAL                      | 105      | 63.6 | 284      | 18.2 |
| DORSAL                       | 47       | 28.5 | 931      | 59.7 |
| CORONAL                      | 13       | 7.9  | 240      | 15.4 |
| LABIAL                       | 0        | 0    | 105      | 6.7  |
| Total                        | 165      | 100  | 1560     | 100  |



As can be seen in (9), PRFs are derived more frequently from roots ending with a lateral than those ending with the others.

The null hypothesis that the distribution of the ideophone roots with PRFs is the same as in those without PRFs with respect to the final consonant class was tested at  $\alpha = .05$ . There was a significant difference between the two groups ( $p = .000$ ). It means that PRFs are derived more from the ideophone roots ending with a lateral than expected. It implies that partial reduplication is more productive with the ideophone roots ending with a lateral than those ending with the others.

To sum up, PRFs derived from disyllabic or closed roots are more common than the others. For the PRFs derived from C-final roots, PRFs whose root ends with a dorsal are more common than those ending with the others. On the other hand, the comparisons of the ideophone roots with PRFs to those without PRFs showed that PRFs are derived more from the ideophone roots which are monosyllabic or end with a lateral than expected. It implies that partial reduplication is more productive with monosyllabic roots ending with a lateral than elsewhere.

## 2.2 Experiment

It was pointed out that productivity must be related to high type frequency. An experiment is necessary to calculate type frequency. The results of the experiment will be analyzed in the linguistic contexts specified in the previous section: the shape and position of the reduplicant, and epenthesis; the syllable count, the final syllable, and the final consonant class of the root.

Twenty native Korean speakers were asked to provide a partially reduplicated form for a given root if they thought a partially reduplicated form could be derived from the given root and to mark 'X' otherwise.

The questionnaire consists of 50 ideophone roots. They were randomly selected from the ideophone roots without PRFs. Korean ideophone root pool consists of 1,823 items, which were sorted in reverse alphabetical order. The 165 roots with PRFs were excluded, leaving 1,658 roots without PRFs. From the remaining 1,658 roots, every 33<sup>rd</sup> ideophone root was selected to constitute the questionnaire for the experiment. This questionnaire consisting of the ideophone roots without PRFs is effective to confirm that Korean partial reduplication is not productive as a whole, if subjects provided few PRFs. On the other hand, it is helpful to see how the results of the experiment are different from the dictionary survey, even if subjects provide quite a few PRFs.

The results of the experiment were 20 native Korean subjects' responses to the 50 ideophone roots in the questionnaire. The number of PRFs provided by each

subject ranges from 2 to 27. The total number of PRFs provided by 20 subjects was 261, which accounts for 26.1 % of all the responses. The results of the experiment provided 6 types of partial reduplication. The frequency of each type is given in (10).

(10) Frequency of types of partial reduplication

| <i>Type</i>                         | <i>f</i> | <i>%</i> |
|-------------------------------------|----------|----------|
| CV, Infixation, and No epenthesis   | 133      | 50.9     |
| CV, Prefixation, and No epenthesis  | 48       | 18.4     |
| CV, Suffixation, and Epenthesis     | 43       | 16.5     |
| CVC, Suffixation, and No epenthesis | 35       | 13.4     |
| CV, Suffixation, and No epenthesis  | 1        | 0.4      |
| CVC, Prefixation, and No epenthesis | 1        | 0.4      |
| Total                               | 261      | 100      |

As can be seen in (10), the CV, infixation, no epenthesis type is the most common of all the types.

The results of the experiment were analyzed in terms of the shape of the reduplicant, the position of the reduplicant, and epenthesis. First, the results of the experiment were analyzed in terms of the shape of the reduplicant. The frequency of PRFs by the shape of the reduplicant is given in (11).

(11) Frequency of PRFs by the shape of the reduplicant

| <i>Shape of the reduplicant</i> | <i>f</i> | <i>%</i> |
|---------------------------------|----------|----------|
| CV                              | 225      | 86.2     |
| CVC                             | 36       | 13.8     |
| Total                           | 261      | 100      |

As can be seen in (11), the percentage of PRFs whose reduplicant lacks a coda is greater than that of those whose reduplicant has a coda.

Second, the results of the experiment were analyzed in terms of the position of the reduplicant. The frequency of PRFs by the position of the reduplicant is given in (12).

(12) Frequency of PRFs by the position of the reduplicant

| <i>Position of the reduplicant</i> | <i>f</i> | <i>%</i> |
|------------------------------------|----------|----------|
| INFIXATION                         | 133      | 50.9     |
| SUFFIXATION                        | 79       | 30.3     |
| PREFIXATION                        | 49       | 18.8     |
| Total                              | 261      | 100      |

As can be seen in (12), the percentage of PRFs with the reduplicant infix is greater than that of PRFs with the reduplicant suffixed or infix.

Finally, the results of the experiment were analyzed in terms of epenthesis. The frequency of PRFs by epenthesis is given in (13)

(13) Frequency of PRFs by epenthesis

| <i>Epenthesis</i> | <i>f</i> | <i>Percentage</i> |
|-------------------|----------|-------------------|
| NONEPENTHETIC     | 218      | 83.5              |
| EPENTHETIC        | 43       | 16.5              |
| Total             | 261      | 100               |

As can be seen in (13), the percentage of PRFs not accompanied by epenthesis is greater than that of PRFs accompanied by epenthesis.

To sum up, partial reduplication occurred more frequently when the reduplicant lacks a coda than when the reduplicant has a coda. Infixational partial reduplication occurs more frequently than suffixational or prefixational partial reduplication. Nonepenthetic partial reduplication occurs more frequently than epenthetic one. Consequently, infixational and nonepenthetic partial reduplication with the reduplicant without a coda occurred most frequently in the experiment.

On the other hand, the results of the experiment can be analyzed in terms of the syllable count, the final syllable, and the final consonant class of the root. First, the results of the experiment were analyzed in terms of the syllable count of the root. The frequency of the ideophone roots with PRFs and those without PRFs is given in (14). PART stands for the ideophone roots with PRFs in the experiment, while NONPART for the ideophone roots without PRFs.

(14) Frequency of the two ideophone root groups by the syllable count

| <i>Syllable count</i> | PART     |          | NONPART  |          |
|-----------------------|----------|----------|----------|----------|
|                       | <i>f</i> | <i>%</i> | <i>f</i> | <i>%</i> |
| DISYLLABIC            | 217      | 83.1     | 663      | 89.7     |
| MONOSYLLABIC          | 44       | 16.9     | 76       | 10.3     |
| Total                 | 261      | 100      | 739      | 100      |

The null hypothesis that the distribution in the ideophone roots with PRFs is the same as in those without PRFs with respect to the syllable count was tested at  $\alpha = .05$ . There was a significant difference between the two groups ( $p = .005$ ). It means that PRFs are derived more from monosyllabic roots than expected. It

is interpreted that partial reduplication is more productive with monosyllabic ideophone roots than with disyllabic ideophone roots.

Second, the results of the experiment were analyzed in terms of the final syllable of the root. The distribution of the ideophone roots with PRFs was compared to that of the ideophone roots without PRFs. The frequency of the 2 groups in terms of the final syllable of the root is given in (15).

(15) Frequency of the two ideophone root groups by the final syllable

| <i>Final syllable</i> | PART     |      | NONPART  |      |
|-----------------------|----------|------|----------|------|
|                       | <i>f</i> | %    | <i>f</i> | %    |
| CLOSED                | 257      | 98.5 | 703      | 95.1 |
| OPEN                  | 4        | 1.5  | 36       | 4.9  |
| Total                 | 165      | 100  | 738      | 100  |

The null hypothesis that the distribution of the ideophone roots with PRFs is the same as in those without PRFs with respect to the final syllable of the root was tested at  $\alpha = .05$ . There was a significant difference between the two groups ( $p = .018$ ). It means that PRFs are derived more from closed ideophone roots than expected. It is interpreted that partial reduplication is more productive with closed ideophone roots than with open ideophone roots.

Third, the results of the experiment were analyzed in terms of the final consonant class of the root. The distribution of the ideophone roots with PRFs was compared to that of the ideophone roots without PRFs. The frequency of the ideophone roots with PRFs and those without PRFs in terms of the final consonant class of the root is given in (16).

(16) Frequency of the two ideophone root groups by the final consonant class

| <i>Final consonant class</i> | PART     |      | NONPART  |      |
|------------------------------|----------|------|----------|------|
|                              | <i>f</i> | %    | <i>f</i> | %    |
| DORSAL                       | 130      | 50.6 | 270      | 38.4 |
| LATERAL                      | 93       | 36.2 | 167      | 23.8 |
| CORONAL                      | 28       | 10.9 | 192      | 27.3 |
| LABIAL                       | 6        | 2.3  | 74       | 10.5 |
| Total                        | 257      | 100  | 703      | 100  |

The null hypothesis that the distribution of the ideophone roots with PRFs is the same as in those without PRFs with respect to the final consonant class of the root was tested at  $\alpha = .05$ . There was a significant difference between the two groups ( $p = .000$ ). It means that PRFs are derived more from the ideophone roots ending with both a dorsal and a lateral than expected. It is interpreted that

partial reduplication is more productive with the ideophone roots ending with a dorsal or a lateral than with those ending with the others.

To sum up, partial reduplication occurred more frequently when the roots are disyllabic or end with a dorsal than elsewhere. On the other hand, the comparisons of the ideophone roots with PRFs to those without PRFs showed that PRFs were derived more from the ideophone roots which are monosyllabic or end with a dorsal or a lateral than expected. It was interpreted that partial reduplication is more productive with monosyllabic roots ending with a dorsal or lateral than elsewhere.

### 3. Conclusion

The dictionary lists 165 PRFs. The ratio of PRFs to all the ideophone roots is no more than 9.1%. The CV, suffixation, epenthesis type is the most common in the dictionary. The dictionary survey showed that PRFs occurred more frequently when the reduplicant lacks a coda or is suffixed or accompanied by epenthesis than elsewhere and that PRFs occurred more frequently when the root is disyllabic or ends with a lateral than elsewhere.

On the other hand, the experiment provided 261 PRFs. The ratio of PRFs to all the ideophone roots is 26.1 %. The CV, infixation, no epenthesis type occurs more frequently than the others. The results of the experiment showed that partial reduplication occurs more frequently when the reduplicant lacks a coda or is infixated or not accompanied by epenthesis than elsewhere and that partial reduplication occurs more frequently when the roots are disyllabic or end with a dorsal than elsewhere.

The comparisons of the distributions of the ideophone roots with PRFs and those without PRFs in the dictionary survey implied that partial reduplication is more productive with monosyllabic ideophone roots than with disyllabic ideophone roots, that partial reduplication is more productive with closed ideophone roots than with open ideophone roots, and that partial reduplication is more productive with the ideophone roots ending with a lateral than with those ending with the others. However, it was pointed out that productivity must be related to type frequency. In that sense, productivity can not be stated with the results of the dictionary survey but with the results of the experiment. The comparisons of the ideophone roots with PRFs to those without PRFs in and the experiment showed that partial reduplication is more productive with monosyllabic roots than with disyllabic ideophone roots, that partial reduplication is more productive with closed ideophone roots than with open ideophone roots, and that partial reduplication is more productive with the

ideophone roots ending with a lateral or a dorsal than those ending with the others. It is notable that those comparisons showed no difference between the dictionary survey and the experiment but that partial reduplication is also more productive with ideophone roots ending with a dorsal in the experiment.

Consequently, the results of the dictionary survey and the experiment demonstrate that Korean partial reduplication is working only in restricted contexts.

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# Negative Inversion in African American Vernacular English: A Case of Optional Movement?<sup>1</sup>

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## 1 Introduction

On minimalist assumptions about language design, optional syntactic movement is ruled out in principle. At any point in a derivation, movement is either forced by the need to eliminate an uninterpretable feature, or prohibited by economy considerations.<sup>2</sup> Specifically, when possible Merge (or Agree) is always preferred over the more complex operation Move. The African American Vernacular English Negative Inversion (NI) construction, first described by Labov, Cohen, Robins, and Lewis (1968), is an apparent counterexample to these crucial assumptions. NI is illustrated in (1):<sup>3</sup>

(1) Don't nobody break up a fight. (L)

NI constructions are declaratives, not questions or imperatives, so (1) means something like “nobody breaks up a fight.” However, as shown in (2), negative sentences need not be inverted. NI is optional:

(2) Nobody don't know where it's at. (L)

At first glance, then, NI seems to involve optional movement—the auxiliary can be optionally raised above the subject NP in a negated declarative sentence. This raises two questions. First, is NI a real case of optional syntactic movement? Second, can syntactic variation and optionality within a particular grammar be accounted for while maintaining minimalist assumptions about human language?

In this paper I will claim that NI does not in fact involve optional movement, but can be analyzed as a purely lexical phenomena involving a silent expletive. This is in keeping with the minimalist intuition that lexical items and their morphological properties are the locus of all syntactic variation. Such a solution suggests that the lexicon is not the source of cross linguistic and cross dialectal variation only. Variation in a single grammar can receive a lexical/morphological explanation as well.

The paper proceeds as follows. Section 2 provides a brief description of African American Vernacular English and some of its relevant features. Section 3 describes the properties of NI. Section 4 presents an analysis of NI, showing how it accounts for the empirical and theoretical problems posed by NI. In Section 5 I discuss a few problems with the analysis, and point out some possible solutions. The paper concludes with a summary, and some answers to the questions posed in the introduction.

## 2 African American Vernacular English

African American Vernacular English (AAVE, a.k.a. Ebonics, Ebonic,<sup>4</sup> Black English) is a variety of English spoken by many African Americans in the United States. There is regional variation in AAVE, but its structure remains remarkably consistent across the country. While AAVE possesses a few unique structural characteristics, it has much in common with other English dialects.<sup>5</sup> As pointed out by Martin and Wolfram (1998), what makes AAVE distinct is not so much any one particular characteristic itself, but rather the particular range of characteristics the language displays. Below, I briefly describe three AAVE grammatical features which are relevant to NI.

### 2.1 Negative concord

AAVE is a Negative Concord (NC) language: multiple negative elements in a sentence may express a single logical negation. Some examples of AAVE NC are given in (3) below, with negative elements including indefinite quantifiers in (3a-b), indefinite NPs in (3c), and adverbs in (3c-d):

- (3)
  - a. I'm not no strong drinker. (L)
  - b. She didn't play with none of us. (L)
  - c. You better not never steal nothin' from me. (L)
  - d. She might not never get him no time. (L)



NC is rather common cross linguistically, and it is found in many dialects of English. However, NC in AAVE differs from NC in some other varieties of English. In an AAVE NC sentence, a negative element may occur as the subject, as shown in (4):

- (4) a. Nobody don't know where it's at. (L)  
 b. Nobody not supposed to bring no firecrackers to school. (L)

## 2.2 Weak expletive *it*

Most varieties of English have two morphologically distinct expletives: the strong expletive *it* and the weak expletive *there*. In AAVE these are homophones. AAVE *it* is the exact equivalent of *there*, as shown in (5) below:

- (5) a. It's a lot of people in here tonight.  
 b. It seems to be some kind of problem.

## 2.3 *Ain't*

In AAVE the negated copula *be* is realized as *ain't*, which shows no overt agreement morphology. This is illustrated in (6a-c):

- (6) a. He ain't no doctor.  
 b. I ain't from Portland.  
 c. You ain't happy to see me, are you?

# 3 NI in AAVE

In the introduction we noted that NI constructions are declarative sentences, not questions or imperatives, and that NI is optional—NI structures may have non-inverted counterparts. However, closer examination reveals interesting restrictions on when NI can occur. Here we consider the properties of NI in more detail.

## 3.1 Basic properties

A NI sentence seems to have more emphasis than a non-inverted negative sentence. In particular, NI adds strong stress to the negation. However, this is a

purely pragmatic difference. An NI sentence and its non-inverted counterpart are identical in their truth conditional meaning.

NI occurs with copulas, as in (7), and auxiliaries, as shown in (8):

- (7) a. Ain't nothin' you can do for 'em. (L)  
 b. Wasn't nobody home. (L)
- (8) a. Don't nobody break up a fight. (L)  
 b. Can't nobody beat 'em. (L)  
 c. Won't nobody catch us. (L)  
 d. Wouldn't nobody help the poor man. (MW)  
 e. Couldn't nobody in the place do more than they did. (MW)

Although NI sentences usually have a negative quantifier NP subject (e.g., *nobody*, *nothin'*, *no NP*), this is not strictly necessary, as shown by sentences such as (9), which have non-negative indefinite determiner NP subjects:<sup>6</sup>

- (9) a. Ain't a car in that lot got a speck of dust on it. (MW)  
 b. Ain't a damn thing changed.

### 3.2 Negation

As its name suggests, NI is restricted to negated sentences. Regardless of the amount of stress or emphasis, "Positive Inversion" is impossible:

- (10) a. \* Is something you can do for them.  
 b. \* Was somebody home.  
 c. \* Can somebody beat 'em.  
 d. \* Will somebody catch us.

Negation must be sentential negation. The negative quantifier alone does not license NI:

- (11) a. \* Is nothing you can do for them.  
 (cf. There is nothing you can do for them.)  
 b. \* Was nobody home. (cf. Nobody was home.)  
 c. \* Can nobody beat 'em. (cf. Nobody can beat 'em.)  
 d. \* Will nobody catch us. (cf. Nobody will catch us.)

Sentential negation must be the clitic morpheme *-n't*. The non-cliticized negative morpheme *not* does not license NI:

- (12) a. \* Is not nothin' you can do for them.  
 b. \* Was not nobody home.  
 c. \* Can not nobody beat 'em.  
 d. \* Will not nobody catch us

### 3.3 The Definiteness Effect

For all other varieties of English, the Definiteness Effect (DE) holds in existential expletive sentences. As one would expect, this is the case for AAVE as well:

- (13) a. It's (a person/some person/no person/somebody/nobody) in the hall.  
 b. \* It's (the person/that person/Mary) in the hall.

Surprisingly, though, NI is also subject to the DE. Definite subjects in NI sentences cause strong unacceptability, as observed by Martin (1996) and Martin and Wolfram (1998). Note that the DE holds of both copular NI, as shown in (14), and auxiliary NI, as shown in (15):

- (14) a. \* Ain't that thing you can do for 'em.  
 b. \* Wasn't Bill home.  
 (15) a. \* Don't the police break up a fight.  
 b. \* Can't the other team beat 'em.  
 c. \* Won't they catch us.  
 d. \* Wouldn't Sally and Jean help the poor man. (MW)  
 e. \* Couldn't my aunt from Chicago do more than she did. (MW)

## 4 Proposal: a Silent Expletive NEXPL

On the two major previous analyses of NI, the DE facts in 3.3 are mysterious and unexplained. Labov et al. (1968) claim that auxiliary NI is subject – auxiliary inversion, but that copular NI is an existential expletive structure with the expletive *it* deleted. Sells, Rickford and Wasow (1996) agree that copular and auxiliary NI have different structures, but their OT analysis denies that NI sentences contain expletives, deleted or otherwise. Neither of these analyses can account for the fact that the DE holds in both copular and auxiliary NI sentences. But the DE is expected if both kinds of NI sentences contain a silent or deleted expletive.<sup>7</sup> This approach was first suggested, but not fully elaborated,

by Martin (1996) and Martin and Wolfram (1998). Here we will follow their intuition, showing that when it is fleshed out within a minimalist theoretical framework, it can provide solutions to the empirical and theoretical problems posed by NI.

I propose, then, that the Lexicon of AAVE contains a phonologically null weak expletive. This expletive is in most respects identical to the English weak expletive *there*. Following Chomsky's (1998) analysis, weak expletives lack a full set of  $\phi$  features, having only an uninterpretable [person] feature which must be eliminated by Agreement with the [person] feature of T. Unlike other weak expletives, however, I argue that the AAVE silent expletive also has an uninterpretable [negative] feature which must be eliminated via Agree. Let us call the AAVE silent negative expletive "NEXPL."

#### 4.1 Deriving the expletive alternation

English expletive sentences have counterpart sentences with NP subjects. This is reminiscent of the inverted – non-inverted alternation seen with NI, suggesting that an expletive alternation might also explain the optionality of NI.

- (16) a. There is a cat in the coop.  
b. A cat is in the coop.
- (17) a. There arose a great commotion from outside the building.  
b. A great commotion arose from outside the building.
- (18) a. There seems to be a problem going on outside the building.  
b. A problem seems to be going on outside the building.

NEXPL will allow NI to be derived using the same mechanisms which derive the English expletive alternation. Following Chomsky's (1998) analysis, the expletive alternation arises from an interaction between the contents of the Lexical Array (LA) and the preference for Merge over Move (MoM). Each alternate comes from a different initial LA—one with and one without an expletive. At some point in the derivation, Merge has created the structure in (19), with irrelevant details suppressed:

- (19) [TP T<sub>[EPP,  $\phi$ ]</sub> [VP is [SC [NP somebody] [PP in the hall]]]]

T has an EPP feature that must be eliminated by Merge of a nominal feature to T. If an expletive is in the LA at the point (19), Move is precluded by MoM. The expletive is forced to Merge, eliminating the EPP feature of T. The [person] feature of *there* is eliminated by Agreement with [person] in T. The NP

*somebody* remains in situ. Its Case feature, and the uninterpretable  $\phi$  features of T, are eliminated by Agreement with T. The result is (20):

(20) There is somebody in the hall.

If there is no expletive in the LA at the point in (19), the more complex operation Move is forced by the need to eliminate T's EPP feature. The NP *somebody* is displaced, and the derivation proceeds in the normal way, resulting in (21):

(21) Somebody is in the hall.

#### 4.2 Deriving copular NI

Using the mechanisms outlined above, and with NEXPL in the AAVE Lexicon, we can give a straightforward derivation for copular NI. At some point in the derivation the structure in (22) has been created by Merge, with irrelevant details suppressed:

(22)  $[_{TP} T_{[EPP, \phi]} [_{NegP} Neg [_{VP} ain't [_{SC} [_{NP} nobody] [_{PP} in the hall]]]]]$

The EPP feature of T must be eliminated. If the overt expletive *it* is in LA at the point (22), MoM forces it to Merge at T, eliminating T's EPP feature. The result is (23), parallel to (20) above:

(23) It ain't nobody in the hall.

If there is no expletive in LA at the point (22), the NP *nobody* is forced to move. The result is (24), parallel to (21) above.

(24) Nobody ain't in the hall.

This is the standard alternation. But AAVE has another option. If NEXPL is in the LA at the point (22), MoM forces it to Merge, eliminating the EPP feature of T. The NP *nobody* remains in situ. The [person] and [negative] features of NEXPL are eliminated via Agree. The result is the NI sentence (25), which has the structure in (26):

(25) Ain't nobody in the hall.

(26) [<sub>TP</sub> NEXPL [<sub>T</sub> T [<sub>NegP</sub> Neg [<sub>VP</sub> ain't [<sub>SC</sub> [<sub>NP</sub> nobody] [<sub>PP</sub> in the hall]]]]]]]]

### 4.3 Deriving auxiliary NI

This analysis can be easily extended to auxiliary NI. At some point in the derivation, the structure in (27) has been created by Merge, with irrelevant details suppressed:

(27) [<sub>TP</sub> T<sub>[EPP, φ]</sub> [<sub>NegP</sub> Neg [<sub>AUXP</sub> can't [<sub>VP</sub> [<sub>NP</sub> nobody] [<sub>V'</sub> get [<sub>PP</sub> in the hall]]]]]]]]

If there is no expletive in LA when the derivation reaches the point (27), the NP *nobody* is forced to move. The result is (28), whose structure is shown in (29):

(28) Nobody can't get in the hall.

(29) [<sub>TP</sub> Nobody [<sub>T</sub> T [<sub>NegP</sub> Neg [<sub>AUXP</sub> can't [<sub>VP</sub> t [<sub>V'</sub> get [<sub>PP</sub> in the hall]]]]]]]]]]

If NEXPL is in LA at the point (27), then MoM forces it to Merge with T, eliminating T's EPP feature. The NP *nobody* remains in si.u. The [person] and [negative] features of NEXPL are eliminated via Agree. The result is the NI sentence (30), whose structure is shown in (31):

(30) Can't nobody get in the hall.

