

**PROCEEDINGS  
OF  
THE TWELFTH NORTHWEST  
LINGUISTICS CONFERENCE**

**WORKING PAPERS IN  
LINGUISTICS  
UNIVERSITY OF WASHINGTON**

**VOLUME 14**

**AUGUST 1996**



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# Foreword

The Linguistics Department at the University of Washington is pleased to present the Proceedings of the Northwest Linguistics Conference as the University of Washington Working Papers in Linguistics Vol. 14. The NWLC is an annual student conference hosted by the University of Washington, the University of Victoria, the University of British Columbia, and Simon Fraser University on a rotating basis.

The twelfth Northwest Linguistics Conference was held at the University of Washington on March 30 and 31, 1996. One of the keynote speakers, Professor Heles Contreras, noted that this was the first NWLC which has gone international. We had many participants not only from all over the States, but also from overseas. Papers in many diverse areas of linguistics were presented. Twenty-one papers were presented and from them, thirteen are included in this volume.

The editor of this volume and the NWLC 1996 chair, Maria Galvao, would like to express sincere appreciation to all fellow students and faculty who volunteered their time to review numerous abstracts and helped with planning the 12th NWLC. Crash space was also provided by both students and faculty to ease the financial burden on students attending the conference from other universities, and generous donations were received to provide snacks and refreshments at the conference site.

The publication of these proceedings is partially funded by the Center for the Humanities at the University of Washington.

We regret that the following authors' papers could not be included:

- Maria M. Carreira (California State University at Long Beach)  
& Gorka Elordieta (University of Southern California)  
"Mora Conservation in Optimality Theory: Evidence from Spanish Diminutives"
- Soohee Kim (University of Washington)  
"Emergence of the Unmarked: Korean Partial Reduplication"
- Enrique Mallen (Texas A&M University)  
"German Attributive Adjectives and Case Matching"
- Yuki Matsuda (University of Southern California)  
"Syntactic Analysis of Focus Sentences in Japanese and its Implication"
- Orin Percus (Massachusetts Institute of Technology)  
"Propositional Anaphora and Presupposition Denial"
- Subhadra Ramachandran (University of Ottawa)  
"Metalinguistic Use of "Any" and the Distribution of Free-Choice Items in Polarity Contexts"
- Lorna Rozelle (University of Washington)  
"Optimality and the Hand Number Feature in ASL and SVK"
- Siri Tuttle (University of Washington)  
"How to Lose Tone: Prominence and Pitch in Tanana Athabaskan"
- Rachel Walker (University of California, Santa Cruz)  
"Nasal Harmony is Strictly Local"

The papers contained in this volume do not represent the final version of the works and are not precluded from being published elsewhere.

Hideo Makihara  
August, 1996



Nancy Ackles

## The Indefinite Article, Historical Syntax and Noun Phrase Structure

Achieving an adequate analysis of the structure of Modern English noun phrases has proven to be a challenging task. Among the many problems have been the difficulties of analyzing the relationships between the items traditionally labeled demonstratives, definite and indefinite articles, possessive adjectives, possessive pronouns, quantifiers, numerals and simple adjectives. The co-occurrence restrictions and ordering rules of these items are complex and filled with many idiosyncrasies.

Even the problems of determining which items are of a single category can be quite difficult. One of these problems, one which will be taken up in this paper, is determining whether or not there is a single category of "article." The prime reason for labeling *a/an* and *the* as items of a single category is that though either can occur directly before a noun, they cannot co-occur, suggesting items of a single class in complementary distribution. However, as Perlmutter 1970 pointed out, *a/an* has the same kind of co-occurrence restrictions with, and semantic equivalences to, an unstressed form of *one*. *The* and *one* are not of the same category and can freely co-occur. In which position does *a/an* occur? Or does it occupy some position uniquely its own, perhaps as some kind of quantifier? Answering these questions requires an analysis of the structure of the entire noun phrase.

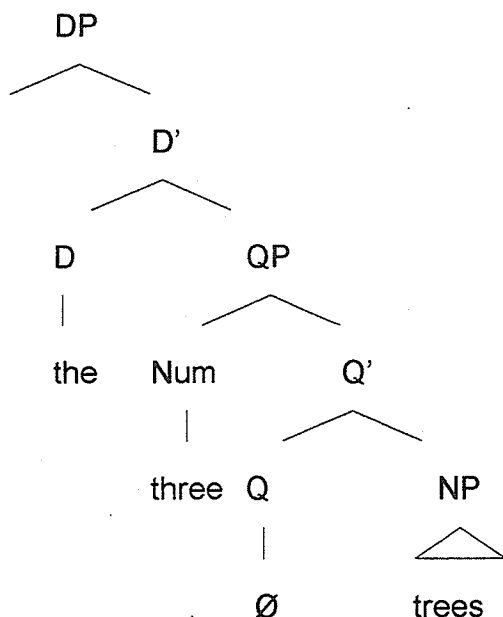
Within the conventions of x-bar syntax, numerous proposed structural descriptions of the noun phrase have been presented. Many of the complexities of the problem were laid out by Jackendoff 1977, using an early form of x-bar analysis which allowed a head Noun to project to the N<sup>0</sup> level. Later work by Brame 1982, Fukui and Speas 1986, and Abney 1987 led to the DP Hypothesis, the hypothesis that noun phrases are constructed of projections of at least two elements, a lexical item, a noun, and a functional item, a determiner. Under this

hypothesis, Noun Phrases (NP's) are lexical complements of functional Determiner Phrases (DP's) just as Verb Phrases (VP's) are lexical complements of functional Inflection Phrases (IP's).

Within the DP Hypothesis, the number and nature of functional nodes inside a noun phrase has been the subject of substantial debate. Many analyses of the noun phrase have posited that all noun phrases are contained within a Determiner Phrase (e.g. Abney 1987, Ritter 1991), while others argue that some noun phrases are not (e.g. Lobeck 1995, Corver 1989). In addition, other functional nodes within the noun phrase have been proposed.

One of the proposed functional nodes is Quantifier. Giusti (1991) argues that the structure of a noun phrase is [QDN]. According to her analysis, the initial element of a noun phrase is a functional head *Quantifier* (Q) which selects either a DP or an NP as its complement, and it is the semantic properties of each quantifier which determine whether it will select a DP or an NP. Structures such as *all the boys* are generated because the quantifier *all* in this case selects a DP, a definite nominal. Structures such as *many boys* are generated because the quantifier *many* selects an NP, an indefinite nominal. This leaves unaccounted for structures such as *the many boys* or *the three boys*. To account for these, Giusti proposes that a number of quantifiers can also function as adjectives. According to her analysis, in the phrase *the many boys*, *many* is functioning not as a quantifier, but as an adjective.

Löbel's 1989 work on pseudopartitive constructions (e.g. three liters of wine) also argues for a second functional node within noun phrases. Working with German and English, she argues that all nouns phrases are DP's and that there is always a second functional category Q. This Q, however, is defined as a node which functions "to make the NP combinable with 'quantificational' expressions" (p.147). By Löbel's analysis, a number is not a Q element; rather, Q exists as a node which makes it possible to combine a number with a noun. In an expression such as *the three trees*, Q is empty morphologically and is made visible by the plural *s* on the noun. The tree looks like this:



Q is present in all noun phrases, and the rules are that a) it must be lexically filled (e.g. with a measure noun) when a non-count noun is combined with a numeral, b) it must be empty when a non-count noun is not combined with a numeral, c) it is allowed to be empty when a count noun with a plural marker is combined with a numeral, d) it may be filled when a count noun with a plural marker is combined with a numeral, but this filled Q is licensed semantically, not syntactically required, and e) in the singular, the numeral *one* may be omitted before a Q because *one* is trivially identical to the singular.

Löbel's analysis may have some particularly relevant possibilities for interpreting German pseudopartitives, but there are reasons for suspecting that it is not the simplest and most productive analysis of the English noun phrase. The rules given are stipulative and rather complex. Numerals occupy a specifier of Q position, which means that in simple count expressions there is always a base generated specifier and an empty head. The analysis is able to account for the English *of* in *three liters of wine* only by saying that it exists because the expression is on the border between partitive and simple count expressions. The *of* comes from the similarity to *three liters of the wine* and *the* is omitted because of the similarity to simple count expressions such as *three apples*. In a formal, node-based analysis, there is no category "on the border between."

Inserting and deleting elements on the basis of analogy, and without stating which position they occupy, should be avoided if possible.

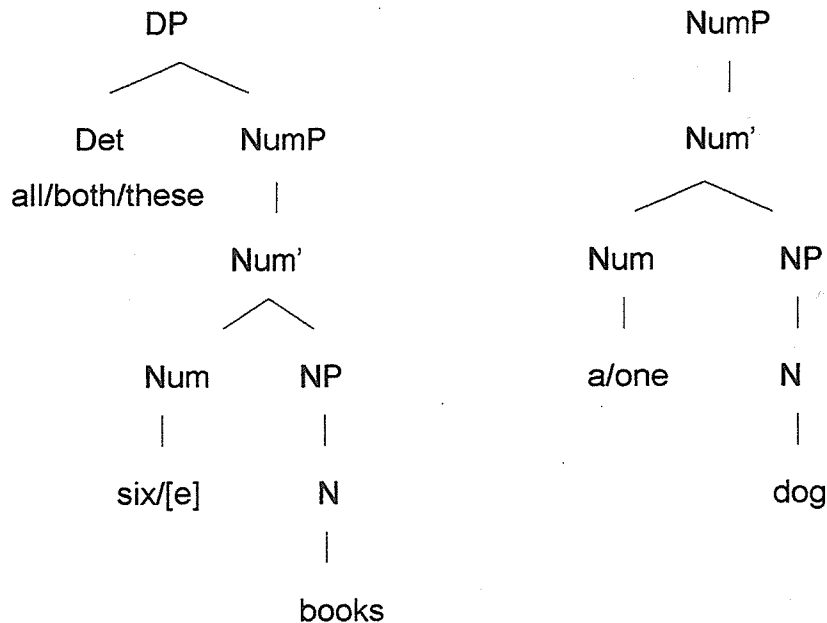
Yet another proposal for the structure of noun phrases has been developed by Ritter (1991 and 1992) for Hebrew noun phrases and extended to English by Lobeck (1995).

Working within the DP Hypothesis and drawing on evidence from genitive constructions, Ritter argues that noun phrases in Modern Hebrew are contained within DP's. Differing from other analyses, however, Ritter's analysis claims that determiner heads do not select an NP as their complement. Rather she argues that there is an intermediate phrase, labeled Number Phrase (NumP) between the DP and the NP in every Hebrew noun phrase. The head of this NumP carries the specification of the noun phrase for singular or plural, and the head of NP, the noun, carries the specification for gender

Operating on the assumption that the rules of Universal Grammar should make structures found in one language at least potentially available in any language, Lobeck (1995) attempts to extend Ritter's analysis of Modern Hebrew noun phrases to Modern English and finds that such an analysis is borne out by an array of facts about ellipsis within English noun phrases.

Lobeck proposes that, in Modern English, D is the location for all definite elements and Num is the location for all indefinites. By her analysis, all definite noun phrases are DP's and contain a NumP. Indefinite noun phrases, on the other hand, are NumP's and are not contained within a DP. The structures look as follows:

*The Indefinite Article*



There are, too, structures which are not straightforwardly accounted for by this analysis. Presumably because Lobeck is not discussing the role of quantifiers, there is no mention of structures such as *all the books* or *both the books* in which there is both a quantifier and a definite determiner.

As might be expected, there have now also arisen proposals which include all three functional nodes, Q, D and Num. Kawashima 1993 argues that the distribution of quantifiers and numeral classifiers in Japanese indicates that the maximal noun phrase for that language is [Q D Num N].

There are very many elements which may affect the collocational patterns of quantifiers, as each quantifier has multiple semantic properties which may govern aspects of its distribution. The present paper is addressed to the function and position of the indefinite article, rather than quantifiers, and so will not attempt to solve the many problems of quantifier distribution. However, some working position on the structure of the complete noun phrase must be adopted in order to discuss the role of the definite and indefinite articles. For the following reasons, I will tentatively adopt the order [Q-D-Num-N].

The evidence presented by Giusti in arguing that *many* and *few* pattern with numerals in functioning as adjectives is, in my view, better interpreted as evidence of *many* and *few* being generated in Num. I will argue below that an appropriate analysis of the indefinite article *a/an* requires positing the existence of a NumP within the structure of the noun phrase.

While it is tempting to adopt the Lobeck position that definite quantifiers are generated in D and the indefinite quantifiers in Num, thus reducing the number of functional nodes within the noun phrase to two, there is evidence to suggest that a node for indefinite quantifiers separate from that for numerals is required. In English there are at least a few structures which combine both an indefinite quantifier and a numeral; for example:

1. The petition was signed by some forty people.
2. Choose any three books you like.

It could be argued that *some* is here used not as a quantifier but as an adjective meaning *approximately*, but it is less easy to dismiss the use of *any*. There is also evidence to suggest that quantifiers occupy a node separate from determiners, as in phrases such as

3. all the books
4. all his many friends

The greatest difficulties come in determining the order of the D and Q nodes. The basic arguments for ordering Q before D are the existence of the constructions *all the books* and *both the books* and the evidence of floating quantifiers. Sportiche 1988 argues that constructions of the type *the boys have all left* arise because the boys moves to the left leaving the quantifier in its initial, base generated, position. Such an analysis is possible only if the Q is outside the DP.

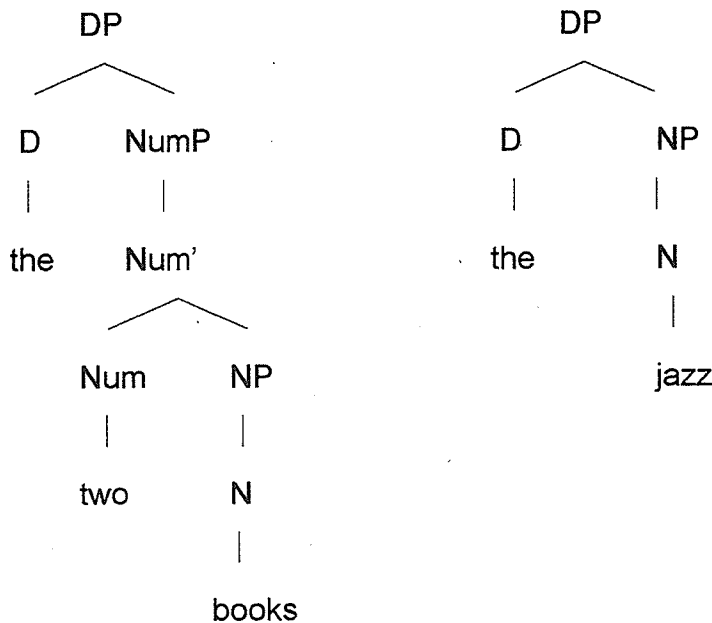
There is further research necessary before the matter can be declared settled, particularly as the rules which determine which quantifiers appear before determiners or are allowed to float may be semantic as well as syntactic



(Carlson 1978 provides evidence of historic changes in the patterns), but in this paper I shall tentatively assume the order [Q D Num N].

### Count Nouns and the Indefinite Article

Neither Ritter nor Lobeck's work attempts to discuss any distinction between count and non-count nouns. However, using the assumptions of Ritter and Lobeck makes possible a simple and straightforward proposal for accounting for the syntactic differences between Modern English count and non-count nouns which I make here. The suggestion is that count nouns obligatorily project a NumP while non-count nouns do not. Structures are as follows:



One immediate result of this proposal is that if in Modern English there is no NumP projected by a non-count noun, we have a simple and straightforward syntactic description of why non-count nouns never appear with numerals, but count nouns do. There is no Number projection in a noun phrase headed by a non-count noun.

Accepting this analysis of the structure of count nouns also point in the direction of an analysis of the syntactic role of the indefinite article *a/an*, but before presenting that analysis it will be necessary to first explore some evidence about rules applying to leftmost nodes in English. By the proposal

presented here, every count noun will project an obligatory NumP. If we operate within the proposal that simple indefinite noun phrases are not enclosed in a DP, that NumP will be the leftmost node of the noun phrase. There is evidence that in English at least, the leftmost node must be filled. Several different types of arguments have been made, each leading to the same conclusion.

Within the principles and parameters approach, most common interpretations of the DP hypothesis have the leftmost node of a noun phrase always a DP. Earlier research has argued that when this DP is +definite, it must contain a +definite element; it cannot be empty. This was proposed by Suzuki (1988) and presented as the Definiteness Principle, defined as follows.

5. The Definiteness Principle

- a. Definiteness Filter: a [+Definite] Determiner Phrase must have one [+Definite] element at S-structure.
- b. Definiteness-raising: every [+Definite] phrase must be raised to [+Definite]DP at LF.

Suzuki's analysis allows for the possibility that possessive elements are not generated as determiners, but rather raise to the Spec of D in order to satisfy the Definiteness Filter. The effect of the Definiteness Principle is that +definite DP's cannot be empty.

Suzuki noted parallels between Complementizer Phrase (CP) which is the location of WH elements, and DP. He noted that a +WH CP, like a +Definite DP, cannot be empty.

6. Both  $CP_{[+WH]}$  and  $DP_{[+Definite]}$  require one and only one overt [+WH] and [+Definite] element at S-structure respectively. In the case of [+WH], this condition is satisfied by a [+WH] complementizer like *if* and *whether*. If no [+WH] complementizer is present, an appropriate [+WH] element must be moved to the specifier position of the CP [+WH].  
(Suzuki, 1988, p.95)

Accepting that there is string-vacuous movement in sentences such as

7. I know who won the prize

Suzuki labeled the filter requiring a [+WH] element in a  $CP_{[+WH]}$  the “WH-Filter” and looked for generalizations in movement rules which would capture the parallelism between CP and DP, leading to his more general statement:

8. Conditions on A-bar Movement

- a.  $\Gamma$ -filter: a [+ $\gamma$ ]XP must have one [+ $\gamma$ ] element at S-structure, where  $\gamma$  is either WH or Definite, and X either C or D.
- b.  $\Gamma$ -raising: every [+ $\gamma$ ] phrase must be raised to [+ $\gamma$ ] XP at LF. (Suzuki, 1988, p.98)

Condition (a) unites the WH-filter and the Definiteness filter of the Definiteness Principle into one filter.

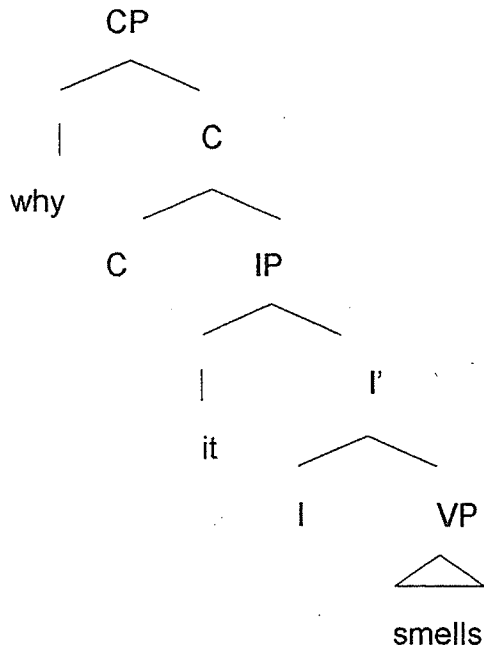
Filters are not a totally satisfying mechanism of analysis, however, as they are not a statement of underlying principle. It would be helpful to find a principle that unites DP and CP, explaining why they, when marked positively for a defining feature, must contain an overt element. One shared characteristic is that these two phrasal nodes are, at least in most instances, the leftmost phrasal node of the noun phrase or clause.

While Suzuki pursued the implications of a requirement for positive marking of a defining characteristic, other research suggests that the node may not be licensed at all if it is both empty and leftmost. Haider (1994) presents evidence that certain leftmost head nodes cannot be empty. He extends Rizzi's (1986) proposal for the empty category known as *pro* to all ‘base generated’ empty categories (meaning that they are not chain links) with the following principle (p.190):

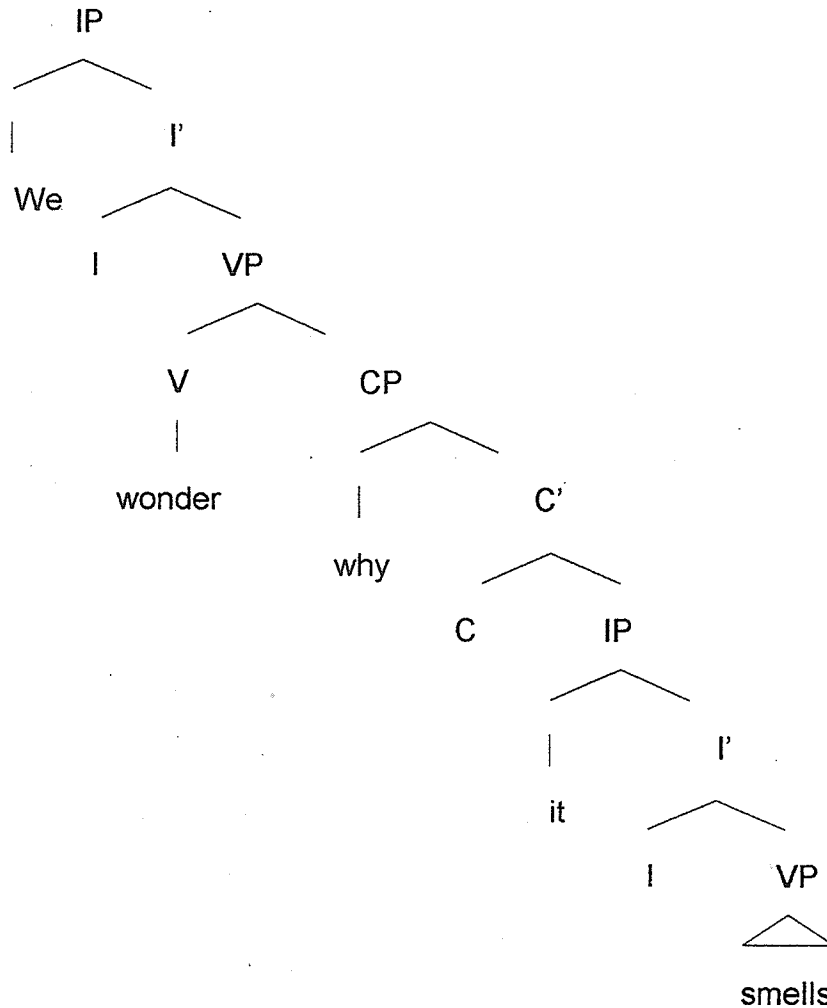
9. A basic empty category must be formally licensed and identified.

In order to be formally licensed, an empty head must be in a projection selected by a governing head. In effect, this means that a functional head cannot be empty when it is the leftmost head of a non-embedded clause because an empty functional head can only be licensed by a governing head to its left. In the following trees, an empty head is allowed in the embedded clause but not in the

following trees, an empty head is allowed in the embedded clause but not in the unimbedded because there is no governing head to the left of the unimbedded clause to license the empty head.



*The Indefinite Article*



Haider's examples and analysis are drawn only from clausal structures, but the principles as he states it would apply to noun phrases also.

Another, currently very influential, theoretical approach emerging from within the principles and parameters model is that which has come to be known as the minimalist program. Based on current Chomsky proposals, the minimalist program allows for the presence of positions filled by an empty category, a phonologically null feature or collection of features, but makes no allowance for an empty position (Marantz p.25). Unnecessary structure is never generated, and any position which is projected must be filled in some way. This theoretical approach obviously leads to the conclusion that a leftmost node must be filled.

In summary, there may be different ways of coming to the conclusion that a leftmost phrase node cannot be empty, and there may be different types of evidence or argument used to reach that conclusion, but it is reasonable to think that allowing a vacuous leftmost phrasal node would produce a highly questionable analysis of a noun phrase.

Under the structure proposed in this paper, that count nouns obligatorily project a NumP and that DP is present only in definite noun phrases, the NumP will regularly be the leftmost node in indefinite noun phrases whose lexical head is a count noun. If the principle is that "the leftmost node must contain an overt element," what would fill the NumP in an indefinite count noun?

There are three possibilities. First, a numeral will certainly fulfill the function and will also make clear the count noun status of the head noun. There is no question whether or not the nouns in *eight books* or *twenty-nine papers* are count or non-count.

The second case is that of bare plurals, which present a more complicated picture. For bare plurals the tentative formulation of the principle "the left-most projection must contain an overt element" is inadequate. Plural count nouns are grammatical without an overt element in Num. For example:

10. We saw elephants at the zoo.

11. Diamonds are a girl's best friend.

The straightforward explanation is that this is an example of Emonds' Invisible Category Principle:

12. Invisible Category Principle:

An obligatory closed category B (such as SP(X) or P) with a feature C may remain empty throughout a derivation if C is morphologically transparent in a phrasal sister of B. (Emonds 1985 p.227)

The tentative hypothesis can be rephrased from "the left-most projection must be overtly filled" to "the left-most projection must be identifiable". The morphological plural marking on count nouns in English allows NumP to remain empty because the presence of NumP is not invisible; it is morphologically

transparent in a phrasal sister. The Invisible Category Principle allows elements which morphologically realize agreement to identify an obligatory closed category, and the assertion here is that NumP is an obligatory closed category projected by count nouns. The plural 's' marker makes it visible.

The third case is that of singular count nouns. Here the paradigm presents some interesting features.

13. I bought one book.

I bought a book.

\*I bought book.

\*I bought green book.

Singular count nouns cannot go "bare" and even an adjective is not enough clothing. This fact can be accounted for if count nouns project a NumP and if this node must be identifiable. The elements *one* or *a/an* fill the node and make it identifiable. The count feature of the head noun is not morphologically transparent in the singular form of the noun and cannot make identifiable the NumP. It is only the presence of *a/an* which makes the count noun status of the second sentence below visible.

14. I bought coffee.

I bought a coffee.

We come now to my second proposal. The first was that count nouns are lexically marked to project a NumP. The second is that when there is no number (one) in the NumP position of a singular count noun, and that when NumP is the leftmost node of the noun phrase, *a/an* must be inserted as the minimal marker of the presence of the NumP, the leftmost node. Without this element, the noun phrase is deviant in structure because a count noun requires a NumP and a leftmost node must be marked.

If, however, the singular count noun is definite, it is contained within a DP and the DP is to the left of NumP. The leftmost node is the one that must be identifiable, and the rule requiring the marker *a/an* is not applicable. Because the presence of the NumP is not marked, the noun will not be identified as count

or non-count and ambiguity arises, as the following examples show. The indefinite noun phrases are unambiguous as to count/non-count meaning, but the definite noun phrase *the paper* is ambiguous.

15. Indefinite

I need papers.	count
I need a paper	count
I need paper	non-count

Definite

I need the papers.	count
I need the paper.	ambiguous, count or non-count

The function, then, of the indefinite article is to mark the presence of a NumP on a count noun, but it is required only when the NumP is the leftmost node of the noun phrase.

### Correlation with Other Research

The proposal presented here, that count nouns obligatorily project a NumP, is in fundamental agreement with the analysis proposed by Emonds (1987). There he says that in English count nouns require a Specifier (p.616). I am suggesting that the required closed category is not a specifier of the noun, but rather a Number Phrase. As well as making use of more recent understanding of the possibility of functional nodes within a noun phrase, this proposal is somewhat less stipulative than Emonds' original in that the requirement for a NumP is specifically related to an analysis of the syntactic structure of count nouns, not an arbitrary, idiosyncratic feature of the same.

A positive consequence of this interpretation of the indefinite article *a/an* is that it preserves the insights found in Perlmutter (1970) about the connections between *one* and *a*, while avoiding the problems raised by Perlmutter's suggestion that *a* is simply a phonologically reduced form of *one*.

Perlmutter's position was that *a/an* is not of the same category as the definite article *the*, but rather is solely an unstressed form of the word *one* and that Modern English includes a rule which obligatorily reduces *one* to *a/an* in



## *The Indefinite Article*

unstressed positions and a rule which deletes *a/an* after the definite article. His support for his position includes the data that *a/an* cannot co-occur with *one* or *the*, and the evidence of structures such as the following paradigm in which an unstressed one is unacceptable.

16. (a) There are only two boys in the room, not five.
- (b) There are only two boys in the room, not any girls.
- (c) There is only one boy in the room, not five.
- (d) \*There is only one boy in the room, not any girls.
- (e) There is only a boy in the room, not any girls.

Perlmutter's analysis fails to account for all the data, however. Thorne, 1987, demonstrates that not all sentences with *a/an* are synonymous with sentences with *one*. Additionally, Seppänen 1982 presents evidence that the distribution of *one* and *a/an* are not identical, and that syntactic differences between the two make it impossible to claim that they are, even at an underlying level, one element.

If *a/an*, as asserted here, marks the existence of a Number Phrase in the structure of the noun phrase, it will always be in the same position as the numeral *one*, but the two will never be simultaneously generated within a phrase. This accounts for Perlmutter's evidence that *one* and *a/an* always occupy the same node in a noun phrase and cannot co-occur. Furthermore, because *one* and *a* are not simply phonological (stressed and unstressed) variants of one element, it is not surprising that they behave differently in terms of syntactic distribution and semantic implicatures.

The explanation of the lack of co-occurrence *the* and *a/an* while preserving the co-occurrence of *the* and *one* will vary slightly depending of the theoretical principles one chooses to adopt. One approach is to say that *a/an* is inserted to mark the presence of the NumP as a kind of dummy element, just as *of* has been said to be inserted to mark the genitive relation within a noun phrase such as *the book of Kells*. Thinking in minimalist terms, this would mean that the phrase construction process has access to the lexicon, and that the element *a/an* is

inserted (before spell out) into the NumP when it is the leftmost node and empty. If one rejects the possibility of dummy elements or access to the lexicon, one must say that the failure of *a/an* and *the* to co-occur exists not because they are never both generated, but because there is a semantic clash between them: *the* marks definite and *a/an* marks indefinite. Rather than generating an element and then deleting it, as Perlmutter proposed, the syntax does not generate the element or does not tolerate the semantic clash.

In addition, the structural analysis of count noun phrases proposed here is compatible with the concept of Extended Projections developed in Grimshaw 1991, though some small adjustments in the theory will be needed.

In Extended Projections, Grimshaw makes use of the functional/lexical distinction in providing a theoretical mechanism by which a DP is both a projection of a head D and a projection of a head N. Determiner and Noun are identified as having the same categorial features (which are [-V, +N] in the feature system of Chomsky (1970) just as Verb and Inflection have the same categorial features ([+V, -N]), and those items which have the same categorial features form extended projections. N is an extended head of DP. In addition, heads have F values which serve to differentiate their lexical and functional status. Lexical elements are level F0 and functional elements are F1, F2, etc. The ordering of elements within an extended projection is achieved by the requirement that F levels differ by no more than one. For example, if DP is level F1, it will take as its complement only an F0 phrase, and because DP has the categorial features [-V, +N], that F0 phrase will have to be an NP.

One implication of Grimshaw's extended projection proposal is that features of the extended head determine features of the entire extended projection. If the extended head is a noun, the entire extended projection is +N. Only those functional categories which are also +N (or perhaps in some cases unspecified for N) are allowable. The nature of the lexical head determines which functional heads are allowed within the extended projection. The proposal that count nouns are lexically marked to project a NumP is quite consistent with

this approach. It is a feature of the lexical head which determines the nature of the functional heads within the extended projection.

The question which must next be taken up is the matter or ordering among the functional nodes. One of the most appealing features of the theory of extended projections is that it eliminates the need to cite selection as the basic process by which functional heads are matched with complements. As Grimshaw notes, selection is not a statement of principle; rather, it is way of describing any pairing that occurs. D selects NP, C selects IP, and I selects VP, but there is no principle requiring that such be the case. Within the theory of extended projections, there is a reason why C is not paired with NP. They do not share the appropriate features. There is also a theory based reason why C is ordered above I which is ordered above V (and Grimshaw notes that this ordering is stable both intra- and cross- linguistically). Each head has an F value and the F values can differ by no more than one. If C is F2 and I is F1 and V is F0, they must always be ordered CIV.