(31) [<sub>TP</sub> NEXPL [<sub>T</sub> T [<sub>NegP</sub> Neg [<sub>AUXP</sub> can't [<sub>VP</sub> [<sub>NP</sub> nobody] [<sub>V'</sub> get [<sub>PP</sub> in the hall]]]]]]]]]]

### 4.4 Negation

The NEXPL analysis allows a unified explanation of the negation restrictions on NI. NEXPL has two uninterpretable features, [person] and [negative]. Agree is a one step operation—following Chomsky (1998), all features must delete “in one fell swoop.” The features of a probe cannot delete selectively, matching features at different places in the structure. Thus, in order for the uninterpretable features of NEXPL to be eliminated by Agree, there must be a second [negative] feature in the structure, and it must be in T, since that is the location of [person]. If either of these conditions does not hold, an uninterpretable feature of NEXPL will fail to be deleted, causing a crash.

#### 4.4.1 "Positive Inversion"

As described above, "Positive Inversion" is impossible in AAVE. On the analysis proposed here, "Positive Inversion" sentences would have NEXPL subjects, as in (32a-b.):

- (32) a. [<sub>TP</sub> NEXPL<sub>[negative, person]</sub> [<sub>T'</sub> T<sub>[ϕ]</sub> [<sub>VP</sub> is [<sub>SC</sub> [<sub>NP</sub> somebody] [<sub>PP</sub> in the hall]]]]]]  
 b. [<sub>TP</sub> NEXPL<sub>[negative, person]</sub> [<sub>T'</sub> T<sub>[ϕ]</sub> [<sub>AUXP</sub> can [<sub>VP</sub> [<sub>NP</sub> somebody] [<sub>V'</sub> get [<sub>PP</sub> in the hall]]]]]]]]

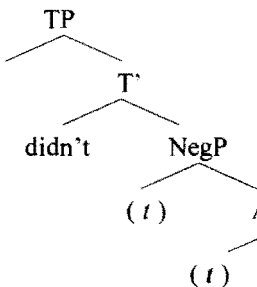
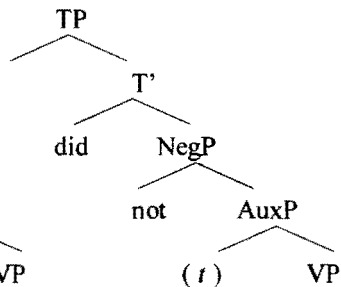
Since there are no other [negative] features in the structure, NEXPL's [negative] feature cannot be eliminated, causing a crash.

#### 4.4.2 Negative quantifier NPs

As described above, negative quantifier NPs alone do not license NI. On the analysis proposed here, negative quantifier NPs remain in situ below T when NEXPL is Merged. Because the [negative] feature of the NP is below the [person] feature in T, NEXPL's [negative] feature cannot be deleted by Agreement with the negative quantifier NP. This causes a crash.

#### 4.4.3 Cliticized negation

As described above, NI is permitted only with cliticized negation. This fact was previously unaccounted for, but following fairly standard assumptions about the clitic *-n't*, it can be explained by NEXPL. According to previous analyses, the clitic *-n't* is located in T with the auxiliary. It may be picked up and moved there via head movement of the auxiliary, as in Pollock (1989) and Chomsky (1995). Or it may be fused to the auxiliary in the lexicon, following Zwicky and Pullum (1983), and then Merged or head moved to T. On either analysis, *not* remains below T in NegP, as shown in (33a-b.):

- (33) a. 
- b. 

If NEXPL is the subject of a sentence whose only negation is *not*, NEXPL's [negative] feature cannot be eliminated by Agree because *not* is below T. An uninterpretable feature of NEXPL remains at the interface, causing a crash as desired. Only the clitic *-n't* in T allows the [negative] feature of NEXPL to be eliminated, explaining why only cliticized negation licenses NI.

## 5 Some Problems

I have tried to show that NEXPL accounts for the facts of NI. However, there are a few problems for this analysis. Although these problems are unsolved, none of them seem insurmountable, and none of them cripple the analysis.

### 5.1 Ad hoc?

If NEXPL is only useful for explaining NI, then it seems ad hoc. The analysis would be improved by cross linguistic evidence for the existence of a silent expletives, and for the existence of expletives with negative features. However, there is some support for NEXPL within AAVE. If NI involves a silent expletive, then in sentences with cliticized negation the distribution of NI should be identical to the distribution of the overt expletive. (34a.) illustrates an expletive passive sentence, and (34b.) its counterpart in AAVE. (35) shows that as predicted, NI with all its properties is permitted with expletive passive constructions:

- (34) a. There wasn't anybody elected to Congress here.  
 b. It wasn't nobody elected to Congress here.
- (35) a. Wasn't nobody elected to Congress here.  
 b. \* Wasn't (that man/the judge from down the street/John Smith) elected to Congress here.  
 c. \* Was somebody elected to Congress here.  
 d. \* Was nobody elected to Congress here.  
 e. \* Was not nobody elected to Congress here

(37) shows that NEXPL also makes the right predictions for raising constructions, illustrated in (36):

- (36) a. There doesn't seem to be anybody in the hall.  
 b. It don't seem to be nobody in the hall.



- (37) a. Don't seem to be nobody in the hall.  
 b. \* Don't seem to be (that man/the doctor /Mary) in the hall.  
 c. \* Do not seem to be nobody in the hall.

### 5.2 No overt expletive in auxiliary NI

An obvious problem with the NEXPL analysis is that, in contrast to copular NI, there is no overt expletive counterpart to canonical auxiliary NI sentences:

- (38) a. Ain't nobody in the hall.  
 b. It ain't nobody in the hall.  
 (39) a. Can't nobody get in the hall.  
 b. \* It can't nobody get in the hall.

It is unclear why this should be. If either a silent or an overt expletive is allowed with copular NI, why aren't both equally good with auxiliaries? There is no obvious solution. But note that an overt expletive is fine with an auxiliary in raising constructions, as shown above in (36b). More interestingly, in earlier forms of AAVE the weak expletive *there* is in fact allowed with auxiliaries, in sentences that look like the precursors of NI. The following examples, from the Ex-Slave Recordings (Bailey, Maynor, and Cukor-Avila (1991)), are cited by Howe (1999):

- (40) a. So there wouldn't nobody interfere with me....  
 b. There couldn't many of them go to school.

These facts suggest that in modern AAVE the prohibition on overt expletives with auxiliary NI may derive from factors external to NI itself, perhaps from more general syntactic and semantic properties of expletives and existentials.

### 5.3 Uninterpretable negative features

The NEXPL analysis depends on the existence of an uninterpretable negative feature. This seems odd at first glance, since negation is clearly interpretable at LF. However, something like uninterpretable negative features must exist in order to account for NC, where despite multiple negative morphemes, only one negation is present at LF. Brown's (1999) analysis of negation phenomena in Russian, including NC, postulates an uninterpretable negative feature similar to the one here. Additionally, in Parrott (2000), I present an account of NC in

AAVE, with further motivation for the uninterpretable negative feature introduced here.

## 6 Conclusion: Syntactic Variation is Lexical

At the beginning of this paper, two questions were posed. The first was whether NI in AAVE is in fact a real case of optional syntactic movement. I have tried to argue that NI is not a real case of optional syntactic movement, but is rather a purely lexical phenomena. The difference between AAVE and other dialects is the lexical item NEXPL, which AAVE has and other dialects lack. The difference between an NI sentence and its non inverted counterpart is whether NEXPL was in the initial LA. Restrictions on NI are explained by the morphological features of NEXPL, and constraints on the operation Agree. NEXPL allows the NI alternation in AAVE to be derived, and its properties accounted for, using mechanisms that are relatively well understood and independently needed, both for English expletive sentences and for general agreement phenomena. To the extent that we would like to maintain minimalist hypotheses about human language, this is a welcome result.

The second question was whether syntactic variation within a particular grammar can be accounted for while maintaining minimalist assumptions about human language. I have tried to show that it can. The NEXPL analysis of NI in AAVE makes crucial use of the lexicon in explaining an apparent case of optional movement in a single grammar. This suggests that just as lexical items and their morphological properties are the locus of all cross linguistic and cross dialectal variation, syntactic variation in a particular grammar can also be accounted for lexically, with successful results. Keeping this in mind, as we encounter what looks like syntactic optionality and variation in languages, we should look more closely, to see if they are not in fact mere cases of lexical optionality and variation. This is what we expect on a minimalist view of human language.

## Notes

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<sup>1</sup> For comments on earlier versions of this paper, I would like to thank Takae Tsujioka, Hector Campos, Raffaella Zanuttini, Ralph Fasold, Paul Portner, Natalie Shilling-Estes, Bruce Moren, and audiences at Georgetown University. Also thanks to Na'im Tyson for sentence judgements. I am of course solely responsible for any errors or oversights.

<sup>2</sup> With the exception of *wh*-movement and object shift, both movement operations which are optional in some sense. Chomsky (1998) allows optional insertion of an EPP feature at C and small *v* in order to account for these, but this is not a satisfactory solution, and it will not suffice here.

<sup>3</sup> Data marked with (L) are from Labov, Cohen, Robins, and Lewis (1968); data with (MW) are from Martin and Wolfram (1998). Unmarked data are my own, with some acceptability judgements provided by Na'im Tyson, a linguist who is a native speaker of AAVE.

<sup>4</sup> This term was coined by Ralph Fasold.

<sup>5</sup> The historical origins of AAVE have been disputed from the early 60's to the present day. Some scholars claim that the unique structural features of AAVE come from plantation creoles spoken by slaves in the Caribbean and the US. Others maintain that these features can be traced to white dialects from the same period. The question is unresolved, although recent evidence points to an intermediate position. See Rickford (1999) and Poplack (2000) for discussion and references.

<sup>6</sup> The judgements are not clear, but it seems that other indefinite quantified subjects are also marginally acceptable with NI. It might be possible to say, for example, "Don't many people go in there," or "Can't three people in the world solve those equations." However, the emphatic nature of NI contrasts with the meaning of quantifiers like *many* and *three*, which pick out only parts of sets. This, rather than any syntactic factor, is likely the reason for the marginal acceptability of these quantifiers with NI.

<sup>7</sup> I make no attempt to explain why the DE always accompanies weak expletives, but this seems to be a valid generalization for English, and even to some extent cross linguistically. See, e.g., Bobaljik, Davis, and Jonas (1996) for examples of the DE in the Germanic Transitive Expletive construction.

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# The Pseudo-simultaneous Nature of Complex Verb Forms in German Sign Language

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In this paper, we shall be concerned with the nature of the morphosyntactic structure of verb signs in German Sign Language (Deutsche Gebaerdensprache: DGS). It has often been claimed that the morphological and morphosyntactic structure of signs is fundamentally different from what we know from the analysis of spoken languages. In the following, we intend to demonstrate that this, in fact, is not the case.

Firstly, we are going to say a few words about simultaneity in sign languages. Secondly, we present a syntactic tree structure for DGS: In this structure, complex verb forms can be derived by head-to-head movement of the verb stem through various functional heads. Thirdly, we briefly present a phonological feature hierarchy for signed languages. Then we discuss the different inflectional modifications in turn, each time looking at the morphosyntactic and the phonological aspects of the respective modification. As the discussion of the phonological aspects will make clear, the simultaneity we observe is in fact an epiphenomenon of the application of various readjustment rules.

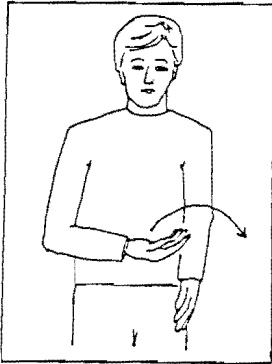
## **1 The Notion of Simultaneity**

One key word in the description of signed languages is simultaneity, a concept which is often taken to be a fundamental property of signed languages. It is claimed that, compared to spoken languages, signed languages are characterized by a higher degree of simultaneity. Above all, the questions we

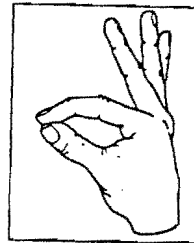
have to ask are: 1. What does this use of the term „simultaneity“ mean; and 2. How can the observed simultaneity be grammatically encoded?

First of all, simultaneity means that in sign languages we may see more than one grammatical information at a given time. For example, in a sentence like "I don't give you a pencil" person agreement is encoded through the beginning and ending points of the verb sign and negation by changing its nonmanual component. Simultaneously, agreement with the direct object is realized by a particular classifier handshape. We will briefly illustrate this point with the verb GEBEN „to give“. The citation form of GEBEN is shown in (1a). With a long and thin object like STIFT „pencil“ in (1c), however, the classifier handshape in (1b) has to be used. For the purpose of sentential negation, a nonmanual feature, i.e. a headshake, will be added (1d).<sup>1</sup>

(1) a. *Citation form of GEBEN*



b. *Classifier handshape for long and thin objects*



c. ICH<sub>1</sub> DIR<sub>2</sub> STIFT<sub>a</sub> <sub>1</sub>[GEB-CL<sub>a</sub>]<sub>2</sub>  
*I you pencil give*  
 "I give you a pencil."

d. ICH<sub>1</sub> DIR<sub>2</sub> STIFT<sub>a</sub> <sup>neg</sup><sub>1</sub>[GEB-CL<sub>a</sub>]<sub>2</sub> (NICHT)  
*I you pencil give not*  
 "I don't give you a pencil."

Obviously, in example (1d) object agreement and negation are encoded by different morphemes, namely handshape change and nonmanual marking, which are simultaneously realized. This kind of morphological encoding is

frequently used in signed languages but only rarely in spoken languages (e.g. tonal languages) which more often display linear ordering of morphemes.

Emmorey (1995) argues that the simultaneity displayed in signed languages is due to the visual-gestural modality. In a psycholinguistic experiment, she shows that the articulators used in signed languages - mainly the hands - are too slow to linearly encode all the information needed in a certain processing time. This shortcoming, she argues, is compensated for by a higher degree of simultaneity which, in her opinion, manifests itself in the frequent use of nonconcatenative morphological processes. At the same time, Emmorey and others (e.g. Bergman 1982) observe that linear affixation is rarely used in signed languages. These findings lead Emmorey to the conclusion that needs imposed by processing limitations may have consequences for grammatical representations in certain languages.

However, Emmorey does not focus on an explanation for her observations in terms of grammar theory. On the morphosyntactic side, the absence of surface affixation does not necessarily imply that there is no affixation at all, as is argued for in Halle & Marantz (1993) and Glueck & Pfau (1999). Due to the involvement of empty affixes and phonological readjustment rules, linear affixation may just not be visible on the surface.

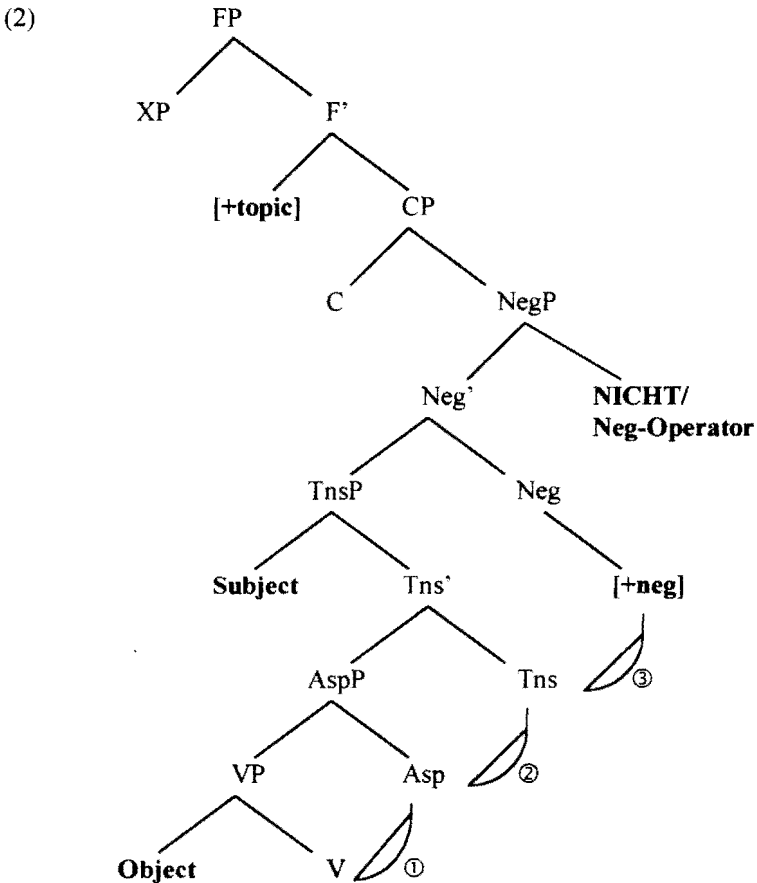
As the previous discussion makes clear, a detailed analysis of the high degree of simultaneity in sign languages in grammatical terms is required. It may then turn out that the more we go into the grammatical description of sign languages the more the differences between signed and spoken languages disappear (cf. Brentari 1998).

## **2 Some Syntactic and Phonological Properties of DGS**

Within the framework of Distributed Morphology as proposed by Halle & Marantz (1993), inflected verbs are derived by the operations of head-to-head movement, merger, and fusion in the syntax and on the post-syntactic level of Morphological Structure (MS). Since on the one hand, the syntactic structure is crucial for the subsequent application of readjustment and Spell-out rules, we shall first sketch some of the syntactic properties of DGS. Readjustment rules, on the other hand, refer to and possibly change certain phonological features of a given sign. A phonological feature tree for signed languages will help us to make statements about the precise nature of the morphophonological modifications under discussion.

## 2.1 A syntactic tree structure for DGS

German Sign Language is a strict SOV-language. Moreover, DGS does not exhibit any asymmetries between matrix sentences and embedded sentences like e.g. spoken German, i.e. there is no V2-effect. The structure in (2) represents the syntactic tree structure we assume for DGS (cf. Glueck & Pfau 1999; Pfau 1999):



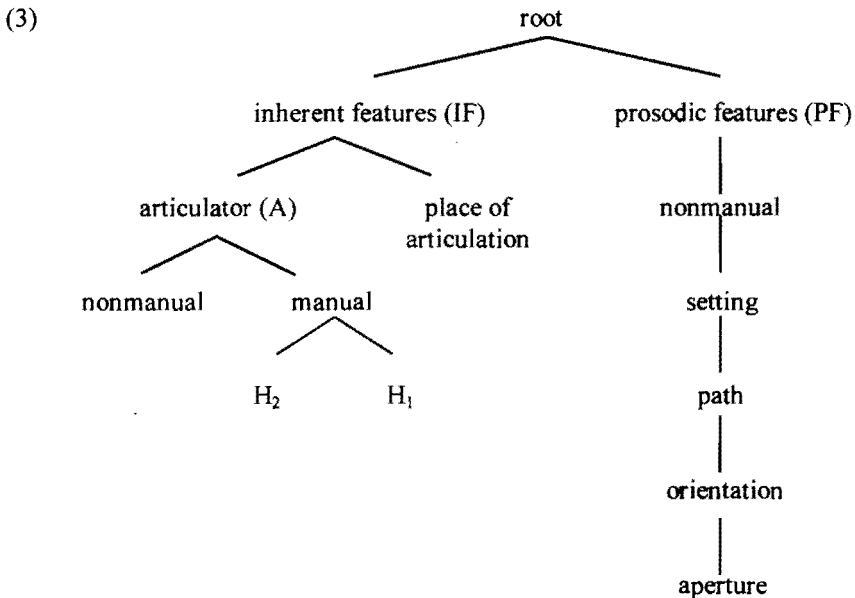
The structure in (2) differs from structures which have been proposed for ASL (e.g. Neidle et al. 1998) in important respects: First of all, word order in ASL is



SVO, not SOV. Moreover, following the Distributed Morphology framework of Halle & Marantz (1993) we assume that agreement nodes are not present in the syntax. Rather, they are inserted prior to Spell-out on the level of Morphological Structure by adjunction of Agr-morphemes to functional heads. Although Tns is not visible on DGS verbs, we take Tns to be an active node, with SpecTP hosting the subject DP and AgrS being adjoined to Tns on MS.<sup>2</sup>

## 2.2 Feature geometry

The second important preliminary for the following discussion is a feature geometry for signed languages. Brentari (1998) presents a comprehensive phonological analysis of ASL which in part can be applied to DGS. The feature tree she proposes for ASL will turn out to be very helpful in our analysis of morphophonological processes within the framework of Distributed Morphology. This feature tree is given in (3) (Brentari 1998:94,130).



The root node branches into an inherent feature (IF) node and a prosodic feature (PF) node. These two nodes dominate two completely different sets of features which are needed to capture lexical contrasts in ASL.<sup>3</sup>

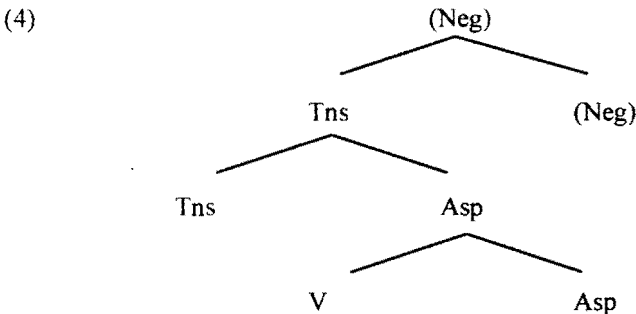
Inherent features are paradigmatically realized features comparable to paradigmatically realized features in spoken languages, like e.g. place, manner, and voicing in consonants. An important difference to spoken languages is that IF are not realized over the course of a segment but rather over the course of a whole lexeme. The IF node comprises the manual, nonmanual, H<sub>1</sub>, H<sub>2</sub>, and place features that are left unchanged during the production of a sign.

In contrast to that, the PF part of the tree is needed to account for feature changes which may appear in certain signs, e.g. handshape changes or path movements. Prosodic features may change in the course of producing signs, which implies that they may be realized sequentially in time.

We shall not discuss this feature geometry proposed for ASL in detail. It will turn out that it can capture much of the phonological facts in DGS, too.

### 3 The Derivation of Complex Forms

We shall now have a closer look at the morphosyntactic and phonological side of the derivation of inflected verbs in DGS. As mentioned above, in the syntax the verb raises via head-to-head-movement to Asp and then to Tns (movement operations ① and ② in (2)). Each time the verb raises, it adjoins to the next head in the tree yielding a complex structure under the Tns node like the one in (4).



We take the structure below Tns to be the basis for the different instances of agreement, the realization of which crucially depends on the paradigmatic dimension of the respective verb stem (sections 3.1 and 3.2); it is also the basis

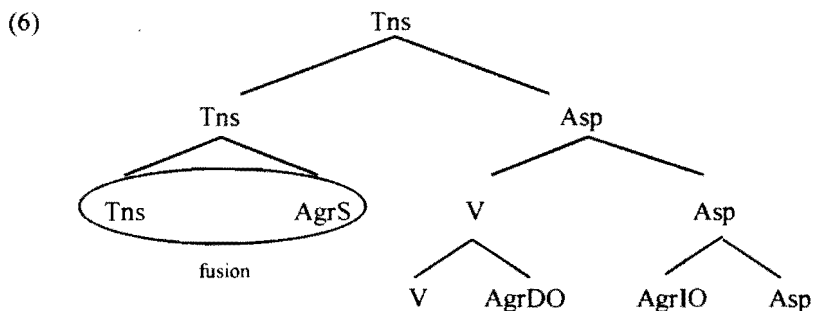
for aspectual modification (footnote 5). Finally, in section 3.3, we shall see that things are somewhat more intricate in negated sentences.

### 3.1 Agreement I: Path movement

It is a well known fact that in DGS as well as in other sign languages, different verb types have to be distinguished with respect to their agreement properties (cf. Padden 1990; Glueck & Pfau 1999). The so-called ‘plain verbs’ do not inflect for person and number information at all. In one subclass of agreement verbs, verbs agree with their subject and direct or indirect object. This kind of agreement is established via path movement. In (5ab) the respective verb signs start at the position of the subject and the movement proceeds towards the position of the direct object (both of which may have been established in the signing space before by means of indexing).