Difficulties arise, however, when attention turns to the possibility of optional functional heads. How do such heads find their place within the system of F-levels? The one optional head discussed by Grimshaw is Negative Phrase (NegP). She offers two solutions. One is that the Neg position is always present but is sometimes empty or filled with some silent element (such as Aff (Laka 1990)). The other solution is to say that Neg has particular properties which make it invisible to higher heads, as higher heads are never sensitive to its presence.

Positing the existence of a NumP in the structure of count noun phrases requires a different solution. Among projections which share the feature +N, there will be some which also share the feature +count, and only these projections contain a functional node, NumP. This node cannot be labeled optional, but neither is it required in all projections which are +N. Additionally, this node cannot be truly "invisible," as some quantifiers are sensitive to the

count/non-count distinction. This is a possibility which Grimshaw's discussion of extended projections does not take up.

The problem is that if NumP has an F-value one higher than the F value of NP, there will arise violations of the requirement that F-values differ by no more than one. In the phrase *the three books*, *book*, in NP, has an F value of 0, *three*, in NumP, has an F value of 1 and *the*, in DP, has an F value of 2. In the phrase *the jazz*, however, *jazz*, in NP, again has an F value of 0 but *the* in DP has an F value of 2, a clear violation of the "differ by no more than one" requirement. The system needs some way of making both NP and NumP available to D.

The solution can be found in the mechanics of the numbering system. While Grimshaw labels the levels 0, 1, 2, etc., the actual numbering of F values need not be absolute, but rather relative. The fundamental hypothesis of extended projections, after all, is that "a functional category is a relational entity." If the lowest possible structure is labeled *base*, or *minimum*, and each succeeding level *base+1*, *base +2*, etc., the ordering of elements remains the same; this system, however, allows for the possibility of differences in the structure which constitutes *base*. The base structure of a non-count noun is an NP and the base structure of a count-noun is NumP + NP. Such differences in what constitutes *base* must not be admitted ad hoc, of course, and there needs to be a principled method of determining what constitutes *base*. The principle is that the minimum syntactic structure required by the head lexical element constitutes *base*.

The theory of extended projections also makes possible a way of stating exactly what is meant by the "leftmost node" in the earlier discussion of the requirement that the leftmost node be identifiable. A "leftmost node" is the leftmost node of an extended projection, either nominal or verbal.

In extended projection theory, the F levels allow lower projections to occur without higher ones, but require the presence of all intermediate projections between the highest one present and the lowest. This analysis gives rise to the

speculation that the requirement that the leftmost node be identifiable may be a processing requirement; a requirement that there be some signal of where the projection begins, while the presence of the intermediate nodes can be deduced from the structure of the tree.

The syntactic analysis of *a/an* presented here is also compatible with at least some theories of semantic interpretation. Heim has argued that *a/an* is not a quantifier in the approach she labels file change semantics and suggests that *a/an* is semantically vacuous in at least many contexts (1993). If *a/an* is simply a marker of the count noun nature of the head noun, it is not surprising that it may not add anything to the semantic interpretation of the noun phrase.

### **The Emergence of A/AN**

If NumP is present in the NP structure of Modern English, its presence should be traceable in the evolution of the indefinite article in English. There are two tasks here. One is to establish that there actually was a change in the function of *a/an* which needs to be explained, and the second is to show that the explanation points towards an analysis of noun phrases in which count nouns project a NumP.

To answer the first question requires only a brief survey of the earliest uses of *an*. It is clear that Old English *an* had much broader functions than the numeral *one* of Modern English. On the other hand, these uses did not include the function now filled by *a/an*, and there is not evidence that the uses in Old English which are related to the rise of *a/an* constitute separate lexical items with different syntactic categorization features from the word *one*.

There have been many systems proposed for categorizing the uses of *a/an* throughout the history of English. The OED uses seven headings, Rissanen (1967) ten, and Toller thirteen. For my purpose here, the classification of uses given by Mustanoja (1960 p. 292) provides a fully adequate framework, because it employs just four main categories while still covering all uses potentially relevant to the development of the indefinite article.

First there are the many uses which are clearly numerical, contrasting one object with two or more.

17. Hwæt gelæhtest þu? Twegen heortas & anne bar. *Æ Coll* 25,71

What did you capture? Two harts and one boar.

In a context of numeration, such as this one, it is not difficult to determine that *an* is used as a numeral because its semantic field is indicated by a contrasting number. When the context does not include a specific contrasting number, categorizing *an* as numerical often involves the exercise of judgment for, as Rissanen (1967) pointed out, nearly all uses of *an* include an implication of ‘one, not two (or three, etc.)’ (p. 14). For example, his study of 4000 instances of the use of *one* in Old and Early Middle English, Rissanen notes a slight functional difference between the use of *one* in a strictly numerical sense and the use of *one* meaning something similar to ‘a single’. The meaning is not so much ‘one not two’ as it is ‘not even one’, and can be used to emphasize smallness.

18. ne wearp þær forþon an Bret to lafe *OEChron* A491

There was not, consequently, one (a single) Breton remaining

19. gyf þar man an ban findeð unforbærned, hi hit sceolan miclum  
gebetan *Alf Oros* 21,12

if anyone there finds one (a single) bone not burned up, he shall  
atone for it mightily

20. Men geseoð oft þæt of anum lytlum cyrnele cymð micel treow

*Alf Hom I* 236,17.

People often see that from one little (a single) kernel comes a great  
tree.

The translations ‘a single’ and ‘one little’ are not identical, but they are interchangeable, and while differences between the numerical use and this use emphasizing smallness are important for achieving the most effective translation of an expression into Modern English, the uses are, as Rissanen says, “closely related.” Inflections and position are identical in the two uses.

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Another category is labeled by Mustanoja the “exclusive use.” There is some evidence that this use with the meaning ‘alone’ or ‘only’ may have had a separate lexical entry from ‘one’ as early as the Old English period. Rissanen (p. 139 & p. 150) points out that the weak masculine nominative singular form *ana* was often used where another case would be expected by rule and that *an* in this meaning generally appears after the noun. Both factors indicate the possibility of an independent adverbial use. Typical examples are:

21. *buton Raab ana libbe* Hept. Joshua 6,17

except Rahab alone lived

22. *losep wæs ana innan his hlafordes huse* Hept. Gen 39, 11

Joseph was alone in his master’s house

A third classification is the “intensifying use.” Mustanoja notes that this use is much more frequent in Middle English, but there are cases in Old English which seem to indicate that *an* could even then be used as an intensifier, something like the Modern English use *That’s one hot car*. A passage which has drawn much discussion is the following from *Beowulf* in which *an* seems clearly to function with an intensifying purpose.

23. *þa wæs on gange gifu Hroðgares oft gehæted; þæt wæs an cyning*

*æghwæs orleahre, op þæt hine ylðo benam mægenes wynnum*

(Beo 1885)

then was Hrothgar’s gift, in the going, often praised. That was one king, in every respect without blame until old age deprived him of the joys of strength

Rissanen (p. 201) points out that this has been translated “he was a blameless king,” “an altogether blameless king,” “peerless,” “he was an incomparable king” “he, at least, was a king (who was) altogether blameless” and “he was a king, if ever there was one.” Another possible translations is “that was indeed a singular king.” All of these translations are attempts to communicate an intensifying function for the word *an*. In these intensifying uses, *an* appears in the places and forms one would expect of the numeral one, and the differences

in use seem to be a matter of idiomatic interpretation, not of syntactic function of the element *an*.

Mustanoja's fourth category is the "individualizing use," and it is from this use that the modern indefinite article is believed to have arisen. In this use the numerical sense 'one,' while present, is less important in the communicative context than the sense 'one out of a possible group.' Particularly good examples of this use are the following:

24. *hig . . . hengon. . . anne sceapan on his swiðran healf, and oðerne on his wynstran* WS Gosp. Luke 23,33

they hanged one thief on his right side and the other on his left

The meaning 'one, not two' is present, as it is in numerical uses, but the communicative emphasis is on 'one of them.'

25. *Gyf Esau cymð to anum flocce & þone ofslyhð, se oðer floc byð gehealden* Hept. Gen 32,8

If Esau comes to one flock and kills that, the other flock is preserved. Here again the communicative emphasis is on 'one member of a set' rather than on the number of flocks approached.

These uses have been grouped by traditional scholars on the basis of the apparent communicative emphasis of the word *an*, but the individualising uses are not syntactically different in terms of position or inflection from the use of *an* in the numerical meaning. Studies of *an* in Old English have at times used the term indefinite article for some of these individualising uses, even while noting that Old English did not actually use indefinite articles. Rissanen, in his exhaustive cataloging of the uses of one in Old and Early Middle English, devotes forty-three pages to the "indefinite article," but puts quotation marks around the term. He categorizes under "indefinite article" those uses in which "the numerical force of the word is clearly weakened," "it does not primarily single out an individual from a group or unity," and "it is not obviously stressed" (1967 p. 261). Clearly, based as they are on semantic information (numerical force), discourse function (singling out of an individual) and phonological form



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(apparent stress), these are not ideal syntactic tests for the classification of an element, especially in a language for which we lack native speakers, or even recordings, and they say nothing definitive about the position of *a/an* in a generative grammarian's phrase structure tree.

Rissanen reports that this "indefinite article" was used very commonly "with nouns denoting a particular person or thing" which is the use often translated 'a certain.' Some typical examples are as follows.

26. þæt an plegende cild arn under wænes hweowol ond wearð sona  
dead Martyrology 8,10

that a (a certain) playing child ran under wagon wheel and quickly  
died

27. þa he wæs on anre ceastre, þa wæs þær an hreofla Hept Judg 4, 17  
when he was in a (a certain) city where then was a (a certain) leper

In each case *an* is inflected as an adjective.

The aforementioned uses of *an* are assumed by many to be the forerunners of the indefinite article of Modern English, but the Old English usage is not equivalent to the modern indefinite article. Singular nouns which in modern English would require *a/an* regularly appear without *an* even when they are "indefinite," and not previously identified in the discourse in any way. The change from a system which did not include an indefinite article occurred in the change from Old English to Middle English and is one of the pronounced changes which took place in the time of the serious manuscript "gap" between Old and Middle English. Stevick (1989) describing Old English says simply, "Old English did not have an 'indefinite article' to correspond to MnE *a/an*" (p. 81). Fischer (1992) describing Middle English says, "In Middle English *a(n)* became a regular feature with indefinite noun phrases, used in more or less the same functions as in Present-Day English" (p.18). Middle English speakers continued to use the "old" rules at times, so there are examples in Middle English of noun phrases without the indefinite article which would otherwise be expected so that, as Fisher says, "usage varies." However, the rise of the indefinite article is a

pronounced, identifiable phenomenon located at the beginning of Middle English.

I believe this historical evidence suggests that English speakers began to use a syntactic system in which (count) nouns project a NumP in the transition between Old and Middle English. This one underlying change is evident in three ways. First is there is the rise of *a/an* as the minimal marker of the NumP when it is the leftmost node and there is no other element identifying the presence of the NumP. When *a/an* is present it serves to mark the noun as projecting a NumP and, therefore, as being a count noun. Secondly, there is the loss of genitive marking on nouns following numbers. Thirdly, there is the rise of a collocational distinction with words of quantity between count and non-count nouns, a collocation which did not exist in Old English and which is a reflection of the syntactic presence of a NumP on count nouns.

First consider the loss of the genitive relationship between number and noun. Historically, English syntax has not always marked the relationship between a noun and number in the same way that the relationship is marked in Modern English. In Old English, case marking morphology makes clear that there were two possible relationships between a number and a noun. First, a number might modify the noun. The inflection on the number agrees with the noun, both noun and number bearing the case that is required by the role of the noun phrase in the clause. This is the less frequent pattern with numbers above nineteen (Mitchell P 548). For example:

28. binnan þæm þrim gearum OR 128.25

within those three years

29. of þrim folcum Bedes 52.2

of three nations

30. mid fif stafum AECHom I.92.12

with five letters

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The second, and much more common, pattern was for the number to bear the case required by the role of the whole phrase in the clause and for the noun to be marked genitive. For example:

31. embe þreo and ðritig geara AECHom I.236.24

about three and thirty years<sub>gen pl</sub>

32. sume hundred scipa Bo 115.18

about hundred ships<sub>gen pl</sub>

33. swa fela ðusend engla AECHom ii.246.29

so many thousand angels<sub>gen pl</sub>

With the loss of noun inflection in the change from Old English to Middle English, the morphology marking these patterns was of course lost, as was most morphological inflection. However, in other genitive constructions, the genitive relationship continued to be marked in some way. While it is possible for a language to lose a case, as is shown by the history of the instrumental case in English (the loss of instrumental case in English was nearly complete by the time our written records begin, with only some vestigial elements of the case remaining in the demonstrative system), English did not lose the genitive case in the transition from Old to Middle English. Genitive relationships continued to be marked in the syntax, as in shown in certain relationships of noun to noun, verb to object, and adjective to noun.

First there is the relationship of noun to noun marked which was marked by the genitive inflection in Old English. It came to be marked by the possessive 's or by the preposition *of*, as can be seen from the glosses of the following Old English noun phrases:

34. Godes sunu AECHom I.32.5

Son of God or God's son

35. anes treowes wæstm AECHom I.14.9

fruit of one tree

Secondly there were verbs which took genitive forms for their objects in Old English. While in Middle English nouns were no longer marked with a

genitive inflection of any kind when used as objects, it would not be appropriate to say that the genitive simply disappeared. While in many cases the verb which took a genitive itself disappeared (Visser p 373), many of the verbs continued in use and began to take a prepositional phrase, a usage which has continued in at least some dialects up until contemporary times.

36. My master will not like of it

(Also taste of, feel of, ask of, beseech of)

In addition, nearly all of the verbs which could take a genitive object could also take an object in the dative or accusative. The genitive object was the less common form (Visser p 373). When the genitive marking on the object was lost, the case could be reanalyzed as accusative (Visser p 374).

A third relationship which could require a genitive marking was that between certain adjectives and a following noun. Where this relationship was marked genitive in Old English, a preposition took the place of the genitive in Middle and Modern English.

pancful + genitive  $\Rightarrow$  thankful for

pancful +dative  $\Rightarrow$  contented with

In these relationships, noun to noun, verb to noun, and adjective to noun, genitive relationships were preserved in the syntax of the language. The genitive relationship between number and noun was not so preserved, however.

The loss of the genitive relationship between noun and number suggests that there was a reanalysis of the relationship between the two elements. If this relationship were still one of case marking, we would expect some sign of the genitive case relationship, presumably a preposition, as we find in other Middle and Modern English structures which derive from an Old English genitive case, but such is not the situation. Because there is no sign of a genitive case relationship, it is reasonable to suspect that the relationship has been reanalyzed.

I propose that this is the change which took place. While most genitive relationships continued to be marked in the grammar in some way, the genitive

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assigned to a noun by a number did not survive in the transition from Old to Middle English. When the morphological signs of case assignment were lost, the genitive relationship of noun to numeral was no longer overt. Instead of maintaining the relationship by inserting a preposition or some other reflex of the genitive, English speakers reanalyzed the relationship. Instead of head plus genitive dependent, the phrase was reanalyzed during the Middle English period as a noun projecting a NumP. Because the relationship was reanalyzed, we find no continuing marker of a genitive relationship. This new analysis, with N projecting NumP, then evidences itself in the emergence of the count/non-count distinction.

Old English did not make the syntactic distinction between count/non-count that is made in Modern English. This does not, of course, mean that speakers of Old English were unaware of the difference between things which can be counted, such as people or animals, and things which cannot, such as air or light; we can assume that their cognitive powers allowed them to notice the difference. These differences were not, however, encoded into the syntax, as the following evidence shows.

In Modern English the count/non-count distinction is (in the point key to this paper) marked by the possibility of a noun taking the indefinite article. In addition, the distinction is marked by the possibility of the plural marker on nouns and by the collocation restriction exemplified by *many* and *much*. These markers were not part of Old English syntax. Because Old English did not use an indefinite article, did not pluralize only countables, and did not make a distinction in the collocation of *many* (*manig*), *much* (*micel*) or the no longer existent *fela*, we can conclude that Old English did not syntactically mark the difference between count and non-count nouns, although speakers of Old English made cognitive distinctions between the telic and atelic properties of physical objects.

First consider the plural marker. In Modern English, only count nouns can be pluralized and so the presence of a plural marker is an indication of a count

meaning for the noun. In Old English this was not necessarily so. Tracing the evidence is difficult, because when a word has multiple uses, dictionaries, and the scholarship they represent, give the word both a count and a non-count translation. The translation does not indicate whether a word's meaning was conceptually count or non-count to the Old English speaker; rather, it indicates that speakers of modern English need count and non/count equivalents in order to translate the word. There is evidence, however, that a plural form was not necessarily a marker of a count interpretation. As Bosworth and Toller note, *wæteres*, the plural form of 'water', is used to mean 'a lot of water' or 'much water'. Such examples are not frequent, but then, with abstractions such as 'joys' we are generally not in a position to judge whether an original author conceived of the abstraction as 'many joys' or 'lots of joy'.

Secondly, there are the markers of amount. In Modern English, the words *many*, *few* and *fewer* collocate with count nouns, *much*, *little* and *less* with non-count (though there is a growing tendency to use *less* with count nouns as well, to the dismay of traditional prescriptivists). The historical antecedents of these words did not show the same distribution, again indicating that there was no syntactic distinction between count and non-count.

The Old English antecedent of *much* was *mycel*; the antecedent of *many* was *monig*. In addition, Old English had the word *fela* which has no Modern English descendants. All three words must be translated into Modern English as 'many or much' because all three could appear with nouns which now, being marked count or non-count, will take only one or the other word. Markwardt (1970) collected and presented the Old English data, but did not provide a theoretical interpretation. The analysis I am presenting in this paper allows one.

*Mycel* (much) was frequently used to indicate great size. Markwardt points to many uses of *mycel* with words for 'armies' and for 'land' or 'wind', and notes that *mycel menigu* is the usual translation for 'great multitude' in the gospels. Some of these uses of *mycel* are with nouns for clearly countable items, such as *stan* (stone) or *fictreow* (figtree). There are also many uses of

*mycel* with nouns referring to items more likely to be classified as non-count, and for which size is difficult to distinguish from amount, nouns such as *wælsliht* (slaughter), *ege* (fear), *mod* (courage or zeal). In these uses with abstractions, the meaning is close to that of the Modern English *much*. In addition, *mycel* was used with the genitive of nouns in constructions in which it is quite clearly referring to quantity rather than size. Marckwardt gives this examples

37. *þær wearð seo cwen ofslægen ond micel þæs heres* Orosius

then was the queen slain and much of that army

Marckwardt proposes that it is these uses which suggest quantity rather than size which led to the current use of *much* with non-count nouns.

It is my thesis that this distinction between size and quantity became required, not just a possible and available variation in meaning, when the count/non-count distinction became encoded in the syntax of the language. Evidence comes from a development which Marckwardt noted and was unable to interpret with confidence but which can be explained simply in the framework being developed in this paper. The word *great* began to refer to size rather than awkward coarseness, *large* began to refer to size rather than abundance, and *big* entered the language all at about the same time that *mycel* (*much*) began to refer to quantity rather than size. As Marckwardt says, this “certainly hints at some kind of relationship among these various developments” (p.54). I would argue that the use of *mycel* as a marker of non-count developed when the feature count/non-count was encoded into the syntax. When *mycel* became a marker of the non-count feature of a noun, new words took on the task of serving as adjectives for size with count nouns. *A big boulder, a large boulder or a great boulder* can roll down a mountain, but no longer *a much (mycel) boulder*, because there now exists a count/non-count distinction, and *much* is marked to collocate with non-count nouns only.

In Old English, *monig*, the antecedent of *many*, was used with both singular and plural nouns. With plurals *monig* (like the numerals) was frequently followed by a genitive form of the noun though (again like the numerals) it

sometimes was in the same case as the following noun. The meaning of *monig* + singular is generally translated with 'many a', and this unusual construction with the indefinite article *a/an* between *monig* and a singular noun began to appear early in the thirteenth century (Marckwardt p. 52), the time at which we are positing that the syntactic marking of the count/non-count status of nouns began. While *manig* often occurred with words for countable items, it also was used with abstractions, and the dictionaries translate it with both 'many' and 'much.' The plural forms of the nouns in the following sentence would not be distinctive and *manig* could be translated 'much'.

38. he manige ehtnesse & costunge & wiðerweardnesse æt mannum

gedreahLS 19 (PurifMary) 86

he endured much persescution and tribulation and opposition from people

Like *micel*, *manig* does not mark a count/non-count distinction in nouns.

A third Old English word which indicated quantity was *fela*. It was very rarely declined and usually appeared with the genitive of a noun. In many cases, the nouns with which *fela* was used were plural nouns which are now marked count, but it also appeared with singulars of what are now non-count nouns

39. þær wearð Heahmund . . . ofslægen ond fela godra monna AS Chron

there were (became) Heahmund killed and many good men

40. fela sceal gebidan leofes and lapes Beo 1060

shall endure much of pleasure and evil

Marckwardt also points out that *fela* could be used with both the singular and the plural of the same noun, indicating the possibility of what would be in Modern English both a count and a non-count meaning. Mitchell (p 428-429) offers translations with both 'many' and 'much', depending on the context. It is appropriate to conclude that *fela* did not mark the count/non-count nature of a



noun. It could be used with nouns with either a count or non-count meaning, because the distinction was not yet encoded in the language.

One of the most interesting aspects of the history of *micel*, *manig* and *fela* is the chronology of the obsolescence of their older uses. As Marckwardt points out, the last uses of *fela* are recorded in the last half of the sixteenth century as are the last uses of *much* meaning 'large' and of *many* with a singular noun unmarked with the indefinite article. He gives this evidence from the OED.

41. 1598 So fele shippes this yeere there ware

1573 a tar kettle, little or mitch

1583 Countenance bears out many evill couseller

Marckwardt points out that, "The correspondence may be coincidental; it may on the other hand point to . . . elements of a larger pattern of development" (p. 52). I contend that these are definitely elements of a larger pattern. All three uses are signals that a speaker is using the rule system found in Old English in which a noun count/non-count feature is not encoded in the syntax. The three uses disappear together as they are surface manifestations of a single underlying element of the grammar. Apparently the last speakers who had access to the syntactic system in which count nouns are not syntactically marked to project a NumP died in the second half of the sixteenth century.

### **Summary**

There is much work yet to be done in achieving an adequate analysis of the structure of the Modern English noun phrase. Two important parts of achieving such an analysis are determining the syntactic function of the indefinite article *a/an* and accounting for the syntactic differences between count and non-count nouns. Neither the indefinite article nor the count/non-count distinction were part of Old English; they arose simultaneously at the beginning of the Modern English period. Both changes are accounted for by an analysis which posits that count nouns are lexically marked to project a Number Phrase, and that when this node is the leftmost element of a noun phrase it must be

overtly identifiable. The presence of a NumP in an indefinite singular count noun phrase is made identifiable by the indefinite article *a/an*.

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## **THE ACQUISITION OF DETERMINER PHRASES IN EARLY CHILD LANGUAGE**

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### **Abstract**

The apparent omission of determiners by young English-speaking children has led to the proposal that the DP-layer is universally absent in very early child grammars. In this paper I challenge this hypothesis by investigating the longitudinal development of the determiner system of a Swedish child (1;8 to 2;1). The paper addresses phenomena such as suffixed and free articles, double definiteness, genitive *s*, pronouns and “nominal style”. I show that analyses of these early data must invoke at least one functional projection above the NP. Thus, young children have more of an adult DP-system than has been assumed.

### **1. Introduction – Functional categories and language acquisition theory**

In this paper I investigate the acquisition of functional elements and projections in early child language. Syntactic theory now generally assumes that the clause contains several layers of functional or inflectional projections, such as for verbal agreement, tense, complementiser. Similarly, for phrases other than the clause, functional categories have been proposed as heads. It has been argued, for instance, that the determiner (D) is the head of the nominal phrase (Szabolcsi 1983/84, Abney 1987).

The introduction of functional projections into the syntactic tree has had repercussions for language acquisition theory. If adults have functional projections, what about children? Is the adult-like grammatical knowledge fully available to the child right from the beginning, or does it come in later? Radford (1990a) hypothesised that very early child grammars lack functional categories, such as INFL, COMP, and D. Instead, he proposed that early child utterances are purely lexical, i.e. that they consist of NPs and VPs only. This proposal led to intense cross-linguistic debate on the status of functional categories in early grammars (cf. the articles in Meisel 1992). Acquisitionists fall roughly into two camps about this matter: on the one hand, supporters of the Full Competence or Strong Continuity Hypothesis believe that the full adult-like representation of tree structure is available in very early child grammars (e.g. Déprez & Pierce 1993, 1994; Hyams 1986, 1992; Pöppel & Wexler 1993). At the other extreme, there is the view that all functional projections are absent in early child language because they are assumed to mature, i.e. to come in only at a genetically predetermined stage (e.g. Radford 1990a, 1990b). As an alternative to maturation, it has been suggested that functional projections are absent until they are constructed by the child, because of and depending on the input (Clahsen 1990/91; Clahsen, Eisenbeiß & Penke 1994; Clahsen, Eisenbeiß & Vainikka 1994; Vainikka 1993/94). In this model, once children acquire a specific functional morpheme, this will trigger the creation of its functional projection in their syntactic representation of a phrase.

In the debate on the acquisition of functional categories, the focus has been on English, and on the clause. Much less research has been done on the early representation of nominal phrases,<sup>1</sup> where few data have yet been presented that challenge the hypothesis of “no functional categories” (cf. Radford 1990b). With this paper, I attempt to do just this. I investigate the development of the Determiner system by one Swedish child (Embla), aged 1;8 to 2;1 (Lange & Larsson 1973a, 1973b). These longitudinal, spontaneous production data lend support to the hypothesis that DP exists in early child language.

The article proceeds as follows: Section 2 introduces the DP-hypothesis and some of its recent extensions. Section 3 examines the basic structure of Swedish nominals in a DP-framework, and accordingly classifies them into different types: nominals without overt determiner, overtly marked indefinites, overtly marked definites (suffixed definites, demonstratives, possessives, and doubly definites). Section 4 re-examines and challenges studies which have claimed that DP is absent in early child grammars on the grounds of missing determiners and of non-adult-like “nominal style”. Section 5 introduces the Swedish child language data and gives a detailed discussion of the findings. The theoretical implications, especially the existence of functional projections in children’s representations of nominals, are addressed in sections 5 and 6.

## 2. DP-structure

Noting important internal parallels between clauses and nominal phrases, Szabolcsi (1983/84), Hellan (1985/86) and Abney (1987:31f, 77) suggested that both are headed by functional categories. For the head of the nominal phrase, the favourite candidate was the determiner, as shown in (1), and this analysis came to be known as the DP-hypothesis.<sup>2</sup>

(1) [DP SPEC [D D NP]]

The DP-hypothesis has since been adopted by many generative linguists. It is generally assumed, also by acquisitionists such as Radford (1990a:83-111), that the following elements constitute determiners and thus are generated under D: definite articles, indefinite articles, possessives, personal pronouns, demonstratives, and genitive (or possessive) 's. In the case of genitive, Abney (1987:79) has suggested that 's as the head of the nominal is in D, whereas the possessor-subject raises out of the NP-internal subject position SPEC (N) to SPEC (D) by XP-movement. See (2).

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Acknowledgments: I am very grateful to Isa Muxí, Roger Maylor and Per Fröjdh for their extensive feedback and helpful discussions. Thanks also the audiences at the Child Language Seminar in Bristol (7 April 1995) and at the Linguistic Colloquium at the University of Durham (24 May 1995), where earlier versions of this paper were presented. Finally, I acknowledge comments by Belma Haznedar, Joe Emonds, Bonnie Schwartz and an anonymous reviewer of Newcastle & Durham Working Papers in Linguistics.

<sup>1</sup>I will use the term “nominal (phrase)” as the neutral cover term, without making any claims about the status of possible determiner-like elements in it. “Noun phrase”, which was the general term in the past, has now become ambiguous, as it also refers to the NP inside a DP.

<sup>2</sup>For arguments for DP, the interested reader is referred to the above references, and to Delsing (1993).



- (2) [DP Julia<sub>i</sub> [D' [D 's] [NP t<sub>i</sub> [N' blue car]]]]

With the recent mushrooming of functional projections in the clause (split-Infl, Neg, etc), additional functional projections have been proposed for the nominal phrase, either recursive DPs, or other projections, for Gender (Bernstein 1993, for Walloon), Number (Bernstein 1993, for Walloon), Agreement (Giusti 1994, for Romanian and Scandinavian), Degree (Abney 1987, for English; Bhatt 1990, for German; Delsing 1993, for Scandinavian), Case (Löbel 1994, for German), and Possessor (Delsing 1993, for Scandinavian). Whether these other functional categories exist, and if so which ones in which languages, is much debated. However, most proponents of the DP-hypothesis agree on D, prototypically a definite article, being the topmost head of the nominal phrase. The possibility of having co-occurring determiner-like elements, such as articles and possessive adjectives in Catalan, Icelandic or Norwegian nominals for instance, indicates that more than one functional head position may well be necessary. It might also indicate that not all the elements listed above as determiners are strictly speaking Ds. Even if that should be the case, it will not affect the basic argument here. Whether, say, possessive 's is the head of DP or of another functional projection, it will still be a functional element. Therefore, its occurrence or non-occurrence in early child language should give us an indication as to whether functional categories in children's nominals exist. For the time being, I shall treat all of the elements listed above as instantiations of D, as proposed in the earlier DP-analyses (e.g. Abney 1987) and in the acquisition literature (e.g. Radford 1990a, 1990b).

### 3. Swedish nominal phrase structure

Here I shall give a brief sketch of Swedish nominals, and how they may be accounted for in a DP-framework. I also classify nominals into certain types, which will prove useful in the discussion of the child language data in section 5.

#### 3.1. Nominal-internal agreement

Swedish exhibits a lot of overt  $\Phi$ -feature morphology. Virtually all elements in the nominal phrase agree in gender and number. There is a two-way number distinction: singular (SG) and plural (PL), number being visible in suffixes on nouns, adjectives and determiners. With respect to gender, Swedish has a two-way grammatical gender system, neuter (NEU) and non-neuter, or common (COMM). Gender is overtly expressed on determiners and adjectives, as shown in bold in the following examples:

- (3)    **ett**                    **lite-t**                    barn  
       a.SG.NEU            little-SG.NEU    child.SG.NEU  
       "a little child"

- (4)    en                      gul                                    stol

a.SG.COMM    yellow.SG.COMM    chair.SG.COMM  
 “a yellow chair”

In order to explain this nominal-internal agreement, we could assume several instances of spec-head agreement of different heads and specifiers. But as virtually all elements overtly agree (this fact holds for all Scandinavian languages),<sup>3</sup> this could also be viewed as  $\Phi$ -feature percolation inside the nominal phrase. Case, which is assigned to the DP from the outside, presumably percolates downwards, whereas gender and number percolate upwards from the noun into adjectives and free and suffixed determiners.

### 3.2. A classification of Swedish nominals

#### 3.2.1. Nominals without overt determiner

As in many other languages, it is possible to use nouns without any overt determiner in Swedish. For instance, proper nouns, such as *Embla* or *mamma* “Mummy”, are inherently definite and don’t normally occur with overt determiners in Swedish.

Other nouns can occur both with or without an overt determiner. These would be indefinite nouns, such as non-count ones, e.g. *vatten* “water”, zero-plurals of count nouns, e.g. *russin* “raisins”, and overtly marked plurals, e.g. *häst-ar* horse-PL “horses”. There are also some idioms where a singular count noun is used without a determiner in combination with a special verb, e.g. *åka bil* travel car “go by car”.