- (5) a. ICH<sub>1</sub> DICH<sub>2</sub> ZEIT<sub>1</sub> FRAG<sub>2</sub>  
*I you time ask*  
 „I ask you the time.“
- b. ICH<sub>1</sub> EUCH<sub>3</sub> ANTWORT<sub>1</sub> FRAG<sub>3</sub>  
*I you(pl.) answer ask*  
 „I’m asking you(pl.) for the answer.“

On the morphosyntactic side, Agr nodes will attach to heads within the derived complex (4) at MS to pick up the features of DPs governed by these heads: AgrS attaches to Tns, AgrDO to V and AgrIO to Asp. The insertion of Agr morphemes transforms tree (4) into tree (6):

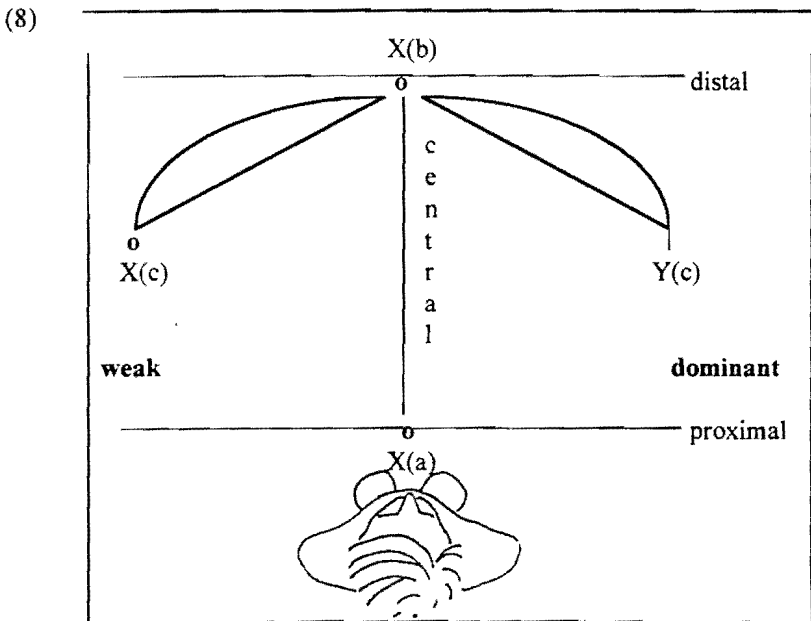


Tns being a phonologically null morpheme, it will subsequently fuse with its sister node AgrS. Thus the number of terminal nodes will be reduced and only one Vocabulary item will be inserted once Vocabulary insertion takes place.

On the phonological side, the surface form of the inflected verb is derived by affixation of the appropriate path features. The relevant Vocabulary items for the person/number affixes under discussion are given in (7):

- (7) a. [+1sg] → [X<sub>prox.body-central-neutral</sub>]  
 (where X is a point in the signing space)  
 b. [+2sg] → [X<sub>dist.body-central-neutral</sub>]  
 (where X is a point in the signing space)  
 c. [+2pl] → [X<sub>weak</sub>ARC<sub>Y-dominant</sub>]

The agreement affixes in (7) do not show variation in their phonological shape. Consequently, application of readjustment rules is not necessary. The Vocabulary item (7a) e.g. is a point in the signing space which is near (proximal to) the signer's body in a central neutral position. The picture in (8) serves to illustrate the above mentioned Vocabulary items.<sup>4</sup>



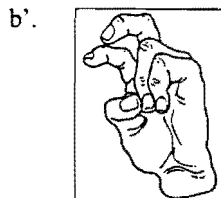
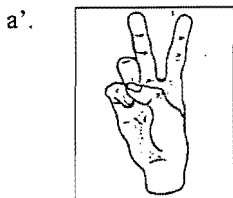
The small letters in the picture (e.g. X(a)) relate to the points in the signing space mentioned in the Vocabulary items (7a-c). Consider e.g. again the Vocabulary item for second person plural object agreement (no matter if it is a direct or indirect object): this agreement affix is realized by adding an arc-shaped movement to the verb stem. Consequently, in the sequence (5b) ICH<sub>1</sub> EUCH<sub>3</sub> ANTWORT<sub>1</sub>FRAG<sub>3</sub> „I'm asking you(pl.) for the answer“ the movement proceeds from the proximal point X(a) (for first person singular subject) towards X(c) on the weak hand side and then in a curve to the dominant hand side of the signer.

### 3.2 Agreement II: Classifiers

In our opinion, classifying verbs in DGS constitute another group of agreement verbs. In Glueck & Pfau (1998) we have presented syntactic and psycholinguistic arguments in favour of such an analysis. Classifying verbs classify one argument - their subject or direct object - by means of a handshape change. In (9ab) the verb classifies its subject; the respective handshapes are given in (9a'b'). In (9c) the verb agrees with all its arguments. As you can see, agreement via path movement (for the subject and the indirect object) and agreement via handshape (for the direct object) can be combined in one verb.

(9) a. STRASSE MANN<sub>a</sub> GEH\_UEBER-CL<sub>a</sub>  
*street man go.over*  
 „A man crosses the street.“

b. STRASSE HUND<sub>b</sub> GEH\_UEBER-CL<sub>b</sub>  
*street dog go.over*  
 „A dog crosses the street.“



c. MANN<sub>1</sub> KIND<sub>2</sub> BLUME<sub>a</sub> <sub>1</sub>[GEB-CL<sub>a</sub>]<sub>2</sub>  
*man child flower give*  
 „A man gives a flower to the child.“

Again, on the morphosyntactic side, the relevant tree for the derivation of the inflected verbs is the tree in (6). As far as the derivation of (9c) is concerned, we must assume that the maximum of three agreement nodes is implemented at Morphological Structure.

In contrast to the person/number-affixes discussed in the previous section, classifier agreement does not show a fixed phonological shape. Therefore, we assume that the Vocabulary item for the classifier feature is a zero affix (cf. Halle 1990).

(10) [+CL-F] → ∅

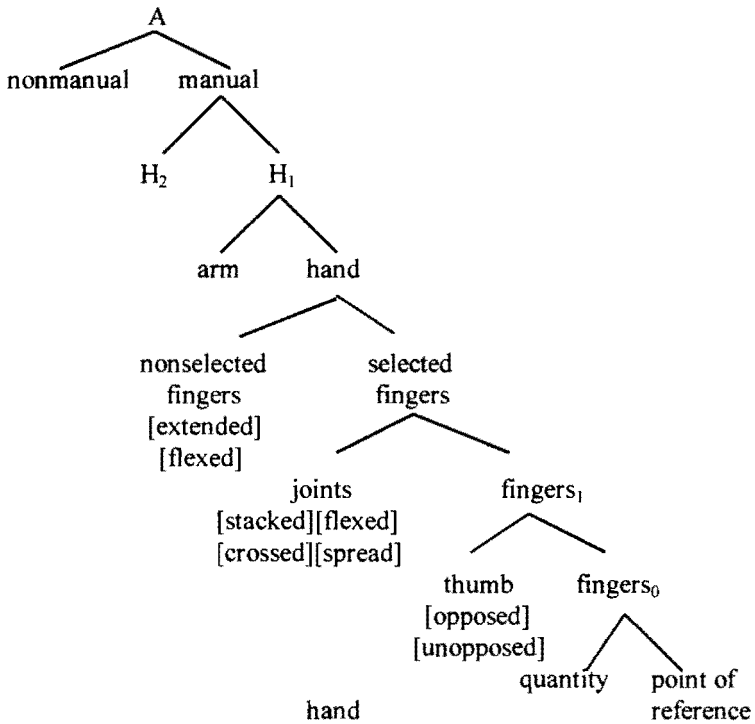
On the level of Morphological Structure, the classifier feature will trigger a phonological readjustment rule which results in the appropriate handshape change. This readjustment rule is informally given in (11). Note that this phonological modification is comparable to umlaut and ablaut phenomena in spoken languages.

(11) handshape → handshape / [+CL-F]  
 |  
 [CI-F<sub>1</sub>]  
 [CI-F<sub>2</sub>]  
 ...  
 [CI-F<sub>n</sub>]

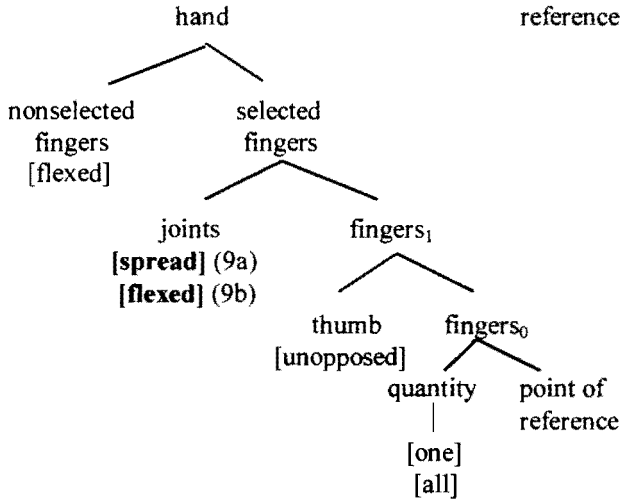
Let's now have a closer look at the phonological side of classification. The relevant part of Brentari's feature tree is the branch below the manual side of the articulator node given in (12), because this is where the handshape features are specified (cf. Brentari 1998:100).

The respective feature specifications for the verbs in (9ab) are given in (13). The feature specification for the verb in (9a) which classifies a two-legged creature differs from the one of (9b) which classifies a four-legged animal only in the joint features of the selected fingers: those are specified as [spread] in nonbase position for the former while for the latter the joints of the selected fingers are flexed.

(12)

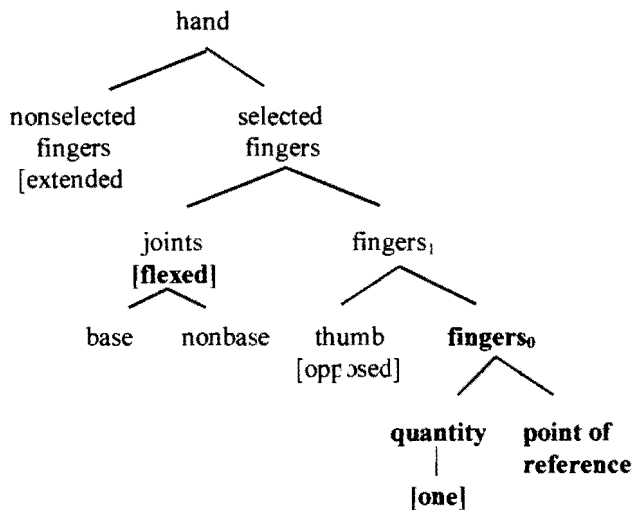


(13)



In the case of object classification, a marked handshape replaces an unmarked one. As it happens, the modifications are somewhat more complex than in the case of subject classification. For the citation form of GEB „to give“ (cf. (1a) above) no fingers are selected and a curved open handshape surfaces. With the long thin object BLUME „flower“ as direct object, however, a different handshape has to be chosen. This is the so-called F-handshape (cf. (1b)) which is characterized by the feature tree in (14).

(14)



### 3.3 Negation

Sentence negation in signed languages is particularly interesting because it comprises a manual and a non-manual component. The manual part is a Neg sign which, however, is optional, while the non-manual part is a headshake, which in DGS is necessarily associated with the predicate. In DGS, the manual Neg sign NICHT „not“ is one of the very few elements that may follow the verb. Two examples for negated sentences are given in (15ab):

- (15) a. GESTERN <sup>neg</sup>SCHNEI (NICHT)  
*yesterday snow not*  
 „Yesterday it did not snow.“





## 4 Conclusion

The analysis we presented facilitates an almost modality-independent explanation for the often mentioned high degree of simultaneity in signed languages. On the syntactic and morphosyntactic side, the structures and operations involved in the derivation of inflected verbs turn out to be exactly the same as in spoken languages. On the phonological side, however, we do of course observe differences which are due to the different articulators used. Still, important phonological concepts like the hierarchical organisation of features, the idea of class nodes etc. are central to the description of signed languages, too, as Brentari (1998) has convincingly shown.

The various inflectional phenomena we discussed are all instances of phonological simultaneity. Phonological simultaneity, however, is also common in spoken languages, where in the production of segments various phonological features are always simultaneously realized.

To sum up, our claim is that on the morphosyntactic side, simultaneity in the true sense does not exist in DGS. Rather, what we are dealing with in fact is pseudo-simultaneity.

## Notes

1. All sign language examples are given in capital letters. In the examples numeral indices represent person and number agreement by referring to points in the signing space. These points either indicate the position of a present referent or they refer to NPs that have been positioned in the signing space before by means of indexing. A letter index indicates which argument the classifier (CL) on the verb refers to. A line on top of a sign illustrates the span of a nonmanual marking, e.g. a headshake in negated sentences.

2. At the moment, we do not wish to make any statements about the structure above C. We only want to stress that topicalization is a very common operation in DGS (and other sign languages). Topicalized DPs are moved to a position above CP labelled as Focus Phrase (FP) in the tree in (2).

3. Brentari's feature geometry differs in that respect from the hand tier-model presented by Sandler (1989) where H2 features can either be dominated by the Hand Configuration node or function as an articulator and are as such part of the location tree.

4. Sorry; this sketch unintentionally discriminates left-handed signers.

5. Aspectual modification also involves the simultaneous realization of grammatical information; due to space limitations, however, we can not discuss its properties in detail here. The habitual and the iterative e.g. surface as movement modifications and subsequent reduplication of the whole sign. On the morphosyntactic side, the relevant tree for the position of aspectual (zero) affixes is the one in (6) above. On the phonological side, readjustment rules affect features of the highest level of the prosodic feature branch in (3) only, i.e. movement features like [straight], [arc], and [trilled movement] which are directly dominated by the prosodic feature node.

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# Negation and N-words in Hungarian\*

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## 1. Hungarian Sentential Negation

Hungarian sentential negation is expressed by a negative marker *nem*. The sentences in (1) illustrate sentential negation. Sentence (1a) is an SVO sentence (corresponding to neutral order);<sup>1</sup> (1b) shows sentential negation combining with a focused constituent. I assume the latter case is typically not a neutral order sentence, and involves the left peripheral (i.e. CP) domain of the sentence.

- (1)a. Balázs       nem látta       Emökét.  
Balazs-nom neg see-pas-3s Emöke-acc  
'Balazs didn't see Emöke.'  
b. EMÖKÉT       nem látta       Balázs.  
Emöke-acc neg see-pas-3sg Balazs-nom  
'It is Emöke that Balazs didn't see.'

Negative sentences can also contain negative expressions, which appear with the negative marker. In (2a), the negative expression *senkivel* ('with nobody') can only appear with the negative marker *nem*. The same applies to subject negative expressions, as in (2b).

- (2)a. Balázs       \*(nem) beszélt       senkivel.  
Balazs-nom neg speak-pas-3s nobody-instr  
'Balazs didn't speak with anybody.'  
b. Senki       \*(nem) beszélt       Emökével.  
nobody-nom neg speak-pas-3s Emöke-instr  
'Nobody spoke with Emöke.'

Hungarian negative expressions also exhibit Negative Concord (NC). This means that when several negative elements appear in the sentence, they jointly contribute one negative force. NC applies when several negative expressions

appear postverbally, as in (3a), as well as when they occur on either side of the verb, as in (3b). In both cases, they give, along with the negative marker *nem*, a unique negative meaning to the sentence:

- (3)a. Nem beszélt      Balázs      senkivel      semmiről.  
 neg speak-pas-3s Balazs-nom nobody-instr nothing-delat  
 'Balazs didn't speak with anybody about anything.'
- b. Senki      nem látott      semmit.  
 nobody-nom neg see-pas-3s nothing-acc  
 'Nobody saw anything.'

## 2. Hungarian N-words

In this paper, I consider the distribution of negative expressions. I will first discuss the status of negative elements.

Although it has been proposed in the literature (see Tóth 1995) that Hungarian has two classes of NPIs, I will assume that only one of the classes, that of the *se*-NPIs includes truly Negative Polarity Items, since these are the elements which are licensed only in antiveridical contexts (in the sense of Giannakidou 1998).<sup>2</sup> As only the *se*-type of expressions are sensitive to purely negative contexts, I will refer to them as 'n-words'.

Note that the *se*-NPIs can only be licensed in a close enough relation with the negative marker, that is they have a very restricted licensing context, even as NPIs. This is still a stronger restriction on the NPI. I will propose that this restriction is a syntactic one: the presence of the negative marker *nem* seems to be crucial in this respect. As an intermediate conclusion, I will say that the *se*-NPI (which I will from now on call 'n-word') must be syntactically licensed by NegP, whose head is realized as *nem* (on motivations for this, see Puskás in press). In this section, I will examine the nature of n-words.

### 2.1 Indefinites

Ladusaw (1992) proposes that English NPIs are indefinites, that is expressions which have a descriptive content, but which have no quantificational (or referential) force. As n-words are open formulae with no inherent quantificational force, the presence of n-words as such cannot yield a negative meaning. Their interpretation is subject to a binding requirement at the appropriate level and by the appropriate operator. Ladusaw proposes the binding

requirement (or roofing) is fulfilled by a negative operator, and must be met at the sentence level.

The problem for Hungarian is that n-words do not behave like indefinites. As discussed above, they do not exhibit the quantificational variability English NPIs do: they occur only in a negative clause. A second point is that unlike indefinites, n-words have a very local licensing (this is also pointed out for Greek n-words in Giannakidou 1998). In (4a), the n-word *senkinek* ('to nobody') cannot appear in the embedded clause, as the latter does not contain a negative marker. On the other hand, indefinites exhibit unbounded scope. In (4b) the indefinite *egy ajándékot* ('a present') can be interpreted with wide scope.

- (4)a. \*Nem mondta Emöke hogy adott senkinek egy ajándékot.  
 neg say-pas-3s Emöke that give-pas-3s nobody-dat a present-acc
- b. Minden vendég emlékszik arra hogy látott  
 Every guest-nom remember-pres-3s that-subl that see-pas-3s  
 egy ajándékot.  
 a present-acc  
 'Every guest remembers that he saw a present.'

I will conclude that Hungarian n-words are not indefinites.

## 2.2 Polarity Items

Laka (1990) argues that n-words are 'Negative Polarity Items', and that they must be interpreted as existential quantifiers within the scope of negation. The problems for Hungarian are as exposed above: the paradigm of (A)PIs, licensed in the standard environments, is disjoint, and in complementary distribution, with the paradigm of n-words. In addition, if only n-words were taken to be NPIs of the existential type, they would have to be in the scope of negation. Hungarian surface positions (which are very often argued to reflect LF positions) show that this cannot be the right analysis. Further arguments against this analysis are also given below.

## 2.3 Quantifiers

Zanutini (1991) argues that n-words in Italian are negative quantifiers. More precisely, she proposes that they have a double component: they are universal and negative. Let us focus on the universal quantifier aspect, which Giannakidou (1998) also examines for Greek n-words. There is a certain number of tests

which enable to determine the universal quantifier properties of n-words. I will review three of them.

The first one is the *almost/absolutely* modification (Zanuttini 1991). Whereas universal quantifiers can be modified by adverbials of the type *almost*, existential quantifiers resist modification. This is exemplified in (5a,b). Hungarian n-words function on a par with universal quantifiers, as given in (5c).

- (5)a. Tegnap majdnem mindenkivel beszélt Balázs.  
 yesterday almost everybody-instr speak-pas-3s Balázs  
 'Yesterday, Zeta spoke with almost everybody.'
- b. \*Tegnap majdnem valakivel beszélt Balázs.  
 yesterday almost somebody-instr speak-pas-3s Balázs
- c. Tegnap majdnem senkivel nem beszélt Balázs.  
 yesterday almost nobody-instr neg speak-pas-3s Balázs  
 'Yesterday, Balázs spoke with almost nobody.'

The second test is the 'donkey anaphora' test (Giannakidou 1998). Universal quantifiers cannot bind a pronoun from a non-c-commanding position (6a). On the other hand, such a binding relation obtains in the same configuration with an existential quantifier (6b). Again, n-words exhibit a behaviour similar to that of universal quantifiers (6c).

- (6)a. \*A lányok akik minden ruhát<sub>i</sub> felpróbálták azt mondták  
 the girls-nom who-nom every dress-acc part try-pas-3pl that say-pas-3pl  
 hogy pro<sub>i</sub> túl drága volt.  
 that pro too expensive be-pas-3s  
 (\* 'The girls who tried every dress<sub>i</sub> on said it<sub>i</sub> was too expensive')
- b. A lányok akik valami ruhát<sub>i</sub> felpróbálták azt mondták  
 the girls-nom who-nom some dress-acc try-pas-3pl that say-pas-3pl  
 hogy pro<sub>i</sub> túl drága volt.  
 That too expensive be-pas-3s  
 'The girls who tried some dress<sub>i</sub> on said that it<sub>i</sub> was too expensive.'
- c. \*A lányok akik semmi ruhát<sub>i</sub> nem próbáltak fel azt  
 the girls-nom who-nom no dress-acc neg try-pas-3pl part that  
 mondták hogy pro<sub>i</sub> túl drága volt.  
 say-pas-3pl that too expensive be-pas-3s  
 (\* 'The girls who tried no dress<sub>i</sub> on said that it<sub>i</sub> was too expensive.')

A third test deals with predicate nominals. It is argued (see Partee 1987) that universal quantifiers cannot appear in predicate nominals, as opposed to

existential quantifiers. Given the previous tests, which group n-word with universal quantifiers, one should expect n-words to be ruled out in predicate nominals. It so happens that Hungarian n-words can appear in predicate nominal constructions (7a). Note that Polish n-words can also function as predicate nominals. Blaszczak (1998) takes this as an argument against the universal quantifier status of these n-words.

- (7)a. Balázs        semmiféle író.  
 Balazs-nom no-sort        writer-nom  
 ‘Balazs is no writer.’

However, de Swart (1996) proposes that Germanic n-words, which can be used as predicate nominals, are negative (universal) quantifiers. If we assume her analysis is correct, the fact that n-words can appear in predicate nominal constructions does not argue against their universally quantified properties. Incidentally, the Hungarian facts show that predicate nominals are fine with any type of quantifiers (7b,c).

- (7)b. Emöke minden öröömöm.  
 Emöke every joy-poss  
 ‘Emöke is all my joy.’  
 c. Balázs        valami kutató (féle).  
 Balazs-nom some researcher-nom (sort)  
 Balazs is some (sort of) researcher.’

Space limitations make it impossible to discuss this here, but there is much more to predicate nominals, at least in languages that allow for such a freedom in the occurrence of quantifiers.

In the light of the evidence discussed above, I will propose that Hungarian n-words are universal quantifiers.

### 3. Negative or not?

I propose that Hungarian n-words are not inherently negative. I take for evidence the fact that Hungarian n-words must always appear with the negative marker, and that they are not licensed in any other context (not even the antiveridical ones). Zanuttini argues in favor of an intrinsically negative component on the basis of negative fragment answers, of the type (8a) and coordinate structures (8b).



- (8)a. Chi hai visto ? Nessuno.  
 who have you seen ? Nobody.  
 b. Voglio o te o nessuno.  
 I want either you or noone.

However, the so-called negative fragment answers in Hungarian typically show case morphology. The n-word in (9a) carries an accusative morpheme, which corresponds to the case of the *wh*-phrase in the question; in (9b), it is marked for instrumental. This seems to confirm that these n-words are part of an elliptical sentence, where the relevant case is assigned/checked in the elided structure.

- (9)a. Kit láttál ? Senkit.  
 who-acc see-pas-2s nobody-acc  
 'Who did you see ? Nobody.'  
 b. Kivel beszéltél ? Senkivel.  
 who-instr speak-pas-2s nobody-instr  
 'With who did you speak ? With nobody.'

Similarly, coordination structures reveal that n-words cannot really appear on their own, and that they must be part of some elided structure. In (10a), the first conjunct contains a non-negative argument (*Balázssal* 'with Balazs'), and the second conjunct contains what looks like a bare n-word. In (10b), the first conjunct contains only the non-negative argument, and the second conjunct is a full clause. In this case, the negative marker has to be present. The n-word cannot appear on its own. I will conclude that in (10a), where it seems to contribute to the negative meaning on its own, the n-word is in fact the overt element of an otherwise elliptical structure.

- (10)a. Vagy Balázssal beszélek vagy senkivel.  
 or Balazs-instr speak-pres-1s or nobody-instr  
 'I speak either with Balazs or with nobody.'  
 b. Vagy Balázssal vagy senkivel \*(nem) beszélek.  
 or Balazs-instr or nobody-instr neg speak-pres-1s  
 'id.'

Given these data, I will conclude that the arguments given in Zanuttini (1991) in favor of an inherently negative component do not hold strongly. Note that Giannakidou 1998 reaches the same conclusions for Greek n-words.

#### 4. The syntax of n-words

The conclusion that n-words are not intrinsically negative has important consequences for the syntax of n-words. It has been advocated that *neg*-dependencies and *wh*-dependencies should be treated on a par. Both types of operators are argued to exhibit similar behaviors with respect to some relevant version of the AFFECT-criterion (Haegeman 1991), namely the WH-criterion (Rizzi 1991) and the NEG-criterion (Haegeman 1995). In Hungarian, this assumption raises problems. *Wh*-dependencies can be licensed long-distance. In (11), the *wh*-phrase *kinek* ('to whom') is *wh*-moved from the embedded clause into the preverbal position of the matrix clause:

- (11) Kinek<sub>i</sub> mondta Emöke hogy adott egy ajándékot t<sub>i</sub> ?  
 who-dat say-as-3s Emöke-nom that give-pas-3s a present-acc  
 'To whom did Emöke say that he gave a present ?'

As it was discussed above (section 3.1), n-words are clause-bound (see 7b). In addition, *wh*-in situ is ungrammatical in Hungarian: *wh*-phrases all have to appear in a left-peripheral position, in single (12) and multiple questions (13).

- (12)a. Kivel beszélt Emöke ?  
 who-instr speak-pas-3s Emöke-nom  
 'With whom did Emöke speak ?'  
 b. \*Emöke beszélt kivel ?  
 Emöke-nom speak-pas-3s who-instr
- (13)a. Kivel miről beszélt Emöke?  
 who-instr what-delt speak-pas-3s Emöke-nom  
 'With whom did Emöke speak about what ?'  
 b. \*Kivel beszélt Emöke miről ?  
 who-instr speak-pas-3s Emöke-nom what-delat

This is not the typical behavior of n-words. N-words can appear optionally in an IP-internal (post-verbal) position, as in (14a), or in a left-peripheral (preverbal) position (14b).

- (14)a. Nem látott senkit.  
 neg see-pas-3s nobody-acc  
 'He/she didn't see anybody.'  
 b. Senkit nem látott.  
 nobody-acc neg see-pres-3s  
 'He/she didn't see anybody.'

When several n-words co-occur, any of the possible variations in the distribution is grammatical.

- (15)a. Nem mondott senkinek semmit.  
 neg say-pas-3s nobody-dat nothing-acc  
 'He/she didn't say anything to anybody.'
- b. Senkinek nem mondott semmit.  
 nobody-dat neg say-pas-3s nothing-acc  
 'id.'
- c. Semmit nem mondott senkinek.  
 nothing-acc neg say-pas-3s nobody-dat  
 'id.'
- d. Senkinek semmit nem mondott  
 nobody-dat nothing-acc neg say-pas-3s  
 'id.'

So in Hungarian, at least, giving *wh*-phrases and n-words a uniform semantic and syntactic treatment leads to an extremely complex system: why is it that whereas *wh*-phrases follow neatly the WH-criterion, n-words behave so strangely with respect to the NEG-criterion? I propose that it is because they do not need to satisfy the NEG-criterion. This implies that the various positions of n-words within the sentence are not to be accounted for in terms of a syntactic constraint of spec-head relation with a relevant head. N-words appear in the sentence as quantified elements, but do not bear the negative 'burden'. Therefore, the negative nature of n-words can legitimately be questioned.

On the other hand, the quantificational nature of these elements involves scope marking. Hungarian quantifiers can appear in different positions. Among others, they can appear overtly in their scope position: whereas (16a) is a neutral order SVO sentence, (16b) is not: the subject *Balázs* is in the Topic position, and the quantifier occupies a left-peripheral position, QP, within the CP-domain. It is a scope position.

- (16)a. Balázs beszélt mindenkivel.  
 Attila speak-pas-3s everybody-instr  
 'Balázs spoke with everybody.'
- b. Balázs mindenkivel beszélt  
 Balázs-nom everybody-instr speak-pas-3s  
 'Balázs spoke with everybody.'

That quantifiers, including n-words, can either reach their scope position overtly, or possibly use LF movement is attested by the examples in (17). In (17a), the n-word appears overtly in a left-peripheral position: it scopes over the quantified DP *két vendég* ('two guests'). (17b), where the n-word occurs postverbally, we observe the same scope relations as in (17a), provided that the n-word has some sort of emphatic stress<sup>3</sup>.

- (17)a. *Senkivel nem beszélt két vendég.*  
 nobody-instr neg speak-pas-3s two guest-nom  
 'Two guests spoke with nobody.'  
 =for all x, it is the case that two guests didn't talk to x
- b. *Nem beszélt két vendég 'senkivel.*  
 neg speak-pas-3s two guest-nom nobody-instr  
 'id.'  
 =for all x, it is the case that two guests didn't talk to x

Similarly in (18), the binding relations show that the n-word can either occur overtly in its scope position, or, alternatively, given the emphatic stress on it, can reach its scope position at LF. In (18a), the n-word occurs in preverbal position, and is coindexed with the n-expression *semmi könyvére* ('on none of his books'), which occurs postverbally. In (18b), both n-expressions are preposed, and the coindexing is also possible. I assume that the two quantified elements appear in the Scope domain<sup>4</sup>. In (18c), however, the n-word *senki* appears postverbally, in a position in which it does not c-command *semmi könyvére* overtly. Coindexing is still fine, as long as the n-word carries the same emphatic stress as in the examples above.

- (18)a. *Senki<sub>i</sub> nem volt büszke semmi könyvére<sub>i</sub>.*  
 nobody-nom neg aux-pas-3s proud no book-poss-subl  
 'Nobody was proud of any of his books.'
- b. *Senki<sub>i</sub> semmi könyvére<sub>i</sub> nem volt büszke.*  
 nobody-nom no book-poss-subl neg aux-pas-3s proud  
 'id.'
- c. *Semmi könyvére<sub>i</sub> nem volt büszke 'senki<sub>i</sub>*  
 no book-poss-subl neg aux-pas-3s proud nobody-nom  
 'Nobody was proud of any of his books.'

So n-words can appear either in a low, postverbal position, which I assume corresponds to their argument/case position. In this case, it seems that they reach their scope position covertly. Alternatively, they can appear overtly in a left-

peripheral position, which is their scope position. On the basis of these observations, I will make two proposals.

The first one is that the movement of n-words in Hungarian is not motivated by the satisfaction of the NEG-criterion. This is an alternative to postulating several NegPs, or at least several *loci* where the NEG-criterion can be satisfied.<sup>5</sup> In Hungarian, one would need at least two positions. This leads to some redundancy in the system, as the movement of n-words is motivated by scope requirements. The NC facts can easily be reduced to scope facts: if you have sentential scope, you are allowed to be interpreted, along with your fellow quantifiers, as forming one unit. (Either absorption or compositionality can do the trick).

The second proposal concerns the overt position of n-words in Hungarian. Consider the distribution of different quantifiers. In the left-peripheral scope domain, the existential quantifier *valakivel* precedes the universal quantifier *mindenről* (19a). The reverse order is ungrammatical (19b).

- (19)a. Balázs            valakivel            mindenről            beszélt  
 Balázs-nom somebody-instr everything-delat speak-pas-3s  
 'Balázs spoke with somebody about everything.'  
 b. \*Balázs mindenről            valakivel            beszélt  
 Balázs everything-delat somebody-instr speak-pas-3s

There are good reasons to argue that the existential quantifier occupies a Topic position in Hungarian (at least as a shorthand analysis)<sup>6</sup>. The universal quantifier occupies the QP position between Topic and Focus. N-words are also licensed in a position which follows the existential quantifier (20a), but not in a position preceding it (20b):

- (20)a. Balázs            valakivel            semmiről            nem beszélt.  
 Balázs-nom somebody-instr nothing-delat neg speak-pas-3s  
 'Balázs didn't speak with somebody about anything.'  
 b. \*Balázs semmiről            valakivel            nem beszélt.  
 Balázs-nom nothing-delat somebody-instr neg speak-pas-3s

Another interesting piece of evidence in favor of the left-peripheral position of n-words is the distribution of the adverb *biztosan* ('certainly'). The adverb can appear preceding a quantifier (21a), but not a Topic (21b). This means that it cannot occur in the Topic field.

- (21)a. Balázs            biztosan mindenkivel            beszélt.  
 Balázs-nom certainly everybody-instr speak-pas-3s  
 'Balázs certainly spoke with everybody.'

- b. \*Biztosan Balázs mindenkivel beszélt.  
 certainly Balázs-nom everybody-instr speak-pas-3s

Again, the n-word can follow the adverb (22a), but cannot precede it (22b):

- (22)a. Balázs biztosan semmiről nem beszélt.  
 Balázs-nom certainly nothing-delat neg speak-pas-3s  
 ‘Balázs certainly spoke about nothing.’  
 b. \*Balázs semmiről biztosan nem beszélt.  
 Balázs-nom nothing-delat certainly neg speak-pas-3s

I will conclude that n-words cannot appear in the Topic field, and that when they are preposed, they appear in the same position as universal quantifiers (in QP).

## 5. Residual problems

However, we have to face one major problem if we are to adopt this analysis. Although Hungarian has been claimed a ‘strictly’ NC language, there are cases where it is possible to have double negation (DN). Consider (23) below:

- (23) Senkivel nem beszéltem semmiről.  
 nobody-instr neg speak-pas-1s nothing-delat  
 ‘I didn’t speak with anyone about anything.’  
 ‘I didn’t speak with anyone about nothing.’

The standard claim is that this sentence is unambiguously NC. A claim which, in normal circumstances, is true. However, as pointed out to me by Katalin E-Kiss, there are different intonation patterns, and it is possible to get a DN reading:

- (24)a. senkivel nem beszéltem semmiről  
 b. senkivel nem beszéltem semmiről

In the first case, the two n-words get some sort of emphatic stress, possibly similar. On the other hand, the second interpretation is possible if the lower n-word has this fall-rise intonation. It is quite clear that the DN reading is somehow an ‘unnatural’ reading. The intonation suggests that there is some sort

of ‘contrastive’ phenomenon going on. It seems that the DN version is either an answer to some previous statement, or is meant to suggest that something else has still to be stated. It has been suggested to me by Edit Doron that in fact, this contrastive kind of reading may be the result of some ellipsis. It might be that the n-word is the only expressed word of a more complex structure in which the rest of the sentence is elided. This would make the case somewhat similar to that of the fragment negation. This seems to me to be on the right track. Hungarian DN is not a regular phenomenon. Note that the DN reading does not obtain if the n-word is preposed:

- (25) Senkivel semmiről nem beszéltem.  
 nobody-instr nothing-delat neg speak-pas-1s  
 ‘I didn’t speak about anything with anyone’  
 \* ‘I didn’t speak about anything with nobody.’

## 7. Conclusion

In this talk, I have proposed that Hungarian n-words are universal quantifiers which are not inherently negative. I have also proposed that their preposed surface position is a scope position, which corresponds to that of universal quantifiers, that is between the Topic position, which typically hosts referential (non-quantificational) type of expressions, and the Focus position.

This proposal solves the problem of the multiple surface positions of n-words in Hungarian, a problem raised by the application of the neg-criterion to n-words in Hungarian.

## Notes

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<sup>1</sup> The term ‘neutral order’, widely used in the literature on Hungarian, refers to sentences which correspond to a simple declarative form. Neutral order sentences in Hungarian may be SVO, but can also exhibit variations in word order (OVS, etc). I assume that neutral order sentences involve IP-internal positions.

<sup>2</sup> Tóth (1995) argues that Hungarian has two sets of 'NPIs': the *vala*-NPIs and the *se*-NPIs. The *vala*-type elements are composed of the morpheme *vala* and the morpheme *ki* for [+human], *mi* for [-human], etc. The *se*-type elements are made up of the morpheme *se* and the same *ki*, *mi* etc element. I propose that only *se*-NPIs can be taken as belonging to the class of NPIs proper.

*Vala*-type PIs are licensed in nonveridical contexts (in the sense of Giannakidou 1998), that is, licensed by an operator that does not preserve the truth of the proposition; *se*-PIs are licensed only in (a subset of the) antiveridical contexts, i.e. with an antiveridical operator which entails the falsity of the proposition it embeds. Given Giannakidou's proposal (which is that Affective Polarity Items are licensed in nonveridical contexts), one can conclude that the so-called *vala*-NPIs are rather Affective Polarity Items (APIs). I will assume that only the *se*-NPIs are strictly NPIs, in the sense that they are sensitive to negative contexts. The semantic licensing tells the *vala*- and *se*- forms apart as API vs NPI. See Puskás (1999) for a detailed discussion.

<sup>3</sup> This emphatic stress, which occurs sentence-internally, must be distinguished from the primary stress assigned to focused constituents.

<sup>4</sup> The two n-words appear the specifiers of in distinct QPs, the higher n-word asymmetrically c-commanding the lower one.

<sup>5</sup> Note that this is a position adopted in Haegeman (1995) for West Flemish, and proposed by Zanuttini for Romance languages (see Zanuttini 1997).

<sup>6</sup> The question remains to be examined whether quantifiers, even of the existential type, can be interpreted as actual Topics. Hungarian offers evidence for a restriction in the distribution of quantifiers with respect to topicalized DPs, e.g. which suggests that the Topic domain contains several distinct projections within a 'split Topic'.

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# On the Felicity Conditions of Disjunctive Sentences

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## 0. Introduction

In “Indicative Conditionals,” Paul Grice (1989: 68) observes that

a standard (if not the standard) employment of “or” is in the specification of possibilities ... each of which is relevant in the same way to a given topic. ‘A or B’ is characteristically employed to give a partial answer to some [*wh*]-question, to which each disjunct, if assertable, would give a fuller, more specific, more satisfactory answer.

Thus, for example, in answer to the question *What is wrong with my car?* your mechanic might reply:

1. Either you have dirt in your fuel line or your carburetor is gummed.

Each disjunct in the response constitutes, from the point of view of your mechanic, a possibly true answer to the question.

Disjunctions not only *may* be used to list related possibilities, but apparently *must* be. A disjunction which is not so interpretable is generally quite unacceptable, as illustrated by:

2. #Either you have dirt in your fuel line or it’s raining in Tel-Aviv.

(2) is infelicitous because the disjuncts are not related in an appropriate way. My first task in this paper is to spell out the relevant notion of relatedness and to explain why this relatedness condition holds of disjuncts. I do this in sections 1 and

2 of the paper. In section 1, I consider disjunctions given in answer to explicit *wh*-questions, and show why *unrelated disjunctions* such as (2) cannot be answers. In section 2, I extend the conclusions of section 1 to non-answer cases of *unrelated disjunctions*.

In section 3, I turn to a different kind of infelicity which arises in what I will call *vacuous disjunctions* such as (3).

3. #Either you have dirt in your fuel line or you have something in your fuel line.

The disjuncts in this example are apparently too closely related to be felicitously disjoined. I will argue that the infelicity arises because such disjunctions are *vacuous*, in a sense to be defined.

Throughout this paper, I maintain the assumption that *or* has the truth conditions of inclusive disjunction. In Gricean vein, I will show that this assumption is unchallenged by the observed felicity conditions, as long as we take into account general principles of conversation.

## 1. Disjunctions as Answers

### 1.1. Conditions on answerhood

To understand the behavior of disjunctive answers, we must first establish some general conditions on answerhood. I express these conditions in terms of Groenendijk and Stokhof's (1984) framework for questions and answers.

Groenendijk and Stokhof construe questions as partitions on the set  $W$  of all possible worlds<sup>1</sup>. Each cell in the partition constitutes a possibly true and exhaustive answer to the question, that is a proposition which is a true exhaustive answer at some world<sup>2</sup>. Consider, for example, the question:

4. Which hand does Mandy write with?

There are four possible exhaustive answers to the question: that Mandy writes with her right hand only, with her left hand only, with both hands or with neither. The question thus divides the set of possible worlds into four non-intersecting subsets. One subset contains all and only the worlds in which Mandy writes with her right hand only, another all and only the worlds in which Mandy writes with her left

hand only, and so on. For any question  $Q$ , “ $W/Q$ ” will denote the partition imposed by  $Q$  on  $W$ .

We will mostly be concerned with the relation between such partitions and the *information state* of the questioner. Following Groenendijk and Stokhof, I adopt a very simple model of information states, taking them to be sets of propositions, represented by the set of possible worlds compatible with the conjunction of these propositions. I will call this set the individual’s *information set*. When a person asks a question, she may already believe some possible answer to be untrue. For example, the person who asks *Which hand does Mandy write with?* appears to take for granted that Mandy writes with one hand or the other. Hence, her information state does not include any worlds in which Mandy writes with neither hand; it has an empty intersection with that cell of  $W/\textit{which hand does Mandy write with}$ . For any partition  $W/Q$  and information state  $i$ , let  $W/Q^i$  denote the set of cells of  $W/Q$  which have a non-empty intersection with  $i$ , i.e.:

$$5. \quad W/Q^i = \{X \in W/Q : X \cap i \neq \emptyset\}$$

Given this framework, the asking of a question can be as a request for information about which cell of the partition contains the actual world, that is, as a request for a particular kind of information update. We model information update as an increase in the number of propositions in the information state, with a concomitant elimination of worlds from the information set. When a hearer accepts an assertion, she eliminates from her information set any worlds incompatible with the asserted proposition. The result of updating an information state  $i$  with a proposition  $\phi$  is the intersection of  $i$  and  $\phi$  i.e.:

$$6. \quad i+\phi = i \cap \phi$$

An assertion made in response to a question  $Q$  is a felicitous answer only if it reduces the information set in such a way as to increase the number of cells of  $W/Q$  which have an empty intersection with  $i$ . To illustrate this, let us return to our example question and consider some possible answers to it.

Consider first:

7. Abe: Which hand does Mandy write with?  
 Betty: She writes with her left hand.

Betty’s response constitutes a complete answer to the question asked. Once Abe updates his information set with the content of her assertion, that set will intersect

with only one cell of the partition *W/which hand does Mandy write with*. A complete answer is of course the best possible kind of answer to a question.

But partial answers are also acceptable responses to a question. Consider:

8. Abe: Which hand does Mandy write with?  
 Betty: Well, she doesn't write with both.

This is a partial answer. It reduces the number of possible answers to the question which are compatible with Abe's information state from three to two, and thus moves him closer to knowing which cell of the partition contains the actual world.

An assertoric response to a question which does not achieve this cannot be an acceptable answer. Consider:

9. Abe: Which hand does Mandy write with?  
 Betty: So far, there have been rather few Y2K problems.

Betty's response may provide Abe with new information, but it does not provide the right kind of information. Although it might lead to a reduction of Abe's information set, it does not reduce the number of cells of the partition with which his information state intersects.

Betty's response in (9) is not an acceptable response to the question at all (unless it can be construed as a refusal to answer). From this observation, we can derive the following acceptability condition on answers:

10. *The Answerhood Condition*

An assertoric response to a question must provide at least a partial answer to the question asked.

The formal definition of partial answerhood is given in (11).

11. *Definition of partial answerhood*

A proposition  $\phi$  partially answers a question  $Q$  with respect to an information set  $i$  iff  $W/Q^{i-\phi} \subset W/Q^i$

Note that partial answerhood is defined only relative to an information state. Thus, what counts as an answer to a question will depend upon the information state of the questioner. Consider, for example, the following exchange:

12. Abe: Why aren't you eating lunch?  
Ann: Because it's Ramadan.

Ann's response will provide Abe with an answer only if he knows that Ann is an observant Muslim and that observant Muslims fast during the day throughout Ramadan. (If Abe knows about Ramadan but not about Ann's religious affiliation, he is likely to respond with *Are you Muslim?*) Thus, judgements as to whether a response satisfies the Answerhood Condition will vary, depending upon the information state of the hearer.

The Answerhood Condition does not characterize all acceptable responses to questions. Another kind of acceptable response is to explicitly refuse to answer by indicating that you are either unable or unwilling to answer the question asked. Another option is to establish or suggest a strategy for finding an answer. (For discussion of this, see Ginzburg 1995 and Roberts 1996.) One way to do this is to ask a related question, as in (13):

13. Abe: What's for dinner tonight?  
Betty: Was it tofu-burgers last night?

Another possibility, discussed in Groenendijk and Stokhof, is to offer a conditional response which indicates that finding an answer to another question will provide an answer to the original one, as in:

14. Abe: What's for dinner tonight?  
Betty: If it was tofu-burgers last night, it'll be stir fry tonight.

The Answerhood Condition should thus be further restricted to apply to assertoric, non-conditional, non-refusal responses to questions. There are no doubt further limitations, but the condition captures the fundamental idea that if a response to a question is informative at all, it must be relevantly so.

## 1.2. Disjunctions as answers

With this much in place, we can turn to disjunctive answers. Let's begin by considering a good case:

15. Mandy: What's wrong with my car?  
Tim: Either there's dirt in the fuel line or the carburetor is gummed.

Recall that I assume that *or* has the truth conditions of inclusive disjunction. Hence, if I accept Tim's assertion I keep in my information set all worlds in which there is dirt in the fuel line and all worlds in which the carburetor is gummed, and eliminate all others. Having updated my information state in this way, I am closer to knowing which cell of the partition contains the actual world. In other words:

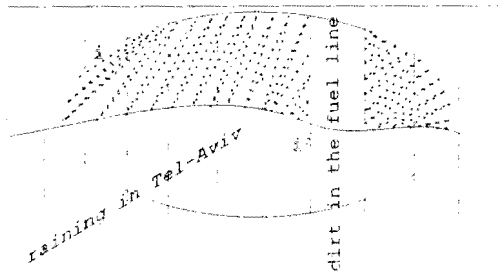
16. *W/what's wrong with my car*<sup>17</sup> either there's dirt in the fuel line or the carburetor is gummed  $\subseteq$   
*W/what's wrong with my car*<sup>1</sup>

Thus, the disjunction constitutes an acceptable response to the question.  
 Consider now the unacceptable:

17. Mandy: What's wrong with my car?  
 Tim: Either there's dirt in the fuel line or it's raining in Tel-Aviv.

If I accept this assertion, then I eliminate from my information set worlds in which there is neither dirt in my fuel line nor rain in Tel-Aviv. But on the assumption that my information set does not reflect any relationship between the weather in Tel-Aviv and the state of my car, then, for every possible mechanical state of my car, there is a world in which my car is in that state and it is raining in Tel-Aviv. This information update thus does not eliminate any possibility with respect to the state of my car. It does not move me closer to knowing which cell of *W/what's wrong with my car* contains the actual world. The update is illustrated schematically in Figure 1.

**Figure 1:** Update with infelicitous disjunction



The disjunctive response in (17) fails to provide a partial answer to the question asked relative to the questioners information set, accounting for its unacceptability as a response.

Notice, however, that if the information set were modified appropriately, the response could constitute an acceptable response. Suppose that Tim, my car and I are all in Jerusalem, that when it rains in Tel-Aviv it is humid in Jerusalem, and that humidity causes the same kind of mechanical problems as dirt in the fuel line. In this state of affairs, the response would be an acceptable response. But this is because, if my information set reflected all of the suppositions just introduced, the disjunction would provide a partial answer to the question. One possible answer to the question – one cell of the partition – would be the proposition that it is humid in Jerusalem. Moreover, at all worlds in my information set where it is raining in Tel-Aviv, it is humid in Jerusalem. Consequently, when I eliminate from that set all worlds in which it is not raining in Tel-Aviv, I am left only with worlds in which it is humid in Jerusalem. The effect of update is thus identical to that shown in Figure 4, and this is because each disjunct in the disjunction now provides at least a partial answer to the question asked.

This turns out to be a completely general result. That is, we can show that a disjunction can provide a partial answer to  $Q$  only if each disjunct is a partial answer to  $Q$ , i.e.:

18. For any information set  $i$  and any question  $Q$ :
- $$W/Q^{c-[A \text{ or } B]} \subset W/Q^c \text{ only if}$$
- $$W/Q^{c-A} \subset W/Q^c \text{ and } W/Q^{c-B} \subset W/Q^c$$

The proof of this theorem is given in the Appendix.

We now have the explanation for the second half of Grice's observation, that when a disjunction is used in answer to a *wh*-question, each disjunct must be a possible answer to the question. The explanation is that assertoric responses to questions generally aim to be at least partial answers, and a disjunction can be a partial answer only if each disjunct is. We further understand why judgements about the acceptability of disjunctive answers can be changed by changing the background assumptions. To change the background assumptions is to change the information set relative to which the Answerhood Condition must be met, and thus to change the answerhood status of the relevant assertion. The conditions which hold of disjunctive answers are thus merely special cases of the conditions which hold generally of assertoric responses to questions. In particular, the explanation does not require any assumptions about the semantics of *or* beyond attributing to it the truth conditions of inclusive disjunction.



## 2. Disjunctions Alone

### 2.1. Prelude: The Topic Condition on discourse contributions

The conditions under which non-answer disjunctions can be asserted likewise turn out to be a special case of the conditions which apply to assertions generally. The relevant condition is what I will call the *Topic Condition*. The basic idea is that for a contribution to a discourse to be acceptable, it must be possible for hearers to determine what it is “about.”