#### 3.2.2. Overt determiners

There are both free and suffixed determiners in Swedish. Indefinite articles (*en*, *ett*) are free morphemes and precede the NP, as in (3) and (4), as do free pronominal demonstratives such as *denna* (this.SG.COMM) or *det här* (this.NEU here, i.e. “this”), and possessives such as *mitt* (my.SG.NEU). On the other hand, definite articles are bound morphemes (*-(e)n*, *-(e)t*, *-(n)a*), which are suffixed onto the noun as shown in the following example.<sup>4</sup> But see section 3.2.3.

- (5)    stol-en  
       chair.COMM-the.COMM  
       “the chair”

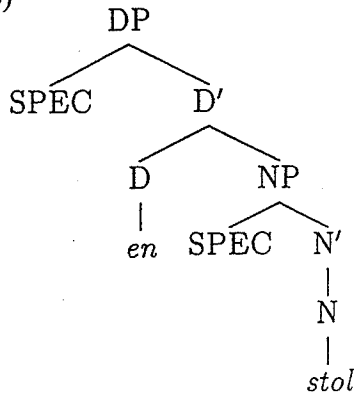
<sup>3</sup>The only nominal-internal elements that do not agree are genitival attributes and objects of adjectives or nouns. However, these elements are assigned case (genitive or objective case) by an adjective or noun inside the DP. It is therefore not surprising that such case-marked elements are not accessible for percolation of the features (including case) of the whole nominal phrase (Delsing 1993:106).

<sup>4</sup>Swedish definite suffixes are always phonetically realised.

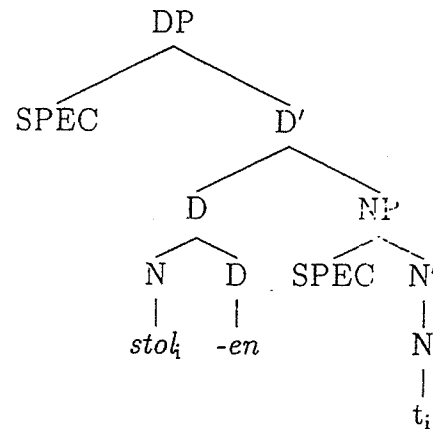
To accommodate the fact that determiners can either precede the NP or follow it, it has been proposed that the DP is head-initial, just as in (1), which yields the right order for free prenominal determiners, cf. (6).

For the case of suffixed determiners, which are phonologically similar to free indefinite determiners, however, it is assumed that the noun raises out of the NP into D (cf. Delsing 1988, Giusti 1994, Santelmann 1993, Taraldsen 1991). This is illustrated in tree (7), where the lexical head *stol* raises and incorporates into the functional head D.

(6)



(7)



### 3.2.3. Double definiteness in Swedish

There can also be two definite elements in the same nominal phrase, such as in (8a).

- (8) a.    **den**            gul-a            stol-en  
           the.COMM    yellow-WEAK chair.COMM-the.COMM  
           “the yellow chair”
- b.    \*den            gul-a            stol  
           the.COMM    yellow-WEAK chair.COMM

Such double determination or double definiteness is obligatory in Swedish if the definite nominal includes an adjective (*gula*), as in (8).<sup>5</sup> It occurs in some other Scandinavian languages too (Faroese, Norwegian). Double definiteness is also obligatory if the definite nominal is deictic, be it because of a demonstrative (e.g. *den här*), as in (9), or a stressed and therefore deictic prenominal determiner, cf. (10).

- (9)    **den här**                            stol-en  
           the.COMM here                chair.COMM-the.COMM

<sup>5</sup>There are a few rare cases where a definite nominal phrase contains a weak adjective and a definite suffix, but is not doubly definite. The prenominal determiner is optional if it is unambiguous which item is referred to in the speech situation, cf. Delsing (1993:116f).

“this chair”

- (10) **den**<sub>stressed</sub> stol-en  
 the.COMM chair.COMM-the.COMM  
 “this chair”

Why double definiteness is obligatory in these nominals is as yet an unresolved question. Some models suggest that double definiteness in Swedish is induced by the presence of an adjective (Delsing 1988, Kester 1993, Santelmann 1993). The adjective is seen as blocking the raising of the noun into D, and instead *-en* is forced to lower onto the N<sup>0</sup> in order for the bound morpheme to be attached to a lexical head. A free determiner (*den*) is then inserted into the D-position. However, under the common assumption that the adjective is an adjunct, the adjective shouldn't block anything.<sup>6</sup> Secondly, the proposed *-en*-lowering might not be permitted in current models. Thirdly, the adjective cannot be the crucial reason for bringing on double definiteness, as the phenomenon also exists in Swedish nominals without adjectives, as we have seen in (9) and (10).

Giusti (1992) tries to account for Scandinavian double definiteness in another way. She argues that in doubly definite nominals the suffix is not a definite article, but an agreement marker, which appears on the noun when there is a definite prenominal determiner. Whilst this does away with the problem of having two determiner-like elements, it raises others. Giusti's proposal entails that the same suffixed element (*-en*) is analysed as an agreement marker in doubly definite nominals (8 -10), but as a proper definite determiner in “singly” definite nominals (5). Further, the claim that the suffix is an agreement marker clashes with examples such as the following, where a (superlative) nominal occurs with a free prenominal determiner *den*, but without the suffixed element *-en*.

- (11) jag k anner den vackraste flicka  
 I know the beautiful-SUPERL girl  
 “I know a very beautiful girl”

- (12) jag k anner den vackraste flicka-n  
 I know the beautiful-SUPERL girl-the  
 “I know the most beautiful girl”

In (11) there is no suffixed element on *flicka*, and the meaning is indefinite; it is some very

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<sup>6</sup>The status of attributive adjectives in nominals is hotly disputed. Abney (1987) suggests a DP where the head D can select as its complement either an NP or an AP, and A in turn selects an NP complement. Bhatt (1990) and Delsing (1993) suggest that the NP is the specifier of A; Delsing (1988) and Holmberg (1993) propose the opposite: they treat adjectives as heads of APs that are specifiers of NP. Santelmann (1993) argues for A being the head of an AP that is adjoined at N'-level, also the view of many introductory syntax textbooks. Sigur sson (1993), on the other hand, treats A as an adjunct to N<sup>0</sup>; and Svenonius (1993) assumes AP-adjunction to NP. Hence we get the full range of hypotheses in the literature: adjectives as complements, as specifiers, as adjuncts, attaching at any level. Since adjectival status is not important to the purposes of this paper, I will treat them for exposition as adjuncts.

beautiful, but not the most beautiful girl. In (12) there is an *-(e)n* suffix, and the meaning is definite. I therefore suggest, contra Giusti, that the suffix isn't some agreement marker, but rather that it bears definiteness.<sup>7</sup>

Trying to account for double definiteness with only one functional category is difficult. Several recent papers therefore introduce models with additional functional projections, be it DP-recursion (Kester 1993), or an intermediate category between NP and DP, such as ARTP (Delsing 1988; Santelmann 1993), to accommodate the different functional elements. In this paper on acquisition I can't go into the details of these analyses, but I hope to have shown that a modified DP-analysis, with nominal head-movement into functional head positions, can account for the characteristics of Swedish nominal phrases. Whether or not the determiner-like elements discussed above are instantiations of D or of some other functional category, it is important that they are functional. Therefore, their (non-)appearance in Swedish child language will provide a window into the child's underlying grammatical structure and competence.

#### 4. Are there determiners in child language?

##### 4.1. No determiners in children's English

It has been noted for some time (cf. Bloom 1970, Brown 1973) that English children below the age of two often appear to be lacking determiners. This has also been discussed in detail by Radford (1990a, 1990b). He cites numerous examples of indeterminate, ungrammatical nominals produced by English children, such as those shown in bold below. In (13a), the referential determiner, i.e. the definite or indefinite article, is missing; in (13b), he argues that possessive 's has been omitted; and with (13c) he illustrates his claim that children typically don't use pronouns (pronominal determiners), but use proper nouns instead.

- (13a) Wayne in **garden**.  
 Daddy got **golf ball**.  
 Lady got **sweetie** now.  
 Where **car**?

(Radford 1990a:84; Daniel 1;11)

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<sup>7</sup>Delsing (1993:128f) has noted this fact for similar constructions, such as existentials with absolute superlatives (i), and generic nominals with a restrictive relative clause (ii):

- (i) *det sitter den vackr-aste prinsessa i torn-et*  
 it sits the beautiful-SUPERL princess in tower-the  
 "there's a very beautiful princess sitting in the tower"
- (ii) *det finns de lingvist-er som tror att allt flyttar i LF*  
 it exist the linguist-PL that believe that all moves at LF  
 "there are linguists who believe that everything moves at LF"

- (13b) **Mommy** vegetable.  
**Mommy** slipper.  
**Kathryn** sock.  
**Kathryn** shoe. (Radford 1990b:202; Kathryn 1;9, from Bloom 1970)
- (13c) **Mommy** smack **Jem**.  
[= “you smack me”] (Radford 1990b:212; Jem 1;11)  
**Mommy** pick up ... **Kendall**.  
[= “You pick me up”] (Radford 1990b:212; Kendall 1;11, from Bowerman (1973))  
**Kendall**<sub>i</sub> see **Kendall**<sub>i</sub>.  
[=“I can see myself”] (Radford 1990a:97; Kendall 1;11, from Bowerman (1973))

He terms the children’s usage in (13c) “nominal (speech) style”, because proper nouns are wrongly used to refer to first and second person: *Mommy* is used instead of adult *you*, *Jem* instead of *I* or *me*. While Radford admits that some young children do use pronouns or other determiners, he argues that these are not real, but rote-learned items or impostors that only occur in a frozen objective “case”. All this shows, Radford claims (1990a:95f), that children do not know the relevant properties of nominals, such as reference, binding and case.

#### 4.2. No DP in child grammars

Radford accounts for the apparent omission of overt determiners in obligatory contexts as follows: while young children have theta-theory, X'-theory and phrasal projections of the lexical categories N, A and V, they do not have functional categories. With respect to nominals, the DP-layer is missing — hence determiners must be missing. This prefunctional stage is said to last until the age of 2;0 ( $\pm 20\%$ ). After that, the functional category of D is acquired, such as by genetically pre-programmed maturation (Radford 1990b: 218). Then, determiners are used systematically, and the nominal style disappears.

For German children, Clahsen, Eisenbeiß & Vainikka (1994:98-103) propose a similar but constructionist model. Again, it is assumed that there are only lexical projections, such as NP, in the grammar of a young child (until the age of around 2;1). Then the child acquires a specific functional morpheme, possessive *s*, and this triggers the construction of the DP-layer. From then on, not just possessive *s*, but all kinds of determiners are used productively by the child. Clahsen *et al* claim that before age 2;1 determiners are not productive, or they are impostors only, so-called “optional adnominal modifiers” (Clahsen, Eisenbeiß & Vainikka 1994:102).

#### 4.3. Testing the “No DP” hypothesis

While this proposed lack of functional categories in early child language may seem attractive, there are some problems with it. First, it is not true that all English-speaking and

German-speaking children omit determiners. As I have shown elsewhere (Bohnacker 1994:46f), various children reported on in Radford (1990a, 1990b) do use articles, as evidenced by transcripts of Kathryn (1;9 - 1;10) in Bloom (1970) or Gia (1;7 - 1;11) in Bloom, Lightbown & Hood (1975, Appendix:52f). While these children may not produce articles in the way adults do, there are many examples where they produce a schwa element in front of an NP, exactly in the position where the determiner would go. Note that schwa is the correct pronunciation for *a*, and it may well be argued on phonetic grounds to be a precursor of *the* as well. Such precursors of articles have been noted in children for a variety of languages (e.g. Bloom (1970:69) for English; Demuth (1992:98) for Sesotho; Heinen & Kadow (1990:61) for French; Clahsen, Eisenbeiß & Vainikka (1994:99) for German). Turning to German child language, we find substantial figures of occurrence of overt determiners. When investigating the nominals of the child Simone, Clahsen, Eisenbeiß & Vainikka (1994:99) found that overt determiners are used in 35% of all obligatory contexts at age 1;10-2;0. 35% is quite an important figure considering that CEV didn't include pronouns in their count. These facts do not fit straightforwardly with the claim that there is no DP-layer.

Second, Radford's evidence for English children omitting possessive's determiners is not quite convincing. Consider (13b) again.<sup>8</sup> While he cites dozens of such examples, it is not clear whether any of these utterances have a possessor structure. Rather, many different interpretations are possible. *Mommy vegetable* could mean 'These are Mommy's vegetables' and have a possessor structure, as Radford claims. However, it might also be a vocative, an imperative, an utterance to attract attention, or simply an utterance noting something new: 'Mommy, vegetables'; 'Mommy, give me vegetables'; 'Mommy, can I have vegetables?'; or 'Mommy, there are vegetables!'; Or it may be a structure with a subject and an object: 'Mommy has got/is getting out/is cutting/is eating vegetables;'. Unfortunately, Radford doesn't mention this structural and semantic ambiguity. His examples of 's-less possessor phrases are given without providing the reader with their context, so it is difficult to tell. As pointed out in (Bohnacker 1994:52f), the possessive reading is unlikely to be the right interpretation, which becomes clear if we consult the original transcript, where the context is given: *Mommy sock* is uttered when the mother is putting Kathryn's sock on Kathryn, *Mommy vegetable* is uttered when the mother is taking vegetables from the fridge.

Third, it is not the case that the lack of article with singular count nouns is always ungrammatical. The following examples illustrate that such bare nouns occur in the input to the child, i.e. in parental speech (from the transcript of Kathryn (1;9) in Bloom 1970:56f).

- (14a) context: Kathryn looking at a bread cookbook on the kitchen counter  
 Kathryn: *book. ə book*  
 Mother: *um hm. cookbook, cookbook*  
 M. looking through the book  
 M.: *let's see what else. what else. bread book*  
 K.: *bread book. bread*

<sup>8</sup>Utterances where the head noun begins with an *s* are ambiguous cases (e.g. *Mommy sock*), as it is impossible to phonetically distinguish between the presence or absence of a possessive 's.

- M.: *you want some bread?*
- (14b) K: *elevator*  
M: *elevator?*  
K.: *elevator*
- (14c) context: K giving raisin to the toy bear  
M.: *what's that?*  
K.: *Kathryn ə bear. ə bear*  
M: *bear have a raisin too? OK*  
K.: *OK*

Here we find singular count nouns used without an overt determiner by adults in the following cases: (i) when teaching the child a new noun, or just citing a noun on its own (14a); (ii) when echo-questioning (14b); (iii) when using the noun as a proper noun (14c).

With respect to the nominal style typical of children, there is evidence that adults, too, refer to themselves by proper nouns, at least when talking to children. Consider the following utterances by Kathryn's mother (Bloom 1970:47-49).

- (15a) context: Mother is holding her sock  
Mother: *Here's Mommy's dirty socks*
- (15b) context: M. setting out her lunch after giving Kathryn lunch  
M.: *Mommy's hungry*
- (15c) context: Kathryn wearing boots, going towards M. in the kitchen  
M.: *see Mommy? are you going to show Mommy the boots?*

Note that the mother doesn't say *my dirty socks*, *I'm hungry*, *see me?*, *show me the boots?*, but refers to herself as *Mommy*. Yet we can't conclude that she therefore doesn't know the referential properties of nominals.

With children's "nominal style" it is notoriously difficult to decide whether a proper noun is incorrectly used instead of a pronoun (nominal style) or whether the proper noun is used correctly. (16) illustrates this interpretative dilemma:

- (16) Mummy sit down.  
Mummy take top off. (Jem 1;11, from Radford 1990a:96)

Radford interprets these examples as *Mummy* incorrectly being used instead of *you*. However, Jem might simply be describing what is going on, talking about his Mummy, and not to her, and then the use of *Mummy* is fine. *Mummy* is equally fine if these are instances of vocatives and imperatives, which would be a natural interpretation (*Mummy* (,) *sit down!*, *Mummy* (,) *take (the/my) top off!*).

And finally, while there may be English-speaking children that mainly use proper



nouns, there are others who use pronouns productively to refer to themselves and others (Bloom 1970:132; Bloom, Lightbown & Hood 1975:18f; Vainikka 1993/94). These children use personal pronouns in different cases, and do distinguish between objective case and nominative subject case (Bohnacker 1994; Vainikka 1993/94:265f).

In his works, Radford provides us with a wealth of examples by children of indeterminate, non-adult-like nominals (some of which are ambiguous, though, as we have seen). However, his arguments would be stronger if they could be supported by quantified data, and by data from other languages than English. In section 5, I shall therefore look at longitudinal data from early child Swedish and statistically analyse them with respect to indeterminate versus determinate nominals.

## **5. The Swedish child language data — Analysis and interpretation**

### **5.1. The data**

I have analysed the spontaneous production data from a Swedish girl called Embla from age 1;8,2 to 2;1,2 (Lange & Larsson 1973a, 1973b).<sup>9</sup> The data were collected in the early Seventies as part of the Swedish Child Language Syntax Project, a longitudinal study set up by Ragnhild Söderbergh at the University of Stockholm. Embla was taped at home during play-sessions of 30 minutes every other week. For the first five recordings (1;8,2 to 1;10,2) I studied the complete transcripts, including parental dialogue and Lange & Larsson's commentary (Lange & Larsson 1973a). For Embla's later five recordings (1;11,0 to 2;1,2), I didn't have access to the original transcripts. However, Lange and Larsson (1973b) list Embla's utterances with dates.<sup>10</sup>

Imitations, repetitions and uninterpretable utterances were not counted, in accordance with Lange & Larsson. I thus arrived at 656 nominals over the five-month observation period. In addition to the child's nominals, I also looked at adults' nominals. Here I included all the 390 nominals uttered by the adults (parents and researchers) interacting with Embla during the first five recordings. I thought it fruitful to have a departure-point for comparison between child and adult nominals.

### **5.2. Embla's nominal types**

Based on my earlier observations on the structure of Swedish nominals, I classified the nominals into different types. Many of Embla's nominals straightforwardly correspond to the classification of nominals given in section 3.2., but as she also produced non-adult-like

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<sup>9</sup>Embla is a first-born child. Her Swedish parents are academics who cared for her at home.

<sup>10</sup>All of Embla's recordings were transcribed independently by two researchers, to insure interobserver reliability. On the basis of these transcripts a third researcher decided on the final version of the transcripts. Transcripts are morphemic, except for unclear utterances, which are transcribed phonetically, and marked as unclear or uninterpretable.

nominals, I expanded to a list of types in the following way:

i. ungrammatical bare count noun

Singular count nouns without any overt determiner are ungrammatical in adult Swedish. Examples would be *litet barn* “small child” or *gul stol* “yellow chair”. (These are (3) and (4) from above, without the article.)

ii. indefinite nominal without overt determiner

As shown in section 3.2.1., indefinite nominals without overt determiner are grammatical.

iii. proper noun

Bare Swedish proper nouns don't occur with overt determiners. Hence they can neither confirm nor disconfirm the presence or absence of D — they might either be NPs only, or DPs with a covert D. However, Embla's usage of proper nouns can shed light on the question whether she employs an ungrammatical nominal style, as Radford has claimed for other children (1990a:240).

iv. overtly indefinite nominal

Indefinite nominals with an overt determiner are grammatical, cf. section 3.2.2.

v. overtly definite nominal

Nominals with an overtly definite determiners, i.e. a definite suffixed article or double definiteness, are grammatical, cf. sections 3.2.2 and 3.2.3.

vi. pronoun

Pronouns are another candidate for D.

vii. possessive *s*

Possessor-possessee constructions, with a possessive *s* as determiner are formed in Swedish as in English, cf. (2), and are grammatical.

viii. unclear

This waste-bin category consists of nominals where some parts of the utterance were transcribed and interpreted (Lange & Larsson 1973a), but other parts were classified as unclear, such as [...] *hand*. As we don't know what exactly preceded *hand* (an article?, a nominal with possessive 's, a verb? etc.), we assign *hand* to the category “unclear”.

The numbers of each type of nominal in each recording are set out in Table 1. Totals, percentages and their implications will be discussed in the following sections. All these nominal types are grammatical in adult Swedish, except for i. and viii. (and nominal style occurring in iii., but see section 5.3.3). To recap, the “no functional categories in children's nominals” will receive support if we find an overwhelming majority of bare NPs (type i.), and only negligible evidence of overt determiners (types iv. - vii.).

Table 1. Embla's nominals

Nominals	1; 8, 2	1; 9, 0	1; 9, 2	1; 10, 0	1; 10, 2	1; 11, 0	1; 11, 2	2; 0, 0	2; 1, 0	2; 1, 2	sum	adult
bare SG (i)	2 12.5%	11 11.3%	4 21.1%	3 14.3%	11 20.0%	5 22.7%	7 8.4%	7 5.3%	8 8.3%	10 8.6%	68 10.4%	9 2.3%
indef. not overt (ii)	0	7 7.2%	3 15.8%	7 33.3%	7 12.7%	8 36.4%	12 14.5%	11 8.4%	14 14.6%	9 7.8%	78 11.9%	25 6.4%
proper noun (iii)	0	31 32.0%	3 15.8%	0	25 45.5%	5 22.7%	27 32.5%	35 26.7%	21 21.9%	25 21.6%	172 26.2%	56 14.4%
indef. overt (iv)	1 6.3%	2 2.1%	1 5.3%	0	0	1 4.5%	1 1.2%	3 2.3%	6 6.3%	2 1.7%	17 2.6%	13 3.3%
defin. overt (v)	13 81.3%	22 22.7%	3 15.8%	8 38.1%	7 12.7%	2 9.1%	21 25.3%	54 41.2%	13 13.5%	18 15.5%	161 24.5%	67 17.2%
pronoun (vi)	0	16 16.5%	2 10.5%	3 14.3%	3 5.5%	1 4.5%	13 15.7%	18 13.7%	34 35.4%	49 42.2%	139 21.2%	207 53.1%
genitive s (vii)	0	4 4.1%	0	0	2 3.6%	0	2 2.4%	3 2.3%	0	3 2.6%	14 2.1%	13 3.3%
unclear (viii)	0	4 4.1%	3 15.8%	0	0	0	0	0	0	0	7 1.1%	0
total	16	97	19	21	55	22	83	131	96	116	656	390

The rows show type of nominal (down), the columns show Embla's age at each recording (across). Each cell gives the total number of each nominal type at a recording. It also gives the percentage of that nominal type in relation to all of her nominals at a recording (100%). The column "sum" totals the occurrences of each type over the entire observation period. The row "adult" gives figures for the nominals produced by the adults interacting with Embla in the first five recordings.



that many, but then the adult controls produce only 3.3% too.<sup>13</sup>

Particularly impressive is the high percentage of overt definite determiners: they are productive right from when observation started at age 1;8. Altogether there are 161 instances, or 24.5%. All of these nominals are grammatical and adult-like. Here is a further breakdown of these nominals. Most of Embla's overt definite determiners are suffixes (142 = 21.6%), but there are also instances of double definiteness: 19 (= 2.9%). These figures are in line with those of the adult controls: 67, or 17.2%, definite determiners, whereof 61, or 15.7%, suffixes, and 6, or 1.5%, double definiteness.

One might object and claim that the suffixed determiners are not real determiners, but just part of an unanalysed whole. This, however, cannot be the case for the following reason: we find that the same noun frequently occurs with different determiners, such as with a free article in some instances, with a suffixed article in others, and with double definiteness yet in others, as exemplified in (18) and (19). We even find the same noun occurring with different determiners in the same recording. This must mean that Embla has separate entries for the noun and the determiners in her lexicon, and that the nominal is not one unanalysed whole. Rather, Embla has access to the DP-system and she knows the process of nominal head-raising into D (or some other functional category).

- (18) a. Adult: Vad            är det            då?  
          what             is this.NEU    then  
          “What’s this then?”  
Embla: en                gubbe  
          a.COMM            man.COMM  
          “a man”
- (Embla 1;9,2)

---

but that it is due to prosodic processes. Demuth (1992, 1995) and Wijnen, Krikhaar & den Os (1994) argue that a functional element (D, tense, agreement, etc.) is just as likely to be omitted in early child language as a syllable of a content word (N, V, A) if unstressed. They suggest that young children apply a metrical template of a foot to all words in their language. Suppose the metrical template is STRONG WEAK, STRONG WEAK, STRONG WEAK etc. In this case, the child is predicted to produce utterances that fit this template. However, utterances where syllables fall outside the template can be realised partly, i.e. those syllables that fit the template will be produced, others may be omitted. This can help explain the omission of functional elements as well as omissions in content words (Thus *the monkey* becomes *monkey*, *banana* becomes *nana* in child English, to fit STRONG WEAK). Extending this to Swedish, we would predict that children produce those determiners that fit the Swedish STRONG WEAK template and tend to omit those that don't. Suffixed articles fit, unstressed free pronominals don't. At first sight, this prediction fits the bill: Embla produces far more suffixed articles than free indefinite ones. However, the adult controls also produce far more suffixed articles than free indefinite ones. The metrical template hypothesis therefore does not help us here.

<sup>13</sup> Most of Embla's indefinite articles are of common gender (14), while only 3 are neuter. Of those 3, an early occurrence of *ett år* (“one year”) may have been a rote-learned form used by Embla to answer questions about how old she is. Yet the low number of neuter *etts* probably doesn't signal that the gender distinction is lacking, for the following reasons: common-gender nouns outnumber the neuter ones in the Swedish language. Also, the adult controls have much fewer neuter indefinite articles (1 instance) than common ones (12 instances), so Embla's figures match the adult ones. And, importantly, with respect to the suffixed definite articles (*-en*, *-et*), Embla uses them in both genders productively. All of her data show virtually perfect nominal-internal agreement in  $\Phi$ -features (gender and number).

- b. gubbe-**n** är glad  
 man.COMM-the.COMM is happy.COMM  
 “the man is happy” (Embla 1;10,2)
- (19) a. en bil  
 a car (Embla 1;8,2)
- b. bil-**en** stå  
 car-the stand  
 “the car can stand/is standing” (Embla 1;9,0)
- c. context: choosing between different cars  
 äh **den**<sub>stressed</sub> bil-**en**  
 no the car-the  
 “no, THIS car” (Embla 1;9,0)
- d. bil-ar-**nana** [PAUSE] all-a bil-ar-**nanana**  
 car-PL-the.PL all-PL car-PL-the.PL  
 “the cars” “all the cars” (Embla 1;9,0)<sup>14</sup>

There is more evidence of a D-system. Embla produces some possessive *s* (Table 1, row viii). There are not many, only 14 instances, i.e. *s* occurs on 2.1% of all her nominals, but the adult controls show low numbers too (13, or 3.3%). Examples are given in (20) and (21).

- (20) Embla-**s** mamma XYZ  
 Embla-’s mummy [name of mother]  
 “Embla’s mummy is called XYZ” (Embla 1;10,2)
- (21) katt-**en-s** hand  
 cat-the-’s hand  
 “the cat’s paw” (Embla 1;9,0)

Whilst not frequent, such examples are grammatical and occur quite early in the data. They are evidence for D, as we will have to assume that the possessor-subject raises out of SPEC (N) into SPEC (D) in order to account for them. Note that in (21) there is even an overt article (*-en*) and a possessive *s*. Like Embla’s doubly definite nominals, this example suggests that there are even further functional projections involved, see section 3.2.3.

Taken together, an impressive 50% of Embla’s nominals exhibit an overt determiner, be it a free or suffixed determiner, a pronoun or a possessive *s*.

<sup>14</sup>The adult plural definite suffix *-na* is reduplicated here.

### 5.3.3. Nominal style?

Turning now to proper nouns, I examine whether Embla's data support Radford's claim of a nominal style. At first sight, that seems to be the case. She does use proper nouns frequently (26.2% on average), which is more than the adult controls do (14.4%). Also, she uses far fewer pronouns (21.2%) than the adults (53.1%). Here's a closer look at these figures. Proper nouns are used in a variety of ways. There are those which are used as a way to attract someone's attention, as a kind of vocative.

- (22) context: Embla shows her mother a little toy horse  
Embla: *Mamma! har gått sönder.*  
Mummy has gone broken  
"Mummy! it's broken" (Embla 1;9,0)

There are those proper nouns that are used to refer to a third party, as in (23).

- (23) context: talking about a friend of Embla's that is not present  
Embla: *Johan gick*  
Johan went (Embla 1;10,2)

Both usage-types are very frequent in both Embla's and the adults' data, and they are entirely grammatical. But there are also proper nouns where the transcript does not tell us whether they are used grammatically or not. Recall the ambiguous *Mummy vegetable* example in (13b) and the discussion in section 4.3. Similarly, it is often very difficult to decide whether a proper noun is used as a vocative and the rest of the utterance is an imperative, in which case the proper noun is used correctly, or whether the proper noun is the subject of the clause — in which case it may be nominal style. See (24).

- (24) context: Embla is feeding her dolls, herself and other people with raisins  
Embla: *Mamma smaka*  
Mummy taste (Embla 1;10,2)

Finally, there are clear-cut cases of nominal style, such as where Embla uses her proper name *Embla* instead of *jag* "I" to refer to herself :

- (25) context: Embla's tower of bricks that she had built has just collapsed  
Embla: *Embla bygga ny. bygga ny.*  
Embla build anew build anew (Embla 1;9,0)

I tried to classify Embla's proper nouns for the first five recordings (1;8,2 – 1;10,2), where I had access to the complete transcripts. I did the same for the adult controls during these recordings. The results are given in Table 2. The four types, vocative, reference to third party, unclear, and nominal style, are the ones discussed above.

Table 2. Proper nouns

Proper nouns	1; 8, 2	1; 9, 0	1; 9, 2	1; 10, 0	1; 10, 2	sum	adult
vocative	0	8 25.8%	3 100%	0	0	11 18.6%	11 19.6%
third party	0	5 16.1%	0	0	18 72.0%	23 39.0%	27 48.2%
unclear	0	15 48.4%	0	0	1 4.0%	16 27.1%	0
nominal style	0	3 9.7%	0	0	6 24.0%	9 15.3%	18 32.1%
total	0	31	3	0	25	59	56

Altogether there are only 9, or 15%, clear nominal-style proper nouns in Embla's data. And, surprisingly, the adults produce them, too (18, or 32% of all proper nouns). Some examples:

- (26) context: Embla and mother building towers with bricks  
 Mother: *ska mamma bygga mer?*  
 shall mummy build more  
 "shall I build some more?" (recording 1;9,0)
- (27) context: Embla is feeding her dolls, herself and other people with raisins  
 researcher: *ska Embla smaka också? ska jag mata Embla då?*  
 shall Embla taste too? shall I feed Embla then?  
 "are you having some too? shall I feed you then?" (recording 1;10,2)

The transcripts show that Embla's mother refers to herself more often as "Mummy" than as "I", and that the adults frequently use "Embla" instead of "you" when addressing Embla. Despite these "non-adult-like" nominals the adults do not lack a determiner system. And if adults interacting with children use nominal style, it is not surprising that the children do so too. I therefore suggest that nominal style (Radford 1990a, 1990b) is not a good test for or against the existence of DP.

### 5.3.4 Pronouns

Embla productively uses pronouns; as shown in Table 1 (row vi.); they constitute 139, or 21.2%, of all her nominals. She uses pronouns in different persons, numbers and genders. Some early examples are given in (28).