Aboutness is a very vague notion and I do not have any new analysis of it to offer here. But I would like to make use of an idea originally due to Carlson (1983), and adopted elsewhere (see for example Roberts 1996), to characterize the notion. Following Carlson, I call what an assertion is about its *discourse topic*, and I identify discourse topics with questions to which the assertion is a possible partial answer, in the sense introduced above.

I further distinguish the *potential discourse topics* of an assertion from the *identifiable discourse topics* of an assertion. A *potential discourse topic* for an assertion A is any question Q to which A provides a partial answer with respect to some information state. Assertions will have an infinite number of potential discourse topics. The more useful notion is the notion of an identifiable discourse topic, which is relativized to discourse participants. A question Q is an *identifiable discourse topic* for an assertion A and discourse participant P only if A provides a partial answer to Q relative to P’s information state. The set of identifiable discourse topics for any assertion and discourse participant will be a subset of the potential discourse topics of that assertion.

We can now use the notion of identifiable discourse topic to state the Topic Condition:

#### 19. *Topic Condition*

For an assertoric contribution to a discourse to be acceptable for a participant P, the contribution must have at least one identifiable discourse topic for P.

That is, there must be at least one question to which the assertion provides a partial answer relative to P’s information set.

## 2.2. Disjunctions and discourse topics

It should now be obvious how the conclusions of the previous section extend to non-answer cases of disjunction. An identifiable discourse topic for a disjunction  $\delta$  and discourse participant  $P$  is a question to which  $\delta$  provides a partial answer for  $P$ . From our earlier conclusions, we know that  $\delta$  can provide a partial answer to a question  $Q$  only if all disjuncts of  $\delta$  are such that, if asserted, they would provide partial answers to  $Q$ . Therefore in order for  $\delta$  to have an identifiable discourse topic for  $P$ , there must be a question  $Q$  such that each disjunct of  $\delta$  is a partial answer to  $Q$  for  $P$ . The disjuncts of any disjunction which is to be an acceptable contribution to a discourse must, therefore, all bear this relation to at least one question. When this is not the case, the disjunction will lack any identifiable discourse topic, and will be judged infelicitous.

We can now explain Grice's observation that the disjuncts of acceptable disjunctions are all "relevant in the same way to a given topic." His characterization is an alternate way of saying that all disjuncts are possible answers to the same question. This is required in order for a disjunction to satisfy the Topic Condition. Felicity judgements about disjunctions are susceptible to variation depending on background assumptions because background assumptions are crucial in determining whether a proposition constitutes a possible answer to a given question. Hence, we expect the variability which is observed.

The Topic Condition is a condition on contributions to discourse, so there is a question as to what is involved in speaker judgements about the acceptability of a disjunction "out of the blue." I suggest that what we are evaluating, when offered a sentence "out of the blue," is whether there is any discourse situation in which the sentence would be an acceptable contribution. In other words, we try to imagine a situation in which the sentence might be used acceptably. This includes a judgement of whether there is a circumstance under which the sentence would have an identifiable discourse topic. When none presents itself, we judge the sentence infelicitous.

## 3. Disjunctions and Vacuity

I return now to the second type of unacceptable disjunction, the *vacuous disjunctions* such as (20):

20. Either there's dirt in the fuel line or there's something in the fuel line.

(20) does have an identifiable discourse topic. It provides an answer to the question *What is wrong with the car?* So its infelicity is not attributable to a failure to meet the Topic Condition. However, observe that the first disjunct of (20) entails the second. In other words, the following holds:

21.  $\{w: \text{there's dirt in the fuel line in } w\} \subset$   
 $\{w: \text{there's something in the fuel line in } w\}$

Consequently for any information set  $i$ :

22.  $i+(20) = i+\textit{there's something in the fuel line}$

Given the identity in (22), it holds that for any question  $Q$ , the disjunction as a whole provides an identical answer to  $Q$  as would assertion of the second disjunct alone. In other words, the first disjunct makes no contribution to the informativity of the assertion. Its inclusion in the assertion is in this sense vacuous. Whatever topic the speaker is addressing, she would have given the same information about that topic had she asserted the second disjunct.

I assume there to be a general prohibition on vacuity, presumably a sub-part of Grice's Maxim of Manner. This prohibition will rule out disjunctions such as (20) along with constructions involving vacuous quantification, conjunctions of identical strings, and so on. Once again, no special assumptions about disjunction itself are required in order to explain the infelicity of the example.

#### 4. The Discourse Conditions Interacting

The two conditions I have identified – the Topic Condition and the prohibition on vacuity – interact to account for certain cases in which disjunction is interpreted exclusively. One example is the following, due to Barbara Partee (p.c.):

23. Either Jane is working, or she's in the library.

Partee observes that this sentence would normally imply that Jane is not working in the library, and indeed that Jane generally does not work in the library. The question is why this would be so. One possibility would be to attribute to the *or* in this sentence the truth conditions of exclusive disjunction. But a more satisfactory

solution is offered by considering the effects of the discourse conditions we have discussed<sup>3</sup>.

In order for (23) to be an acceptable contribution to a discourse, it must have an identifiable discourse topic, that is, there must be some question to which it would provide a partial answer. There are two questions which immediately suggest themselves as candidates:

- 24. Where is Jane?
- 25. What is Jane doing?

Suppose that the disjunction is to provide an answer to (24). Then both disjuncts must be construable as possible answers to this question. It is obvious that the second disjunct – *Jane is in the library* – is a possible answer. The first disjunct – *Jane is working* – can only be an indirect answer, and can be one only if Jane's working contextually entails that she is in a particular place, or at least excludes some possibilities<sup>4</sup>. The exclusion of possibilities (the weaker case) is equivalent to contextual entailment of a disjunction. Consider one instance of this case. Suppose that Jane's working contextually entails that she is either in the library or in her office or in a coffee shop. In this case, the first disjunct of (23) would indeed constitute an answer to the question. However, this answer would be entailed by the answer offered by the second disjunct. As we saw above, when one disjunct entails another, the answer offered by the disjunction as a whole is identical to that answered by the weaker disjunct. Inclusion of the stronger disjunct is ruled out by the prohibition on vacuity. Consequently, in order for the disjunction to be an appropriate answer to the question *Where is Jane?* it must be the case that Jane's working excludes the possibility that she is in the library. This would be the case if it were known that Jane generally does not work in the library.

The same argument applies, *mutatis mutandis*, to the second candidate topic question, *What is Jane doing*. Suppose that Jane's being in the library excludes certain possibilities as to what she is doing, but does not exclude the possibility that she is working. In this case, the answer offered by the second disjunct would be entailed by the answer offered by the first, and once again the disjunction would be in violation of the prohibition on vacuity. The disjunction thus constitutes an acceptable answer to either of the two obvious topic questions only in a context in which it is assumed that Jane does not work in the library. This is the source of the observed exclusive interpretation of the disjunction.

## 5. Conclusion

I have argued here that the felicity conditions of disjunctive sentences are sub-cases of the felicity conditions to which all assertions are subject. The way these conditions apply in the case of disjunctions is a consequence of the information update induced by disjunctive assertions, which is itself a reflection of their truth conditional properties. The observations are predicted on the basis of the assumption that *or* has the truth conditions of inclusive disjunction.

## 6. Appendix: Proof of theorem (18)

Lemma:

$W/Q^{i+\varphi} \subset W/Q^i$  iff  $\exists X \in W/Q$  s.t.  $X \cap i \neq \emptyset$  and  $X \cap i \cap \varphi = \emptyset$

Proof:

1. Show: for any Q, any i:  
 $W/Q^{i+[\varphi \text{ or } \psi]} \subset W/Q^i$  only if  
 $W/Q^{i+\varphi} \subset W/Q^i$  and  
 $W/Q^{i+\psi} \subset W/Q^i$
2. Suppose that for some arbitrary Q and i,  
 $W/Q^{i+[\varphi \text{ or } \psi]} \subset W/Q^i$
3. Then  $\exists X \in W/Q$  s.t.  $X \cap i \neq \emptyset$  and  $X \cap i \cap [\varphi \text{ or } \psi] = \emptyset$  (by lemma, L to R)
4.  $X \cap i \cap [\varphi \text{ or } \psi] = X \cap i \cap (\varphi \cup \psi)$
5. So  $\exists X \in W/Q$  s.t.  $X \cap i \neq \emptyset$  and  $X \cap i \cap (\varphi \cup \psi) = \emptyset$  (rewrite of line 3)
6. So  $\exists X \in W/Q$  s.t.  $X \cap i \neq \emptyset$  and  $X \cap i \cap \varphi = \emptyset$  and  
 $\exists X \in W/Q$  s.t.  $X \cap i \neq \emptyset$  and  $X \cap i \cap \psi = \emptyset$
7. So  $W/Q^{i+\varphi} \subset W/Q^i$  and  
 $W/Q^{i+\psi} \subset W/Q^i$  (by two applications of lemma, R to L)  
 i.e.,  $\varphi$  is a partial answer to Q and  $\psi$  is a partial answer to Q.

## Notes

1. A partition of a set  $S$  is a way of dividing  $S$  into non-overlapping subsets. Formally  $P$  is a partition of a set  $A$  iff:

- (i)  $P \subseteq \text{pow}(A)$  and  $\emptyset \notin P$   
( $P$  is a set of non-empty subsets of  $A$ )
- (ii)  $A = \cup\{B: B \in P\}$   
(The union of the members of  $P$  equals  $A$ , i.e. every member of  $A$  is in some cell of  $P$ .)
- (iii)  $\forall X, Y \in P: X \cap Y = \emptyset$  or  $X=Y$   
(The cells of  $P$  do not overlap.)

2. The partition on the set of possible worlds (equivalent to a function from worlds to sets of worlds) is the intension of a question in Groenendijk and Stokhof's framework.

3. In other cases, the apparent exclusive reading of *or* is attributable to the interpretation of the disjuncts as exhaustive answers to the question under discussion. For a presentation of this view and objections to the semantic ambiguity approach to *or*, see Simons (to appear).

4. The term *contextual entailment* is due to Chierchia and McConnell-Ginet (1990), and can be defined as follows: Let  $\alpha, \beta$  be propositions and let  $\Gamma$  be some subset, possibly empty, of the set of background assumptions. Then  $\alpha$  contextually entails  $\beta$  iff  $\alpha \wedge \Gamma$  entails  $\beta$ .

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# Interactions of Sentence Final Particles and Verb Movement\*

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## **1 Introduction**

It has been argued that verbs move out of *vP* overtly in English (Johnson 1991, Koizumi 1995, Kural 1998, among others). The landing site of the verbs in English is T. On the contrary, Chinese lacks V-to-T movement. Chinese verbs never move out of *vP* to T overtly (Cheng 1989, Gu 1995, Huang 1997a, among many others). The path of verb movement in Chinese is ‘shorter’ than that in English (Huang 1997b, Fukui and Takano 1998, Tang 1998).

A question arises: Why does Chinese differ from English that V-to-T movement is missing in Chinese? Can the lack of V-to-T movement in Chinese be derived from some general properties of this language?

Before proceeding, let me spell out some theoretical assumptions in section 2.

## **2 Some Theoretical Assumptions**

First of all, let us take the model of the language faculty proposed by Chomsky (1995), as represented by (1), to be our working hypothesis.





Let us assume that (2) is a universal requirement. If the tense feature cannot be attached to a predicative host, the derivation crashes at the LF interface level.

How to satisfy (2) is subject to parametric variation. In what follows, I will illustrate two different strategies to satisfy such a requirement manipulated by natural languages. It will be shown that economy principles play a role.

### 3.2 The (non)existence of the temporal sentence final particles

Lasnik (1995) convincingly argues that English verbs are morphologically ‘impoverished’ when they are introduced into the derivation. According to him, inflectional elements are attached to English verbs in syntax.

Let us assume that in English the tense feature is assigned to T and could be overtly realized as suffixes such as *-ed* and *-s*. Recall that the tense feature must be associated with a verbal element at LF. A strategy to satisfy such a requirement in English is to move the verb to T overtly. Hence, V-to-T movement in English is necessary, which is mainly for LF convergence.

The situation in Chinese is different. I propose that the lack of V-to-T movement in Chinese is due to the existence of temporal sentence final particles.

Sentence final particles in Chinese can be classified into at least two types: temporal particles and mood particles (Zhu 1982, among others). The former includes *le* (=3)) and *laizhe* (=4)) and the latter includes the interrogative particles *ma* (=5)) and *ne* (=6)).

#### *Temporal particles*

- (3) Ta chu qu mai dongxi le.  
she exit go buy thing Part  
‘She’s gone shopping.’
- (4) Xia yu laizhe.  
fall rain Part  
‘It just rained.’

#### *Mood particles*

- (5) Ni kai che ma?  
you drive car Q  
‘Do you drive?’
- (6) Tamen shi-bu-shi wo de xuesheng ne?  
they be-not-be I Mod student Q  
‘Are they my students?’

Sentences with the temporal particle *le* denote a 'current relevant state' (Li and Thompson 1981). In Reichenbachian terms, sentences with *le* convey the meaning that the event time precedes the reference time. For example, Li and Thompson (1981) point out that (3) says that her having gone shopping is 'current with respect to some particular situation, and ... it is assumed that her having gone shopping is relevant to the present'. In other words, the event of her having gone shopping occurred at a time before the reference time and the reference time is the same as the speech time.

The reference time could be before the speech time. Let us compare (3) with (7). We may notice that the state of her having gone shopping was relevant to the situation of 'that day' in the past. Using Reichenbachian terms, her having gone shopping is the event time and 'that day' is the reference time.

- (7) Nei tian ta chu qu mai dongxi le.  
that day she exit go buy thing Part  
'That day she went out shopping.'

Sentences with the temporal particle *le* could refer to the time in the future. For example, the state of being in California will be current in the situation specified by 'next month' in (8).

- (8) Xia-ge yue wo jiu zai Jiazhou le.  
next-CI month I then at California Part  
'Next month I'll be in California.'

As we can see, the reference time signaled by sentences with *le* could refer to the speech time, some time prior to the speech time, or some time after the speech time. The way to signal the so-called 'current relevant state' is relational. Such a relational characteristic could be regarded as the 'Perfect', which is a relative tense, on a par with the auxiliary *have* in English.

Sentences with the temporal particle *laizhe* refer to an event in the 'recent past' (Chao 1968), i.e. that both the event time and the reference time precede the speech time. For example, the event of raining in (4) should have happened prior to the speech time. The particle *laizhe* could be treated as a past tense marker.

As noted by Chao (1968) and Li (1997), the so-called 'recent past' is more psychological than factual. Sentences with *laizhe* could refer to an event, which occurred long before the speech time. Consider (9).

- (9) Wo hai jide xiao shihou women zai neige hu-li youyong laizhe.  
 I still remember small time we at that lake-in swim Part  
 'I still remember that we used to swim in that lake when we were  
 children.'  
 (Li 1997:120)

Historically, the temporal sentence final particles *le* and *laizhe* were verbs in Chinese. The particle *le* was derived from the verb *liao* 'finish' whereas *laizhe* was derived from the verb *lai* 'come'. Cao (1995) observes that *le* was first used as a temporal final particle since the late Tang dynasty. The earliest usage of *lai* as being a temporal marker can be found in the colloquial speech spoken in the Tang dynasty and it was used productively in the Song and Yuan dynasties. *Lai* became *laizhe* in the Qing dynasty. Sun (1999) suspects that *zhe* in *laizhe* was originally a mood particle. In other words, *laizhe* was derived from *lai* + *zhe*. Along these lines, we may explain why mood particles never follow *laizhe*. The ungrammaticality of (10) is due to the fact that both *zhe* and *ma* are mood particles and there is only one room for either one of them.

- (10) \*Xia yu laizhe ma?  
 fall rain Past Q  
 'Did it rain?'

The monosyllabic form is still preserved in some modern Chinese dialects, such as *lei* in Cantonese, as in (11).

- (11) Zingwaa lok-gwo jyu lei.  
 just now fall-Exp rain Past  
 'It just rained a moment ago.'

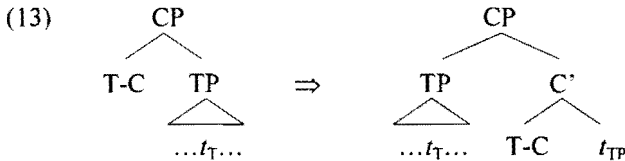
Given that *lei* is monosyllabic and the counterpart of *zhe* is missing in Cantonese, we predict that mood particles can cooccur with the temporal particle *lei* in Cantonese. The prediction is in fact borne out. For example, (12) is acceptable in Cantonese, in which *me* is an interrogative particle in Cantonese.

- (12) Zingwaa lok-gwo jyu lei me?  
 just now fall-Exp rain Past Q  
 'Did it rain a moment ago?'

By virtue of the verbal origin of *le* and *laizhe*, it is natural to assume that they are still verbal in modern Chinese.<sup>2</sup> Assuming that the tense feature is assigned

to T in Chinese, the temporal sentence final particles can be regarded as the host of the tense feature of T. The tense feature is attached to the temporal sentence final particles when they are introduced into the derivation. Consequently, V-to-T movement is not required by semantics and thus is unnecessary in Chinese.

Assuming that ‘specifier-head-complement’ is the universal word order of human languages (Kayne 1994), I assume that the temporal particles move to C followed by TP remnant movement to the specifier of C to derive the right word order in Chinese. The derivation can be represented as in (13).



Suppose that mood particles are associated with C in Chinese. The derivation in (13) explains why the temporal particles must precede the mood particles. For example, in Mandarin the mood particle *ma* always follows the temporal particle *le*. The linear order is fixed, as shown in (14a) and (14b).

- (14) a. Ni chi-le fan le ma?  
 you eat-Perf rice Part Q  
 ‘Have you eaten?’  
 b. \*Ni chi-le fan ma le?  
 you eat-Perf rice Q Part

If the analysis in this paper is on the right track, Chinese should not be regarded as a language that does not have overt tense markers. Both Chinese and English have some morphology to indicate tense, contrary to the views held by many linguists. The major difference between the temporal particles in Chinese and the tense suffixes in English is that the latter triggers verb movement whereas the former doesn’t. In the next section, it will be shown that such a linguistic variation reflects the economy property of human languages.

#### 4 MOM: Economy Considerations

Notice that the choice of the verbal element that can serve as the host of the tense feature in natural languages is arbitrary. It happens that the tense feature is attached to the temporal sentence final particles in Chinese and verbs in English.

Whether the temporal sentence final particles are present is a language-particular factor.

Though UG can't tell us whether the temporal sentence final particles should exist in a particular language, what UG can do seems to select an optimal strategy from the given numeration.

From economy considerations, if the operation Merge alone is able to satisfy the morphological requirement of the tense feature in a language, a more complex operation, such as Move (=Copy + Merge + Delete + Form Chain), should be banned. The idea is that (i) Merge is cheaper than Move and (ii) at any point in a derivation where both Merge and Move are applicable, the cheaper operation is chosen. Such an idea is also known as 'Merge over Move' or 'MOM'.

Consider the case in Chinese. If the temporal sentence final particles exist and they can be the host of the tense feature, V-to-T movement should not be an optimal strategy. In other words, verb movement is a 'last resort' option to satisfy the morphological requirement of the tense feature. The above discussion is summarized as the following conjecture.

- (15) The availability of the temporal sentence final particles correlates with the lack of V-to-T movement in the overt component.

Informally speaking, we may say that Chinese employs a more 'economical' strategy to satisfy the morphological requirement of the tense feature. As English does not have sentence final particles, it can only choose a more 'costly' strategy to satisfy the requirement.

The conjecture in (15) should not be isolated. It seems to be reminiscent of the correlation between the existence of question particles and overt *wh*-movement and the correlation between the existence of classifiers and overt noun movement. It is a well-known fact that Chinese lacks overt *wh*-movement that English has. Cheng (1991) points out that if question particles are available to type a clause as a *wh*-question, overt *wh*-movement should be banned because the relevant features have already been checked off by the particles. I have argued elsewhere that the existence of classifiers blocks noun movement in Chinese and some southeast Asian languages (Tang 1999). Perhaps Chinese is a typical 'MOM language'.

In any event, it turns out that the fundamental difference between Chinese and English with respect to V-to-T movement is related to the existence of the temporal sentence final particles. Though it is very difficult to explain why Chinese has the temporal sentence final particles that English lacks, the

conjecture in (15) could tell us something about the deep properties of the nature of natural languages. Falsifying (15) awaits future research.

## 5 Concluding remarks

In this paper, I have argued that parametric variation of verb movement in Chinese and English is determined by the (non)existence of certain categorial features. Consequently, V-to-T movement should not be formulated as a 'parameter'. Whether verbs move to T has nothing to do with the 'strength' of features. So-called strong vs. weak distinction of features can be eliminated entirely.

I have claimed that the tense feature is assigned to T in the course of the derivation in Chinese and English. The tense feature triggers V-to-T movement before Spell-Out in English. As the temporal sentence final particles exist in Chinese, they can be the host of the tense feature and V-to-T movement is not required. Let me summarize the discussion in table (16), in which 'SFP' stands for the temporal sentence final particles.

(16) *Variations of the assignment of the tense feature and verb movement*

|                           | Chinese | English |
|---------------------------|---------|---------|
| host of the tense feature | SFP     | V       |
| V-to-T movement           | *       | OK      |

Due to limitation of space, I cannot provide an extensive analysis of all linguistic variations between Chinese and English in this paper. Many interesting consequences should await future research.<sup>3</sup> I hope that my proposal outlined here may open up a new way of looking at the typological differences of verb movement in natural languages in terms of the principles-and-parameters approach.

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## Notes

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1999 and the Linguistic Society of Hong Kong Annual Research Forum held at the Chinese University of Hong Kong on December 11-12, 1999 has been invaluable. All errors remain my own. This project is partially funded by the Hong Kong Polytechnic University Departmental General Research Grants G-S971.

<sup>1</sup> Can attaching the tense feature to T satisfy (2), assuming that T is a verbal [+V] category? I suspect that the categorial features of functional categories are somehow 'defective'. For example, the verbal categorial feature of T is 'defective' and thus it cannot be interpreted as predicative at LF. Thanks to Naomi Harada (personal communication) for raising this question.

<sup>2</sup> For differences between *lai zhe* in Mandarin and *lei* in Cantonese, see Tang 1998 and Lee and Yiu 1999.

<sup>3</sup> See Huang 1997b and Tang 1998 for discussion of parametric variations between Chinese and English along these lines.

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# Feature-Driven Coordination: (A)symmetry and Matching

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## 1. Background

In this section we review briefly some central issues that a theory of coordination should address as motivation for the proposal presented in section 3 for deriving elliptical coordinate constructions on the basis of feature matching. In section 2 I point out a central challenge of a minimalist approach to coordination and how some other proposals have addressed this challenge. In section 4 the focus is on how symmetry exists within asymmetric phrase structure, comparing past proposals with the one presented here. In the conclusion I make a final brief assessment of my proposal and raise some questions for further research.

In a derivational approach driven by features like the one proposed here, the matching of syntactic and semantic features is necessary for determining whether the appropriate level of coordinate symmetry has been reached. A simple example of “coordinate symmetry” is given in (1):

- (1) Conjoined DPs/NPs bear the same morphological Case in German:
- a. Peter kennt den Mann und seinen Bruder  
P knows the.acc man and his.acc brother
  
  - b. Der Mann und sein Bruder kennen Peter auch  
The.nom man and his.nom brother know Peter too

I will assume that “unbalanced” coordinate structures investigated in Johansson 1998 are the exception rather than the rule; they are grammatical in spite of coordination and do not reflect its core properties (cf. te Velde 1999a).

Coordinate symmetry requirements are stricter in elliptical structures. For example, an ambiguous NP must be interpreted in the same way as a conjoined antecedent if it is elliptical:<sup>1</sup>

- (2) [<sub>C1</sub> Peter likes visiting relatives] and [<sub>C2</sub> Sue does too]

If “visiting relatives” in conjunct 1 means “going to visit relatives” (vs. relatives coming to visit), then “Sue does too” must mean “Sue likes going to visit relatives, too.” See Lang 1984 for further discussion.

In Gapping, the elliptical verb must meet syntactic and semantic symmetry requirements: it must match its antecedent in terms of tense, mood, voice, etc.; only number can differ:

- (3) Peter visits relatives and his parents e their friends  
(e = *visit*, not *visited* or *have visited*, etc.)