- (28a) context: researcher and Embla are building with bricks



- Embla: vi bygga  
we build  
"we're building" (Embla 1;9,0)
- (28b) context: Embla puts a brick down so that it stands up  
Embla: stå. [PAUSE] den vill stå  
stand. it/this want.FINITE stand  
"stand. it/this wants to stand" (Embla 1;9,0)
- (28c) det är ju mamma!  
it/this is EMPHASIS mummy  
"why, it's mummy!" (indicating surprise) (Embla 1;9,0)

However, Embla uses pronouns significantly less than the adult controls do (53.1%). This warrants further investigation. The most common pronouns are *den* and *det*, which, when used on their own (and not preminally), mean "it" or "this". These two pronouns are there from 1;9,0. *han* "he", *hon* "she, her" and *jag* "I" only appear in the seventh recording (1;11,2). On the other hand we find a small selection of other pronouns in the earliest recordings. There is a quantitative increase in pronouns after the age of two, the percentage of pronouns rising from around 15% to 35% and more. A Radfordian explanation for this could be that proper nouns are being replaced by pronouns, but the data suggest that this is not the case, as the number of proper nouns does not decrease. Another explanation would be that earlier null elements are now being overtly realised as pronouns. Again, the data do not support this view. Embla does omit subjects (incorrectly),<sup>15</sup> but she also realises many subjects (correctly). Subjects are much more often omitted than objects. (Objects are virtually always realised.) There is a constant number of subject-drop utterances throughout the observation period. Pronouns are used both as subjects and objects. Thus, whilst pronouns increase towards the end, there is no correlation that suggests that they would replace the null subjects.

I propose that the reason Embla produces fewer pronouns than the adults lies in the rather trivial fact that the utterances are both different in type and length. With respect to length, many of Embla's utterances are one-word and two-word, and Lange & Larsson (1993b:8f) give the following MLU count (based on the number of morphemes, not words — in each utterance).

Table 3. Embla's MLU

Age	1; 8, 2	1; 9, 0	1; 9, 2	1; 10, 0	1; 10, 2	1; 11, 0	1; 11, 2	2; 0, 0	2; 1, 0	2; 1, 2
MLU	1.64	1.71	1.32	1.39	1.54	1.37	1.73	2.19	2.05	2.54

In contrast to Embla, the adult controls have an MLU of 4.40. Apart from being longer, these

<sup>15</sup>Deciding whether the subject has been omitted can be difficult. Often it is not clear whether the utterance is an imperative (in which case a null subject is perfectly grammatical) or a declarative/interrogative, where an overt subject is obligatory in virtually all cases in Swedish.



ungrammatical, determiner-less type. A comparison of the proper nouns produced by Embla and her adult conversation partners shows that both parties use proper nouns in the same way. Proposals for a nominal style that is only found in early child language are thus not supported by the data.

There is clear evidence of the productive use of determiners, be it definite suffixes, double definiteness, indefinite articles, pronouns or possessive *s*. We find that the same noun can occur with different determiners, which shows that nouns and determiners are stored separately in the child's lexicon, and not as an unanalysed whole. Taken together, overtly definite nominals make up an impressive 50% of all her nominals. I conclude that the high occurrence of overt determiners must invoke at least one functional projection above the NP in Embla's representation of nominals. She is also shown to have access to the processes that govern nominal-head-raising to a functional head, and possessor-subject raising into the specifier of such a functional category. This indicates that children have more of an adult DP-system than has been assumed.

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**Deconstructing Weak Crossover**  
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**1. Introduction**

In the first attempt within generative grammar to deal with the crossover problem, Postal (1971) introduced a constraint on movement rules which, among other things, blocked both structures in (1) (examples from Postal 1971:166).

- (1) a. \*Who<sub>i</sub> did he<sub>j</sub> take a picture of t<sub>i</sub>?  
b. \*Who<sub>i</sub> did a picture of him<sub>j</sub> fall on t<sub>i</sub>?

The principle, reduced to its essentials, prevented certain transformations from moving an element X across a co-referential element Y, both in cases where Y c-commands X, as in (1a), and in cases where there is no c-command relationship between X and Y, as in (1b).

Later research (beginning with Wasow 1979) has distinguished between these two cases and suggested that different principles are responsible for ruling them out. Strong crossover cases like (1a) have been considered violations of the Binding Theory (principle C in Chomsky 1981:193, principles A or B in Chomsky 1982:36). For weak crossover cases like (1b), a variety of proposals have been put forth. In this paper I want to suggest that the reason for the wide divergence in the range of hypotheses addressing weak crossover is that we are not dealing with a unified phenomenon but rather an

epiphenomenon related to different conditions relevant to the interpretation of pronouns.

- (2) The c-command condition on pronouns interpreted as variables (Chomsky 1977, Higginbotham 1980, Hornstein 1984).
- (3) Some ill-understood conditions on backward pronominalization (Kuroda 1968, Wasow 1979).

Since these are independent constraints on pronouns, I will be arguing against a feature of several hypotheses purporting to account for weak crossover, namely that the relevant principle somehow involves the relationship between two syntactic variables. For concreteness, I will adopt the following formulations of the constraints informally alluded to in (2) and (3):

- (4) The c-command condition on pronouns as variables:  
For a pronoun to be interpreted as a bound variable of a (type II) QP, it must be c-commanded by that expression in LF (Hornstein 1984:23).
- (5) a. The acceptability of backward pronominalization is in direct correlation with the degree of determinateness of the antecedent (Kuroda 1968, Wasow 1979).  
b. The acceptability of backward pronominalization is in direct correlation with the depth of embedding of the pronoun.



## 2. The status of Quantifier Raising

Most previous proposals relating to weak crossover assume that the ungrammaticality of cases like (1b) is due to the same principle that rules out the examples in (6).

- (6) a. \*His<sub>i</sub> mother likes everybody<sub>i</sub>.  
b. \*Their<sub>i</sub> mother likes [few people]<sub>i</sub>.

The rationale, first articulated by Chomsky (1977), is that, after the application of Quantifier Raising, the structure of (6) is similar in the relevant respects to that of (1b):

- (7) a. \*[IP everybody<sub>i</sub> [IP [NP his<sub>i</sub> mother] likes t<sub>i</sub>]]  
b. \*[IP [few people]<sub>i</sub> [IP their<sub>i</sub> mother likes t<sub>i</sub>]]<sup>1</sup>

The prediction under these assumptions is that if a language exhibits 'overt' weak crossover effects as in (1b) it will also show LF-type weak crossover as in (6) and viceversa. This prediction is not borne out, however. German shows only the latter type, as illustrated in the following examples provided by Michael Gamon (see also Georgopoulos 1991):

- (8) Wen<sub>i</sub> sieht seine<sub>i</sub> Mutter?  
who sees his mother  
'Who does his mother see?'

---

<sup>1</sup>Under May's (1985) proposal, the QP adjoins to VP but has scope over IP.

- (9) a. ??Seine<sub>i</sub> Mutter sieht jeden<sub>i</sub>  
his mother sees everybody  
'His mother sees everybody.'
- b. \*Sein<sub>i</sub> Bruder trifft niemanden<sub>i</sub>  
his brother meets nobody  
'His brother meets nobody.'

This is totally unexpected under the assumptions that all QPs undergo raising at LF and that there is one principle which rules out both overt and covert weak crossover. The status of QR has been questioned recently. While Beghelli (1993) argues that QR applies only to distributive universals like everybody, Kitahara (to appear) suggests that the rule does not exist at all. The German distribution of weak crossover facts lends support to these proposals as well as to the modular approach presented in this paper. If there is no QR in cases like (6b) or (9b), the ungrammaticality of such cases must be attributed to a violation of the c-command condition (4), which is, of course not violated in cases like (1b) or (if Beghelli is right) (6a) and (9a). While I have no suggestion to offer as to why German shows no overt weak crossover effects, separating the cases involving quantifiers in the manner suggested by Kitahara or Beghelli solves the dilemma of the 'unified' approaches to WCO.

I will assume for the rest of this paper that (4) is the principle responsible for weak crossover cases involving quantifiers and will focus on cases of overt crossover like (1b).

### 3. Previous approaches

Previous proposals include the following:

(10) The Leftness Condition (Chomsky 1977)

A variable cannot be the antecedent of a pronoun on its left.

(11) The Bijection Principle (Koopman and Sportiche 1982)

There is a bijective correspondence between variables and A' positions.

(12) The Parallelism Constraint on Variables (Safir 1984)

If O is an operator and x is a variable bound by O, then for any y, y a variable bound by O, x and y are [ $\alpha$  lexical].

(13) The c-command condition (Lasnik and Stowell 1991)

In a configuration where a pronoun P and a trace T are both bound by a quantifier Q, T must c-command P.

(14) The Path Containment Condition (May 1985, based on Pesetsky 1982)

Intersecting A'-categorial paths must embed, not overlap.

(15) The ECP account (Georgopoulos 1991)

Resumptive pronouns must be properly governed.

(16) Syntactic rank and linear order (Bresnan 1994)

- a. The domain of O is restricted to the set of f-structures that O's operator complex outranks.<sup>2</sup>
- b. The domain of a variable-binding operator O excludes

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<sup>2</sup>F-structure is a nonlinear representation related to a linear and hierarchical representation called c-structure by means of a mapping algorithm. Bresnan assumes the following functional hierarchy: SUBJ > OBJ > OBL > COMP >...

all f-structure elements that f-precede O's operator complex.<sup>3</sup>

(17) The Antisubjacency Condition (Contreras 1991)

A pronominal variable must be non-subjacent to its operator.

Time constraints preclude a detailed examination of these various proposals. I want to suggest, however, that there are two fundamental problems which these proposals fail to address and which render them inadequate. An updated interpretation of Wasow's (1979) conjecture that weak crossover effects reduce to constraints on backward pronominalization, on the other hand, solves both of these problems, and must, therefore, be considered as the correct account of the relevant facts.

**4. The embedding problem**

It has been noted at least since Wasow 1979 (see also Georgopoulos 1991), that structures which would otherwise be ungrammatical improve considerably when the pronominal variable is separated from its operator by a syntactic island. Consider the examples in (18), from Georgopoulos 1991.

- (18) a. ?Who<sub>i</sub> did photographs of his<sub>i</sub> sister embarrass t<sub>i</sub>?  
b. Who<sub>i</sub> did you regret giving his<sub>i</sub> grades to t<sub>i</sub>?

---

<sup>3</sup>An element X f-precedes Y if and only if the counterpart of X precedes the counterpart of Y in c-structure.

Under most previous accounts, there is no explanation for the contrast between these structures and (1b): they all violate Chomsky's Leftness Condition, Koopman and Sportiche's Bijection Principle, Safir's Parallelism Constraint, Lasnik and Stowell's c-command condition, Pesetsky's Path Containment Condition, Georgopoulos's proper government requirement, and Bresnan's syntactic rank condition.

The Antisubjacency Condition proposed in Contreras 1991 was intended to account for the contrast between (18) and (1b), on the assumption that, contrary to the standard view, subjects are not syntactic islands. This proposal, however, fails to account for the determinateness problem discussed in the following section.

## **5. The determinateness problem**

Wasow (1979) noted that the degree of determinateness of the operator affects the acceptability of the structures under consideration. Consider the following contrasts:

- (19) a. \*Who<sub>i</sub> does his<sub>i</sub> mother like t<sub>i</sub>?  
b. [Which of the twins]<sub>j</sub> does his<sub>i</sub> mother like t<sub>j</sub> best?
- (20) a. \*Who<sub>i</sub> did the woman he<sub>i</sub> loved betray t<sub>i</sub>?  
b. [Which famous actor]<sub>j</sub> did the woman he<sub>i</sub> loved betray t<sub>j</sub>?

These contrasts are problematic for all the proposals under consideration including the Antisubjacency Condition.<sup>4</sup>

Kuroda (1968) and Wasow (1979) showed that these determinateness effects are also present in cases of backward pronominalization:

- (21) a. A man who had heard i t before interrupted Bill's story.  
b. ?\*A man who had heard i t before interrupted someone's story.  
c. ?\*The man who lost i t needed to find something.

Examples of this sort suggest the existence of a principle like (5a), repeated here:

- (5a) The acceptability of backward pronominalization is in direct correlation with the degree of determinateness of the antecedent (Wasow 1979).

I will suggest that this principle is also responsible for the contrasts in (19) and (20). Consider (19b). Assuming Chomsky's (1995) copy-and-deletion interpretation of wh-movement, the derivation is as follows:

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<sup>4</sup>The Antisubjacency Condition is still a valid generalization which rules out structures like (i).

- (i) \*Who<sub>i</sub> does Mary like him<sub>i</sub>?

It is just not relevant to examples like (1b), contrary to what I claim in Contreras (1991).

- (22) a. [IP His mother likes [which of the twins] best]  
b. [CP [which of the twins] does [IP his mother like  
[which of the twins] best]]  
c. [CP [which [t (one) of the twins]] does [IP his mother  
like [which [t (one) of the twins]] best]]  
d. [CP [which] does [IP his mother like [t (one) of the  
twins]] best]]

(22a) is the structure prior to movement. (22b) is the output of the copy component of wh-movement. (22c) is obtained by 'an operation akin to QR' (Chomsky 1995:203), and (22d) results from two complementary deletion processes: everything but the operator is deleted in Spec of CP, and the operator is deleted in the original position of the wh-phrase.<sup>5</sup>

Given this analysis, (19b) is well formed because it is a case of backward pronominalization with a determinate antecedent. Consider, by contrast, the derivation of (19a):<sup>6</sup>

- (23) a. [IP His mother likes [DP wh [NP [+human]]]  
b. [CP [DP wh [NP [+human]]] does [IP his mother  
like [DP wh [NP [+human]]]]]

---

<sup>5</sup> Although Chomsky (1995) also allows a structure like (i),

(i) [CP [Which [t one of the twins]] does [IP his mother like t]]

he suggests (1995:209) that there is a preference principle which selects (22d) whenever possible.

<sup>6</sup> I assume that *who* consists of a wh head of category D and an empty NP complement with the feature [+human].

- c. [CP [wh [t [+human]]] does [IP his mother like  
[wh [t [+human]]]]]]
- d. [CP [wh] does [IP his mother like [t [+human]]]]

The antecedent for his in (23d) is not determinate, since it only consists of the feature human. The contrast in (20) can be accounted for in the same way: after copy-and-deletion, the antecedent for he is the feature [+human] in (20a) and the NP famous actor in (20b), which differ in degree of determinateness.

## 6. Supporting evidence

I will now present some supporting evidence in favor of Wasow's conjecture. First, consider the following structures from Lasnik and Stowell (1991):

- (24) a. Who<sub>i</sub> did you say [CP t<sub>i</sub> was a liar] [PP before you  
met him<sub>i</sub>]
- b. Who<sub>i</sub> did Jan say [CP she admired t<sub>i</sub>] [PP in order to  
please him<sub>i</sub>]

Under our updated interpretation of Wasow's conjecture, the well-formedness of these structures is expected, since the pronoun follows its (reconstructed) antecedent at LF. For most of the previous proposals, these structures are problematic.

The second piece of supporting evidence comes from Wasow (1979) himself. Based on observations by Larry Horn and Avery Andrews, he shows that the presence of even and only improve both



backward pronominalization and weak crossover, as shown in the following examples:

- (25) a. ??The man who designed i t can understand a computer.  
b. Only the man who designed i t can understand a computer.
- (26) a. ??I have a friend who those who know him well can appreciate.  
b. I have a friend who only those who know him well can appreciate.
- (27) a. ??If you are looking for i t, you'll never find a unicorn.  
b. Even if you are looking for i t, you'll never find a unicorn.
- (28) a. ??John owns a machine which the man who designed i t can't understand.  
b. John owns a machine which even the man who designed i t can't understand.

It is unclear exactly why the presence of only and even has this effect, but the fact that it is common to backward pronominalization and weak crossover strongly suggests that weak crossover and backward pronominalization are the same phenomenon, as claimed by Wasow.

A final piece of supporting evidence comes from Hurtado's(1984) observation that in Spanish weak crossover effects are nullified by the presence of a clitic, as shown by the following examples:

- (29) a. \*¿A quién<sub>i</sub> adora su<sub>i</sub> madre t<sub>i</sub>?  
whom adores his/her mother  
'Whom does his/her mother adore?'
- b. ¿A quién<sub>i</sub> lo<sub>i</sub> adora su<sub>i</sub> madre e<sub>i</sub>?  
whom CL adores his mother  
'Whom does his mother adore?'

If, as claimed by Suñer (1988), clitics carry the feature [+specific], the contrast in (29) follows from Wasow's conjecture. Assuming, as is natural, that the empty object shares the feature [+specific] with the clitic in (29b), this is a case of backward pronominalization with a determinate antecedent. In dialects which allow accusative clitic doubling, the contrast is duplicated in cases not involving weak crossover, as expected under Wasow's conjecture:

- (30) a. ?Su<sub>i</sub> madre adora a Juan<sub>i</sub>.  
'His mother adores John.'
- b. Su<sub>i</sub> madre lo<sub>i</sub> adora a Juan<sub>i</sub>.  
'His mother adores John.'

## 7. Reconsidering the embedding problem

We can now return to the embedding problem represented by the structures in (18), repeated here.

- (18) a. ?Who<sub>i</sub> did photographs of his<sub>i</sub> sister embarrass t<sub>i</sub>?  
b. Who<sub>i</sub> did you regret giving his<sub>i</sub> grades to t<sub>i</sub>?

These structures are still problematic under our interpretation of Wasow's conjecture, since at LF the antecedent for his will consist only of the feature [+human], which, as we have seen above, is not determinate enough to license backward pronominalization.

Wasow's conjecture suggests, however, that the improved status of (18) over (1b) must be attributed to some condition on backward pronominalization. I suggest that the principle at work is (5b), repeated here.

- (5b) The acceptability of backward pronominalization is in direct correlation with the depth of embedding of the pronoun.

Depth of embedding, just like the presence of only and even, can improve backward pronominalization even when the antecedent is not determinate. I will illustrate the effect in question with a determinate antecedent. For many speakers, backward pronominalization in (31a) is better than in (31b).

- (31) a. Pictures of his<sub>i</sub> sister embarrass John<sub>i</sub>.  
b. ?His<sub>i</sub> sister embarrasses John<sub>i</sub>.

It appears, then, that both the embedding problem and the determinateness problem can be solved by adopting Wasow's conjecture. This suggests that, apart from LF cases, which we have shown to follow in part from the c-command condition on bound variables, weak crossover effects reduce to conditions on backward pronominalization. Chomsky's (1995) copy-and-deletion version of wh-movement produces the required structures which the restrictions on backward pronominalization can apply to in weak crossover configurations.

An important consequence of the analysis suggested here is that different speakers may have different judgments concerning weak cross-over cases, since the principles at work refer to degrees of determinateness and embedding. Thus, it is to be expected that for some speakers even the standard cases of purported violation are acceptable. This seems to be the case. Under any of the previous proposals, where weak cross-over violates a specific principle of grammar allowing no gradation, cancellation of that principle would be totally unexpected.

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## Suprasegmental Changes in Progress: Parallels between Japanese and English\*

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Speech differences between one generation and another can offer a clue to language change in progress. This paper discusses the mechanisms of suprasegmental changes in Japanese and English. Labov's concepts of real time and apparent time form the framework of the discussion. Though English and Japanese use different phonetic resources to implement accentuation, this paper will discuss similar principles at work in the two languages.

### 1. Introduction

In this paper we will examine ongoing suprasegmental changes in Japanese and English, using the notion of real time and apparent time. Let us explain the methodology briefly. Real time means 'calendar time.' Diachronic changes occur in real time. Apparent time studies involve--to cite McMahon's expression--"looking at synchrony and attempting to perceive the seeds of diachrony in it." (McMahon, 1994: 240). Differences between the speech of older people and younger people are interpreted as indicators of changes in progress. Each generation acquires both its motor-controlled vernacular and its evaluative norms between the ages of four and seventeen; the accent of each age group reflects the state of the feature at the time when they acquire it (Downes, 1984:198). So, the speech of, say, 70 year olds today directly reflects the speech of 20 year olds fifty years ago.

As a study of change in terms of real time, we have collected examples of changes comparing earlier editions (1893, 1943) of Japanese pronouncing dictionaries with recent editions (1966, 1985). As a study of change in terms of apparent time, innovations are detected by recording and examining younger people's speech. Recent accent changes are observed in nouns, adjectives and compound verbs (Hattori, 1991), but we will discuss nouns and adjectives here.

First, we will consider accent changes in progress in Japanese and then stress

changes in progress in English.

## 2. Japanese

### 2.1. Nouns

Recent accent changes in Standard Japanese indicate an interesting aspect of suprasegmental changes. We need to mention briefly the accentual system of Standard Japanese first.

In Standard Japanese, only one type of pitch drop needs to be specified in the lexicon. In the case of nouns consisting of  $n$  moras, they are either first-mora accented, second-mora accented, ...  $n$ -th mora accented, or unaccented (i.e. no pitch drop appears). We will count moras from the end, since this leads to systematic generalization which would otherwise be missed. By (n-2), for example, we mean that the second mora from the end is accented in a word consisting of  $n$  moras; (n-0) means unaccented.

We also need to mention devoiced vowels. Among the five vowel phonemes in Japanese, the high vowels /i/ and /u/ are devoiced when they occur between voiceless consonants (especially in an unaccented syllable). Examples are given in (1). In the traditional literature it is claimed that devoiced vowels cannot bear a pitch drop.

- (1) a. hikari 'light'  
b. kusa 'grass'

As for nouns, we collected more than 800 words which have changed their accent patterns or in some cases show a fluctuation between conservative and new accents. We found that there are two canonical patterns as a target of change: a pitch drop on an antepenultimate mora and the 'unaccented'. Examples are given below:

- (2) (n-3) pattern (antepenultimate accent as a target of change;  
' indicates a pitch drop)

- a. aku'i -> a'kui 'malice'  
b. seka'i -> se'kai 'world'  
c. ashiku'bi ->ashi'kubi 'ankle'  
d. fukiso'ku -> fuki'soku 'irregularity'  
e. mogishike'n -> mogishi'ken 'mock exam'



(3) (n-0) pattern ('unaccented' as a target of change)

- a. do'dai -> dodai 'foundation'
- b. a'ikagi -> aikagi 'duplicate key'
- c. saku'ryaku -> sakuryaku 'plot'

These two patterns account for 89.1% of all the recent accent changes in nouns. Furthermore, in spite of the belief that tone-bearing units in Standard Japanese should be [+voiced], 99 examples of our data show change to pitch fall on devoiced vowels (e.g. (2c-e)).

## 2.2. Adjectives

Next we will see the adjectives. In Standard Japanese, adjectives are of two classes, accented and unaccented. Examples of accent patterns of a paradigm of some adjectives are presented in (4) and (5).

(4) Accented	'white'	'cool'
a. (lexical entry form)	shiro'i	suzushi'i
b. (root)	shiro-	suzushi-
c. (pre-verbal)	shi'roku	suzu'shiku
d. (suspensive)	shi'rokute	suzu'shikute
e. (past)	shi'rokatta	suzu'shikatta
f. (conditional)	shi'rokereba	suzu'shikereba
(5) Unaccented	'red'	'bright'
a. (lex)	akai	akarui
b. (root)	aka-	akaru-
c. (pre-v)	akaku	akaruku
d. (susp)	aka'kute	akaru'kute
e. (past)	aka'katta	akaru'katta
f. (cond)	aka'kereba	akaru'kereba

In Standard Japanese it is claimed that devoiced vowels cannot bear a pitch drop; therefore when it happens to fall on them, it is moved one mora to the left. A couple of examples of accent shift are shown in (6).

- (6) accent shift
- a. yasashi'katta -> yasa'shikatta (yasashii 'kind')
  - b. kanashi'katta -> kana'shikatta (kanashii 'sad')
  - c. muzukashi'katta -> muzuka'shikatta (muzukashii 'difficult')

Recently, however, the accent patterns to which accent shift has not applied (that is, *yasashi' katta*, *kanashi' katta*, *muzukashi' katta*) are also heard. To complicate the matter, new accent patterns as shown in (7) are reported in the literature. They are accented adjectives, but their conjugational forms take the accent pattern of unaccented adjectives. This seems to be natural in that the accent pattern of lexical entry forms remains throughout the paradigm.

- (7) conservative new
- a. shi'rokute shiro'kute (The Japan Foundation, 1981: 113)
  - b. miji'kakatta mijika'katta (Bunkachoo, 1971: 150)

As a study of change in apparent time, the speech of the younger generation was examined; eight informants who speak Standard Japanese were asked to read sentences which contain eight adjectives. The adjectives are those which we think tend to be pronounced in different accent patterns from those indicated in dictionaries and other reference works. Part of the result is presented in (8) ('conservative' in the left column means the accent patterns given in the literature; in the right are the pronunciations given by the informants--which we will call 'new' here; the figures in parentheses indicate the number of informants who pronounced the lexical items with the accent pattern in question):

- (8) conservative new
- a. miji'kakatta (0) mijika'katta (8) cf. mijika'i 'short'
  - b. tano'shikatta (0) tanoshi'katta (8) cf. tanoshi'i 'happy'
  - c. oka'shikatta (2) okashi'katta (6) cf. okashi'i 'funny'
  - d. omoshi'rokatta (2) omoshiro'katta (6) cf. omoshiro'i 'interesting'
  - e. kana'shikute (0) kanashi'kute (8) cf. kanashii 'sad'

In (8b, c, e) pitch accent came to fall on devoiced vowels. The examples (8a-8d) are the cases where accented adjectives came to have the same pitch pattern as the unaccented adjectives; (8e) is the case where accent shift due to devoicing of a high vowel failed to

apply.

Since none of the dictionaries we used for comparison shows us in detail the accent patterns in the conjugational forms, we turn to another dictionary which demonstrates conjugational forms of frequently used adjectives. We obtained 28 examples. Among them three are unaccented adjectives and the rest are accented adjectives. All of the three unaccented adjectives undergo accent shift in the conservative pronunciation but it fails to apply in the suspensive form in the new pronunciation, which is shown in (9).

- |     |                 |              |              |
|-----|-----------------|--------------|--------------|
| (9) | conservative    | new          |              |
|     | a. aya'shikute  | ayashi'kute  | 'suspicious' |
|     | b. kana'shikute | kanashi'kute | 'sad'        |
|     | c. yasa'shikute | yasashi'kute | 'kind'       |

The other 25 examples listed with new accent patterns are all accented adjectives and the pitch drop occurs just before *-kute*, the suspensive form. As we have seen in (7) above, the accent patterns in the lexical entry forms are retained in the new pronunciation.

To cite several examples:

- |      |            |              |            |            |
|------|------------|--------------|------------|------------|
| (10) |            | conservative | new        |            |
|      | a. kowa'i  | 'afraid'     | ko'wakute  | kowa'kute  |
|      | b. shibu'i | 'refined'    | shi'bukute | shibu'kute |
|      | c. sema'i  | 'narrow'     | se'makute  | sema'kute  |
|      | d. naga'i  | 'long'       | na'gakute  | naga'kute  |
|      | e. haya'i  | 'quick'      | ha'yakute  | haya'kute  |

To recapitulate, there are two kinds of surface melodies for adjectives, i.e. accented and unaccented; in the new accent grammar, i) especially in the suspensive and past endings (i.e. *-kute*, *-katta*) some accented adjectives came to have the same accent patterns as the unaccented adjectives; ii) unaccented adjectives ending in *-shii*, which are said to undergo accent shift because the devoiced vowels cannot bear a pitch drop, fail to undergo accent shift. As a result, in these conjugational forms both accented and unaccented adjectives come to have the same surface melody. These facts are explained by what Kiparsky (1971, 1972) calls the Paradigm Coherence, that is, "Allomorphy tends to be minimized in a paradigm." In our study, accent patterns in the conjugational forms tend to become unified within a paradigm.

### 2.3. Two Principles at Work

We can see the relative strength of the principles in the case of nouns derived from adjectives. In some of them the tendency toward fixed accent patterns (i.e., a pitch drop on an antepenultimate mora and the 'unaccented') conflicts with the tendency toward Paradigm Coherence. We have collected changes in accent patterns by comparing 1893 and 1985 editions of the Japanese accent dictionaries. The results are shown in (11).

(11)	1893 edition	1985 edition	
	a. yuka'shisa	yuka'shisa~yukashi'sa	cf. yukashi'i
	b. kana'shisa	kana'shisa~kanashi'sa	cf. kanashi'i
	c. sabi'shisa	sabi'shisa~sabishi'sa	cf. sabishi'i
	d. shibu'tosa	shibuto'sa	cf. shibuto'i

These examples of nouns are derived from adjectives by adding a noun-forming suffix *-sa* to the root of an adjective in question. The accent patterns of their original adjectives show no change at all in 1893 and 1985 editions.

Interestingly, the directionality of accent changes in (11) seems to suggest the existence of a hierarchy among possible changes. That is, in (11) all the examples of 1893 edition show the (n-3) pattern (i.e. the antepenultimate pattern), which is emerging as one of the canonical noun melodies in our examination, whereas the examples of 1985 edition present a fluctuation between the (n-3) and the less favored (for nouns) (n-2) pattern.

Our explanation here is that the demand for Paradigm Coherence would be stronger than the demand for canonical accent patterns. In fact, both of the demands contribute to the production of surface canonical patterns for the language, but the requirement of the elimination of the allomorphy in a paradigm seems to be more essential. Thus, nouns in (11) are changing to accent patterns which retain the same place of pitch drop as their original adjectives at the cost of the preferred word melody.

### 3. English

Now let's see stress changes in progress in English. A similar kind of conflicts between two types of possible change is reported to exist in stress changes in present-day

*Suprasegmental Changes in Progress*

English. Bauer (1994) examines English stress changes in this century and points out two tendencies: antepenultimate stress and base transparency. Examples collected by Bauer are presented in (12). He compared earlier editions of English dictionaries (that is, the first edition of the *OED* and the first edition of *English Pronouncing Dictionary* with recent editions (that is, the second edition of the *OED* and later editions of the *EPD*). As Bauer (1994: 99) points out, every change in (12) is a "change towards stress on the antepenultimate syllable."

(12) conservative	new
(OED 1 or EPD 1)	(modern reference works)
a. abdómen	ábdomen
b. acúmen	ácumen
c. anchóvy	ánchovy
d. hóspitable	hospítale
e. inéxplicable	inexplicable
f. nómenclature	noménclature
g. péjorative	pejórative
h. précédenche	précedence
i. quándary	quíandary
j. secrétive	sécretive
k. sonórous	sónorous
l. vagáry	vágary

(adapted from Table 4.1 and Table 4.2 in Bauer (1994))

Another observable tendency which sometimes conflicts with the trend to stress the antepenult is the "tendency for the base in a morphologically complex word to remain transparent--more easily recognizable." (Bauer, 1994: 101). The examples in (13) show stress changes leading to transparent bases. The accent pattern of the base form is retained in the new pronunciation, though the accent pattern of the conservative pronunciation shows the preferred antepenultimate stress.

(13) Base form	conservative	new
a. cápital	capítalist	cápitalist
b. convérse	cónversant	convérsant

c. démonstrate	demónstrable	démonstrable
d. illustrate	illústrative	illustrative
e. subsíde	súbsidence	subsidence

(adapted from Table 4.3 in Bauer (1994))

This reminds us of the nouns derived from adjectives in Japanese. Again in that case, the preferred antepenultimate accent was given up in favor of the base (root) transparency. As to the case where the two types of possible change conflict, Bauer (1994: 101) says that "there does not seem to be any way of predicting which tendency will win out. In terms of sheer numbers, antepenultimate stress is the dominant pattern."

#### 4. Summary

In this paper we have shown similar principles at work in Japanese and English as to the way suprasegmentals change. In Japanese nouns, there are two canonical patterns as a target of change: a pitch drop on an antepenultimate mora and the 'unaccented'. As for Japanese adjectives, accent patterns tend to become unified within a paradigm. In the case of Japanese nouns derived from adjectives, we have seen that the demand for paradigm coherence is stronger than the demand for canonical accent patterns. Similar kinds of conflicts between two types of possible change are also observed in ongoing stress changes in English. Suprasegmental change is studied less often than segment change. The present study attempts to discover controlling mechanisms underneath the superficial phenomena.

#### Note

\*The present paper is a condensed version of one read at the Northwest Linguistics Conference held at the University of Washington, March 30-31, 1996. A slightly modified version of the original paper will be published in *English Historical Linguistics and Philology in Japan*, edited by Jacek Fisiak & Akio Oizumi.