In “Right Node Raising” (RNR) phonological identity appears to be a requirement (i.e. “complete” symmetry: Case, gender, number,  $\theta$ -role, tense, reference, etc. must all be the same):

- (4) a. Peter entertains e<sub>i</sub> and his brother interrogates [his relatives]<sub>i</sub>  
 b. \*Peter entertains e<sub>i</sub> and his sister interrogates [her relatives]<sub>i</sub>  
 (intended interpretation: each interrogates his/her own relatives)  
 c. \*Have you noticed that Peter always e<sub>i</sub> but his parents seldom [visit relatives]<sub>i</sub>

In (4b) the ungrammaticality is caused by the fact that *her* cannot have *Peter* as its antecedent: in (4c) *visit* does not agree with *Peter*.

## 2. Theories of Coordination and the Minimalist Program

Developing a minimalist theory of coordination is challenging for the following two reasons: 1) a minimalist theory must unify the syntactic symmetries of coordinate structures with the asymmetric phrase structure that results from Merge (Chomsky 1998), and 2) it must unify the syntax of coordination with syntax theory in general in a way that is optimal; i.e. a minimalist theory cannot "afford" to have a separate syntax for coordination, nor can it "afford" a syntax theory which fails to account for all the properties of coordination.

Space limitations do not allow a review of past approaches to coordination (see the parallel planes approach of Goodall 1987, the 3D approach of Moltmann 1992, the asymmetric approaches of Munn 1992, 1993, Johannessen 1998, and the various phrase structures summarized in Progovac 1998). The present proposal will depart from the strictly asymmetric ones in one significant respect: I will assume that coordinate symmetry is more than just semantic; it can also be found in the syntax. Related to this assumption is the claim made here that coordinating conjunctions are not projecting heads (cf. section 3.2).

We turn now to a look at the role of features in coordination.

## 3. Features in Coordination

### 3.1 Symmetry in terms of features

I will assume, following much other minimalist work, that lexical as well as non-spelled-out elements occur in the form of feature bundles, similar to (5):

|     |         |                      |                       |           |      |
|-----|---------|----------------------|-----------------------|-----------|------|
| (5) | Peter   | likes                | visiting              | relatives |      |
|     | [+hum]  | [+V <sup>fin</sup> ] | [+V <sup>part</sup> ] | [+hum]    |      |
|     | [+male] | [+sg]                | [+prog]               | [+pl]     |      |
|     | [+sg]   | [+trans]             | [+trans]              | [+obj]    | etc. |

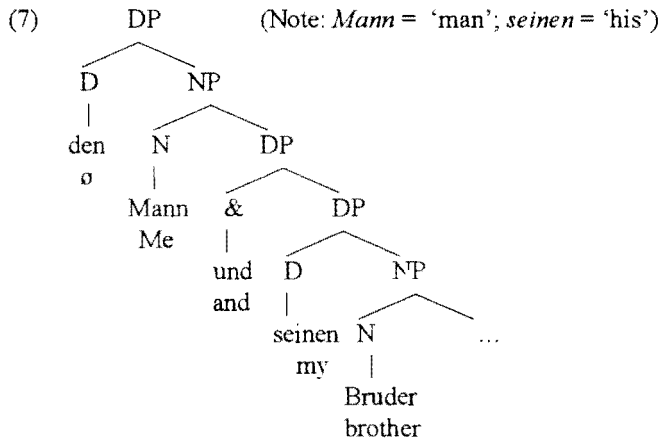
It follows that symmetry and asymmetry can be defined in terms of matching or non-matching of features:

|     |    |                                            |          |
|-----|----|--------------------------------------------|----------|
| (6) | a. | Peter kennt [den Mann] und [seinen Bruder] |          |
|     |    | P. knows the man and his brother           |          |
|     |    | [+acc]                                     | [+acc]   |
|     |    | [+hum]                                     | [+hum]   |
|     |    | [+theme]                                   | [+theme] |
|     |    | etc.                                       |          |

- b. [Me] and [my brother] don't visit relatives together  
 [+obj] [+nom]  
 [+hum] [+hum]  
 [+agent] [+agent] etc.

Even though the Cases assigned in (6b) don't match, they are grammatical (in non-prescriptive usage) because other forms of symmetry exist.

Both of these coordinate constructions have basically the same syntactic structure. Though this structure is itself not symmetric, the syntax is, as represented in the category labels and the features assigned to each conjunct:



### 3.2 Coordination vs. Subordination

Even though the phrase structures of coordination and subordination are essentially the same, they remain **syntactically and semantically** distinct. The differences between them result from the different properties of the heads: a subordinating conjunction projects its own syntactic domain, while a coordinating conjunction does not project (like a clitic, which it is in Japanese) and therefore does not have its own syntactic domain.

Furthermore, a conjunct (versus a subordinate clause, always a CP) can have any category status and stands in no syntactically or semantically subordinate relation to another syntactic category (if we abstract away from the phrase structure itself). I take asymmetry in phrase structure as reflective of the linear properties of language primarily and only to a limited extent of the hierarchical

properties. Linear dominance does not always produce “subordination” i.e. hierarchical dominance, or one-way c-command: witness the fact that a subordinate clause may be linearly dominant over a main clause.

Coordination has very different properties than subordination. Space limitations do not allow a discussion of them all here, but I simply point out for its relevance to the analysis to follow that a conjunct, in contrast to a subordinate clause, must only satisfy some minimal requirement on matching in coordinate structures. Some conjuncts must match another conjunct closely, some only loosely, depending on the type of coordinate structure. If ellipsis occurs, the match must always be closer. But otherwise there are no syntactic or semantic relations between conjuncts.

### 3.3 Feature matching and ellipsis: the Subject Gap Construction (SGC)

The SGC, illustrated in the English example in (8), exists in many languages:

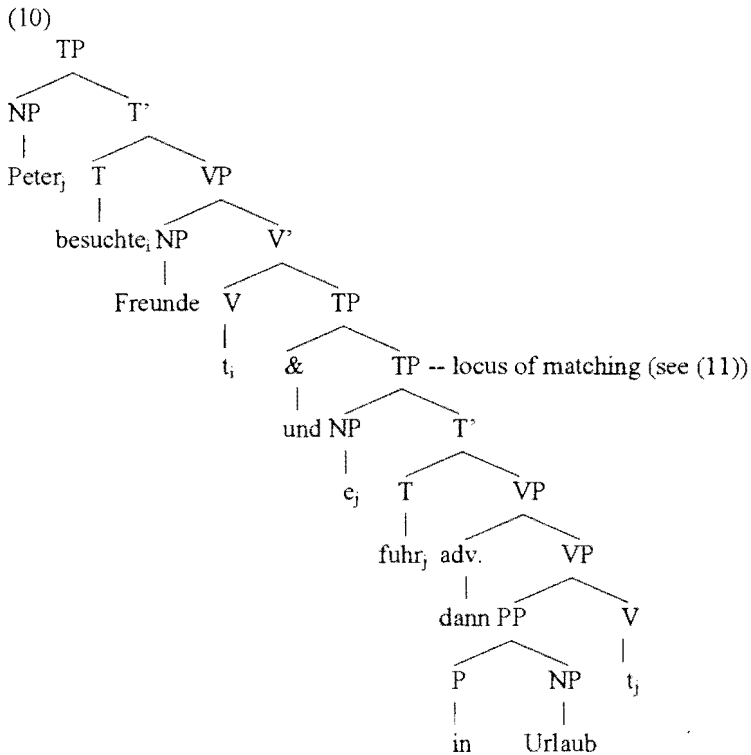
(8) Peter<sub>i</sub> visited his friends and then e<sub>i</sub> left on vacation

I will assume, as do Büring & Hartmann 1998 (building on Höhle 1983), that a gap actually occurs. In my proposal it is accounted for by means of coordinate feature matching at the TP, in English as well as in German (and in Dutch, which will not be considered here). The German equivalent of (8) looks like:

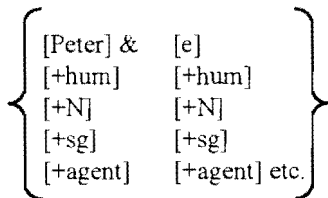
(9) Peter<sub>i</sub> besuchte seine Freunde und e<sub>i</sub> fuhr dann in Urlaub

A comparison of (8) and (9) immediately brings similarities and contrasts to light. The gap in (9) must occur in a left-peripheral position, whereas in (8) it may be preceded by the adverb *then*. This difference illustrates simply and clearly how the particular syntax of a given language must be unified with a syntactic theory of coordination. Because German is a verb-second language, *dann* may not occur in the clause-initial position, as that is where the gap, having syntactic reality, is located.

Both languages on the other hand require no more than a TP projection for subject-initial clauses (see Zwart 1997 on this point for Dutch). Assuming that the TP can be a finite clause in German (the verb raises no higher than T) allows for an account of the gap in terms of feature matching.



(11) Feature matching at the coordinate node



### 3.4 Feature Matching and Ellipsis: the Object Gap Construction (OGC)

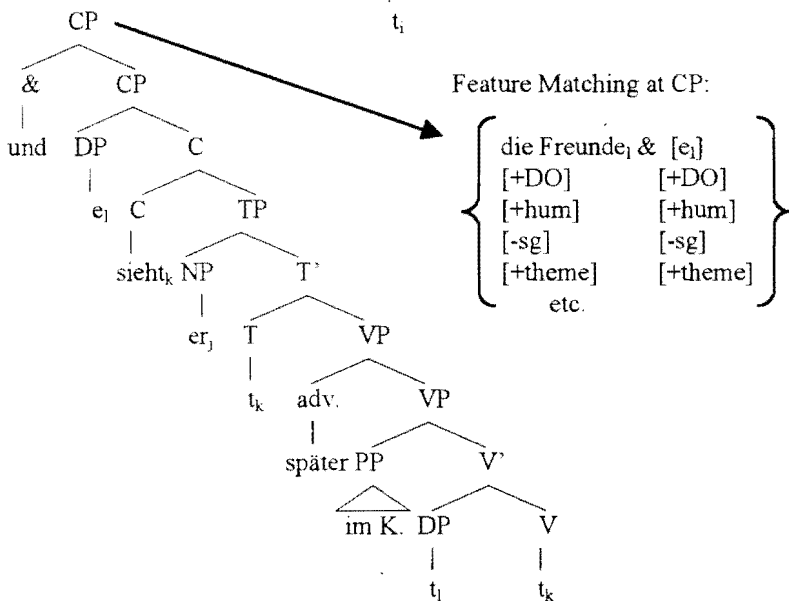
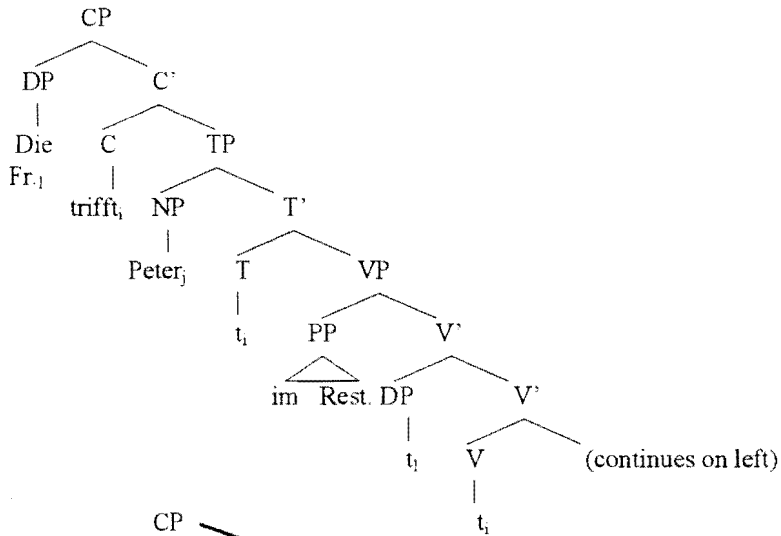
A construction parallel to the SGC is the OGC, as illustrated in (12a) from German, with the English equivalent in (b):

- (12) a. Die Freunde trifft Peter im Restaurant und sieht er später im Konzert  
The friends meets P. in-the restaurant and sees he later in-the concert  
b. His friends Peter is meeting in the restaurant and seeing later at the concert

Though both English and German can front a direct object, there is a difference in the landing site: in German it is consistently Spec,CP, and in English constructions like (12b) it appears to be an adjunct position to Spec,TP. Because of the V2 rule in German, it is not possible to also omit the subject from the second conjunct, in contrast to English.

In (13) is given a tree diagram of (12), illustrating the asymmetric phrase structure with coordinate feature matching at the CP node:

- (13) Die Freunde trifft Peter im Restaurant und sieht er später im Konzert  
 The friends meets P. in-the restaurant and sees he later in-the concert





How the SGC and the OGC compare and contrast:

A. Both require the gap and the antecedent to be at the left periphery of the category conjoined in their respective conjuncts.<sup>2</sup> If the subject is in the VP (as with German verbs like *unterlaufen*) the SGC is not possible:

- (14) \*Peter ist beim Vortrag ein Fehler unterlaufen und wurde nicht korrigiert  
 P.dat is by-the lecture a mistake.nom underrun and became not corrected  
 "Peter made a mistake during the lecture and it wasn't corrected."

B. In the SGC the category TP defines the ellipsis domain, in the OGC the category CP is the domain. The antecedent conjunct in the SGC may be a CP, but the gap-containing conjunct must be a TP (cf. A); in the OGC both conjuncts must be a CP.

C. The SGC is unmarked, the OGC is highly marked.

D. The SGC appears to be a universal, the OGC is limited to certain languages.

## 4. Accounting for the Properties of the SGC and the OGC

### 4.1 Some past proposals

In this section we briefly consider some theories which have been or could be used to account for the properties of the SGC and OGC.

Across the board (ATB) movement cannot generate these constructions because the option exists for the gap and the antecedent to have different reference (cf. Büring and Hartmann 1998):

- (15) A woman<sub>x</sub> has served as governor but e<sub>y</sub> has never been elected president

It is doubtful that ATB movement could allow for the non-identity required in (15) because movement leaves an identical copy, which would presumably have identical reference.

In an ATB approach there is no basis for explaining property C, the difference in markedness between the SGC and the OGC which goes beyond subject-object asymmetries. It is clearly more marked than cases of symmetric wh-extraction in a coordinate structure as in *Which person did Peter meet, go out to dinner with, and later invite to a concert?* Furthermore, the markedness of the OGC is particularly hard to explain if one assumes, as do Büring & Hartmann, that the

TP in German is not *satzwertig* ("sentence worthy"), i.e. is not a saturated clause in German, thereby limiting all V2 clauses in German to the category CP.

Assuming all V2s are CPs also eliminates the analysis from consideration which was presented earlier: that a central difference between the SGC and the OGC stems from the fact that the SGC is TP-based and the OGC is CP-based (cf. property B). Given independent evidence of the TP status of subject-initial V2 clauses in German, I will assume that proposal is viable in this respect.

#### 4.2 Symmetry within asymmetric phrase structure

The present proposal makes it possible to have syntactic and semantic (and potentially prosodic) symmetry within an asymmetric phrase structure. That syntactic symmetry exists in coordinate structures is supported by (16):<sup>3</sup>

- (16) a. [<sub>C1</sub> Katie has never come home and [<sub>C2</sub> acted rude to her parents]]  
 ≠ (b) Katie has never come home and has never acted rude to her parents  
 ≠ (c) Katie has never come home and never acted rude to her parents  
 = (d) It has never been the case that Katie came home and acted rude to her parents

The fact that only (d) is a possible paraphrase tells us the following:<sup>4</sup>

A) The coordination cannot be such that *has* occurs in both conjuncts (in the second only abstractly, but with the same syntactic and semantic content) and is an auxiliary for both *come* and *acted*. This analysis is ruled out by the non-equivalency of (16b).

B) The coordination cannot be such that *has* occurs only once and is shared by the two participles. This kind of sharing is possible in coordinate structures, as we see in (17):

- (17) Peter has bought a car and paid the tag, title and tax.  
 =Peter has bought a car and Peter has paid the tag, title and tax.

If this kind of sharing were necessary for the interpretation of (16a), then it should be equivalent to (16c), but it is not. Even if we eliminate the negation, this kind of sharing is still not possible, as indicated in (18):

- (18) Katie has come home and acted rude to her parents.  
 ≠Katie has come home and Katie has acted rude to her parents.

In an analysis using feature matching, (16a) is the coordination of two TPs in which the second TP has a gap for *Katie*, but not for *has* and *never*:

- (19) [<sub>TP1</sub> Katie<sub>i</sub> has never come home and [<sub>TP2</sub> e<sub>i</sub> [<sub>T</sub>  $\emptyset$ ][<sub>VP</sub> acted rude to her parents]]]

The reason I assume there is a gap for *Katie* is given in section 4.1. Arguments for the lack of gaps for *has* and *never* follow from the properties of the syntactic and semantic relations between the conjuncts in (16a). A gap for *has* cannot occur in the second conjunct for reasons of interpretation. In place of the gap of *has*, there is an empty [T] position, required at LF as a landing site for *acted* so that subject-verb agreement can be completed. The absence of *has* in conjunct 2 (C2) actually creates an asymmetry in the coordinate structure, evident in the tenses: present perfect in C1, preterite in C2. In the interpretation of this construction, it is necessary to isolate one event out of an array of many occurrences in C1 and to match it with a single (preterite) occurrence in C2:

- (20) a. Katie came home  $t_1, t_2 \dots t_n$   
 (where  $t$  = one time/instance of coming home)  
 = Katie has come home  
 b. Katie never came home  $t_x$  and was rude to her parents  $t_x$ .

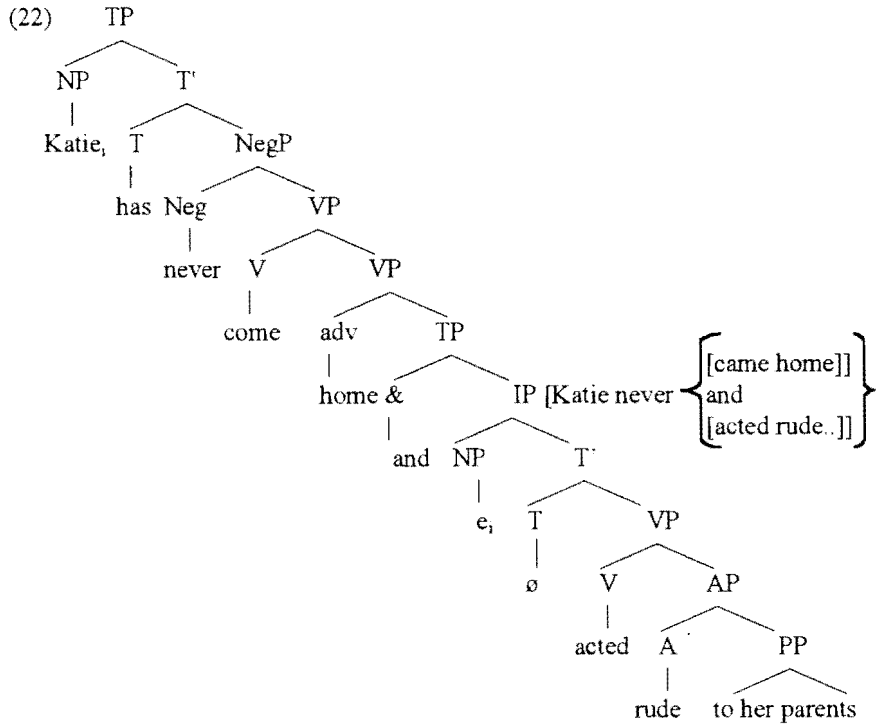
In concrete terms, both events must be interpreted as if they are in the preterite; otherwise they won't match. What we are forced to do in interpreting the sentence is create symmetry out of a surface-level asymmetry. So once again we see that symmetry, both syntactic and semantic, is an essential property of coordination, despite other asymmetries.<sup>5</sup>

The lack of a gap for *never* in the second conjunct of (16a) does not automatically follow from the structural asymmetry of the coordinate structure. That is, *not* does not always have scope over a second conjunct:

- (21) a. Katie didn't come home last night but stayed at her friend's  
 b. Katie hasn't come home and has really frightened us again

(16a) is different than the constructions in (21) in one crucial way: The interpretation requires a symmetric reading of the two clauses, as we saw earlier. It is over this entire symmetric coordinate structure that *never* has scope. This scope of *never* is possible because it is part of the feature matching that is required in this construction for the only correct reading. So while the surface

syntax remains asymmetric, symmetry is created with feature matching, as represented in (22):



## 5. Conclusion

The analysis in (22) raises a number of questions: 1) At what point in the derivation does the symmetry of the conjuncts come about? Must it precede the syntactic structure? Or is it a result of conjunction? One thing is clear: The conjunction of parallel planes show to the right in (22) does not precede the syntactic derivation (like a “deep structure”). There is no good theory of syntactic derivation that would get the asymmetric structure out of the symmetric structure on the right. Presumably the syntax and semantics exist side by side, though obviously the syntactic structure itself plays a key role in the interpretation. There would be no reason for its existence otherwise. What we see in (22) is just another reminder of the form-meaning dichotomy in language.

If the above analysis is correct, i.e. that symmetry or tense exists on an abstract plane along side the asymmetric phrase structure, then we must come to the conclusion that the symmetry is already “worked out” at least before the string of elements is spelled out. But how much before? Does symmetry in the semantics rely on syntactic derivation, or vice versa? I will leave these questions for further research. A more detailed analysis of the steps or phases in the derivation of the SGC and the OGC is available in te Velde 1999b.

What I have attempted to show is that a theory of coordination that is feature-driven is more compatible with minimalist theory for several reasons: 1) It can utilize a mechanism that is needed for syntax theory in general: feature matching. This aids unification. 2) The properties of asymmetry found in coordination fall out naturally from asymmetric phrase structure. 3) The symmetries of coordination can be captured through feature matching, which can be shown independently to be a central property of coordination, particularly of coordinate ellipsis. 4) Feature-driven coordination is economical/optimal and thereby addresses the central challenge of the minimalist approach. There are of course a number of technical details to be ironed out: Just how exactly does feature matching proceed in coordinate structures? If feature percolation is no longer an option, does it proceed according to independent principles of feature matching? What are these principles? Are they dependent on the symmetry of coordination? Are they present anywhere else in the grammar? These questions could be taken up in current work on interfaces.

## Notes

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<sup>1</sup> One could propose that there is a universal constraint on the interpretation of gaps, whether they are part of a coordinate structure in the strict sense or not, that a gap must be interpreted as identical to its "symmetric" antecedent -- where symmetry is defined in terms of Case,  $\theta$ -role, etc. Any flexibility in this regard cannot be tolerated, in contrast to what is possible with pronouns, which can be optionally interpreted as bound by a linearly closer element in a coordinate structure:

(i) Peter<sub>i</sub> visited his dad<sub>j</sub>, and then e<sub>i</sub>/he<sub>i,j</sub> went on a real vacation.

Note that the same ambiguity exists in the German equivalent of the construction (2):

(ii) Peter mag gern Verwandtenbesuche und Susi auch

P. likes gladly relative-visits and S. also

<sup>2</sup> For a thorough investigation of peripherality in coordination, see Wilder 1997.

<sup>3</sup> Implicit in the analysis is the assumption that there is a correlation between the syntactic and the semantic properties of constructions, i.e. the semantic properties which require symmetry in coordination have a syntactic correlary.

<sup>4</sup> It is interesting that *Katie has never come home and been rude to her parents* can be paraphrased as *It has never been the case that Katie came home and was rude to her parents*. This is somewhat unexpected, as the construction appears to be the coordination of two VPs which share *has* as a helper. If this is the case, then we would expect *Katie has never come home and has never been rude*. . . to have the same interpretation, but it doesn't. The reason is that when the lexical *has* occurs in the second conjunct, the same kind of matching is not possible: the two VPs can no longer refer to a single instance when the actions/states of both verbs, *come* and *been*, occurred in one event.

<sup>5</sup> The contrast in the tenses accomplishes its own purpose which is to allow for the broader time period implicit in the present perfect, but it does this without disrupting the underlying symmetry of the interpretation.

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*toN* (1b), two taps; and the reduplicated form *tóN-toN*, continuous tapping. Hamano (1986) furthermore notes that these variant forms of a mimetic are not always free to appear in the same context as an alternative choice, suggesting that co-occurrence restrictions may exist between a mimetic and another element in the sentence. For example, in (2), while the reduplicated form *póN-poN* ‘manner of doing things vigorously’ is allowed in this context, the single counterpart *poN* ‘a single vigorously done action’ is disallowed.

- (2) *tugi kara tugi e to póN-poN (\*poN) to ton-de ki-ta*  
 one after another mimetic fly-linker come-PST  
 ‘(Words) came out one after another.’ (modified from Hamano 1986: 81)

Along the same lines, Kita (1997) notes that selectional restrictions hold between a mimetic and a verb, and he attempts to offer an account for the aspectual restrictions on the basis of Vendler’s (1957[67]) Aktionsart classification.

This paper provides an account of the interaction between the aspect of a mimetic and of a verb, on the basis of Talmy’s (1985) aspectual classes. First, semantic characteristics of mimetics are presented to provide a general picture of what mimetics express in Japanese. Next, the aspectual characteristics of mimetics are explored on the basis of Depraetere (1995). Then, Talmy’s (1985) aspectual classes are introduced. Lastly, the co-occurrence patterns between the mimetic and the verb are examined, focusing on the adverbial use of mimetics which express manner (cf. Tamori and Schourup (1999) for other use of mimetics).

## 2. Semantic Characteristics

The semantic characteristics of both the kinds of predications made and the event types encoded by mimetics are relevant to this analysis. Mimetics express the sensations perceived by the sense organs in general, not limited to either hearing or the five senses. The types of sensations (Sakai 1996) and the corresponding mimetics can be exemplified as follows: vision (e.g., *pika-pika* ‘glitter’), audition (e.g., *botaQ* ‘sound of a fall’), olfaction (e.g., *puuN* ‘strong smell’), taste (e.g., *saQpari* ‘refreshing taste’), cutaneous sensation (e.g., tactility/pressure: *núru-nuru* ‘slimy’, warmth: *póka-poka* ‘warm’, pain: *hiri-hiri* ‘smarting pain’), the sense of equilibrium (e.g., *kúra-kura* ‘dizzy’), muscle sensation (e.g., vibration: *gúra-gura* ‘strong vibration’, pain: *zúki-zuki* ‘throbbing pain’), and visceral sensation (e.g., nausea: *múka-muka* ‘feel

nauseous', pain: *kiri-kiri* 'pain as if drilled').

Importantly, mimetics express a particular facet of a state of affairs, either a static state or a dynamic event. Accordingly, mimetics can be divided into two groups on the basis of staticity, as shown in table 1.<sup>2</sup>

Table 1: Classification of mimetics

|                                                                                                                           |                                                                                               |                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S<br>T<br>A<br>T<br>I<br>C                                                                                                | -Physical appearance<br>(e.g., boNyari 'dim'; biQchiri 'filled'; hiQsori 'quiet')             |                                                                                                                                                                                                                                                                                              |
|                                                                                                                           | -Psychological state<br>(e.g., íra-íra 'irritated'; kúyo-kuyo 'concerned'; múka-muka 'angry') |                                                                                                                                                                                                                                                                                              |
|                                                                                                                           | -Bodily sensations<br>(e.g., núru-nuru 'slimy'; póka-poka 'warm'; kúra-kura 'dizzy')          |                                                                                                                                                                                                                                                                                              |
|                                                                                                                           | D<br>Y<br>N<br>A<br>M<br>I<br>C                                                               | -Sound                                                                                                                                                                                                                                                                                       |
|                                                                                                                           |                                                                                               | -Sound which does not accompany a change of state<br>-Animates' voice (e.g. wáa-waa 'cry loudly'; bécha-becha 'talk noisily'; kéro-kero 'croak')<br>-Sound of artifacts (e.g., riN-riN 'ring'; pipipiQ 'whistle')<br>-Sound of bodily processes (e.g., gúru-guru 'rumble'; zée-zee 'wheeze') |
| -Motion                                                                                                                   |                                                                                               | -Factive motion<br>(e.g., téku-teku 'trudge'; piku-piku 'wiggle'; yúra-yura 'sway'; kúru-kuru 'revolve')                                                                                                                                                                                     |
|                                                                                                                           |                                                                                               | -Fictive motion<br>(e.g., kira-kira 'glitter'; bóo-boo 'burn'; jíro-jiro 'stare')                                                                                                                                                                                                            |
| -Change of state which accompanies no sound or motion<br>(e.g., garaQ 'change one's attitude'; jiwaQ 'something emerges') |                                                                                               |                                                                                                                                                                                                                                                                                              |

Note: 'Q' stands for the first segment of a geminate; 'N', a mora nasal

The static state which mimetics express refers to the state such as physical appearance, psychological state, and bodily sensations. On the other hand, dynamicness is most typically expressed by means of sound, motion and change. Interestingly, motion can refer to either a *factive* or a *fictive* kind in the sense of Talmy (1996). Many of the mimetics which belong to the category *fictive motion* (e.g., kira-kira 'glitter') are traditionally classed as inanimate conditions (e.g., Kindaichi 1978). The advantage of grouping them under motion is that it can capture the dynamic nature of such events, irrespective of animacy of the involved entities.

Now that a general picture of mimetics has been given, the following section

examines how the forms of mimetics are related to the aspectual meaning of mimetics.

### 3. Mimetic Form and Aspect

#### 3.1. *N*-times instantiated and reduplicated mimetics

Mimetics are morpho-phonologically distinct from Japanese origin words (cf. McCawley 1968, Poser 1990). Kindaichi (1978) and Hamano (1986: 59-61) independently present a classification of mimetics on the basis of their morphological characteristics and their accent patterns respectively. Examination of such forms, presented in Kindaichi's and Hamano's classifications, reveal that mimetics are basically of two types; those that express 'ending' as opposed to those that express 'non-ending', further discussed in section 3.2.2. Except for *ri*-suffixed mimetics, these two types can be predicted quite regularly from form of the mimetic.<sup>3</sup> Here, the forms which express 'ending' will be termed ***n*-times instantiated** while those that express 'non-ending' will be termed **reduplicated**. Each form has the following characteristics:

The *n*-times instantiated forms refer to the accentless mimetics which end in: the first segment of a geminate--represented as /Q/ (e.g., paQ, paaQ, pakuQ), a mora nasal--represented as /N/ (e.g., paN, pakuN, pa-paN, pa-pa-paN), diphthong (e.g., pui, poi), or a suffix *-ri* (e.g., paQkuri, pikari).<sup>4</sup> The base can be repeated iconically to the exact number of times as the event is realized. For example, the one-time instantiated mimetic *toN* expresses a tap; the two-times instantiated mimetic *toN toN* expresses two taps, the three-times instantiated mimetic *toN toN toN* expresses three taps, and so on. Within sentences, the *n*-times instantiated forms are obligatorily marked by the particle *to* (usually glossed as 'quotative' or 'complementizer'), as exemplified in (3).

- (3) *doa* o            koN (koN koN)        to            tatai-ta  
 door ACC        MI(metic)            P(article) hit-PST  
 I knocked on the door once (three times).<sup>5</sup>

In contrast, the reduplicated forms consist of fully reduplicated forms which are accented on the initial vowel with no phonological break at the morphological boundary (e.g., dón-doN, páku-paku). Within sentences, they can be optionally marked by the particle *to*, as shown in (4).

- (4) *doa o*                    *kôN-kon* (to)            *tatai-ta*  
 door ACC            MI            (P)            hit-PST  
 I knocked on the door continuously.'

While some reduplicated mimetics have the *n*-times instantiated counterparts, others do not. For example, mimetics such as *bôta-bota* 'drip continuously' or *dôshi-doshi* 'lumber' have the *n*-times instantiated counterparts (i.e., *botaQ* 'sound of a drip', *doshiN* 'thump'), whereas the mimetics such as *téku-teku* 'trudge', *iso-iso* 'eagerly' occur only in the reduplicated forms and the *n*-times instantiated counterparts *\*tekuQ*, *\*tekuN*, *\*isoQ*, *\*isori* etc. are non-existent. Specific criteria for this distribution must be studied in future research.

The next section examines the concept described earlier as (non-)ending by adopting the two notions, '(a)telicity' and '(un)boundedness,' discussed in Depraetere (1995), who claims that these two notions are distinct.

### 3.2. Aspectual characteristics

#### 3.2.1. Telicity vs. boundedness

According to Depraetere (1995), 'telic' refers to a situation<sup>5</sup> that has a potential endpoint (i.e., a natural or an inherent endpoint), and 'bounded' refers to a situation where a temporal boundary is reached, independent of whether or not the situation contains a potential end-point. She discusses sentences such as (5) and (6).

- (5) a. John opened the parcel.                                            (telic, bounded)  
 b. John was opening the parcel.                                            (telic, unbounded)  
 (6) a. Mary played in the garden for an hour. (atelic, bounded)  
 b. Mary plays in the garden.                                            (atelic, unbounded)

The situation in (5), *open the parcel*, contains an inherent end-point (i.e., a potential end-point), and is therefore telic. The situation in (6), *play in the garden*, contains no inherent end-point, and thus is atelic. Temporal boundaries can be simultaneously expressed in each situation. Typically, habitual or progressive '-ing' in English unbounds the situation, as in (5b), and an adverbial phrase such as 'for an hour' can add a temporal boundary, as in (6a). Note that Depraetere (1995: 8) assumes that a telic situation does not necessarily bring about a change of state and analyzes *The light flashed* as describing a telic situation.<sup>6</sup>

#### 3.2.2. Mimetic aspect

Now, the property of (non-)ending can be restated in terms of (a)telicity and

(un)boundedness, in the sense of Depraetere (1995). It turns out that the  $n$ -times instantiated forms ( $n=1$ ) express a temporally bounded phase of (a) a single telic situation or (b) an atelic situation. The former refers to a situation which involves either (a.1) a change of state (e.g., *bataQ* ‘fall’, *bariQ* ‘break’) or (a.2) a one or less than one cycle of motion (e.g., *korori* ‘roll once’, *guraQ* ‘a single swaying motion’). An atelic situation (b) refers to either (b.1) a temporally bounded phase of a static state, such as a momentarily emerged state (e.g., *hiyaQ* ‘suddenly felt coldness’, *mukaQ* ‘momentarily felt nauseousness’), or (b.2) a dynamic event, such as a voice or sound projected briefly (e.g., *riiN* ‘sound of a bell’, *guuQ* ‘rumbling sound’). By contrast, the reduplicated forms express a temporally unbounded phase of an atelic situation (c) which consists of multiple telic situations (e.g., *dósa-dosa* ‘fall one after another’, *púka-puka* ‘rise to the surface repeatedly’) or (d) whose internal structure cannot be identified as consisting of multiple telic situations (e.g., *póka-poka* ‘being warm’, *iso-iso* ‘manner of being eager’). In brief, the  $n$ -times instantiated forms express boundedness with a telic or an atelic situation, while the reduplicated forms express unboundedness with an atelic situation.

Given these characteristics of mimetics, the aspectual properties of verbs are to be examined below. Talmy’s (1985) verbal classification provides a framework to elucidate how mimetic aspect interacts with verbal aspect.

#### 4. Verbal aspect

Talmy (1985: 77-78) classifies lexical aspect into six types as schematized in figure 1:

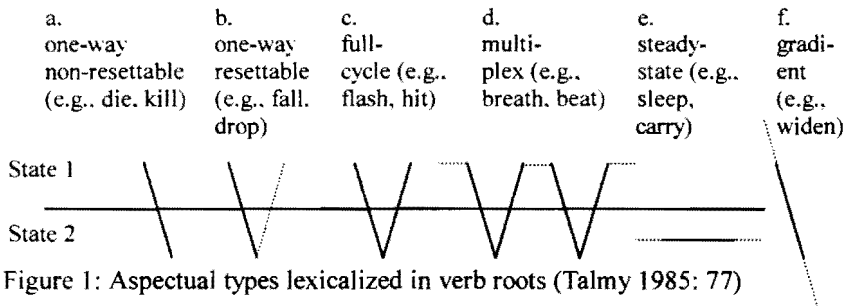


Figure 1: Aspectual types lexicalized in verb roots (Talmy 1985: 77)

The six classes (i.e., (a) one-way non-resettable (e.g., die, kill), (b) one-way resettable (e.g., fall, drop), (c) full-cyclé (e.g., flash, hit), (d) multiplex (e.g.,

breath, beat), (e) steady-state (e.g., sleep, carry), and (f) gradient (e.g., widen)) are distinct from one another in whether the event involves the transition from one state to another (i.e., a change of state), and how the transition progresses. For example, in a one-way non-resettable event, resetting does not occur. Therefore, the sentence *\*He died three times* is unacceptable. In a one-way resettable event, resetting is possible, and therefore; one can say *He fell three times*. Also, a full-cycle event can be repeated as one can say *The light flashed three times*. Thus, when an event potentially contains a resetting phase to the initial stage, the event can be repeated. A one-way non-resettable event cannot be repeated since it lacks the resetting phase. The term ‘repeatability’ is reserved here to mean the possibility of repeating an event by a single entity, and not of repetition in the sense of multiple happenings distributed among multiple entities. In terms of telicity, one-way non-resettable, one-way resettable, full-cycle and gradient event types are telic since they contain potential end-points, while multiplex and steady-state are atelic, which contain no inherent terminal points.

## 5. Co-occurrence Restrictions

### 5.1. Kita’s (1997) observation

Kita (1997) observes that a reduplicated mimetic *goro-goro* ‘manner of a heavy object rolling’ must occur with a verb that expresses iterated motion of rotation; therefore, it can occur with a verb *korogaru* meaning ‘to roll’ but not with a verb *ik-kaiten-suru* meaning ‘to roll once’, as shown in (7).

- (7) Tetu no            tama ga gorogoro to            {*\*ik-kaiten-si/korogat*}-ta  
 iron Gen            ball Nom Mimetic Comp        one rotation do/roll-Past  
 ‘An iron ball {*\*made one rotation/rolled on*}.’ (Kita 1997:403)

Kita (1997: 404) hypothesizes that mimetics ‘select’ the Aktionsart classes of the verbs in the sense of Vendler (1957[1967]), and states that mimetics such as *goro-goro* select a subset of Vendler’s classes of activity or accomplishment. However, since the criteria for mimetic selection is not specified, it is not clear why the mimetic can select those particular classes, but not others. In what follows, we will examine aspectual selectional restrictions between the mimetic and the verb more closely.

## 5.2. Hypothesis

First, consider the co-occurrence patterns between the mimetics and the verbs in (8).

- (8) a. *sono hito wa koroQ to nakunat-ta*  
 the person TOP MI P die-PST  
 ‘The man died suddenly.’ [one-way  
*koroQ*: to change/die suddenly non-resettable]
- b. *mado ga kaze-de pataN to ai-ta*  
 window NOM wind by MI P open- PST  
 ‘The window opened once by the wind.’ [one-way  
*pataN*: sound of a flap/fall resettable]
- c. *inazuma ga pikaQ to hikata-ta*  
 lightning NOM MI P flash-PST  
 ‘The lightning flashed once.’ [full-cycle]  
*pikaQ*: a flash of light

These examples illustrate that the one-time instantiated mimetics *koroQ*, *pataN*, and *pikaQ*, which denote telic situations, are co-occurring with the telic verbs *nakunaru* ‘die’ (8a), *aku* ‘open’ (8b), and *hikaru* ‘flash’ (8c). In each case, the verb refers to a single event and the mimetic expresses the manner within that single event. Now, consider (9), in which the mimetics express multiple events.

- (9) a. *hako ga dōsa-dosa (to) ochi-ta*  
 box NOM MI (P) fall-PST  
 ‘The boxes fell one after another.’ [one-way resettable]  
*dōsa-dosa*: sound of heavy objects falling one after another’
- b. *kurage ga umi ni pūka-puka (to) ui-te-iru*  
 jellyfish sea in MI (P) float-linker-exist  
 ‘A jelly fish is floating in the sea.’ [one-way resettable]  
*pūka-puka*: manner of an object surfacing repeatedly

The sentence (9a) expresses multiple falling events distributed among multiple boxes, whereas (9b) expresses the repeated actions by a single jellyfish, and the respective sub-events can be expressed as in (10).

- (10) a. *hako ga dosaQ to ochi-ta*

- |    |                                                  |                 |                      |
|----|--------------------------------------------------|-----------------|----------------------|
|    | box NOM                                          | MI P            | fall-PST             |
|    | 'A box fell with a thud.'                        |                 | [one-way resettable] |
|    | dosaQ: falling sound of a heavy object           |                 |                      |
| b. | kurage ga                                        | pukari to ui-ta |                      |
|    | jellyfish                                        | MI P            | float-PST            |
|    | 'A jelly fish rose to the surface of water.'     |                 |                      |
|    | pukari: an object coming to the surface of water |                 |                      |

(10) shows that the sub-event is expressed by the telic verbs *ochiru* 'fall' (10a) and *uku* 'float' (10b) and the one-time instantiated mimetics *dosaQ* and *pukari*, which denote a telic situation. In other words, (9)-(10) illustrate that the mimetic is interpreted as possessing the aspectual property that matches the verb's telicity, and furthermore, that the number of occurrences of the verb's event is in turn interpreted as matching that which the mimetic expresses. This leads to the hypothesis in (11) if the mimetic is to participate in the verb's event coherently.

- (11) The mimetic aspect must match the aspect of the verb for telicity within the single event denoted by the verb. If the mimetic expresses multiple telic events, the number of occurrences of the event must match the number of occurrences of the event denoted by the verb. If the mimetic expresses repetition, the event denoted by the verb must be interpreted as repeated.

### 5.3. Predictions and discussions

(11) predicts that an inherently atelic predicate is incompatible with a mimetic which denotes a telic situation. This is borne out in (12).

- |         |                                    |                  |                |
|---------|------------------------------------|------------------|----------------|
| (12) a. | ?? karada ga                       | kunyaQ to        | yawarakai      |
|         | body NOM                           | MI (P)           | soft           |
|         | (intended) 'Her body is flexible.' |                  | [steady-state] |
|         | kunyaQ 'to bend once'              |                  |                |
| b.      | karada ga                          | kúnya-kunya (to) | yawarakai      |
|         | body NOM                           | MI (P)           | soft           |
|         | 'Her body is flexible.'            |                  | [steady-state] |
|         | kúnya-kunya: 'being flexible'      |                  |                |

(12a) shows that the predicate *yawarakai* 'soft' is incompatible with one-time instantiated mimetic *kunyaQ*, which denotes a telic situation 'to bend', although the predicate *yawarakai* can occur with the reduplicated counterpart *kúnya-*



*kunya* in (12b), which expresses an atelic state of ‘being flexible’. Thus, (12) shows that the mimetic aspect must match the verbal aspect for telicity.

Analogously, (11) predicts that a verb that expresses a single occurrence of a telic event is incompatible with a mimetic that expresses plural telic events, and this accounts for Kita’s (1997) example, repeated as (13).

- |         |                             |                |                     |
|---------|-----------------------------|----------------|---------------------|
| (13) a. | tetu no tama ga             | góro-goro (to) | korogat-ta          |
|         | iron GEN ball NOMMI (P)     |                | roll-PST            |
|         | ‘An iron ball rolled on.’   |                | [multiplex]         |
| b. *    | tetu no tama ga             | góro-goro (to) | ik-kaiten-si-ta     |
|         | iron GEN ball NOMMI (P)     |                | one rotation-do-PST |
|         | ‘An iron ball rolled once.’ |                | [full-cycle]        |

The verb *ik-kaiten-suru* ‘one-rotation-do’ (13b) is telic, and therefore, the mimetic *góro-goro* is interpreted as referring to multiple happenings of a telic situation. Then, the number of occurrences of the event by the verb should be interpreted as referring to multiple happenings. However, since it is lexically determined as ‘one’, interpreting it as ‘multiple’ is blocked. Thus, the unacceptability of (13b) is due to discrepancy of the number of events between the verb and the mimetic.

Furthermore, (11) can account for the contrast in acceptability between (14) and (15).

- |         |                                                      |                |               |
|---------|------------------------------------------------------|----------------|---------------|
| (14) a. | otoko wa                                             | koroQ to       | sin-da        |
|         | man TOP                                              | MI P           | die-PST       |
|         | ‘The man died suddenly.’                             |                | [one-way non- |
|         | koroQ: to change/die suddenly                        |                | resettable]   |
| b. *    | otoko wa                                             | koroQ koroQ to | sin-da        |
| (15) a. | kami wa                                              | biriQ to       | yabure-ta     |
|         | paper TOP                                            | MI P           | tear- PST     |
|         | ‘The sheet tore.’                                    |                | [one-way      |
|         | biriQ: sound of tearing                              |                | resettable]   |
| b.      | kami wa                                              | biriQ biriQ to | yabure-ta     |
|         | ‘The sheet tore emitting sound <i>biriQ biriQ</i> .’ |                |               |

These examples show that a one-time instantiated mimetic is possible in both cases, but a two-times instantiated form is possible only in (15) and not in (14). The verbs *shinu* ‘die’ and *yabureru* ‘tear’ both belong to Vendler’s class of achievement; thus, in Kita’s term, it can be stated that the mimetics *koroQ* and

*biriQ* both ‘select’ Vendler’s class of achievement. This grouping as achievement does not explain why the contrast in acceptability exists in the (b) examples. However, using Talmy’s classification, it can be explained that in (14b) the aspect of the one-way non-resettable event (i.e., inherently non-repeatable) contradicts the aspect of the two-times instantiated forms, which entails that the event is repeated. Hence, Talmy’s classification better explains the aspectual interaction between the mimetic and the verb.

An additional piece of evidence which favors Talmy’s classification can be provided by the meaning of reduplication. Reduplicated mimetics can occur with any of Vendler’s or Talmy’s classes, yielding distinct interpretations which are dependent on the co-occurring verbal aspect. Such distinct interpretations are well-captured by Talmy’s classification--namely, reduplication can mean (a) the maintained phase of an atelic situation with steady-state verbs, (e.g., *súya-suya neru* ‘sleep peacefully’), (b) the repeated cycles with multiplex, one-way resettable, and full-cycle verbs, (e.g., *kíru-kuru mawaru* ‘rotate continuously’), (c) multiple occurrences of events distributed among multiple entities with any of the classes (e.g., *báta-bata shinu* ‘die one after another’), and (d) the gradual change of state as time progresses with multiplex verbs (e.g., *púku-puku hukuramu* ‘swell up gradually’). Vendler’s classification, based on durativity, telicity and staticity, does not lend itself to creation of such categories. Thus, Talmy’s classification better characterizes the aspectual interaction between the mimetic and the verb in Japanese.

One point worth mentioning is that the hypothesis (11) is not applicable to a case such as (16), where the mimetic expresses an event distinct from the one denoted by the verb; i.e., when the mimetic expresses an event which is not a part of the meaning of the verb.

- (16) booru ga            kóro-koro to            ana ni            hait-ta  
 ball NO            MI P            hole to            enter-PST  
 ‘The ball entered into the hole, rolling.’            [one-way resettable]  
 kóro-koro: manner of a small object rolling continuously

In this example, the verb denotes an event of ‘entering’, while the mimetic expresses an event of ‘rolling’, which takes place prior to entering (the mimetic cannot be construed as describing multiple entering events). The rolling phase corresponds to what Smith (1997:31) calls ‘preliminary stages’ (‘conceptually detached’ stages from the main event), which are not a required part of the meaning of the verb. Thus, aspectual interaction considered in this paper holds for cases where the mimetic describes an event denoted by the verb.

## 6. Conclusion

This paper investigated the aspectual characteristics of mimetics, corroborating Hamano's (1986, 1998) suggestion that aspect is a part of the meaning of mimetics. First, a classification of mimetics is presented on the basis of staticity and dynamicity. Next, mimetic aspect was explored in terms of (a)telicity and (un)boundedness in the sense of Depraetere (1995). Then, the aspectual interaction between mimetics and the verbs was examined, and it was proposed that mimetic aspect must match verbal aspect for telicity and for the number of occurrences of events. This paper furthermore provided evidence that we need to add to a Vendler-style aspectual classification, a more-fine grained distinction among punctual events, along the lines of Talmy (1985).

## Notes

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<sup>1</sup> This pattern is known as the 'lexicalization patterns' (Talmy 1985).

<sup>2</sup> The categories shown in table 1 represent the common types but are not exhaustive.

<sup>3</sup> A subset of the *-ri*-suffixed mimetics express 'non-ending' (i.e., an unbounded phase of a static state). We can call them *-ri*-ending mimetics to separate them from the regular *-ri*-suffixed mimetics which express 'ending', although the two types are not distinguished morphologically. Thus, the mimetics which express 'non-ending' appear in the *-ri*-ending mimetics and reduplicated mimetics. The former will not be discussed separately since they behave analogously to the reduplicated mimetics.

<sup>4</sup> Segments *N*, *Q* *-ri* and lengthened vowels are called semantic extenders in Garrigues (1995).