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## Phonological Difficulties for Cantonese ESL Learners<sup>1</sup>

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### 1.0 INTRODUCTION

There has been previous research on Chinese ESL learners that examines the differences in morphology and syntax between Chinese (mostly Mandarin) and English. I conducted two experiments with seven native Cantonese speakers to study the interaction of the phonological inventories of Cantonese and English at the segmental level. The results are written in terms of rules that show feature differences and prosodic conditions. The dialects investigated are the dialect of Cantonese spoken in Hong Kong and Western Canadian English. Some of the questions I try to answer are:

- (1) Given the English environment of a word, how does a Cantonese speaker pronounce it if:
  - a. the word contains certain sounds that are not present in the Cantonese inventory?  
for example: [v, ʃ]
  - b. the word has a syllable structure that violates the coda conditions in Cantonese?
  - c. the word has phonotactic sequences that do not exist in Cantonese?
  - d. the word has a consonant cluster?
- (2) For the same set of cases in (1), how do the results compare if the speaker's language experience has increased over a given time period?

What I will show for (1a) is that speakers either delete the segment (if it is in the coda), or substitute it with a "phonologically similar"<sup>2</sup> sound. For (1b), I will show that Cantonese coda constraints are systematically obeyed in early stages of English acquisition. For (1c), I will show that non-occurring Cantonese phonotactic sequences systematically do occur in English production. For (1d), the speaker's treatment of consonantal clusters depends on whether a given cluster belongs to one of three groups: (i) CGV clusters, (ii) CLV clusters, and (iii) coda clusters. Finally for (2), I found that different processes used to answer the questions raised in (1) are not particular to an individual speaker but particular to the amount of the speaker's English experience.

To supplement the observations found in answering (2), the notion of *stages* was introduced. A speaker in an *early* stage is someone who is beginning to learn English. Those with more background are in the *later* stage. The *intermediate (inter)* stage is one in which speakers demonstrate phonological processes from both the early stage and the later stage. Those who have acquired most properties of English are in the *advanced* stage. Stages are defined such that they are independent of the ability of the speaker but dependent on the natural class of sounds. Moreover, speakers at the early stage of natural class A can be at the later stage for natural class B. The categorization of my speakers mainly depends on one speaker whose progress throughout the period of these experiments helped me to define the processes in the different stages. From there, data from other speakers were slotted accordingly with consideration given to their English background and their regular exposure to English.

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<sup>1</sup> Acknowledgments: I would like to thank Dr. Patricia A. Shaw for giving me invaluable guidance and comments on this paper, Timothy Chu for helping me conduct the experiment, and Winnie Lam for insight into Chinese. I also thank Bill Turkel and Brett Allen for reviewing this paper.

<sup>2</sup> The definition of phonologically similar depends on the speaker and his/her knowledge of English.

## 2.0 PROPERTIES AND THEORIES

Before I go on to the structure and procedure of the experiments, I will review several properties of Cantonese and review some relevant theories.

### 2.1 An Inventory Comparison

First of all, compare the inventories between Cantonese and English. Notice that the English phonemes [č, v, θ, ð, z, š, r] and other voiced obstruents are not in the Cantonese inventory.

#### (3) Consonants<sup>3</sup>

	Cantonese:				English:			
	Labial	Coronal	Dorsal	Pharyn	Labial	Coronal	Dorsal	Pharyn
stops	p <sup>h</sup> p	t <sup>h</sup> t t <sup>sh</sup> t <sup>s</sup>	k <sup>h</sup> k k <sup>wh</sup> k <sup>w</sup>		p b	t d č j	k g	
fricatives		f s		h		f v θ ð s z š ž		h
nasals	m	n	ŋ		m	n		
liquids		l				l r		
glides	w		j		w	j		

From the vowel inventory in (4a), notice that Cantonese does not contrast in [ATR] and it does not have the sound [æ]. Of the possible diphthongs in Cantonese shown in (4b), the central vowels, [ʌ] and [a], combine with either front and unround, or back and round, namely [ʌj, ʌw, aj, aw]. Only three diphthongs agree in fronting and rounding [ej, œy, ɔw]. There is asymmetry in both inventories is that [ɔj] and [ɔw] are both possible, but only [ej] is possible, not \*[ew].

#### (4) a. Feature Matrix for Vowels

	Cantonese:							English:											
	i	ɛ	a	y	œ	ʌ	u	ɔ	i	ɪ	e	ɛ	æ	ʌ	u	ʊ	o	ɔ	a
high	+	-	-	+	-	-	+	-	high	+	+	-	-	-	-	+	+	-	-
back	-	-	+	-	-	+	+	+	back	-	-	-	-	+	+	+	+	+	+
round	-	-	-	+	+	-	+	+	round	-	-	-	-	-	+	+	+	+	-
low	-	-	+	-	-	-	-	-	low	-	-	-	-	+	-	-	-	-	+
									ATR	+	-	+	-	-	-	+	-	+	-

#### b. Possible Diphthongs

	Cantonese:							English:											
	i	ɛ	a	y	œ	ʌ	u	ɔ	i	ɪ	e	ɛ	æ	ʌ	u	ʊ	o	ɔ	a
i		ej	aj			ʌj	ɔj		ɪ		ej							oj	aj
u			aw			ʌw	ɔw		u									ow	aw
y					œy														

<sup>3</sup>Aspiration is denoted as [x<sup>h</sup>]. Labial velars in Cantonese are [k<sup>wh</sup>] and [k<sup>w</sup>].

## Phonological Difficulties

As stated later in section 2.2, Cantonese has a coda constraint in which codas must be one of [p°, t°, k°, m, n, ŋ]. Given this constraint and the phonemic vowels shown above in (4a), there is still a set of non-occurring rimes:

- (5) [ɛm, ɛp, ɛn, ɛt, ɔm, ɔp, ɔm, ɔp, um, up, ym, yp, yŋ, yk].

In previous literature, the issue of whether this set of missing phonotactic sequences is accidental or systematic is an open question. Results obtained in the present study provide compelling evidence that these are accidental gaps.

### 2.2 Properties Particular to Cantonese

In this section, we will consider four types of properties in Cantonese, namely (i) the canonical syllable, (ii) coda constraints, (iii) labial constraints, and (iv) n~l alternations.

In Cantonese, the maximal syllable is CVC, where both the onset and the coda are optional. If the coda is missing, then the syllable becomes (C)VG. Note that this structure is maximally and minimally bimoraic because Cantonese vowels do not contrast in length (Wong 1994; Matthews 1994; Hui 1995). Therefore, some impossible structures are \*CV:C, \*CV:, and \*CV:G.

As mentioned earlier, there is a constraint in Cantonese such that all codas must be one of the following sounds:

- (6) a. [m, n, ŋ, p, t, k].

In addition, when [p, t, k] appear in the coda position, they become unreleased, as the following rule illustrates:<sup>4</sup>

- (6) b. p, t, k → p°, t°, k° / \_\_]σ

There are three labial constraints about the syllable boundaries, as shown in (7) below. Both figures (7a) and (7b) show a constraint on adjacent labial segments, and (7c) shows that tautosyllabic consonants also bear this constraint.

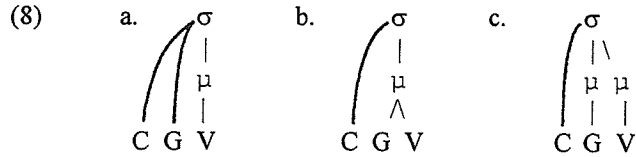
- (7) a. \*σ[C V                      b. \*V C]σ                      c. \*[C V C]σ  
           |    | \                      |    |                      |    |  
           LAB LAB [-back]            LAB LAB                      LAB    LAB

Lastly, there is an alternation between [n] and [l] in the onset position. Where a word has an underlying [n], the older generation of the Cantonese population maintains the [n] (e.g. 'you' [ne j]) but the younger generation prefers [l] (e.g. 'you' [le j]).

### 2.3 Onlide Structures

This section discusses the moraic structure of American onglides proposed by Davis & Hammond (1995). Consider the three possible moraic structures for onglides shown in (8):

<sup>4</sup> A non-released segment at the syllable final position is denoted as [x°].



Davis & Hammond argue that American onglides have asymmetric structures. In particular, C[w]V sequence has the structure in (8a) and C[j]V has the structure in (8b).

### 3.0 EXPERIMENT

#### 3.1. Procedure

Results discussed in this paper are taken from two experiments, which will be referred to as experiments A and B, that took place in July 1995 and February 1996 respectively. The speakers received no training either before or during the two time periods. Five speakers participated in experiment A and three speakers in experiment B, all of whom are Hong Kong immigrants. Each speaker was given a word list to pronounce. If the speaker came across an unfamiliar word, then the designated reader (the author in experiment A and another Canadian reader in experiment B) would read the word and the speaker would imitate the sound. The word lists were made available for them to read during the experiment. Note that if the process used was imitation, then a native Cantonese speaker from Hong Kong with a British English background had to imitate a Canadian style of English.

One speaker participated in both experiments, making a total of seven distinct speakers. For that one speaker, there were distinct processes observed within each experiment that were used to set a baseline for two different stages: the early stage and the later stage. After outlining this baseline established by the progression shown by this one speaker, I started relating the rest of the phonological processes observed with other speakers to this baseline. There was also a near fluent speaker who led to my definition of the advanced stage. As a result, phonological processes particular to an individual speaker were generalized to stages.

#### 3.2. Word Lists

In experiment A, the word list was constructed with respect to the word boundaries. More specifically, it had the following environments:

- For each phoneme in the English inventory, the three attested word environments to account for were: word initial; word medial; and word final.

As a follow up on experiment A, the word list for experiment B was:

- For each consonantal phoneme in the English inventory, the attested environments were: word initial, word final, syllable initial, and syllable final
- Each possible consonant cluster in English is constructed in its restrictive environment with respect to the word boundaries (i.e. 'str' must be an onset (word initial))
- For each vocalic phoneme in the English inventory, the attested environments were: open syllable and closed syllable.

#### 3.3. Influential Factors

In both experiments, subjects were preferred to have a minimal background in English, to be in the post adolescent age range, and to be native speakers of Cantonese. This preference was not always met because of the given time constraint. The process of imitation or self-reading and the use of isolated speech might have caused unnatural utterances that otherwise would not have been present in connected

## Phonological Difficulties

speech. Also, there is only one token<sup>5</sup> made explicitly for each environment listed above and each word was pronounced three times. If there was any sort of inconsistency, then the results of the analysis are either drawn from evidence with previous data or by other speakers, or stated as unknown.

### 4.0 ANALYSIS

This section summarizes the data into three subsections: (i) sounds not present in Cantonese, (ii) violation of language particular constraints, and (iii) dealing with consonant clusters. Phonological processes observed and discussed deal with data where the phonological realization did not match the target pronunciation. Along with the discussion, sample data will be cited and a general rule will be made. Rules are written in terms of feature changes, as well as prosodic conditions where possible.

#### 4.1 Sounds Not in Cantonese

The set of English phonemes that are not in the Cantonese inventory will be looked at in their natural classes. These classes will form the following subsections: (i) vowels, (ii) stops and affricates, (iii) non-strident fricatives, (iv) strident fricatives, and (v) sonorants.

##### 4.1.1 Treatment of Missing Vowels

First, consider the data in (9):

(9)	<u>Rules</u> <sup>6</sup>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
a.	[æ] → [ɛ] ‡ [+ low]	cat	kæt → k <sup>h</sup> ɛt°
b.	[ɪ] → [i] ‡ [- ATR]	it	ɪt → it°
c.	[e] → [ɛ] ‡ [+ ATR]	name	nem → nɛm
d.	[ʊ] → [u] ‡ [- ATR]	i. woman ii. food	wu.mən → wu.mən fud → fut° ('foot')

Because vowels [ɪ, e, ʊ, æ]<sup>7</sup> are not phonemic in Cantonese, they are substituted by a phonologically near segment. In (9a), we see that [æ] changes to [ɛ] by delinking [+ low]. Data in (9b-d) change in terms of [ATR] and can be generalized to the rule stated in (10).

<sup>5</sup> Although one token is made specifically for that environment, other tokens from the remainder of the word lists might have overlapped this.

<sup>6</sup> Rules indicate the process that takes place. The sample data shown includes the gloss, target phonetic representation, and phonological realization. The target is written in broad transcription and the phonological realization is written in narrow transcription.

- (10)
- |                 |
|-----------------|
| [– consonantal] |
| [+ sonorant ]   |
|                 |
| Pharyngeal      |
| ≠               |
| Radical         |
|                 |
| [ATR]           |

Whether the value of [ATR] is plus or minus, once the Radical node is delinked, the value of [ATR] will change to the default value in Cantonese. That is, this reflects the fact that [ATR] is not a distinctive feature in Cantonese. An interesting case appears in the second example in (9d), where ‘food’ is pronounced like ‘foot’. Although [u] should change to [u] according to (9d), [u] and [u] resulted in free distribution for several speakers. Therefore, minimal pairs with the above underlying vowels and substitutes are problematic for Cantonese learners.

#### 4.1.2 Treatment of Missing Stops

Consider the treatment of voiced and voiceless stops in English. As previous claims showed (Yip 1988), voiced stops in English are replaced by unaspirated stops in Cantonese and voiceless stops in English are replaced by aspirated stops in Cantonese. This is stated in (11) below, along with two examples.

- (11) / p, t, k, b, d, g / → [p<sup>h</sup>, t<sup>h</sup>, k<sup>h</sup>, p<sup>o</sup>, t<sup>o</sup>, k<sup>o</sup>]

Rules	Gloss	Target → Ph.Realization
[+ voiced] → [– aspirated] <sup>8</sup>	dip	dɪp → tɪp <sup>o</sup>
[– voiced] → [+ aspirated]	post	pɔst → p <sup>h</sup> ɔs

In the case of affricates, the substitutions for [č, ǰ] will depend on the stage of the speaker. In the early stage [č] and [ǰ] behave as illustrated in (12a):

(12) Rules	Gloss	Target → Ph.Realization
a. early: č → t <sup>sh</sup> / σ[ <u>  </u> ∅ / <u>  </u> ]σ	church	čərč → t <sup>sh</sup> ə
ǰ → t <sup>s</sup> / σ[ <u>  </u> ∅ / <u>  </u> ]σ	John edge	ǰɔn → t <sup>s</sup> ɔn ɛǰ → ɛ
b. later: [č] is accepted	church	čərč → čəč
ǰ → č	judge edge	ǰʌǰ → čʌč ɛǰ → ɛč <sup>9</sup>

<sup>7</sup> Note that [ɛ] and [e] are allophonic in Cantonese (Hui 1995) where [ɛ] is underlyingly phonemic and [e] surfaces when it is a diphthong [ej].

<sup>8</sup> This rule shows the target with English features changing to the realization with Cantonese features. Therefore, the rule is not [+ voice, – aspirated] → [– voice, + aspirated], since English does not contrast in aspiration and Cantonese does not contrast in voicing.

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In the onset position, [č] becomes [t<sup>sh</sup>] and [ǰ] becomes [t<sup>s</sup>]. Again, voicing correlates to the opposite value of aspiration. The features that describe these four sounds are shown in (13). In order for [č] to become [t<sup>sh</sup>], it changes the [anterior] value from minus to plus, and for [ǰ] to become [t<sup>s</sup>], it changes the [anterior] value from minus to plus and [+ voice] to [- aspirated].

(13)	t <sup>sh</sup> [+ cons] [- son ] / \ [+ anter] LARYN / \ [- voice] [+ SG]	č [+ cons] [- son ] / \ [- anter] LARYN   [- voice]	ǰ [+ cons] [- son ] / \ [- anter] LARYN   [+ voice]	t <sup>s</sup> [+ cons] [- son ] / \ [+ anter] LARYN   [- voice]
------	--	---	---	--

However, in coda position, both segments are deleted because they violate the coda constraint in (6). In the later stage in (12b), [č] is acceptable in both positions and serves as a substitute for [ǰ] in the onset position. Here, the only feature that changes is [voice]<sup>10</sup>. What happens in the advanced stage is that both [č] and [ǰ] are possible. The fact that [ǰ] is accepted more readily than [b, d, g] suggests that something about [ǰ] makes it more salient than any of [b, d, g]. In fact, as evidence shows later in section 4.2.1, [ǰ] is easier to learn because it is both [+ strident] and [+ continuant].

### 4.1.3 Treatment of Missing Non-Strident Fricatives

The third part of this section deals with substitutions for non-strident fricatives in English, namely [f, v, θ, ð]. Although [f] is phonemic in Cantonese, it cannot occur in coda position, for it would violate the coda constraint in (6). So in the early stage, speakers will replace it by a stop. As the data in (14) shows, the substitute for [f] is inconsistent. In the first two examples, it is replaced by [p°]. However, the first example is deceiving because the change could have been caused by regressive assimilation of [- continuant] from the following [t<sup>h</sup>]. Now, consider the second example together with the first. It is very natural for [f] to change to [p]. If this is really the case, then it is curious why the third example shows ‘rough’ [rʌf] becoming [wʌt°]. For reasons that [r] changes to [w], refer to the last part of this section that deals with changes in sonorant sounds.

(14) Rules	Gloss	Target	→ Ph.Realization
f → p° / __]σ	i. after	æftər	→ æp°t <sup>h</sup> ə
	ii. tough	tʌf	→ tʌp°
	iii. rough	rʌf	→ wʌt°

The process observed in the first example in (14) is not sufficient to show whether [f] is undergoing a substitution or a process of assimilation. If it is undergoing a substitution rule, then this means that we get \*f]σ, and where there is an [f] in the coda, it must be substituted. Evidence that this is not the case is seen from data in (15,17,19) which show that [f] is used as a replacement for [v, θ, ð] respectively in the early stage. Perhaps the difference between this substitution and those in (15,17,19) depends on

<sup>9</sup> The realization of [eč] rather than the expected [ɛč] might have been caused by the speaker defaulting to the letter “h” in the alphabet, which sounds like [eč].

<sup>10</sup> The features given in (13) is not minimal, but they are shown for the purpose of comparison between Cantonese and English sounds. In Cantonese, the features [spread glottis] and [voice] is not used (Hui 1995).

whether it is an underlying [f] or a derived [f]. It could be the case that underlying segments and derived segments are not treated in the same way. Perhaps it is also a matter of rule ordering, that blocks the rule from applying elsewhere in (14). On the other hand, if [f] is simply going through a process of assimilation, then we cannot account for the second example in (14). In any case, the treatment of [f] is unclear.

Now, consider English [v] and the following examples:

(15)	<u>Rules</u>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
a.	early: v → w / σ[ <u>    </u> ∅ / <u>    </u> ]σ	David five	dej.vɪd → teɪ.wɪt° fajv → faj
b.	later: v → f / σ[ <u>    </u> f / <u>    </u> ]σ	vote five	vot → fot° fajv → fajf

What is happening here is that [v] is changing to [w] in onset position and deleted in coda position in the early stage. In the later stage, [v] becomes [f] in both positions. Now, consider these changes in terms of their features in (16).

(16)	f	v	w
	[+ cons]	[+ cons]	[- cons]
	[- son ]	[- son ]	[+ son ]
	[- voice]	[+ voice]	[+ voice]

Here, we can see that in the early stage, the feature [voice] is acknowledged and kept, while [consonantal] and [sonorant] are changed. In the later stage, both values for [consonantal] and [sonorant] are kept while [voice] is changed. Recall that voicing is not contrastive in Cantonese but this distinction is still recognized (Best 1995) and maintained in the early stage. As a consequence of maintaining this voice value, the values in the root node are changed (Kaisse 1992) as [v] becomes [w]. Also note that as [f] is used as a substitute of [v] in the coda position at the later stage, the Cantonese coda constraint is violated, allowing [+continuant] at the coda position.

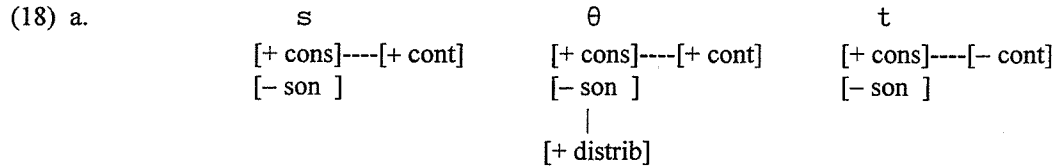
As for the dentals [θ] and [ð], we will look at them separately. First, examine the treatment of [θ] among the three stages shown in (17).

(17)	<u>Rules</u>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
a.	early: θ → s / #[ <u>    </u> t / <u>    </u> ]#	theta with	θe.tə → se.t <sup>h</sup> ə wɪθ → wɪt°
b.	inter: θ → t <sup>h</sup> / σ[ <u>    </u> f / <u>    </u> ]σ	think worth	θɪŋk → t <sup>h</sup> ɪŋk° wərθ → wɛf
c.	later: θ → f	thin with	θɪn → fɪn wɪθ → wɪf

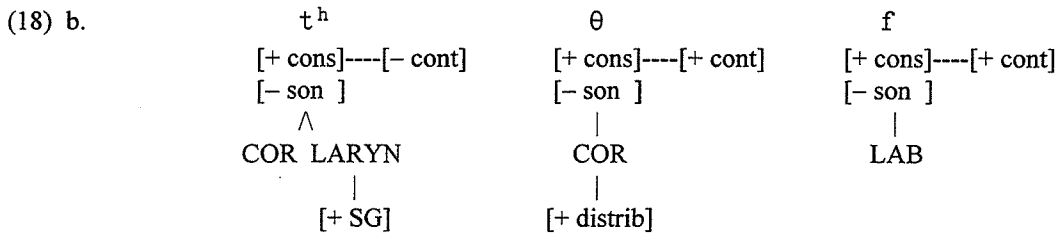
Attested data for [θ] in the early stage is only available about the word boundaries, so the treatment of [θ] word internally is unclear. Given this limited data, [θ] becomes [s] by delinking [+distributed] and [θ] becomes [t] by delinking [+distributed] and [+continuant] as (18a) below shows:



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In the intermediate stage, [θ] becomes [t<sup>h</sup>] in word and syllable initial positions and becomes [f] in word and syllable final positions. The changes in (17b) are illustrated by the feature trees in (18b) below:

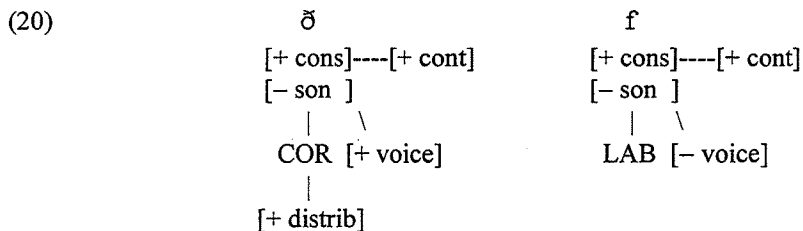


Where delinking [+continuant] and [+distributed] from [θ] gives [t], and then applying the voicing to aspiration rule in (11) gives [t<sup>h</sup>]. Changing from coronal to labial from [θ] gives [f].

Turning to [ð], consider the data in (19).

(19) Rules	Gloss	Target → Ph.Realization
a. all:    ð → t / σ[___	father	fa.ðər → fa. tə
b. early:  ð → Ø / ___]σ	smooth	smuð → smu
c. inter:  ð → t / ___]#	smooth	smuð → smut <sup>o</sup>
	loathesome	loð. SAM → lo. SAM
d. later:  ð → f / ___]σ	loathe	loð → lof

In all the stages, [ð] becomes [t] in the initial positions by delinking [+continuant], [+voice], and [+distributed]. Where the stages become crucial is in word final position versus syllable final position. In the early stage, as the coda constraint in (6) is obeyed, [ð] is deleted completely. In the intermediate stage, [ð] is deleted in the syllable final position and it becomes [t] when it is in word final position. Finally, in the later stage, [ð] becomes [f] in all final positions. Now, if we look at which features are changing, we will see that from [ð] to [f], we delink [+voice] and [+distributed] and change the place of articulation from coronal to labial, as shown in (20).



Compare the data in (17) to the data in (19). In the final position in the early stage, [θ] changes to [t] and [ð] is deleted. One may expect [ð] to become [t] also, but this is not the case. In the later stage, we get the changes [θ] → [f] and [ð] → [t] in onset position. Why are [θ] and [ð] behaving differently? Perhaps the motivation for this difference in treatment is to show that speakers want

to maintain the voicing distinction between [θ] and [ð] by substituting them with different segments. If this is the real motivation behind this varying behaviour, then why do both [θ] and [ð] change to [f] in coda position at the later stage? The reason behind this is unclear.

Compare this asymmetric behaviour to the substitutions of the affricates [č] and [ǰ] from section 4.1.2. There, once [č] was accepted, [ǰ] becomes [č] which indicates a loss of voicing contrast. But this also indicates that [č] and [ǰ] are “closest” phonologically to each other. Now, if we analogously apply this observation to the dental pair, I would predict that once [θ] is accepted, [ð] becomes [θ] rather than either [t] or [f]. But because none of my speakers have yet accepted [θ] (except for the advanced speaker who has accepted both [θ] and [ð]), this prediction is unconfirmed. Therefore, the result is to preserve the voicing distinction by using different substitutes. Also compare this behaviour to that of [š] and [ž] discussed in section 4.1.4.

#### 4.1.4 Treatment of Missing Strident Fricatives

The fourth part of this section is looking at the treatment of strident fricatives in English, namely [s, z, š, ž]. Although [s] is phonemic in Cantonese, it creates an ill-formed syllable when it is in the coda position. What happens in the early stage where constraints are obeyed is that [s] gets deleted. As soon as [s] is accepted into the coda position, then the ill-formed syllable remains intact. Just as we saw with [f], [s] violates the coda constraint, allowing [+continuant] in the coda position.

For the remaining strident fricatives, consider the data in (21):

(21)	Rules	Gloss	Target → Ph.Realization
a.	early: z → s / σ[ <u>  </u>	zero	zɪ.ro → si.lo
	š / σ[ <u>  </u> u	zoom	zum → šum
	∅ / <u>  </u> σ	gizmo	gɪz.mow → k°ɪ.mow
	later: z → s	presume	pri.zum → pri.sum
		phase	fez → fes
b.	early: š → s / σ[ <u>  </u>	facial	fe.šəl → fe.so <sup>11</sup>
	∅ / <u>  </u> σ	wishful	wiš.fəl → wi.fo
	inter: š → s / <u>  </u> σ		wiš.fəl → wis.fo
	later: [š] is accepted	facial	fe.šəl → fe.šo
c.	early: ž → s	measure	mɛ.žər → mɛ.sə
		garage	gə.ræž → kə.las
	later: ž → š / σ[ <u>  </u>	measure	mɛ.žər → mɛ.šə
	č / <u>  </u> σ	garage	gə.ræž → kə.lač

In most cases, [z], [š], and [ž] use [s] as the substitute. For [z] in the early stage, it changes to [s] in initial position unless the following vowel is [u]. In that case, [z] becomes [š], delinking [voice] and [anterior]. In the coda position where the coda constraint is kept, [z] deletes. In the later stage, [z] becomes [s] in all positions. The change here is by delinking [+voice] (refer to the simplified feature trees in (22) below).

<sup>11</sup> The vowel [o] surfaced as a realization of [ɪ].

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Similarly for [š], it will delete in coda position in the early stage due to the preservation of the coda constraint, and change to [s] in the onset position elsewhere. Before [š] is accepted, [s] becomes [s] in the coda position. The feature change here is from [-anterior] to [+anterior]. In the later stage, [š] is accepted. Due to the restrictive distribution of [ž] in English, data was only available with [ž] in the syllable initial and word final positions. Given this, we see that [ž] becomes [s] in both positions at the early stage, and becomes [š] in the onset and [č] in the final at the later stage<sup>12</sup>. The features that change from [ž] to [s] are [+anterior] and [-voice], and the features that change from [ž] to [č] are [-continuant] and [-voice].

Here are the feature trees for [s, z, š, ž] for comparison purposes:

(22)	š [+ cons] [- son ] / \ [- anter] \ [- voice]	s [+ cons] [- son ] / \ [+ anter] \ [- voice]	z [+ cons] [- son ] / \ [+ anter] \ [+ voice]	ž [+ cons] [- son ] / \ [- anter] \ [+ voice]
------	--	--	--	--

Note that both [š] and [ž] use [s] as a substitute. Unlike [θ] and [ð], there is a lack of evidence to support any sort of maintenance of voicing contrast between the pair. So the asymmetric behaviour seen in [θ] and [ð] may not be explicitly supporting voicing distinction and recognition at all.

### 4.1.5 Treatment of Missing Sonorant

The last part of this section deals with the missing [r] in Cantonese. Consider the data in (23).

(23) Rules	Gloss	Target → Ph. Realization
a. all: r → Ø / __ ]σ	car	kær → k <sup>h</sup> a <sup>13</sup>
b. early: r → w / σ[ __	trick	trɪk → twɪk <sup>o</sup>
inter: r → w / #[ __	rhythm	rɪ.ðəm → wɪ.təm
l / σ[ __	sorry	sɔ.ri → sɔ.li
later: r → l / σ[ __	rime	rajm → lajm

Common to all stages is the deletion of [r] in coda position. Changes observed when [r] is in the onset position are particularly interesting. In the early stage, [r] changes to [w], while in the later stage [r] changes to [l]. There is an intermediate stage where [w] is the substitute word initially and [l] is the substitute syllable initially. Let us look at these changes in terms of feature differences in (24).

<sup>12</sup> In the case where ‘garage’ surfaces as [kə.lač], what might be happening is that the speaker knows the word or heard it as [gə.ræʃ] and just applied the devoicing rule to get (ʃ → č).

<sup>13</sup> Pronouncing [æ] followed by [r] requires the tongue to raise up and back, which results in the surface of [a].

(24)	l	r	w
	[+ cons]	[+ cons]	[- cons]
	[+ son ]	[+ son ]	[+ son ]
	[+ anter]	[- anter]	

Just as we saw earlier with [v] from section 4.1.3, the root node is changed in the early stage but preserved in the later stage. In (24), we see that the feature [consonantal] changes from plus to minus as [r] becomes [w]. As [r] becomes [l], the root nodes are intact and [anterior] changes from minus to plus.

#### 4.2 Handling Cantonese Constraints

Given the language particular properties in section 2, this section examines how speakers deal with English words that violate a property or a constraint in Cantonese. The discussion is divided into four subsections: (i) coda constraint, (ii) syllable structure, (iii) phonotactic gaps, and (iv) n~l alternation.

##### 4.2.1 Violation and Conformity with Coda Constraints

Recall from (6b) that the coda constraint in Cantonese is as follows:

(25) /p, t, k/ → [p°, t°, k°] / \_\_ #

Now, consider the data in (26):

(26)	<u>Rules</u>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
a.	early:	tip	tɪp → t <sup>h</sup> i p°
		pet	pɛt → p <sup>h</sup> ɛ t°
		trick	trɪk → t wɪk°
b.	later: accepted [s, f, č, š]	kiss	kɪs → k <sup>h</sup> ɪs
		tough	tʌf → t <sup>h</sup> ʌf
		peach	pič → p <sup>h</sup> ič
		wishful	wiš. fəl → wi s. fə
c.	later: /p, t, k/ → [p <sup>h</sup> , č, k <sup>h</sup> ] / __ #	tap	tæp → t <sup>h</sup> ɛp <sup>h</sup>
		get	gɛt → kɛč
		peck	pɛk → p <sup>h</sup> ɛk <sup>h</sup>
d.	advanced: always release	outcome	awt. kʌm → awt <sup>h</sup> . k <sup>h</sup> ʌm
e.	advanced: devoicing: [+voiced] → [-voiced] / __ #	loathe	loð → loθ

In the early stage, the coda constraint is systematically obeyed as shown in (26a). In the later stage, there is a set of easily accepted codas: [s, f, č, š]. What these sounds have in common is that they are voiceless obstruents that share continuance and/or stridency. Sample data of this is shown in (26b). Note that this creates a [+continuant] ]σ, [+strident]]σ, and [+continuant, +strident]]σ. This suggests that sounds with features [+continuant] and/or [+strident] are more salient, or easier to acquire.

Another process in the later stage is to allow release when [p, t, k] appear in the coda position as illustrated in (26c). In the case of [t] becoming released, the speaker systematically produces [+strident], yielding [č] instead of [t<sup>h</sup>]. On the same note in the advanced stage, [p, t, k] are always

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released, even when they appear word internally. This is illustrated in (26d). Another process in this stage is a devoicing rule. Here, all segments in word final positions are devoiced. This is shown in (26e).

### 4.2.2 Conformity with the Syllable Structure

One of the words from the first experiment is 'utopia' [jut<sup>h</sup>opiə]. Note that the last two syllables of 'utopia' makes CVV#. Speakers in the early stage find this structure problematic to produce, and a deletion process results: [jut<sup>h</sup>opiə] → [jut<sup>h</sup>op<sup>h</sup>ə]. This can be accounted for if we hypothesize \*VV as a constraint in Cantonese.

### 4.2.3 Appearance of Phonotactic Gaps

Recall the set of missing phonotactic sequences from (5) and the labial constraints from (7b). In this set of impossible rimes, the labial constraint can account for the absence of [ɔm, ɔp, œm, œp, um, up, ym, yp] but not [ɛm, ɛp, ɛn, ɛt, yŋ, yk]. As Yip (1988) pointed out in her study on loanword phonology, "unlike the other [labial] constraints... this holds even for borrowed words", where "this" refers to the labial constraint for \*VC]σ. Along a similar argument, Matthews (from Matthews & Yip (1994); Matthews p.c.) notes that loan and borrowed words can in fact take the sequences of these absent rimes, as their examples are cited in (27):

(27)	<u>Borrowed Term</u>	<u>Surface</u>
	'wet'	[wɛt]
	'friend'	[fɛn]
	'M.C.'	[ɛm si]

Although in his examples there are no borrowed words of LAB-LAB rime sequence, introducing any of these rimes do not seem problematic at all. Some examples from my experiment are shown in (28).

(28)	<u>Gloss</u>	<u>Target</u>	<u>Phonological Realization</u>
	'Tom'	[t <sup>h</sup> ɔm]	[t <sup>h</sup> ɔm]
	'slop'	[slɔp]	[sə.lɔp]
	'zoom'	[zum]	[ʃum]
	'name'	[nem]	[nɛm]
	'map'	[mæp]	[mɛp]
	'Gwen'	[gwɛn]	[k <sup>w</sup> ɛn]
	'debt'	[dɛt]	[tɛt <sup>o</sup> ]

The above examples include all the absent sequences except for [up, œm, œp, ym, yp, yŋ, yk]. Since English does not have [œ] and [y] vowels, it is not possible to test the underlying reason for their absence. However, [up] is possible in English but it was missing from my data because this experiment was not directly constructed to attack this problem. In any case, these results are significant in suggesting that this set of missing rimes is accidental and not systematic.

### 4.2.4 Conformity with the [n~l] Alternation

Recall that there is a generation preference in n~l alternation when /n/ appears in the onset position. What happens is this process is carried across into English as the speaker learns to speak the language. For example, in the older generation, the preference is /n/, preserving the underlying segment.

The younger generation prefers [l]. When given an [n]-initial word in the experiment, the older generation preserves the sound but the younger generation changes it (29a). On the other hand, when given an [l]-initial word, the older generation may change the onset to [n] even though it was underlyingly [l] (29b) and the younger generation would preserve [l]. Although this cross-linguistic application by the older generation is not always absolute, Matthew & Yip term this process *overcorrection*. As a consequence, speakers confuse the distribution of the two sounds, resulting in an n~l alternation.

(29)	<u>Rules</u>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
a.	/n/ → [l]	napkin	næp.kɪn → læp.k <sup>h</sup> ɪn
b.	/l/ → [n]	lucky	lʌ.ki → nʌ.ki

### 4.3 Consonant Clusters in English

In this section, the three major types of consonant clusters examined are (i) CGV-sequences, (ii) CLV-sequences, and (iii) coda clusters.

#### 4.3.1 Dealing with CGV Clusters

First, a look at the two Canadian onglides C[w]V and C[j]V. Evidence suggests that the structures Davis & Hammond proposed for American onglides reflect the same structures for Canadian onglides. The two onglides will be dealt with separately, first C[w]V and second C[j]u.

Consider the sample data in (30):

(30)	<u>Rules</u>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
a.	[sw]: Accept or Epenthesize [ə]	snow	snow → snɔw
		sweet	swit → sɔ.wit <sup>ə</sup>
b.	/kw, gw/ → [k <sup>wh</sup> , k <sup>w</sup> ]	queen	kwin → k <sup>wh</sup> in
		Gwen	gwen → k <sup>w</sup> ɛn
c.	Elsewhere: (w → ∅) or [w] is intact	twin	twin → t <sup>h</sup> in
		dwel	dwɛl → twɛl
d.	Creates LAB-LAB cluster	thwart	θwart → fwart

The above data (30a-c) suggest that the [w] in a CGV cluster is treated like an onset rather than a moraic element. In (30a), [sw] is either intact or saved from deletion by a schwa. The [ə] epenthesis suggests that this is a consonant cluster that violates the canonical CVC syllable. In (30b), [kw] and [gw] are recognized as [k<sup>wh</sup>] and [k<sup>w</sup>] consonantal phonemes in Cantonese. In (30c), [tw] demonstrates the treatment in the earlier stage that [w] → ∅ and [dw] demonstrates the later stage that [w] is intact. The motivation for [w] deletion can be justified if we see the [w] as part of a cluster that violates the canonical form of a syllable. Assuming that [w] is part of the onset, then out of this set of data, there is one surface form that creates a labial-labial onset cluster. Shown in (30d), the word 'thwart' [θwart] surfaces as [fwart]. Even though [θ] is substituted by [f], this speaker had to be in the later or advanced stage because clusters are tolerated and the [r] is accepted. Being in one of these stages, the adjacent labial segments within the onset may not be much of a problem or violation at all.

Now, let us turn to C[j]u, the only kind of C[j]V sequence in English. Examples follow in (31).

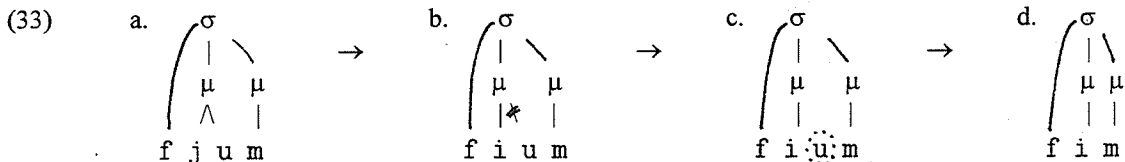
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(31) Rules	Gloss	Target → Ph.Realization
a. $j \rightarrow \emptyset / \text{COR } \_$	tune	tjun → tun
b. With Coda: $[j] \rightarrow [i], [u] \rightarrow \emptyset$	fume	fjum → fim
c. Without Coda: $[j] \rightarrow [i], [u] \rightarrow [l]$	stupid	stju.pɪd → stil.pɪd
	skew	skju → skil
d. Special Case	enthuse	ən.θjus → ən.fɪls ən.θjus → ən.fə.lɪs

As shown in (31a), the deletion of [j] after a coronal reflects the Canadian dialect of English. The remaining results with C[ju] clusters can be dealt with by looking at the examples in (31b) and (31c). If the syllable consisting C[ju] has a coda, then it follows (31b). If it does not have a coda, then it follows (31c). Looking closely at 'spune' for example and using the model proposed by Davis & Hammond, we can get the structure shown in (32).

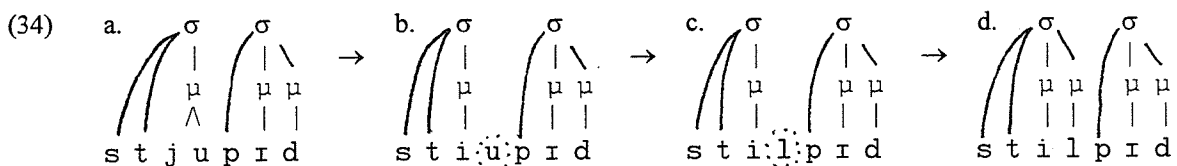


Now, to derive the surface representation, we follow the steps shown in (33):



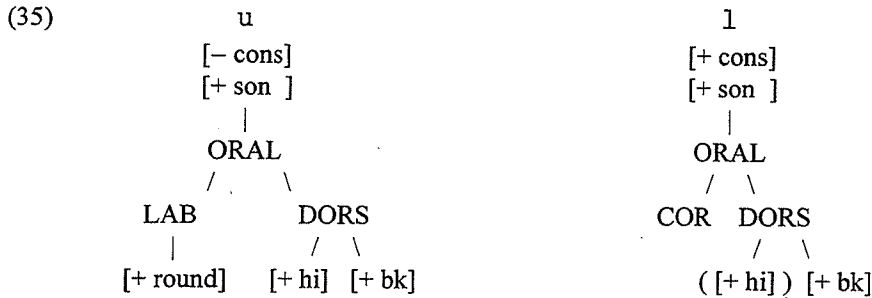
From the underlying structure shown in (33a), we get (j → i) in (33b) where [i] becomes the dominant nucleus of the syllable. In (33c), [u] is delinked and remains floating. Since the coda is another moraic element in the syllable, there is no reason to keep [u] around; otherwise the syllable would get too heavy. So instead, Stray Erasure comes along and deletes [u], leaving the surface representation in (33d).

For an example without a coda, consider the word 'stupid'. Starting from the underlying structure again and deriving the surface representation, we get what is shown in (34).



We will start with the underlying structure shown in (34a). First, we get (j → i) in (34b) and delink [u] from being a dominated by a mora so it is not linked to any prosodic unit. Because there is no coda in this case, there would be no problem in keeping [u] as part of the syllable, since it is only monomoraic right now. But since [u] has already been delinked from being a nucleus, it will behave like a consonant. So it

gets changed to [l] by delinking the labial node, relinking the place value to coronal instead, and changes the [consonantal] value from minus to plus. The features of [u] and [l] are shown in (35) below. Lastly, a mora is assigned to [l] by Weight By Position, and we get the final structure shown in (34d).



There is one exception to the discussion above: 'beauty'. For this word, speakers do not seem to have any problems pronouncing the onglide sequence. What they get on the surface is the following:

(36) <u>Rules</u>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
[bju] in 'beauty'	beauty	bju.ti → pju.t <sup>hi</sup>

This behaviour is asymmetric to that of [pju].

Going onto the special case in (31d). Recall that [θ] changes to [f] in the later stage. With this rule, we get /ən. θjus/ → [ən. fjus]. To get from [ən. fjus] to [ən. fɪls], we simply apply the case of (31c). But this is strange and questionable, because [ən. fjus] does have a coda and should undergo the derivation in (31b). This may be explained if [s] is not moraic with the onglide sequence, but post-vocalic elements in English are moraic. Nor is there apparent motivation for [s] to be extrasyllabic. Perhaps [ɪl] is being treated like a diphthong. If this is the case, then we cannot explain the two different behaviours observed in (33) and (34), nor account for the distribution of these two behaviours. The motivation for such a representation is unclear. However, we shall go on to explain the two different surface representations [ən. fə.lɪs] and [ən. fɪls]. The result of [ən. fɪls] we have already considered. If we examine [ən. fə.lɪs] as a derivation of [ən. fɪls], then we could hypothesize a metathesis rule that simplifies the cluster in the coda and a schwa epenthesis rule that simplifies the onset cluster. The steps are illustrated in (37).

(37)

(metathesis)	(epenthesis)
[ən. fɪls] → [ən. flɪs]	→ [ən. fə.lɪs]

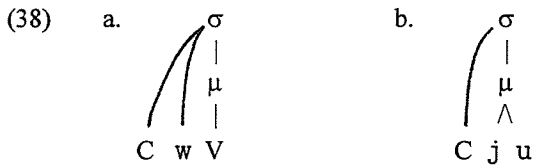
Due to the coda constraints in Cantonese, it makes sense that clusters would be more tolerant in the onset position than in the coda position. The metathesis process supports this.

Recall the three possible structures in (8). Although the derivations above work with the structure proposed by Davis & Hammond, we need to see why the other two structures are ruled out. Consider the structure where [j] is not moraic. If [j] were not dominated by a mora (as in (8a)), there would be no motivation for it to become the dominant nucleus of the syllable as (j → i). Consider the structure (8c) where [j] and [u] form a bimoraic syllable. If [j] and [u] were dominated by separate moras, then there would be no motivation for [j] to be realized as the sole nucleus and for [u] to become consonantal.



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Therefore, evidence by the Cantonese speakers support the structure for C[w]V sequence as (38a) and the structure for C[ju] sequence as (38b).



### 4.3.2 Dealing with CLV Clusters

The second part of the section on consonant clusters discusses CLV sequences. For C[r] clusters, [r] is changed by one of the above rules stated in (23) from section 4.1. What decides the substitution for [r] is not the stage of the speaker nor the natural class for C; rather, [r] will delete, remain intact, change to [l], or change to [w]. This is consistent with what was observed in (23). As for C[l] clusters, there are consistent but ungeneralized processes also. For example, [l] can be deleted, remain intact, or substituted by [r]. In the case with [kl], one speaker produced [k<sup>w</sup>h], treating the [l] like an [r] segment. With [bl], it becomes [pə.l] in the early stage and remains intact in the later stage. This is asymmetric to the early stage for [pl] (see data in (40) below). In the later stage, all C[l] clusters are accepted.

We can account for [r] serving as a substitute for [l] because [r] does not exist in Cantonese; therefore, there is a lack of discrimination between [r] and [l]. This causes a somewhat free alternation between them. Sample data is shown in (39).

(39)	<u>Rules</u> C[r] ~ C[l]:	<u>Gloss</u> free slew	<u>Target</u> → <u>Ph.Realization</u> fri → fli slu → sru
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A special case with CLV sequence is the [pl] cluster. Consider the following data in (40).

(40)	<u>Rules</u>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
a.	early: [pl] → [p]	play explosion	plej → p <sup>h</sup> ej ɛks.plo.ʃən → ɛk <sup>o</sup> .p <sup>h</sup> o.sən
b.	inter: [pl] → [pwr] / #[__] → [p] / σ[__]	please explosion	plis → p <sup>h</sup> wris ɛks.plo.ʃən → ɛk <sup>o</sup> .p <sup>h</sup> o.sən

As mentioned, [l] is deleted if it is in the early stage and if it is in syllable initial position in the intermediate stage. What is interesting here is the substitution observed in the intermediate stage at the word boundaries. Why is 'please' [plis] pronounced as [p<sup>h</sup>wris]? There are two obvious violations to this phonological realization. One is that it contains [r] which does not exist in Cantonese, and the other is that it contains an onset cluster [p<sup>h</sup>wr] which on the surface seems more complex than a cluster [pl]. To explain the former violation, we apply the rule stated in (39), where [r] and [l] alternate because they are non-contrastive in Cantonese. This is a reasonable argument because the alternation is observed elsewhere with other onset clusters.

As for the latter violation, we have to explain why [w] is surfacing by transitional epenthesis of a segment which coalesces values from the segments on each side. If we treat [w] as a means to get from [p] to [l], then it is easier to understand the realization of this cluster. Analyze this in terms of feature differences. As shown in (41) below, [p] is articulated at the labial place and [l] is articulated primarily at the coronal place and secondarily at the dorsal place. Because [w] has articulators which are primary to both [p] and [l], it serves as a bridge between the two sounds. In addition, [w] is bridging the gap of sonorant differences between [p] and [l] even though [w] differs in [consonantal]. Whether this bridge is motivated by the place of articulation or the accordance in sonorance is a question. Recall that in section 4.1, we saw that in the early stage [v] and [r] were substituted by a phonologically similar segment even though it meant changing the values in the root node. Whereas in the later stage, the values of the root nodes were more important and their values were sustained by giving a different substitute for [v] and [r]. As a reminder, stages as defined in section 1.0 are dependent on the natural class of sounds but independent of the speaker. Although it is the case that [v], [r], and [w] do not belong to the same class, we may attempt to use the notion of stage to find the underlying motivation for the appearance of [w]. If it is the case that the root node values are changed to accommodate another feature in the early stage for [v] and [r], then we should see that [w] serves to accommodate the place of articulation in the coalescence process. This is a better argument than saying that sonorance is the underlying motivation because then we would also have to explain and give evidence for the preference of keeping the [sonorant] value but changing [consonantal] value. Finally, as we get [pwɫ], [w] spreads the place labial onto [ɫ], yielding [r], and therefore surfacing as [pwr].

(41)	<p>p</p> <p>[+ cons]</p> <p>[- son ]</p> <p> </p> <p>ORAL</p> <p> </p> <p>LAB</p>	<p>w</p> <p>[+ cons]</p> <p>[+ son ]</p> <p> </p> <p>ORAL</p> <p>/ \</p> <p>LAB DORS</p> <p>/ \</p> <p>[+ hi] [+ bk]</p>	<p>l</p> <p>[+ cons]</p> <p>[+ son ]</p> <p> </p> <p>ORAL</p> <p>/ \</p> <p>COR DORS</p> <p>  / \</p> <p>( [+ hi] ) [+ bk]</p> <p>[+ anter]</p>	<p>r</p> <p>[+ cons]</p> <p>[+ son ]</p> <p> </p> <p>ORAL</p> <p>/   \</p> <p>LAB COR DORS</p> <p>  / \</p> <p>( [+ hi] ) [+ bk]</p> <p>[- anter]</p>
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### 4.3.3 Dealing with Coda Clusters

Generalizations in this section depend heavily on the speaker and the background. A speaker from an early stage will systematically obey coda constraints and therefore delete coda clusters. A speaker in a later stage will tolerate “simple” clusters, e.g. if the cluster consists of one consonant and a plural segment. A speaker from the advanced stage will find it much easier to accept various clusters of two consonants. Even though this is acquired, the devoicing rule stated in (26e) still applies to each segment in the coda cluster. Due to the complexity of these clusters, data gathered in this section are taken from the later stage and the advanced stage only.

There are two types of coda clusters in English, CC clusters and CCC clusters. Results here only deal with CC clusters because the experiment did not cover CCC clusters sufficiently. The other reason for not dealing with CCC clusters is that CCC clusters are mostly made up of sequences of coronals. Since this is the case, then the properties of coronals need to be taken into deeper consideration because this may cause a difference in behaviour. Also, the last segment in the CCC clusters is generally a plural or possessive inflection. In this case, the status of [s] needs to be established (i.e. whether it is extrasyllabic)

## Phonological Difficulties

before we decide what its role is in the cluster. This is also true in some cases with CC clusters, as acknowledged below.

Results observed from the set of CC clusters are quite interesting. Although more data needs to be collected and several exceptions need to be explained, evidence suggests that the motivation underlying the tolerance of coda clusters is the Sonority Sequencing Principle (SSP). This principle “requires the onsets to rise in sonority towards the nucleus and codas to fall in sonority from the nucleus.” (Kenstowicz 1994). In addition, [continuant] played a major role.

Given this knowledge, the data in this section will be grouped in terms of their sonorance and continuance of the natural classes<sup>14</sup>. With these two features, we get all four possible combinations of each consonantal segment. This yields  $4 \times 4 = 16$  possible combinations for CC clusters. Of course, this number is imprecise because there is more than one phoneme that fits each feature description; moreover, not every combination is possible. In any case, this will be what guides the analysis that follows.

Now, we will look at the data according to this grouping. First, we will look at data where C' is [- sonorant, - continuant]; secondly, C' is [- sonorant, + continuant]; thirdly, C' is [+ sonorant, - continuant]; and lastly, C' is [+ sonorant, + continuant].

When C' is [- sonorant, - continuant], it can be one of the stops: [p, b, k, g, t, d, č, ʃ]. Notice there is no sequence such that C'' is [+ sonorant], so we only have to consider cases where C'' is [- sonorant] with either a plus or minus value of [continuance]. We will first have a look at the case when C'' is [+ continuant], because the cluster violates SSP. Here, because [+ continuant] is more marked than [- continuant], C' deletes, and we get the cluster becoming C'' (42a). The exceptions to this rule are when C' is [+ voice] and when the cluster is [ks]. When C' is [+ voice] (42b), the cluster undergoes the devoicing rule stated in (26e). Within a [dz] cluster, where the expected output is [tʃ], it surfaced as [s] instead (42c). What might have happened here is that [dz] was perceived as [tʃ] so that the rule for a [tʃ] cluster is applied. The rule that a non-continuant C' uses is discussed later. With [ks], there is so much inconsistency with words such as ‘peaks’ and ‘six’ that no generalizations can be made<sup>15</sup>. Now, when C'' is [- continuant], both of the segments are perceived (42d). This is what we expect because SSP is not violated. In fact, when C' is [+ strident], which is when it is [č], we have a cluster [čt]. To maintain both segments, what we get on the surface is [č.t<sup>h</sup>ə]. An exception to the intactness is [kt]. What we get instead is [t], with [k] deleted (42e). The motivation is unclear.

(42)	<u>Rules</u>	<u>Gloss</u>	<u>Target</u> → <u>Ph.Realization</u>
a.	C'' = [+ cont]: CC → C''	sets	setʃs → seʃs
b.	C' = [+ voice]: devoicing applies	labs	læbz → læps
c.	Exception to (42b)	ads	ædz → æs
d.	C'' = [- cont]: coda is intact	apt	æpt → æpt <sup>h</sup>
e.	Exception to (42d)	act	ækt → æt <sup>o</sup>

<sup>14</sup> From here on, I will refer to the first consonant of the CC cluster as C' (“C prime”) and the second consonant as C'' (“C double prime”).

<sup>15</sup> Words that had a [ks] coda cluster include ‘peaks’ [piks], ‘six’ [siks], ‘sixth’ [siksθ], and ‘sixths’ [siksθs]. The only consistent result was with ‘six’ and ‘sixths’, which both surfaced as [siks] for all speakers. For ‘peaks’ and ‘sixth’, the surface varied among all speakers.

Now, onto the next case where C' is [- sonorant, + continuant], a fricative. Again, C'' can only be one of [- sonorant, - continuant] or [- sonorant, + continuant]. Neither of these sequences violate SSP, so we would expect the clusters to be intact. But this is not what happens. Here, it depends on whether C'' is continuant. If C'' is [- continuant], then the cluster either becomes the devoiced counterpart of C'' (43a) or results in C'' deletion (43b). If C'' is [+ continuant] then it is always the plural inflected form, which is a [+ strident] element. In this case, C' is deleted and the cluster becomes C'' (43c).

(43) Rules	Gloss	Target → Ph.Realization
a. C'' = [- cont]: devoicing applies	soothed	suðd → suft
b. C'' = [- cont]: C'C'' → C'	lift	lɪft → lɪf
c. C'' = [+ strid]: C'C'' → C''	faiths	fɛjθs → fɛjs

We will look at C' when it is a nasal; [+ sonorant, - continuant]. This classifies the set of nasals [m, n, ŋ] in English. For [m, n], C'' can only be a non-sonorant element. Here, we apply the devoicing rule to C'' again (44a). In addition, when C' is [m], there is an intermediate stage such that C'' becomes a stop when C' and C'' do not agree in place (44b), and the cluster becomes either C' or C'' if they do agree in place (44c). As for [ŋ] in the C' position, there are three possible coda clusters: [ŋk], [ŋkθ], and [ŋz]<sup>16</sup>. With [ŋk], because it agrees with SSP, the sequence is intact (44d). With [ŋkθ], the sonorance is high at [ŋ], drops to [k], and raises back at [θ]. This violates SSP and [k] is deleted. Another possible reason for [k] to be deleted is that [k] is not a salient segment because it is not [+ sonorant], [+ continuant], or [+ strident]. On the surface, we get [ŋf] instead (44e).

(44) Rules	Gloss	Target → Ph.Realization
a. Devoicing Applies	tend	tɛnd → t <sup>h</sup> ɛnt <sup>o</sup>
b. inter: C'' → [- cont]	cams	kæmz → k <sup>h</sup> æmt <sup>o</sup>
c. inter: C'C'' → C'	nymph	nɪmf → nɪm
C'C'' → C''		nɪmf → nɪf
d. Intact	wink	wɪŋk → wɪŋk <sup>h</sup>
e. Violate SSP	length	lɛŋkθ → lɛŋf

Finally, we have C' as [+ sonorant, + continuant], a liquid. This gives us both [l] and [r]. For [l], C'' can be of either value of sonorance, but not with both [+ sonorant, +continuant]. There, we have accordance with SSP and so only devoicing in (26e) applies. The cluster [lk] is the single exception to a [+ sonorant, + continuant][- sonorant, - continuant] sequence not being tolerated. One speaker gets [l] on the surface after deleting [k] (45a). With the nasals, [lm] is tolerated (45b) but not [ln] (45c). Perhaps the sonorance level is further divided among the nasals and liquids. Since we cannot compare this to another sonorant segment because C'' cannot be a liquid, we cannot work out the fine details of the levels in SSP. A special case with [l] is 'false' (45d). Here, two outcomes were produced: [fals] and [flas]. The first is expected but the second is not. Again, like the case with 'enthuse' in (31), section 4.3.1, metathesis took place to simplify the coda cluster but results in complicating the onset. This suggests a higher tolerance level for onset clusters than coda clusters.

<sup>16</sup> [ŋz] is not attested in my data.

## Phonological Difficulties

(45) Rules	Gloss	Target → Ph.Realization
a. Exception: [lk]#	elk	ɛlk → ɛl
b. [lm]#	helm	hɛlm → hɛlm
c. [ln]#	kiln	kɪln → k <sup>h</sup> ɪl
d. Special Case: Metathesis	false	fals → fals fals → flas
e. C[ar]C'' → C[a.j]C''	dart	dart → tajč

For [r], we get all four combinations of sonorance and continuance for C''. Unfortunately, there is no attested data for C'' being [+ sonorant]. Also, the chosen data all had [a] as the vowel. So the data is no longer C.V[r]C'', but C[ar]C'', where C'' is [- sonorant]. The results observed for C[ar]C show two possible analyses. Given that devoicing applies to C'' if it is [+ voice], we can have (r → ∅) and [a] diphthongizes to [aj], or (r → j). The former hypothesis is consistent with the rule shown in (23a) from section 4.1.5 that we get [r] deletion. To account for the diphthongization of [a] we can say that it is compensating for [r] deletion and to fill the mora, thereby preventing the loss of prosodic weight. With the latter hypothesis, we need to suggest why [r] may become [j]. Perhaps this is a palatalization process, but more data is needed to confirm this hypothesis.

### 5.0 CONCLUSION AND FUTURE WORK

What we have seen in the previous section is a survey of how Cantonese ESL learners perceive the sound pattern of English. We observed that Cantonese constraints are preserved in the early stage and violated as the speaker progressed. As well, this progression introduced some discrete stages that classified how difficult certain sounds and properties of English are to acquire. I will now summarize several important results from this study. In section 4.2.3, evidence shows that the set of absent phonotactic sequences in Cantonese are accidental and not systematic. With n~l alternations in section 4.2.4, the diachronic shift is from [n] to [l] for the younger generation. This is a shift away from a universally less marked segment which is even carried into English production. In section 4.3.1, we saw that the co-moraic onglide C[ju] was replaced by C[i]C or C[i.l]. In section 4.3.3, not only did SSP play a role in governing the surface realization of coda clusters, but the features [strident] and [continuant] determined which segment of the cluster to delete.

To enhance this experiment, multiple tokens for each entry in the database and more subjects should be studied. Specific parts of the experiment that require more focus are learning words with phonotactic gaps or clusters, particularly coda clusters.

Other experiments for studying the prosodic structures include examining the syllable structure, the domain of a phonological word in Cantonese, the treatment of English stress pattern, and possible interaction between the English stress pattern and the Cantonese tonal system. Results here are significant to both phonological theory, and its interaction with morphological processes and categorization of word particles.

An interesting experiment of particular language educational value would be a case study of an adult Cantonese ESL learner with special attention directed towards the acquisition and progression of natural classes and modules at defined time intervals. Results from this experiment could shape the design of current teaching strategies, curriculums, and ESL programs to help students learn more readily. A comparison of this experiment with a similar case study done on a child would draw interesting results for both language acquisition and psychological development.

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## **Eliminating Overt Verb-Movement in Korean and Checking Theory**

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NWLC 03/30/96

### **1. Introduction<sup>1</sup>**

Within GB Theory, it has been assumed that Korean verbs move cyclically to higher functional projections until they get a fully inflected form. In this framework, verbs are selected as bare forms and functional morphemes like Tense, Agr, Neg are inserted into the syntax independently and form their own projections. They are combined with verbs later by overt verb-movement (OVM). The reason for the movement has been that affixes have some features which induce OVM (Chomsky's (1988) Morphological Principle).

In the Minimalist Program, it is broadly proposed that all affixations (inflectional affixation as well as derivational ones) might be done before verbs are inserted into the syntax. The natural question to be raised here is whether or not we still need OVM in Korean. Recently, Yoon (1994) argues that the lexicalist approach adopted in Chomsky's Minimalist Program does not work to explain the verbal inflectional facts of head final languages like Korean and Japanese. Even though Sells (1995) adopts a lexicalist approach to explain the verbal inflectional facts, he does not give an explanation for the coordination facts of verb phrases. In

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<sup>1</sup> I would like to express thanks to Heles Contreras, Soowon Kim, James Lyle, Yongkil Chung, and Wulf Douglas for their priceless comments and advice. All the remaining errors and shortcomings are mine.

this paper, I will show that the lexicalist approach of checking theory is more appropriate to explain the verbal inflection of Korean by introducing the theory of Interpretability of features proposed very recently by Chomsky (1995).

## 2. Theoretical Issue

According to Chomsky (1995: 238), tense and  $\phi$ -features of verbs “might be chosen optionally and assigned to the word as it enters the numeration, or they might result from overt V-raising to Agr or T. Or the word might reach the phonological component uninflected, the PF form resulting from interaction with functional elements within the phonological component. The answers could vary across or within languages.”

It must be empirically ascertained whether verbs are inserted as fully inflected forms or they reach the phonological component uninflected, their phonetic forms resulting from interaction with functional elements within the phonological component. If we do not find any syntactic necessity to move verbs to get inflected forms other than purely morphological reasons, the traditional OVM approach can be eliminated from Korean syntax, and then the result will be a simpler and economized grammar in the sense of the Principle of Procrastinate. That is, affixational morphology but not syntax is responsible for inflected verb forms and we can get phonetic forms without overt movement. Within the GB theory, there have been many attempts to show that OVM is necessary in Korean and Japanese (Koizumi 1995; Jung 1992; Ahn 1991; Otani and Whitman 1991). I



will try to show that the empirical evidence for OVM is not compelling within the lexicalist approach of checking theory, and that this approach eliminates the problems resulting from OVM.

### 3. Against Overt Verb-Movement

Within GB theory, Korean verbal functional morphemes like tense and agreement (Honorification) morphemes, sentential endings, and negation morpheme have been treated as forming their own independent syntactic projections (ISP) in the syntax. For example, Jung (1992) and Ahn (1991) take (1b) as the D-structure of (1a).<sup>2</sup> They argue that the S-structure is derived as a result of cyclic overt verb-movement until it reaches the SE *-ta* ‘declarative ending’ as shown in (1c).

- (1) a. *emenim-i ku chayk-ul ani ilk-usi-ess-ta*  
       mother-Nom that book-Acc not read-Hon-Pst-Dec  
       ‘Mother read that book’  
    b. [====[emenim-i ku chayk-ul ilk JVP an JNegP -usi ]AgrP -ess ]TP-ta ]CP  
    c. [====[emenim-i ku chayk-ul *tv* JVP *t*Neg JNegP *t*Agr ]AgrP *t*T ]TP  
       *ani-ilk-usi-ess-ta* ]CP

They further conjecture, following Lasnik (1981), Chomsky (1988), Reuland (1982), and Safir (1981), that what attracts the verb to combine with the functional morphemes is morphological requirements like (2). That is, the status of these morphemes is that of bound affixes which need to be supported by lexical items at S-structure.