<sup>5</sup> (A)telicity should refer to a situation. Expressions such as 'telic verbs' may be used to refer to telicity as an inherent property of the verb.

<sup>6</sup> This differs from Smith's (1997:29) sense. A full-cycle event corresponds to Smith's semelfactives, which are classed as 'atelic.' See Garey (1959) for the original sense of (a)telicity.

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# Locality at the Syntax-Semantics Interface: Control and Predication in the Rationale Clause<sup>1</sup>

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## 1 Introduction

In this paper, I'm going to address the issue of locality as it applies to one infinitival modifier of the verb in English. An example of the infinitive in question is given in (1).

(1) Arnold<sub>1</sub> slapped the table<sub>2</sub> (in order) PRO<sub>1</sub> to get everyone's attention.

This infinitive has been dubbed by Faraci (1974) a Rationale Clause, as it expresses the intention or rationale behind an Agent's action. My claim will be that this infinitive exhibits locality of two types: locality of predication, by which the intention expressed in the infinitive is attributed to the external argument of the modified verb; and locality of control, by which PRO is controlled by the minimally c-commanding DP.

In particular, I will deny four specific claims in the literature which effectively violate this hypothesis of locality: first, a claim by Farkas (1988) that it is not the local Agent *per se* which controls PRO and which is attributed the intention described by the Rationale Clause but rather any individual in the interpretative model who can be judged RESPONSIBLE, in a technical sense, for the occurrence of the main event; second, a claim by Jones (1991) that PRO allows control from the discourse context and that the Rationale Clause may be linked to the main clause by little more than an "aboutness" condition of some sort; third, a claim by both Jones (1991) and Kratzer (1996) that the Rationale Clause is subject to non-obligatory control in the sense of Williams (1980) and therefore does not require a c-commanding controller; and fourth, a claim by Kratzer (1996) that the Rationale Clause requires an antecedent which is a logophoric

centre (along lines reminiscent of Williams 1992). I'm going to start by setting out my own analysis in more detail before addressing each of these claims.

## 2 The Analysis

The analysis of the Rationale Clause (and two other modifier infinitives) developed in my doctoral thesis and subsequent work (Whelpton 1995; Whelpton 1999a; Whelpton 1999b; Whelpton 1999c; Whelpton 1999d) is motivated by the observation that the Rationale Clause introduces into the sentence a specific interpretation which is not reducible to the necessary interpretation of the verb it modifies or even to the infinitive itself, simply as an infinitive. So, for instance, the verb *trip* can, and naturally does, occur with a non-intentional meaning, as in (2); it may however occur with an intentional meaning, as in (3); use of the Rationale Clause with *trip*, however, excludes the non-intentional reading, as in (4).

- (2) John accidentally tripped.
- (3) John tripped (in order) to get Mary's attention.
- (4) \*John accidentally tripped (in order) to get Mary's attention.

This restriction is clearly introduced by the Rationale Clause itself rather than emerging from the semantics of the modified verb. In Whelpton (1999a) I discuss the implications of this for natural augmentation accounts of adverbial modifiers such as those of McConnel-Ginet (1982) and Chierchia (1989), but for the sake of time I will leave the issue here.

Similarly, it is not the infinitive *per se* which introduces the intentional reading, as infinitives occur in a wide variety of contexts and need not express intention. Take for instance another infinitival modifier, closely related to the Rationale Clause, and labelled in my thesis "a Telic Clause", as shown in (5).

- (5) A leaf fell from the tree, to settle on the window ledge near John's desk.

Here the leaf does not intend to settle on the ledge, it simply does. The Telic Clause is factive and purely resultative.

In my thesis, I therefore develop the idea that infinitives like the Rationale Clause are in fact headed by a predicate with an argument structure of its own, which is integrated with the argument structure of the verb in the process of modification. Following Stowell (1981) and Higginbotham (1985; 1989), this argument structure takes the form of a syntactic grid which must be satisfied

during the process of structure building and which maps onto a standard first-order predicate which is subject to conditions on reference. The argument structure for the head of the Rationale Clause is given in (6).

(6) RATIONALE <1,2,3>

RATIONALE (x, e, ^p) ↔ x brings about e with the intention that p

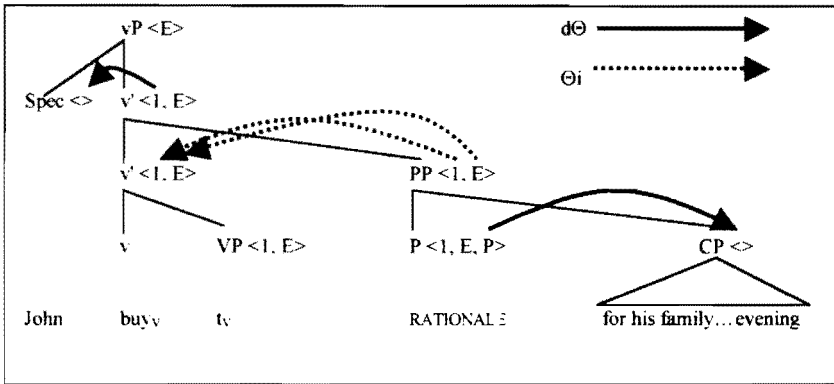
It is a three place predicate, which relates an individual, an event, and a proposition, and is true on condition that the individual brings about the event with the intention that the proposition be true. The important point to notice here is that the agentive individual appears in the argument structure and therefore must be syntactically realised. For the purposes of this paper, I will assume that this predicate is lexicalised by a null preposition, though this assumption is not fundamental to the current analysis.

The process of modification itself involves theta identification (in the sense of Higginbotham 1985; Higginbotham 1989), by which open positions in the modifier are identified with equivalent open positions in the modifiee: the syntactic result is that the modifier is saturated and the argument structure of the modifiee (the verb) filters up unchanged; the semantic result is that the identified positions appear as variables with the same value in the translation. Composition of a predicate with a core argument involves direct theta marking, by which a completed phrase is used to saturate a position of the predicate's argument structure, resulting semantically in substitution.

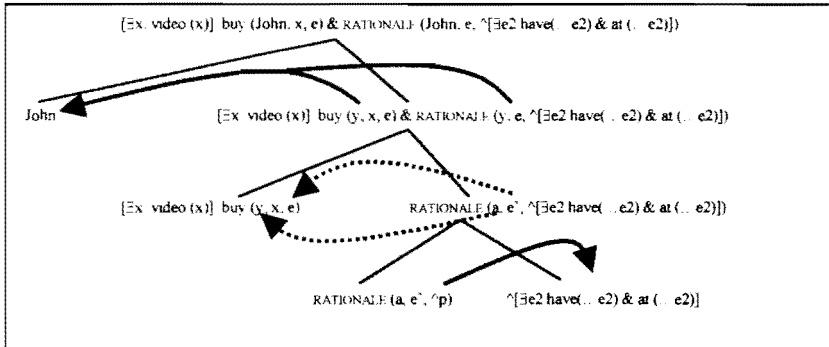
Take the sentence in (7). The projection of syntactic structure and its compositional interpretation is shown in (8)-(9). The preposition takes the infinitival CP as its complement and directly theta-marks it, saturating that argument position and resulting in substitution in the semantics. The PP then merges with the light verb, which has an open position for the external argument of the verb and for the event. The open positions of the PP are theta-identified with those of the light verb; the argument structure of the PP is satisfied and the argument structure of the light verb filters up unchanged; the semantic result is the equation of the relevant variables. The internal subject DP is then merged and directly theta-marked by the light verb: this saturates the first argument position and leaves the event position to filter up; the semantic result is substitution of the DP into all positions with the relevant variable value.

(7) John bought a video [for his family to have something to watch in the evening].

(8) the syntax of RATIONALE modification (d $\Theta$ =direct theta-marking;  $\Theta_i$ =theta identification)



(9) the semantics of RATIONALE modification (d $\Theta$  results in substitution;  $\Theta_i$  results in equation of variables)



$\exists e$   $[\exists x: \text{video}(x)] \text{ buy}(\text{John}, x, e) \& \text{ RATIONALE}(\text{John}, e, \wedge \exists e2 \text{ have}(\text{his family, something-to-watch}, e2) \& \text{ at}(e2, \text{that evening}))$



“There is an event, *e*, and an individual, *x*, which is a video; *e* is an event in which John buys *x*; John brings about *e* with the intention of making it true that his family have something to watch that evening.”

An important point to notice here is that the composition of argument structure is a strictly local process. Unlike theories of role assignment (cf Chomsky 1981) or index assignment (cf Williams 1987; Williams 1989; Williams 1994) which allow one to play with the structural conditions of theta assignment (as it allows you to choose, for instance, between c-command or m-command), Higginbotham’s theory is necessarily local because it conceives of argument projection as the manner by which two nodes are combined to form a mother node. Despite the fact that the theory was originally developed within the GB framework, it is most naturally interpreted in minimalist terms as conditions on the application of Merge (cf Whelpton (1998)). The strict locality enforced by Merge for syntactic relations (cf Epstein (1998)) also follows therefore for argument projection in this view.

Another point to notice above is that the process of predication is logically independent of the control of PRO in this view. The problem of the reference of PRO is simply a problem of syntactic dependency. Following Rosenbaum (1970), I claim that the referential properties of PRO are determined by the minimally c-commanding DP. However, I believe that there is an important distinction between the behaviour of PRO in the Rationale Clause and the behaviour of PRO in another closely-related modifier infinitive-- the Purpose Clause, an example of which is given in (10).

(10) Sally<sub>1</sub> prepared a fraud report<sub>2</sub> [*e*<sub>1</sub> to send *e*<sub>2</sub> to her boss].

Purpose Clauses contain one obligatory gap, usually VP-internal, and have the possibility of an optional second gap in subject position. I assume an analysis in which the obligatory gap is produced by *wh*-movement of an empty operator and in which the optional subject gap is an instance of PRO (cf Browning 1987; Chomsky 1977; Chomsky and Lasnik 1977; Whelpton 1995; Whelpton 1999a; Wilder 1989).

(11) Sally<sub>1</sub> prepared a fraud report<sub>2</sub> [*Op*<sub>2</sub> PRO<sub>1</sub> to send *t*<sub>2</sub> to her boss].

(12) Sally<sub>1</sub> prepared a fraud report<sub>2</sub> [*Op*<sub>2</sub> for her secretary, Peter, to send *t*<sub>2</sub> to her boss].

In most cases, the antecedent of the empty operator is the Theme-object of the modified verb. Notice, however, that the DP which minimally c-commands

PRO in (11) is in fact the empty operator. I assume that the empty operator maps to a lambda abstractor in the semantics and is in that sense not truly referential. The effect is that the PRO in the Purpose Clause is discourse free, as illustrated in (13)-(15).

- (13) David<sup>1</sup> brought Ruth<sup>3</sup> some articles<sup>2</sup> [PRO<sup>3</sup> to explain e<sup>2</sup> to him<sup>1</sup>].  
 (14) David<sup>1</sup> brought Ruth<sup>3</sup> some articles<sup>2</sup> [PRO<sup>1</sup> to explain e<sup>2</sup> to her<sup>3</sup>].  
 (15) ?David<sub>1</sub> brought some sour cream<sub>2</sub> along [PRO<sub>3</sub> to have e<sub>2</sub> in the potatoes, which is good of him given that he is vegan].

In (13), PRO is controlled by the Goal in the standard way; in (14), however, it is controlled by the Agent, despite the fact that the sentence is structurally identical; and in (15), it can be controlled from context by the individuals to whom David has shown such generosity. My claim in this paper is that the control of the Rationale Clause, in contrast, is not free in this way.

I therefore assume the Control Principle in (16) for the three infinitival constructions discussed in my thesis.

(16) Control Principle

- The reference of PRO is determined by the minimally c-commanding DP
- if DP is referential, then PRO is coreferential with DP;
  - if DP is non-referential, then PRO is discourse free.

Notice in (8) that the minimally c-commanding DP for the Rationale Clause will always be the DP in the Specifier of the light verb phrase. I follow Kratzer (1996) in the claim that the external argument of an active verb is still attributed to that Specifier in a passive sentence but that the DP to which it is assigned is a *pro*, deficient in its *phi*-features, which takes a reading similar to the exclusive use of the German impersonal pronoun *man*, as shown in (17).

- (17) Man behauptete, man habe meine Akte verloren.  
 imp\_pron claimed imp\_pron had my file lost  
 "They claimed they had lost my file"

Kratzer observes that this use of *man* cannot be the subject of predication, as shown in (18).

- (18) \*[Als Hüter des Gesetzes]<sub>i</sub> hat man<sub>i</sub> mir erklärt, ich könne hier nicht wohnen.

[as guardian\_nom\_sing/pl\_masc the\_gen law\_gen] has imp-pro me explained I could\_subj here not live  
 "As guardians of the law, they explained to me that I couldn't live here."

She points out that *passive-pro* is also excluded from predicative contexts, as seen in Lasnik's well-known (1988) example in (19).

(19)\*The ship was *pro<sub>man</sub>* sunk PRO<sub>man</sub> to become a hero.

Here infinitival PRO inherits the feature deficiency of *passive-pro* by control and thus cannot act as the subject of predication for the predicative DP, *a hero*.

I therefore develop an account in which PRO in the Rationale Clause is always controlled by the DP in the Specifier of the light verb phrase and in which the intention described by the Rationale Clause is always attributed to the external argument of the verb. I will now consider the four claims which deny some aspect of this locality hypothesis.

### 3 Claims Violating the Locality Hypothesis

#### 3.1 Local Agency or general RESPONSIBILITY

Consider first Farkas' (1988) claim that it is not the local Agent which is the antecedent of the Rationale Clause but the individual ultimately RESPONSIBLE for the event's occurrence. Imagine a situation in which prisoners of war are forced by fascist officers into empty water tanks. Regular soldiers are then ordered to turn on the water so that the tanks fill. In one scenario, the soldiers know that the prisoners are in the tanks; in the other, they act in ignorance to obey orders.

Consider different possible descriptions of their actions.

(20)The soldiers turned on the water and unwittingly drowned the prisoners.

(21)The soldiers turned on the water (in order) to drown the prisoners.

(22)\*The soldiers unwittingly turned on the water (in order) to drown the prisoners.

(23)\*The soldiers turned on the water (in order) to unwittingly drown the prisoners.

We can attribute to the soldiers agentive causation in the drowning of the prisoners and still deny their volitional involvement, as in (20) (that is, they did

drown the prisoners but they didn't intend the consequences). We can also assert that the soldiers intended by their action to drown the prisoners (using a Rationale Clause), where the subject of the infinitive, PRO, is controlled by the expression referring to the soldiers and the intention described by the Rationale Clause is attributed to the soldiers, as in (21). We cannot, however, assign the soldiers the role of Agent in the turning on of the water, and still deny that they had anything to do with the drowning by attributing the intention expressed by the Rationale Clause to their commanding officers, as in (22)-(23). We may judge that the soldiers do not bear the lion's share of the blame for what happens. But we cannot deny that they share some portion of the responsibility once the Rationale Clause is used. As there is surely no clearer example of a situation in which one individual controls the agency of another than the one in which a superior officer orders one of his subordinates to perform some action, it is clear that the semantic notion of RESPONSIBILITY, independent of local argument structure, cannot account for the behaviour of the Rationale Clause.

### 3.2 Syntactic control or discourse control

Next, consider Jones' (1991) claim that the Rationale Clause is only loosely associated with the sentence it modifies, allowing control from the context. He observes (Page 37, fn.1) that "[the Rationale Clause] is not best conceived of as a predicate of one of the matrix arguments, or of the matrix itself, but rather should be conceived of as a kind of "aboutness" modifier". He bases this observation on cases of control from the context by implicit Agents in the passive, as in the classic example in (24).

(24) The lights were turned off (in order) [PRO<sub>Agent</sub> to conserve electricity].

The problem for this view comes from a set of data first discussed in my thesis, as shown under (25)-(28).

(25) The lights<sub>2</sub> were turned off by John<sub>1</sub> PRO<sub>1</sub> to save some money.

(26) The lights<sub>2</sub> were turned off by John<sub>1</sub> PRO<sub>1</sub> to save himself some money.

(27) The lights<sub>2</sub> were turned off PRO<sub>Agent</sub> to save some money.

(28) \*The lights<sub>2</sub> were turned off PRO<sub>Agent</sub> to save himself some money.

Notice that (26) and (28) contain masculine reflexive pronouns which take PRO as an antecedent. In (25)-(26), the Agent is present in an oblique *by*-phrase; in (27)-(28), there is no overt Agent present. If Jones' claim that PRO in

the Rationale Clause allows control from the context is correct, then there should be no difference in the grammaticality of these sentences. The fact that (27) is well-formed seems to illustrate Jones' point that PRO can be controlled by the Agent whether or not the Agent is syntactically realised. However, (28), with the reflexive, is ill-formed. Given that PRO receives its reference from the Agent in context, there is no reason for this ill-formedness to occur.

In my own account, the *phi*-deficiency of passive-*pro* can be used to explain this set of alternations. Consider the sentences again, with the control relations explicitly marked, as in (29)-(32).

- (29) The lights<sub>2</sub> were *pro*<sub>1</sub> turned off by John<sub>1</sub> PRO<sub>1</sub> to save some money.  
 (30) The lights<sub>2</sub> were *pro*<sub>1</sub> turned off by John<sub>1</sub> PRO<sub>1</sub> to save himself some money.  
 (31) The lights<sub>2</sub> were *pro*<sup>man</sup> turned off PRO<sup>man</sup> to save some money.  
 (32) \*The lights<sub>2</sub> were *pro*<sup>man</sup> turned off PRO<sup>man</sup> to save himself some money.

Here control of infinitival-PRO by the Agent in the passive is generally allowed where the Agent is present as an oblique *by*-phrase, because it can assign full *phi*-features to passive-*pro*. However, where the Agent is not overtly present and passive-*pro* takes its impersonal reading, passive-*pro* can only control infinitival PRO where infinitival PRO can itself lack *phi*-features. This is of course impossible when infinitival PRO is the antecedent of a reflexive personal pronoun, hence the ill-formedness of (32). Once again, the relations of control and predication are reduced to a local relation in the syntax and argument structure.

### 3.3 C-command or non-structure-dependency

Now consider the claim by both Jones (1991) and Kratzer (1996) that the Rationale Clause is subject to non-obligatory control in the sense of Williams (1980) and therefore does not require a c-commanding controller. The main reason for dropping the c-command requirement is to allow control from the discourse, a move that has already been rejected. It appears, however, that PRO in the Rationale Clause is in fact subject to a c-command requirement, a fact that can be seen most clearly by comparing it with the behaviour of PRO in the Purpose Clause, which, as we have already seen, is discourse-free.

- (33) ?[[John's]<sub>1</sub> mother]<sub>2</sub> brought a thick, warm blanket<sub>3</sub> along to the dock [Op<sub>3</sub> PRO<sub>1</sub> to keep himself<sub>2</sub> warm with *t*<sub>3</sub> during the long journey].

- (34) \*[[John's]<sub>1</sub> mother]<sub>2</sub> brought a thick, warm blanket<sub>3</sub> along to the dock (in order) [PRO<sub>1</sub> to keep himself<sub>2</sub> warm during the long journey].
- (35) [[John's]<sub>1</sub> mother]<sub>2</sub> brought a thick, warm blanket<sub>3</sub> along to the dock [*Op*<sub>3</sub> PRO<sub>2</sub> to keep herself<sub>2</sub> warm with *t*<sub>3</sub> during the long journey].
- (36) [[John's]<sub>1</sub> mother]<sub>2</sub> brought a thick, warm blanket<sub>3</sub> along to the dock (in order) [PRO<sub>2</sub> to keep herself<sub>2</sub> warm during the long journey].

The Purpose Clause in (33) is acceptable where it is understood that John is the recipient of the blanket and the purpose of the blanket is to keep John warm during his long journey; the Rationale Clause in (34) is ungrammatical on this reading. This suggests that the locality constraint on the Rationale Clause includes the structural requirement of c-command. That restriction falls out naturally from the theory of argument projection which I assume, although it is of course stipulated as part of the Control Principle which I adopt.

### 3.4 Agency or logophoricity

Finally, consider Kratzer's (1996) claim that the antecedent of the Rationale Clause must act as a logophoric centre, specifically the SELF of Sells (1987): "The SELF represents the one whose "mind" is being reported...". My view is that logophoricity is not relevant to Rationale Clause antecedence, although once that antecedence is established, it may have consequences for logophoricity.

Perhaps the simplest way to see that logophoricity does not determine control is to take a language, like Icelandic, where logophoricity plays a direct role in the grammar of antecedence and then consider its relevance to control and attribution of intention in the Rationale Clause. Icelandic allows long distance control of reflexives in subjunctive clauses where the antecedent can be interpreted as the "logophoric centre" or SELF (cf Maling 1984; Sigurðsson 1990; Thráinsson 1976; Thráinsson 1990). So in (37), it is the SOURCE/SELF and not the subordinate subject who is saved.

- (37) Jón<sub>1</sub> sagði Tolla<sub>2</sub> að María<sub>3</sub> hefði bjargað sér<sub>1</sub>.  
 John said Tolla-DAT that Mary had-SUBJ saved self-DAT<sup>2</sup>  
 "John told Tolla that Mary had saved him"

If one modifies the subordinate verb with a Rationale Clause, however, the controller of PRO must be the subordinate subject and not the SOURCE/SELF: in other words, in a context where logophoricity is already relevant to the fixing of antecedent relations for a reflexive, it is not relevant for control of PRO.

- (38) Jón<sub>1</sub> sagði Tolla<sub>2</sub> að María<sub>3</sub> hefði bjargað sér<sub>1</sub> til að PRO<sub>3/\*1/\*2</sub> hindra að Sigga kæmi í sinn stað.  
 John said Tolli-DAT that Mary had-SUBJ saved self-DAT for to PRO  
 prevent that Sigga come-SUBJ in self-POSS place  
 "John told Tolli that Mary had saved him to prevent Sigga from replacing him"

The question then is whether the crucial factor is agency of a local DP, as in English. As (39) shows, if the subordinate verb is passivised (so that the logophorically controlled reflexive become the c-commanding subject of the subordinate clause), the control of PRO shifts with the local Agent, now expressed as a PP-adjunct.

- (39) Jón<sub>1</sub> sagði Tolla<sub>2</sub> að sér<sub>1</sub> hefði verið bjargað af Mariu<sub>3</sub> til að PRO<sub>3/\*1/\*2</sub> hindra að Sigga kæmi í sinn stað.  
 John said Tolli-DAT that self-DAT had-SUBJ been saved by Mary-DAT  
 for to PRO prevent that Sigga come-SUBJ in self-POSS place  
 "John told Tolli that he had been saved by Mary to prevent Sigga replacing him"

Even in a language where logophoricity has clear importance for the establishing of antecedent relations, it is still the case that the relevant constraint on Rationale Clause control is that PRO is controlled by the external argument of the modified verb.

In fact, the claim that logophoricity determines control in the Rationale Clause gets the situation backwards. It appears that once Rationale Clause control is established under strict locality conditions, the antecedent is then available as a logophoric centre. Take for instance the Icelandic example given above as (39) and repeated here as (40).

- (40) Jón<sub>1</sub> sagði Tolla<sub>2</sub> að sér<sub>1</sub> hefði verið bjargað af Mariu<sub>3</sub> til að PRO<sub>3/\*1/\*2</sub> hindra að Sigga kæmi í sinn<sub>1/3/\*2</sub> stað.  
 John said Tolli-DAT that self-DAT had-SUBJ been saved by Mary-DAT  
 for to PRO prevent that Sigga come-SUBJ in self-POSS place  
 "John told Tolli that he had been saved by Mary to prevent Sigga replacing him/her"

Notice that the Rationale Clause contains the possessive form of the logophoric pronoun: as we have seen, this logophor in Icelandic must be bound by the SELF

of the local discourse. The main SELF is Jón; but binding properties of the logophoric *sinn* show that it can also be María. The reason for this is presumably that by virtue of being the antecedent of the Rationale Clause, María comes to be a potential logophoric centre whose state of mind can be reported (in fact the Rationale Clause is a report of her state of mind). So, although control of the Rationale Clause is not established by logophoricity, once control is established, the controller becomes a logophoric centre by virtue of being linked to the Rationale Clause.

## 4 Conclusion

In conclusion, I have argued that the relations of control and predication involved in Rationale Clause modification are strictly local: predication is to the external argument of the verb, which must be agentive though it need not be logophoric; and the controller of PRO must be a minimally c-commanding DP.

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## Notes

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<sup>2</sup> DAT=dative case; SUBJ=subjunctive mood; POSS=possessive pronoun



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