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<sup>2</sup> Han’s (1987) configurational structure of functional categories is also very similar to theirs. In Han’s approach, however, the sentential endings are attached under INFL, and only the interrogative morpheme *-nya* is overtly raised to Comp.

(2) **Morphological Principle**

Items lexically identified as affixes should be properly attached at S-structure (cf. Lasnik 1981; Reuland 1982; Safir 1981)

Here, I will try to provide an explanation for the phenomena taken as the evidence for the ISP of these functional morphemes and OVM in the framework of GB theory, without actually incorporating either approach in the Minimalist Program. I will propose, as a result of my argument, that the base-generated structure for (1a) is (3). The functional categories Agr, T, and C are phonologically empty and just a bundle of features which, at LF, license the functional morphemes attached to the verb. I will also argue that the Neg-morpheme *ani* is a verbal prefix and that there is no NegP projection in Korean.

(3) [ [ [ [ [emenim-i ku chayk-ul **ani-ilk-usi-ess-ta** ]<sub>VP</sub> Agr ]<sub>AgrP</sub> T ]<sub>TP</sub> C ]<sub>CP</sub>

4. Agr

4.1. Coordination Facts of Honorification

In sentence (4a), three verb phrases appear but the honorific morpheme *-si* appears just once in the last conjunct. However, the honorific morpheme exerts its force of honorification over all the three preceding verbs. From this fact, Jung (1992) (and also Ahn 1991) argues that some independent phrase headed by the honorific morpheme *si* projects above the conjoined verb phrase, as presented in (4b).<sup>3</sup> To derive the surface form, the last verb *tolao* 'to come back' raises to Agr

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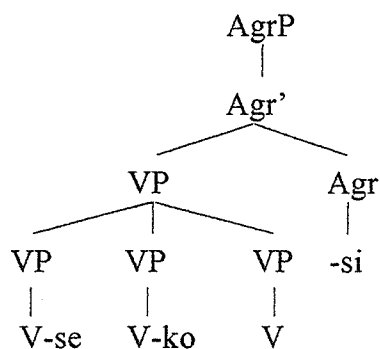
<sup>3</sup> I ignore the exact position of the coordinators *-(e)se* and *-ko*, since they are out of the range of the present study.

in order to combine with the honorific morpheme *-si*, and then to Tense and sentential ending.

(4)

- a. Sensayngnim-i [hakkyo-ey ka]-se [chayk-ul ilk]-ko [tolao] -si-ess-ta  
 teacher-Nom school-to go-and book-Acc read-and come back-Hon-Pst-Dec  
 ‘The teacher went to school, read a book and came back.’

b.

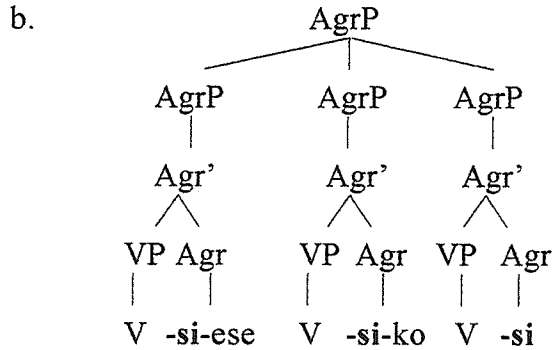


This sentence is synonymous with (5a) in which each of the three verb phrases has its own honorific morpheme. If we apply the approach proposed by Jung and Ahn, the structure of this sentence will be (5b) where three AgrPs are conjoined.<sup>4</sup> To derive the surface form, each verb overtly raises to the head of its own AgrP and the last verb still must go up to Tense or even further to Comp.

- (5) a. Sensayngnim-i [hakkyo-ey ka-si]-ese [chayk-ul ilk-si]-ko  
 teacher-Nom school-to go-Hon-and book-Acc read-Hon-and  
 [tolao-si]-ess-ta.  
 come back-Hon-Pst-Dec  
 ‘The teacher went to school, read a book and came back.’

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<sup>4</sup> Another possibility is Agr'-conjunction. However, neither one makes any difference with respect to the issues.



This structure raises several theoretical questions. First, how does the optional honorific morpheme require such a drastically different syntactic structure? The two sentences are so similar in meaning that it is favorable to explain the optional appearance of the honorific morpheme with a simple structure. Second, this approach needs some extra theory to explain how subjects are not allowed in the non-initial VPs or AgrPs, as shown in (6). In other words, if the VP- and AgrP-conjunction structures are adopted for the sentences (4a) and (5a) respectively as in Jung's and Ahn's approaches, the base-generated structures for the two sentences should be as in (6), in which the non-initial conjuncts have the same subject as the initial conjunct. If so, this approach must provide some explanation how the subjects must be elided in the non-initial conjuncts.

- (6) \* Sensayngnim-i [hakkyo-ey ka-(**si**)]-ese sensayngnim-i  
 teacher-Nom school-to go-**Hon**-and teacher-Nom  
 [chayk-ul ilk-(**si**)]-ko sensayngnim-i [tolao-**si**]-ess-ta.  
 book-Acc read-**Hon**-and teacher-Nom come back-**Hon**-Pst-Dec  
 'The teacher went to school, read a book and came back.' (Intended)

Third, this structure does not explain how the subject of the second conjunct in (7) can be assigned Nominative Case under her assumption that Tense is responsible for Nominative Case. In other words, under her approach (7) must

be a AgrP conjunction structure in which only one TP projects above the conjoined AgrP as in (5b). If so, only one of the two subjects can raise to [SPEC TP] to be assigned Nominative Case.

- (7) eme-nim-un sicang-ey ka-si-ko ape-nim-un hoysa-ey  
mother-Hon-Top market-to go-Hon-and father-Hon-Top company-to  
ka-si-ess-ta  
go-Hon-Pst-Dec  
'Mother went shopping and father went to work.'

#### 4.2. Explanation without ISP and OVM

##### 4.2.1. Feature Interpretability of Agr

To explain the distribution of the honorific morpheme *-si*, I adopt the concept of feature interpretability with some modifications. According to Chomsky's (1995) proposal, the  $\phi$ -features of NP are [+Interpretable] and can check off corresponding [-Interpretable] features in a multiple fashion. The  $\phi$ -features of verbs are [-Interpretable] and must be erased at LF. After the  $\phi$ -features of NP raise at LF somehow (maybe for the reason of Case), those of verbs, in a multiple fashion, adjoin to Agr to be checked off through SPEC-head agreement with the  $\phi$ -features of NP. I assume here that the honorific feature is part of the  $\phi$ -features.

Modifying Chomsky's proposal in order to adapt it to our Principle of Identity, I propose (8) as a theoretical intrinsic property of functional categories. If this is applied to Agr, its features triggering SPEC-Head agreement with respect to honorification will be as in (9), and the honorific features of subjects and verbs will be as in (10).

(8) The functional categories triggering SPEC-Head agreements have a set of two inverse features, one for NPs and the other for verbs.

(9) **Agr Features for Subject Honorification**

a. Honorific	[+HonS <sup>-</sup> ]	[+HonV/S <sup>-</sup> ]
b. Non-honorific	[-HonS <sup>-</sup> ]	[-HonV/S <sup>-</sup> ]
	[-Interp]	[+Interp]

(10)

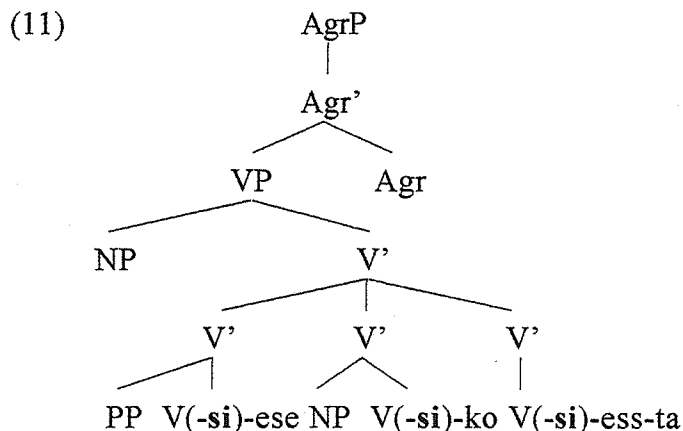
	Subject		Verbs
a. Honorific	<i>-nim</i> [+HonS]	<i>-si</i>	[+HonV/S]
b. Non-honorific	∅ [-HonS]	∅	[-HonV/S]
	[+Interp]		[-Interp]

I suggest that the honorific features of Agr licensing subjects are [-Interpretable] and those licensing verbs are [+Interpretable], as indicated in (9). The honorific features of subjects and nouns are consistent with Chomsky's proposal, that is, the honorific feature of subjects is [+Interpretable] while that of verbs is [-Interpretable].

#### 4.2.2. Explanation of Optionality with a Simple Structure

Within the feature system reinforced with interpretability, the honorification phenomena discussed in § 4.4.1 can be explained with a simple uniform structure. Instead of the two different structures (4b) and (5b), I suggest that (4a) and (5a) are all a case of V'-conjunction structure, as shown in (11). Either inflected or uninflected forms of the three verbs are inserted directly to the head of VP, conjoined together. This structure is supported both semantically and theory-internally. That is, the similarity of the meaning between the two sentences

is explained with the invariable structure and the nonoccurrence of subject in the non-initial conjunct is explained with the V'-conjunction.



As for the sentence in (7), a structure similar to (5b) might be suggested. But Agr is just a bundle of features and the honorific morpheme *-si* is inserted as a form attached to verbs. Here, I assume that Agr is responsible for Nominative Case in Korean and, unlike Chomsky's proposal, that Agr must be distinguished from T is supported by this structure. Each subject of the two conjuncts in (7) can get its Case-feature checked in the checking domain of its own Agr. No further feature-checking takes place with respect to subjects.

With the feature system proposed in (9) and (10), the optional appearance of the honorific morpheme *-si* in (11) is explained under the basic idea of feature-interpretability. The positive interpretability of [+HonV/S] (or [-HonV/S]) of Agr can license, in a multiple fashion, the honorific morphemes appearing in conjunction structures. Notice that the feature of the honorific morpheme *-si* is [-Interpretable] which must be checked by LF. An important question which must be answered is: How can the verbs without the honorific morpheme in the non-

final conjuncts in (11) be licensed? Here I suggest (12) as a generalization of verbal affixation which is determined in the lexicon. According to this generalization, when the honorific morpheme does not appear in the non-final conjuncts in (11), it will be a case of (12b) with honorification undefined, but not [-Honorific] despite the non-appearance of the honorific morpheme. If verbs are not defined with respect to honorification, it does not have any honorific feature to be checked.

- (12) a. [V-\*(H)-T]: Tense cannot be marked alone without Honorification marked.  
 b. [V-(H)-( )]: Honorific morpheme can be marked without Tense marked, but it is not necessary when Tense is not marked.

The coordinated sentence in (13a) can be explained in a similar way. In this case, each of the two conjoined phrases has its own subject. I suggest that this is a case of AgrP-conjunction structure. Unlike (5), if the honorific morpheme *si* is not selected in the first conjunct of this sentence, it will be out. This fact implies that the first conjunct has its own projection of AgrP by which the morpheme *si* can be licensed. This structure is supported by the following sentence, in which two separate honorifications take place. In (13b), the first conjunct shows an agreement with [-Honorific], while the second one shows an agreement with [+Honorific]. If this were a case of V' or VP conjunction, we could not explain how one Agr could license two different honorifications at the same time. And this AgrP-conjunction structure is necessary to explain the Nominative Case assignment relationship, as we discussed in the beginning of this subsection.



- (13) a. Ape-**nim**-un [hakkyo-ey ka-\*(**si**)]-ko eme-**nim**-un  
 father-**Hon**-Top school-to go-**Hon**-and mother-**Hon**-Top  
 [sicang-ey ka-**si**]-ess-ta  
 market-to go-**Hon**-Pst-Dec  
 ‘Father went to school and mother went shopping.’
- b. tongsayng- $\emptyset$ -un hakkyo-ey ka- $\emptyset$ -ko eme-**nim**-un  
 younger brother-**Hon**-Top school-to go-**Hon**-and mother-**Hon**-Top  
 sicang-ey ka-**si**-ess-ta  
 market-to go-**Hon**-Pst-Dec  
 ‘My younger brother went to school, and mother went shopping.’

A natural question to ask is how the ungrammaticality of (14) can be explained in this approach. In this sentence the honorific morpheme appears only in the first and second conjuncts but not in the last one and the whole sentence is out. In this case, the verb form of the last conjunct, which does not have an honorific morpheme, bears the feature [-Honorific] which cannot be licensed through SPEC-head agreement with the NP *sensayngnim* ‘teacher’ which has a positive honorific feature. On the other hand, the verb forms of the first and second conjuncts lack the honorific feature if they do not have the honorific morpheme. How can we say that the verb of the last conjunct in (14) is marked with [-Honorific]? Again the answer is in the generalization (11), which says that honorification of verbs must be marked if Tense is marked.

- (14) \* Sensayng-**nim**-i [hakkyo-ey ka-**si**]-ese [chayk-ul ilk-**si**]-ko  
 teacher-**Hon**-Nom school-to go-**Hon**-and book-Acc read-**Hon**-and  
 [tolao]-ess-ta  
 come back-Pst-Dec  
 ‘The teacher went to school, read a book and came back.’

## 5. Tense

### 5.1. Coordination regarding Tense

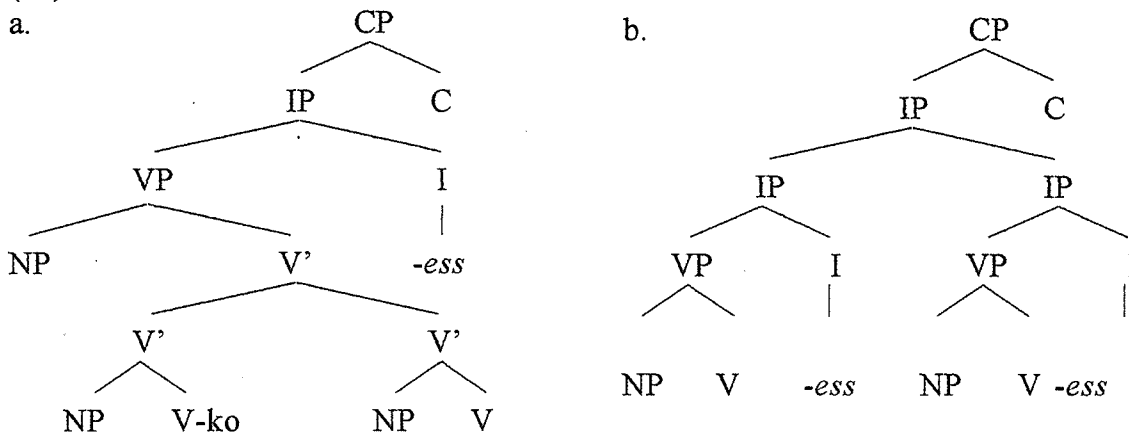
Like the honorific morpheme, it is possible for Korean tense morphemes not to appear in non-final conjuncts depending on the kind of conjuncts, as shown in (15).

- (15) a. John-i chwum-ul chwu-ko nolay-lul pwulu-ess-ta.  
John-Nom dance-Acc dance-and song-Acc sing-Pst-Dec.  
'John danced and sang songs.'  
b. John-i chwum-ul chwu-ess-ko nolay-lul pwulu-ess-ta.  
John-Nom dance-Acc dance-Pst-and song-Acc sing-Pst-Dec.  
'John danced and sang songs.'

As glossed, the two sentences have almost the same meaning. That is, even though the tense marker does not appear in the first conjunct in (15a), it is interpreted as having the past tense as that of (15b). Even though their approaches are somewhat different from each other in detail, Many Korean linguists (Jung 1992; Yoon 1994; Ahn 1991; Kang 1988; Choi 1991) take this fact as a piece of evidence for the independent projection of TP headed by the tense morpheme above AgrP.

Among them, Yoon (1994) argues that the lexicalist approach of the Minimalist Program does not explain this coordination fact and that Korean grammar still needs the ISP of TP headed by a tense morpheme that is a "phrasal suffix" in his terms. Yoon proposes two different base-generated syntactic structures (0a&b) for the two sentences in (15) which have basically the same meaning. (0a) is a V'-conjunction structure for (15a) and (0b) is TP-conjunction for (15b). (For the sake of space, I use IP instead of TP.)

(16)



In addition to Sells' (1995) observation which shows several pieces of evidence against the syntactic explanation of verbal affixation, these structures involve the same kinds of problems as the Agr structures (4b) and (5b). Even though Yoon argues that the tense morpheme is a kind of phrasal suffix and therefore OVM is eliminated, the proposal of the two drastically different structures for the optional tense morpheme contains basically the same problems as involved in the structures for the optional appearance of honorific morpheme that we discussed in the preceding section. First, the two sentences are not so different in meaning as requiring the two drastically different structures; V'-conjunction and TP-conjunction. If the optionality of the tense morpheme in the non-initial conjuncts can be explained with a simple structure, it is favorable in terms of simplicity of grammar. Second, this approach needs some extra theory to explain how subjects are not allowed in the non-initial IP, as shown in (17). If the IP-conjunction structure is adopted for the sentence (15b) as in Yoon's approach, the base-generated structure for the sentence should be as in (17), in which the

second conjunct has the same subject as the initial conjunct. If so, this approach must provide some explanation how the subject must be elided in the second conjunct to derive the correct one (15b).

- (17) \*John-i chwum-ul chwu-ess-ko John-i nolay-lul pwulu-ess-ta.  
John-Nom dance-Acc dance-Pst-and John-Nom song-Acc sing-Pst-Dec.  
'John danced and sang songs.'

These structures bring a more serious problem for the linguists who argue that Nominative Case is assigned by Tense. That is, in (18) two different subjects appear, but the tense morpheme is optional in the first conjunct. If the structure for (18) is similar to (0a) in which the two conjuncts adjoin under the shared Tense, how can both subjects get their Case-feature checked?

- (18) Yenghi-ka pap-ul mek(-ess)-ko Chelswu-ka selkeciha-yess-ta  
Yenghi-Nom meal-Acc eat-(Pst)-and Chelswu-Nom dishwash-Pst-Dec  
'Yenghi ate the meal and Chelswu washed the dishes.'

It is more desirable that the two different surface sentences having the same meaning are possibly derived from the same base-generated structure. If we adopt, as for the case of honorification, the concept of Interpretability, the optional appearance of the tense morpheme in non-final conjuncts can be explained without positing different syntactic structures.

## 5.2. Explanation without ISP and OVM

### 5.2.1. Feature Interpretability of T

In a similar way for Agr, I adapt the concept of feature interpretability in order to explain the distribution of the tense morpheme, as in (19). The functional

category T has a [+Interpretable] inverse tense feature with which it can check the corresponding ordinary feature of tense morphemes in a multiple fashion.

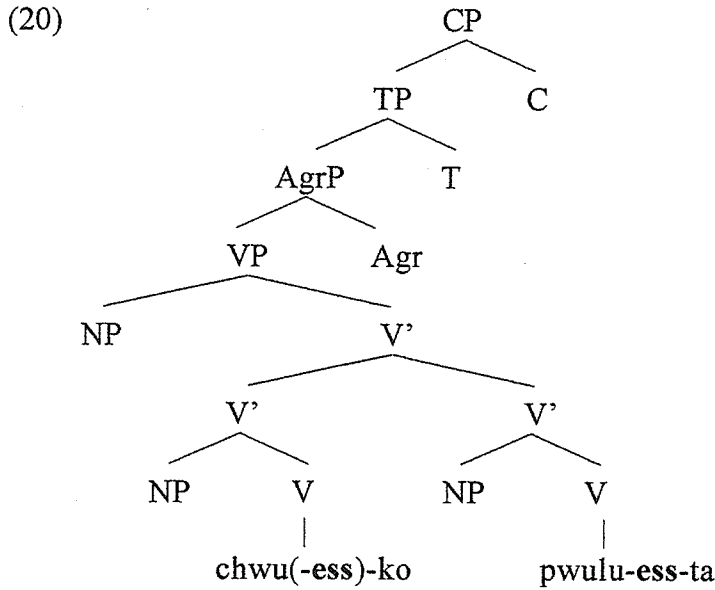
(19)

Tense Morphemes	T
[-Past] <i>-n</i>	[-Past <sup>-</sup> ]
[+Past] <i>-ess</i>	[+Past <sup>-</sup> ]
[+Fut] <i>-keyss</i>	[+Fut <sup>-</sup> ]
[-Interp]	[+Interp]

Here, it is worth noting again Chomsky's (1991) proposal that the functional categories are just bundles of features. And the tense morphemes are introduced into syntax as an adjoined form with verbs. No tense features are strong in Korean by definition, and the feature-checking operation for Tense takes place at LF.

### 5.2.2. Explanation with a Simple Structure

With the feature system proposed in the preceding section, I suggest (20) as the structure for both sentences in (15) instead of (0). When the tense-morpheme *-ess* is not selected in the first conjunct, the verb is not defined with respect to Tense. In other words, the verb does not have any tense feature to be checked. This is a case of (12b), the generalization of morphological structure of verbal inflection.



As for the sentence in (18), I suggest the AgrP-conjunction structure as for the case of (7). Each of the two independent subjects requires its own projection of AgrP for honorification and Case-assignment.

Let us consider the sentences in (21). The meanings of these sentences are different from each other, as glossed. That is, in (21b) the tense-morpheme in the first conjunct is optional, but in (21a) it is not. The two events in it are different from each other with respect to the reference of time. I claim that (21a) is a case of TP conjunction structure composed of two different Ts, whereas (21b) is one of V'-conjunction structures like (20). Consequently, this implies that our approach to the optionality of the tense-morpheme with feature interpretability is not challenged by the apparently problematic sentence (21a).

- (21) a. Yenghi-ka pap-ul mek-ess-ko selkeciha-n-ta  
 Yenghi-Nom meal-Acc eat-Pst-and dishwash-Prg-Dec  
 'Yenghi ate the meal and she is washing the dishes.'



NegP.<sup>5</sup> In my view, however, in Korean the only reason for the independent syntactic projection (ISP) of NegP above VP is that, following X-bar theory, it is hard to designate a position for the Neg-morpheme inside VP. Within this framework, in Korean verbs obligatorily move overtly to the right side of the negation morpheme unlike English since the negation morpheme never appears on the left side of VP in surface forms. The overt verb-movement over the negation morpheme has been explained with the affixal property of the negation morpheme.

In the literature, attempts have been made to attest that the negator *ani* performs its own syntactic functions which form the fundamental evidence for the independent existence of NegP. Some of this evidence is used as the basis for the argument that Neg-morpheme projects an independent NegP above VP in Korean as in English. In the following section, I will examine discussions presented in the literature to prove the independent existence of NegP, pointing out the problems. I will show that their arguments do not support the structure (23) and argue that the Neg-morpheme is just a verbal prefix which attaches to verbs before they are

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<sup>5</sup> For example, according to Haegeman (1995: 80), the ungrammaticality of the French sentence in (ii) can be analogous with that of (ia). The trace cannot be governed by the LF-antecedent *personne* 'no one', violating ECP. For Korean, this kind of Neg-movement is not attested in the literature.

- (i) a. \* Who did you think that *t* would arrive first?  
 b. Who did you think would arrive first?

- (ii)\* [AgrP Personnei [AgrP je ne demande [CP que [AgrP *ti* dise cela]]]]  
           noone                  ne



introduced into syntax. And I will argue that the phenomena involved in negation can be successfully captured with a feature-percolation.

### 6.1. Distribution and Classification of the Neg-morpheme *an* ‘not’

Even though the Neg-morpheme *an* seems to be used as a free morpheme in the writing system of Korean, its syntactic (or morphological) distribution is very confined. As contrasted in (24), it seems to be adjacent to verbs. It cannot precede nouns or time adverbials. From this observation, some Korean linguists like Han (1987) and No (1988) treat *an* as a verbal bound morpheme.

- (24) a. John-i ppang-ul **an** mek-ess-ta.  
John-Nom bread-Acc **not** eat-Pst-Dec.  
‘John did not eat the bread.’
- b.\* John-i **an** ppang-ul mek-ess-ta.  
John-Nom **not** bread-Acc eat-Pst-Dec.  
‘John did not eat the bread.’ (Intended reading)
- c.\* John-i **an** ecey o-ass-ta.  
John-Nom **not** yesterday come-Pst-Dec.  
‘John did not come yesterday.’ (Intended reading)

Ahn (1991), however, observes that the Neg-morpheme can precede some other class of adverbs as shown in (25), and he classifies it as the “emphatic negative adverb” (p. 215). In his system this morpheme is distinct from the ones which occur in front of verbs, which is called “non-emphatic negator” (p. 215). A noteworthy point involved here is that the Neg-morpheme can be used to negate the meaning of some adverbs.

- (25) a. John-i ppang-ul **an** ppalli mek-ess-ta.  
John-Nom bread-Acc **not** fast eat-Pst-Dec.  
‘John ate the bread not fast.’

- b. John-i chack-ul **an** khukey ilk-ess-ta.  
 John-Nom book-Acc **not** loud read-Pst-Dec.  
 'John read the book not loud.'

From the observation that the negator appears in front of verbs or adverbs modifying their meaning, some linguists like Oh (1971) treat it as an adverb. This treatment is, however, immediately denied by other linguists. For instance, Ahn (1991) and No (1988) correctly observe the parallelism between the passive suffix *i* and *an*. That is, in the constructions of Verb-Reduplication as in (26) and (27), the Neg-morpheme is obligatory in the reduplicated portion as the passive morpheme is. Whereas, in the case of adverbs, the appearance of the adverb is not obligatory in the reduplicated portion, as shown in (28). This observation supports their argument for the affixal property of the Neg-morpheme.

- (26) a. ku san-i po-i-ki-nun po-i-n-ta  
 the mountain-Nom see-Pss-ki-Top see-Pss-Prg-Dec  
 'The mountain is seen anyway.'  
 b. \*ku san-i po-i-ki-nun po-n-ta.
- (27) a. pap-ul **an** mek-ki-nun **an** mek-ess-ta  
 meal-Acc not eat-ki-Top not eat-Pst-Dec  
 '(I) really didn't eat meal.'  
 b. \*pap-ul **an** mek-ki-nun mek-ess-ta
- (28) a. pap-ul **manhi** mek-ki-nun **manhi** mek-ess-ta  
 meal-Acc much eat-ki-Top much eat-Pst-Dec  
 '(I) really eat meal much.'  
 b. pap-ul **manhi** mek-ki-nun mek-ess-ta

Another difference between the negator and adverbs is observed in scope interpretation. In (29a), the adverb *tel* 'less' modifies the verb and its force is confined within the verb. Consequently, (29a) is not ambiguous with respect to the

scope interpretation with the quantifier *ta* 'all,' which always has wide scope. Whereas, in (29b) the negator *an* may exert its force of negation over the quantifier *ta* and consequently it is ambiguous with respect to the scope relationship with the quantifier.

- (29) a. na-nun cen kwamok-ul ta tel kongpwuha-yess-ta.  
I-Top all subjects-Acc all less study-Pst-Dec.  
'I studied less for all the subjects.'
- b. na-nun cen kwamok-ul ta an kongpwuha-yess-ta.  
I-Top all subjects-Acc all not study-Pst-Dec.  
'I did not study for all the subjects.'  
'I studied not all the subjects.'

## **6.2. The ISP of NegP in the Literature**

### **6.2.1. Local Dependency between Neg- and Interrogative Morphemes**

The sentences in (30) are Quasi-tag questions usually found in the Kyongsang (south-east province of Korea) dialect. The co-occurrence of the Neg-morpheme *an* and the interrogative morpheme *-na* forms a quasi-tag question. According to Jung (1992), this implies that the Neg-morpheme and the interrogative morpheme are in a local-dependency relation. She claims that this local relationship can be expressed in terms of the Extended Projection of Grimshaw (1991) if it is assumed that the NegP projects as a member of the verbal extended projection above VP. That is, if the NegP projects inside VP, it cannot be a member of the verbal projection and consequently we cannot capture its local relationship with the Int-morpheme *-na*, which is a part of the verbal extended projection above VP.

- (30) a. Yenghi-ka mikwuk-ulo an ttena-ess-na?  
Yenghi-Nom America-to not leave-Pst-Int.  
'Yenghi went to America. Don't you know that?'
- b. Yenghi-ka Chelswu-hako kyelhon an ha-yess-na?  
Yenghi-Nom Chelswu-with marriage not do-Pst-Int.  
'Yenghi married Chelswu. Don't you know that?'

However, this local relationship can be captured if we assume that the Neg-morpheme is a verbal prefix which merely adds the negative property to verbs. The claim that the Neg-morpheme is a pure verbal prefix is supported by the following evidence. The sentences in (31) are also quasi-tag questions which form the positive counterparts of the ones in (30). In this case, the positive meaning of the verbs are questioned in an opposite way to (30). This implies that the Neg-morpheme attached to the verbs in (30) merely change the positive meaning of the verbs into the negative ones.

- (31) a. Yenghi-ka mikwuk-ulo ttena-ess-na?  
Yenghi-Nom America-to leave-Pst-Int.  
'Yenghi did not go to America. Don't you know that?'
- b. Yenghi-ka Chelswu-hako kyelhon ha-yess-na?  
Yenghi-Nom Chelswu-with marriage do-Pst-Int.  
'Yenghi did not marry Chelswu. Don't you know that?'

### 6.2.2. *An* as a Negative Polarity Item Licenser

It is generally accepted that a Negative Polarity Licensing Condition (NPLC) like (33) is needed to explain the difference of grammaticality between the two sentences in (32).

- (32) a. John did **not** meet **anyone**.  
b. \***Anyone** did **not** meet John.

- (33) **Negative Polarity Licensing Condition**  
An Negative Polarity Item must be c-commanded by a negator at S-S.

Similarly, Korean has several negative polarity items (NPI, henceforth). As we can see in the data presented in (0) and (35), the words *amwuto* ‘anyone’ and *amwukesto* ‘anything’ are NPIs since they require a negator in certain positions.

- (34) a. **amwuto an** o-ass-ta.<sup>6</sup>  
 anyone **not** come-Pst-Dec  
 ‘No one came.’  
 b. \***amwuto** o-ass-ta.  
 anyone come-Pst-Dec  
 ‘Anyone came.’ (Intended meaning)
- (35) a. na-nun **amwukesto an** mek-ess-ta.  
 I-TOP anything **not** eat-Pst-Dec  
 ‘I didn’t eat anything.’  
 b. \*na-nun **amwukesto** mek-ess-ta.  
 I-TOP anything eat-Pst-Dec  
 ‘I ate anything.’ (Intended meaning)

Mahajan (1990) claims that the licensing condition of NPI is somewhat different in Hindi and Japanese. As contrasted in (36), Hindi shows that the NPI must be licensed by a negator somehow. However, the c-command condition at S-structure does not apply to Hindi. That is, in (36a) the negator does not c-command the NPI at S-structure, but it is still grammatical. To explain this,

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<sup>6</sup> As a matter of fact, the word *amwu* ‘anyone’ itself is not a NPI. The element *to* ‘also’ that is attached to *amwu* make the whole string a NPI. If this word combines with the element *-na* ‘also’ whose meaning is very similar to *to*, forming the string *amwu-na* ‘anyone,’ the string is not a NPI and therefore does not require a negator, as shown below:

- (i) amwu-na o-ess-ta.  
 anyone-also come-Pst-Dec  
 ‘Anyone came.’

The identification of these two elements is not relevant to the purpose of this paper and I will not discuss it.

Mahajan (and also Kitagawa (1986) for Japanese) proposes that the NPLC (33) should be parametrized; it applies at LF in Hindi, hence (37).

- (36) a. mE yahaaN kisii-ko bhii      nahiiN jaantaa (Mahajan 1990: 336)  
 I(Sub) here anyone-emp. (DO) neg. know  
 'I don't know anyone here.'  
 b. \*mE yahaaN kisii-ko bhii      jaantaa (huN)  
 I(Sub) here anyone-emp. (DO) know  
 \*'I know anyone here.'

- (37) **Negative Polarity Licensing Condition** (for Hindi, Japanese, and Korean)  
 A NPI must be c-commanded by a negator at LF.

Ahn observes that Mahajan's modification (37) is not enough to explain the ungrammaticality of the following Korean sentences. In the sentence in (38a) the NPI is c-commanded by the negator at LF, but it is still ungrammatical (cf. (38b)).

To explain this phenomenon, Ahn adds another condition (39).

- (38)  
 a. \*na-nun [CP Yenghi-ka ppang-pakkey mek-ess-ta-ko]      an mit-nun-ta  
 I-Top Yenghi-Nom bread-only eat-Pst-Dec-Comp not believe-Prg-Dec.  
 'I don't believe that Yenghi ate anything but bread.' (Intended reading)  
 b. na-nun [CP Yenghi-ka ppang-pakkey an mek-ess-ta-ko]      mit-nun-ta  
 I-Top Yenghi-Nom bread-only not eat-Pst-Dec-Comp believe-Prg-Dec.  
 'I don't believe that Yenghi ate anything but bread.'

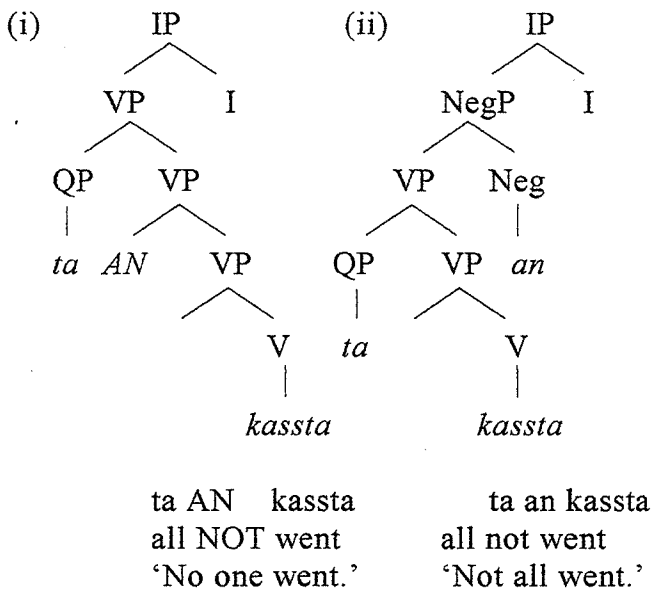
- (39) **Negative Polarity Licensing Condition II**  
 Negative Polarity Items must co-exist with their licensers at LF  
 in their Local domains.

Ahn goes on to say that (40a) is ungrammatical due to the two conditions in (37) and (39), whereas (40b) is grammatical since there is no NPI, not undergoing either (37) or (39). According to him, in (40a) the NPI *amwuto* is not c-commanded by the negator *AN* which is base-generated as an adjunction to the

adverb *ppalli* ‘fast’ which is in turn located within VP. In addition, as *AN* does not move for the scopal reason at LF, the NPLC II (39) is also violated. That is, he distinguish the negator *AN* from the other negator *an* used before verbs as in (35).

- (40) a. \*?amwuto *AN* *ppalli* *talli-ess-ta*<sup>7</sup>  
 anyone Not fast run-Pst-Dec  
 ‘No one ran fast.’ (Intended meaning)  
 b. *Chelswu-ka* *An* *ppalli* *talli-ess-ta*  
 Chelswu-Nom Not fast run-Pst-Dec  
 ‘Chelswu did not run fast.’

<sup>7</sup> Ahn (1991) suggests two negators; *AN* and *an*. One is the emphatic negative adverb and the other is the non-emphatic negator, according to him. *AN* is used to modify adverbs or verbs whereas *an* is used to negate verbs. With this device, he argues that the ambiguity of the following sentence is due to these two negators. That is, even though the surface form is the same, the base-generated positions of the two negators are different, as shown below:



The negator *an* has a wider scope than *ta* in (ii), whereas the scope of the negator *AN* is narrower than *ta* in (i).

Basically, I agree with Ahn on the observation about the NPI licensing in Korean. However, I do not agree with him on the argument that there are two negators, *AN* and *an* in Korean. I will show that negative polarity item licensing can be explained without the separate classification of the two morphemes and the projection of NegP headed by the second negator *an* above VP. I will argue that there is no NegP projection in Korean and the negator *an* is a verbal prefix. I will accommodate the proposal of Feature Percolation by Cole et al. (1993) in order to explain the NPI licensing and scope of negation which will be discussed in the following section.

### 6.2.3. Scope Interpretation of Negation

Another example taken by Ahn (1991) to support the argument that Neg is independently base-generated above VP is that of scope interpretation involved in quantifier phrases. (41a) is ambiguous in the scope of negation with respect to the quantifier *ta* 'all,' whereas in (41b) *an* has only wide scope with respect to the quantifier. To explain this fact, Ahn again depends on the two different negators; one is the emphatic negator which exerts its force only on the following item, and the other is the non-emphatic negator which projects NegP over the VP. That is, he claims that even though (41a) has only one surface form, it has two base-generated structures. One is formed with the emphatic negator *AN*, inducing the narrow scope reading of negation and the other is formed with the non-emphatic



*an*, inducing the wide scope reading of negation. In the case of (41b), the negator is the emphatic *AN* and it negates only the quantifier *ta*.<sup>8</sup>

- (41) a. John-i pap-ul ta an mek-ess-ta.  
John-Nom meal-Acc all not eat-Pst-Dec.  
'John did not eat all the meal.'  
'John ate not all the meal.'
- b. John-i AN ta mek-ess-ta.  
John-Nom not all eat-Pst-Dec.  
'John ate not all the meal.'

However, it is hard to say that these examples support the existence of an independent projection of NegP above VP. We can say that in the case of (41b) the negator modifies just the quantifier *ta* 'all' and its force of negation is confined within the quantifier phrase, whereas in case of (41a) the negator modifies the verb and its force of negation percolates up to CP at LF and permeates into any element within the CP. In addition, as in the case of NPI licensing, the subcategorization of the two negators is not necessary. I will show that it is enough for Korean to treat the negator as a verbal prefix in Korean in §4.6.3.

The ISP of NegP seems to be supported by the examples of lexical negative-verb constructions which do not show scope ambiguity. In (42), the verbs *pwulhaynghata* 'unhappy' and *mwusikhata* 'to be ignorant' do not incur scope ambiguity with regard to the quantifier *ta* 'all' and have only one reading, with wide-scope of the quantifier.

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<sup>8</sup> See footnote 9.

- (42) a. ta pwulhayngha-ta.  
 all not-happy-Dec  
 ‘All are unhappy.’  
 b. ta mwusikha-ta.  
 all not-learned-Dec  
 ‘All are ignorant.’

It is true that these sentences have only one reading regarding scope interpretation. However, this fact does not support the syntactic autonomy of NegP, either. The unique reading of the sentences in (42) has a somewhat different interpretation. Professor S. Kim (p.c.) suggests to me that the internal morphological structures of these verbs are different from the ones which are formed by attaching the negator *an* to verbs. That is, the verbs *pwulhayngha*- ‘to be unhappy’ and *mwusikhata* ‘to be ignorant’ are not formed by attaching the negative morphemes *pwul* ‘not’ and *mwu* ‘no’ to the verbs *hayngha* and *sikha* respectively as in (43). In other words, the negative morphemes *pwul* and *mwu* always select nouns as their stems. Therefore, the verbs in (42) are actually formed by attaching the light verb *ha* to the negative nouns *pwulhayng* ‘unhappiness’ and *mwusik* ‘ignorance’.

- (43) a. [V [N pwul [N hayng]] ha]  
           not       happiness do  
 b.\* [V pwul [V hayng [V ha]]]

This implies that the negative force does not exceed the boundary of the noun when the negative nouns are incorporated with the verb *ha* to form verbs in terms of Baker (1981). The negator *an*, however, only attaches to verbs or adverbs

and it can exert its negative force over verbs and furthermore over the whole VP through feature percolation.

Another problem of positing the negator as the head of NegP is that it behaves differently from the other functional heads such as Tense or Honorific morphemes if they independently project in the syntax at all. That is, only the negator *an* appears in front of verbs while the other morphemes are suffixed to verbs. This difference might be explained by supposing a different affixal property for the negator from the other suffixes. However, there is no theoretically solid evidence for the argument that the negator is placed in front of verbs through overt verb-head movement.

#### **6.2.4. Neg-Tense Co-occurrence Requirement**

Modifying Zanuttini's (1990) argument about the co-occurrence of Neg and Tense (44), Ahn claims that Korean shows a similar phenomenon and that the existence of NegP is supported by the existence of TP in Korean. In other words, if TP does not project, NegP is not allowed.

(44) Neg takes TP as its obligatory complement.

For example, Ahn insists that (45) is ungrammatical since the embedded sentence is tenseless.

(45) \*?ku salam-i        tampay-lul    an kkunh-ki-ka    ship-ta.  
      that person-Nom cigarette-Acc not quit-Comp-Nom easy-Dec.  
      'It is easy for that person not to quit smoking.'

However, in my view its marginal acceptance is not due to this reason. (46), in which the unique difference from (45) is that (46) does not have the Neg-morpheme, is also marginal.

- (46) \*?ku salam-i tampay-lul kkunh-ki-ka ship-ta  
 that person-Nom cigarette-Acc quit-Comp-Nom easy-Dec  
 'It is easy for that person to quit smoking.'

My claim is supported by the following observation. If we modify (45) by replacing the subject with a universal quantifier as in (47), the sentence becomes perfect. This implies that the marginality of (45) is due to a somewhat different reason.

- (47) Nukwuna-ka tampay-lul an kkunh-ki-ka swip-ta  
 everyone-Nom cigarette-Acc not quit-Comp-Nom easy-Dec  
 'It is easy for everyone not to quit smoking.'

There are many constructions similar to (47) in which the Neg-morpheme is allowed without a tense morpheme. Some of them are presented below. All of these are constructions of ... *-ki-ka ship/elyep-ta* 'it is easy/ hard to ...' (literally).

- (48) a. chencay-ka nolyek-ul an ha-ki-ka swip-ta  
 genius-Nom effort-Acc not do-C-Nom easy-Dec  
 'It is usual that a genius does not make efforts.'  
 b. mikwuk-eyse-nun yenge-lul an ha-ki-ka elyep-ta  
 America-at-Top English-Acc not do-C-Nom hard-Dec  
 'It is hard to live in America without using English.'  
 c. ku-ka an o-ki-ka swip-ta (Song 1988: 340)  
 he-Nom not come-C-Nom easy-Dec  
 'He is not likely to come.'

Another piece of independent evidence against this argument is (49). In this case, the embedded verb is tenseless (or non-finite), but the negator is allowed in the embedded sentence.

- (49) na-nun ney-ka an ttena-ki-lul pala-n-ta.  
I-Top you-Nom not leave-Comp-Acc want-Prg-Dec.  
'I want you not to leave.'

### 6.3. Negation without NegP

#### 6.3.1. *Ani* as a Verbal Prefix

To explain the distribution and syntactic function of the negator *an*, I put forth three suggestions, (50), (53), and (55). Each suggestion deserves some explanation. As for (50), with our assumption that all affixations are done before syntax, the negator attaches to active verbal elements, i.e., active adverbials and verbs, in the lexicon. In other words, it is inserted into the syntax either with a verb under the V-node like the other functional morphemes such as tense and honorific morphemes or with an active adverbial under the AdvP.

- (50) The negator *ani* is a verbal prefix; it attaches to [+V] elements in the lexicon.<sup>9</sup>

One thing to make clear is how (50) can apply to (41b), in which the quantifier *ta* seems not to be [+V]. However, its precise interpretation is 'completely all' rather than merely 'all,' as paraphrased in (51). That is, it is actually an adverb. My claim is supported by the observation of the sentences in (52). These sentences are derived from the ones in (41) by replacing *ta* with the pure quantifier *motwu* 'all.' The paraphrasing from (41a) to (52 a) induces no problem. Both sentences are ambiguous in the same way. However, the

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<sup>9</sup> I use the term 'in the lexicon' in a broad sense. That is, it means either in the process from lexicon to the Numeration, or before the Numeration. The distinction is not relevant to the current study.

paraphrasing from (41b) to (52b) is not possible, as shown below. I analyze this fact as follows: The quantifier *motwu* 'all' is not an adverb so that it cannot combine with the negator *an* in the lexicon.<sup>10</sup>

- (51) John-i pap-ul **an ta** mek-ess-ta.  
 John-Nom meal-Acc **not completely** eat-Pst-Dec.  
 'John ate the meal not completely.'
- (52) a. John-i pap-ul **motwu an** mek-ess-ta.  
 John-Nom meal-Acc all **not** eat-Pst-Dec.  
 'John did not eat all the meal.'  
 'John ate not all the meal.'
- b. \*John-i pap-ul **an motwu** mek-ess-ta.  
 John-Nom meal-Acc **not all** eat-Pst-Dec.  
 'John ate not all the meal.' (Intended Reading)

As for (53), the negative force of negated verbs percolates up to CP when verbs raise to CP to get features checked. That is, when verbs adjoin to C, the feature [+Neg] percolates to the maximal projection CP in a similar way to the argument of Cole et al. (1993).<sup>11</sup> From this position, the feature [+Neg] permeates

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<sup>10</sup> M.-S. Kim et al. (1991) state that Korean has two kinds of *ta*; one is an adverb as in (i) and the other is a quantifier as in (ii). According to them, the element *ta* discussed in the current study is classified as an adverb.

- (i) pap-i **ta** toy-ess-ta (M.-S. Kim et al. 1991: 367)  
 rice-Nom **completely** become-Pst-Dec  
 'The rice is completely cooked.'
- (ii) nay-ka kaci-n kes-un ikes-i **ta** i-ta  
 I-Nom have-Pst thing-Top this-Nom **all** is-Dec  
 'This is all that I have.'

However, I am not sure what is the correct categorial status of the element *ta*. What is certain is that even when *ta* is used as an adverb as in (i), it has the meaning of quantifier *all*. I simply treat it as a 'quantifier-like adverb' in this study and then the verbal negator *an* can attach to it. In this sense, we can say that (52b) is ungrammatical since the negator *an* cannot attach to pure quantifiers.

<sup>11</sup> The Feature Percolation Principle of Cole et al. (1993) is:

into any one element dominated by CP, inducing ambiguity. Here, I assume that Neg-feature permeation is not a process of feature-checking since it is not a formal feature but a semantic one.

- (53) The feature [+Neg] of the verb percolates up to CP at LF and permeates into any one element dominated by the CP.<sup>12</sup>

The suggestion (53) is conceptually appropriate when we consider another scopal relation of negation. For example, in (54), all the three elements, *Chelswu*, *Yenghi*, or *cohahanta*, can be negated depending on the focusing intonation. In other words, the preverbal Neg-morpheme always induces sentential negation. That is, this fact is expressed in (53).

- (54) *Chelswu-ka Yenghi-lul an cohahanta.*  
Chelswu-Nom Yenghi-Acc **not** like  
'Chelswu does not like Yenghi.'

(55) combines Ahn's two NPLCs (37 ) and (39). Instead of the condition of c-command and co-existence in local domain, I introduce the traditional concept

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(i) Feature Percolation Principle

- a. The features of the mother node and the features of the daughter nodes will be identical.
- b. If the features of the daughter nodes conflict, the mother node will have the features of the head node.
- c. No feature can percolate out of a lexical complement structure.

<sup>12</sup> It seems to be possible for us to accommodate c- or m-commanding of the feature [+Neg] from the C-head position instead of percolation and permeation. However, this has a technical problem. That is, once the feature [+Neg] c- or m-commands from this position, all members of a sentence come to be included under the domain of negation at the same time. If so, there is no way to explain the scope ambiguity with respect to negation between elements like adverbs and verbs. Therefore, I do not adopt the concept of commanding.

of government (Chomsky 1981) into the condition. CP is a bounding node which prevents the elements inside CP from being governed by a CP external element.<sup>13</sup>

(55) **Negative Polarity Licensing Condition**

A NPI must be governed by the feature [+Neg] at LF.

With these suggestions, the phenomena we examined so far can be captured. To summarize the issues discussed so far:

- (56) a. The distribution of the Neg-morpheme *an* shows an affixal property unlike adverbs; it attaches to only verbs and a certain class of adverbs.  
 b. The NPI in Korean is licensed by being governed by the Neg-morpheme *an* in the local domain.  
 c. The Neg-morpheme appearing in front of verbs induces scope ambiguity with respect to adverbs, if any.  
 d. The Neg-morpheme appearing in front of adverbs does not induce sentential negation

**6.3.2. Problem Solving**

In this section, I will show how the suggestions proposed in the preceding section apply to explain the phenomena summarized in (56).

First, consider the case of NPI-construction (38a), repeated here as (57). In this case, the verb *an-mit-nun-ta* ‘to be not believing’ adjoin to the matrix C to get its [+D] feature checked. The feature [+Neg] comes along with the other formal features at that stage. This feature, however, cannot govern the NPI *ppang-pakkey* ‘only bread’ due to (55), hence it is ruled out.

(57)

\* na-nun [CP Yenghi-ka ppang-pakkey mek-ess-ta-ko] an mit-nun-ta  
 I-Top Yenghi-Nom bread-only eat-Pst-Dec-Comp not believe-Prg-Dec.

<sup>13</sup> I assume that the CP headed by the traditional Comp *ki* in the light verb construction is defective. In this construction, CP-internal elements can be always governed by CP-external elements.



‘I don’t believe that Yenghi ate anything but bread.’

(58) is ruled out since the feature [+Neg] does not govern the NPI. The Neg-morpheme attached to adverbs does not percolate its feature [+Neg] into CP since it does not move at all in terms of Chomsky (1991). It can percolate only up to AdvP. Even when a negative adverb is base-generated above VP, its negative force is confined within AdvP.

(58) \*? amwuto **an** ppalli talli-ess-ta  
 anyone **Not** fast run-Pst-Dec  
 ‘No one ran fast.’ (Intended meaning)

Finally, consider a case of scope ambiguity of negation with respect to adverb or quantifier. (59b) is unambiguous; the negative force of *an* is confined within the quantifier phrase, whereas (59a) is ambiguous; one of its two meanings is the same as that of (59b) and the other is the wide scope reading of the quantifier *ta* ‘all’. In this case, the negative verb raises to C at LF to get its formal features checked. The feature [+Neg] percolates up to CP at that stage. If the feature permeates into the quantifier, it induces the first meaning, while it induces the second meaning if it permeates into the verb.

(59) a. John-i     ta                     **an** mek-ess-ta.  
 John-Nom **completely all not** eat-Pst-Dec.  
 ‘John ate not all.’  
 ‘John did not eat all.’  
 b. John-i     **an** ta                     mek-ess-ta.  
 John-Nom **not completely all** eat-Pst-Dec.  
 ‘John ate not all.’

Feature permeation does not count any maximal projections as bounding nodes. In other words, as stated in (53), once the feature [+Neg] percolates up to

an XP, it can permeate into any element dominated by the XP. For example, in (60) any element can be an object of negation, including the elements inside the subordinated clause.

- (60) na-nun [CP John-i yelsimhi kongpu-lul ha-yess-ta-ko] **an** mit-nun-ta  
 I-Top John-Nom hard study-Acc do-Pst-Dec-C **not** believe-Prg-Dec  
 a. 'I do not believe John studied hard.'  
 b. 'I believe John did not study hard.'  
 c. 'I believe John studied not hard.'  
 d. 'It is I who do not believe that John studied hard.'  
 e. 'It is John who I do not believe studied hard.'  
 f. 'It is John who I believe studied not hard.'

However, feature percolation does not cross over a CP boundary. For example (61) does not have the meanings of (60a, d, & e). In other words, the negative force of *an* inside the embedded CP does not affect the external elements *na* 'I' and *mit-nun-ta* 'believe.' This implies that the feature [+Neg] comes along with the embedded verb *ha-yess-ta* 'did,' which raises to the embedded C but not to the matrix C since it has no feature to be checked by the matrix C. Consequently, it can be said that the proposal that the Neg-morpheme is a verbal prefix is on the right track.

- (61) na-nun [CP John-i yelsimhi kongpu-lul **an** ha-yess-ta-ko] mit-nun-ta  
 I-Top John-Nom hard study-Acc **not** do-Pst-Dec-C believe-Prg-Dec  
 a. 'I believe John did not study hard.'  
 b. 'I believe John studied not hard.'  
 c. 'It is John who I believe studied not hard.'

## 7. VP-ellipsis and Verb-movement (Otani & Whitman 1991)

Another independent argument for overt verb-movement is that of Otani and Whitman (1991) (O&W, hereafter) for the sloppy reading of the constructions

of VP-ellipsis. In this section, to support the proposed non-overt verb movement approach in Korean, I will just introduce Kim's (1995) argument against their approach without providing any alternative.

**7.1. Otani & Whitman (1991)**

In (62) is a sentence with an empty object. This sentence is ambiguous between the sloppy reading and the strict reading.

- (62) a. Chelswu-ka [caki-uy phyenci-lul] peli-ess-ta  
 Chelswu-Nom self-of letter-Acc discard-Pst-Dec  
 'Chelswui threw out selfi's letter.'  
 b. Yengmi-to [e] peli-ess-ta.  
 Yengmi-also discard-Pst-Dec  
 = 'Yengmii also threw out selfi's letter.' (sloppy reading)  
 = 'Yengmi also threw out Chelswu's letter.' (strict reading)

According to O&W, this ambiguity can be reasonably explained by VP reconstruction in LF preceded by V-raising at S-structure. Their analysis is along the same lines as the account of VP-ellipsis constructions by Fiengo & May (1994), May (1985), Sag (1976), or Williams (1977). The procedure for getting the sloppy reading is presented as follows:

- (63) a. V-Raising (S-structure)  
 Chelswu-ka [[caki-uy phyenci-lul]NP *t<sub>v</sub>*]VP [peli]V -ess-ta  
 Yengmi-to [[e]NP *t<sub>v</sub>*]VP [peli]V -ess-ta.  
 b. Reflexive Rule (LF) ( $\lambda$ -extraction)  
 Chelswu-ka [ $\lambda x[x [x\text{-uy phyenci-lul}]NP t_v ]]$ VP [peli]V -ess-ta  
 Yengmi-to [[e]NP *t<sub>v</sub>*]VP [peli]V -ess-ta.  
 c. VP Rule (LF) (Copying)  
 Chelswu-ka [ $\lambda x[x [x\text{-uy phyenci-lul}]NP t_v ]]$ VP peli-ess-ta  
 Yengmi-to [ $\lambda x[x [x\text{-uy phyenci-lul}]NP t_v ]]$ VP peli-ess-ta.

The important implication regarding the purpose of this study is that their analysis depends on overt verb-movement. However, this analysis involves several

serious problems as pointed out by Kim (1995). In the following subsection, I will summarize Kim's counter evidence against O&W.

## 7.2. Kim (1995)

Kim observes that O&W's analysis with overt verb-movement for the sloppy reading does not appropriately apply to the double object, quantifier floating, and part-whole constructions. To begin with the double object construction, in (64) the inside of the VP would not be empty even after V-raising and consequently VP-copying would not be applied and the sloppy reading should not be obtained but actually it can be.

- (64) a. Peter-nun [caki-uy sacin-ul] na-lul poyecwu-ess-ta.  
Peter-Top self-Gen picture-Acc I-Acc show-Pst-Dec.  
'Peter showed me his (Peter's) picture.'  
b. Kulena Ruth-nun amwu-to an poyecwu-ess-ta.  
But Ruth-Top anybody-even not show-Pst-Dec.  
i) But Ruth did not show anybody her (Ruth's) picture.'  
ii) But Ruth did not show anybody his (Peter's) picture.'

A similar problem occurs with the quantifier floating (65) and part-whole (66) constructions. The sloppy reading is possible in these sentences. However, verb-raising cannot derive this reading because the VP could not be empty even after verb-raising and VP-copying would not be applied. This fact implies that the sloppy reading of these sentences requires an analysis other than the verb-raising approach.

- (65) a. Alan-un [caki-uy chinkwu-lul] twumyeng-ul pwul-ess-ta.  
Alan-Top self-Gen friend-Acc two.CL-Acc invite-Pst-Dec.  
'Alan invited two of his (Alan's) friends.'
- b. Kulena Jane-un [NP e] semyeng-ul pwul-ess-ta.  
But Jane-Top three.CL-Acc invite-Pst-Dec.  
i) But Jane invited three of her (Jane's) friends.  
ii) But Jane invited three of his (Alan's) friends.
- (66) a. Jerry-nun [caki-uy ai-lul] phal-ul ttayli-ess-ta.  
Jerry-Top self-Gen child-Acc arm-Acc whip-Pst-Dec.  
'Jerry whipped his child on the arm.'
- b. Kulena Julia-nun [NP e] tali-lul ttayli-ess-ta.  
But Julia-Top leg-Acc whip-Pst-Dec.  
i) But Julia whipped her (Julia's) child on the leg.  
ii) But Julia whipped his (Jerry's) child on the leg.

## 8. Summary

In this paper, I discussed Tensification, Honorification, and Negation in Korean. I examined the traditional GB approaches based on the ISP of these functional morphemes and OVM, pointing out their problems. I showed that most syntactic phenomena involved in the three operations can be successfully explained without the ISP of functional morphemes or OVM.

To do this, I introduced or proposed the following:

- (1) The concept of Feature Interpretability proposed by Chomsky (1995) with a slight modification; the features of Functional Categories licensing the verbal suffixes are [+Interpretable], hence optional appearance of these morphemes in conjunction structures can be licensed.
- (2) All affixation is done in the lexicon; the verbal suffixation undergoes a certain morphological rule.

(3) The Neg-morpheme is a verbal prefix in Korean; NegP is not necessary in Korean.

(4) Feature Percolation and Permeation; The feature [+Neg] of the Neg-morpheme percolates up to CP when verbs raise to C at LF, and permeates into any element dominated by CP.

(5) The NPI must be governed by the feature [+Neg] at LF.

Finally, I introduced Kim's argument that overt verb-movement is not appropriate for the sloppy reading of VP-ellipses construction.

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He claimed that progressive *-ing*, plural *-s*, and copula are acquired earliest in the acquisition sequence, followed by auxiliary and articles, then irregular past, and lastly regular past, third person singular *-s*, and possessive 's.

#### 1.1.2. Previous research with Japanese L2 learners of English

The first cross-sectional study that examined the English morpheme acquisition by Japanese L2 learners was conducted by Makino (1979). He used a sentence completion task to examine the acquisition order of nine morphemes by Japanese junior high school students. His subjects were 800 Japanese junior high school students, aged 14-15. He obtained an acquisition order similar to the "natural order" proposed by Krashen. Makino's results are shown in (2):

(2) Prog -> Art -> Plu -> Cop -> Pos -> Aux -> R-past -> 3rd -> I-past

In the 1980's, two studies were conducted with Japanese high school learners. Shirahata (1988) used 31 high school students as his subjects and used oral data, namely, free conversation and story telling. The results of his study that examined the acquisition order of 10 morphemes (He differentiated between definite and indefinite articles) are shown in (3):

(3) Cop -> Pos -> Prog -> Plu -> Aux -> Def Art -> I-past -> R-past -> 3rd -> Indef Art

Tomita's (1989) subjects were 278 high school students and he used two tasks, namely a multiple-choice grammar test and an English composition with picture cues. He examined nine morphemes and obtained the following results shown in (4):

(4) Cop -> Pos -> Prog -> Aux -> I-past -> 3rd -> Plu -> R-past -> Art

## *Morpheme Acquisition*

Apparently these orders are different from each other. For example, articles are acquired the second earliest in Makino's study, whereas they are acquired late in Shirahata and Tomita's studies. Plural *-s* is acquired relatively early in Makino and Shirahata's studies, but late in Tomita's study.

These previous studies have employed different data elicitation methods. It may be because the methodologies were different that they obtained different acquisition orders. We will come back to this issue and discuss the methodology later.

### 1.2. Count/mass distinction of nouns

Our interest in this paper is the acquisition of plural *-s*, articles, and third person singular *-s*. These morphemes are related to nouns, especially to the two different properties of nouns of English, namely count and mass. Plural ending *-s* is used with plural count nouns; indefinite articles *a/an* are used with singular count nouns; and, third person singular *-s* is attached to a verb when the subject is a singular count noun or a mass noun. Moreover, the subject-verb agreement is involved in third person singular *-s*. At this point it is instructive to introduce Quine (1960), who proposes (5):

(5) In L1 acquisition, the category of mass terms is acquired earlier than that of general terms.

He claims that in the developmental sequence in the L1 acquisition, the category of mass terms is acquired earlier than that of general terms. For our purpose, in this paper, we interpret his claim as (6):

(6) Mass nouns are acquired before count nouns.

Quine explains a case where children utter the word "apple" when they look at an apple, and

“apples” when they look at a heap of apples. He suggests that this utterance cannot be interpreted in such a way that they have acquired the distinction of singular “apple” and plural “apples,” namely, the concept of count nouns. He states that children may well view “apple” and “apples” as two different mass nouns, and that we cannot decide that they have acquired the concept of count nouns until they begin to say “that apple,” “not that apple,” “an apple,” “another apple,” or “these apples.”

### 1.3. Telic/atelic distinction in the temporal system

It is worth mentioning here that we can expand Quine’s (1960) claim further to the telic/atelic distinction in the temporal system of English. Dahl (1985) points out that there are parallels between the telic/atelic distinction in the temporal system and the count/mass distinction of nouns. According to this proposal, mass and atelic “go together.” Then the picture is that articles, plural *-s*, and third person singular *-s* are instances of telic and progressive *-ing* is an example of atelic.

## 2. Experiment

### 2.1. Hypothesis

Given that we can incorporate Dahl’s theory into Quine’s claim on L1 acquisition, and that we can extend it to L2 acquisition, we hypothesize that plural *-s*, articles, and third person singular *-s* are acquired later than progressive *-ing* in the English morpheme acquisition sequence by L2 learners. In order to examine this hypothesis with Japanese L2 learners of English, we conducted an experiment with junior high school students studying English in Japan.

### 2.2. Methodology

The subjects in this study are 33 junior high school students in Japan, aged 14-15.

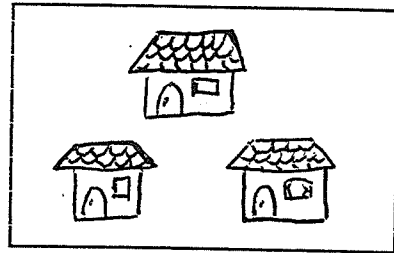
## Morpheme Acquisition

Nine morphemes given in (7) are examined:

(7) *Morphemes*: Art, Aux, Cop, R-past, I-past, Plu, Pos, Prog, 3rd

These are the same morphemes that were examined by Makino (1979). As for methodology, we used a grammaticality judgment task, which was similar to Crain and McKee's (1986) Truth-value judgment task. This experiment involves the researcher, the assistant, and the subject. Each subject is tested individually. The researcher uses a puppet and talks to the subject, while the assistant shows 50 pictures one after another. The puppet and the subject look at the picture. The puppet describes the picture in English and asks the subject if the sentence is correct. If the subject thinks it is a correct sentence, he/she is expected to say "OK." If the subject thinks it is not, he/she is expected to say "No." Then the puppet asks him/her to correct the error and repeat the sentence. In this way, we can determine if they are giving their judgment for an irrelevant reason. Two of the test sentences are given in (8a) and (8b):

(8) a. Puppet: There are three house.  
Subject: No. There are three houses.



b. Puppet: She has pen.  
Subject: No. She has a pen.



In (8a), the puppet says "There are three house." It is expected that the subject says "No."

Then the puppet asks the subject to correct the error and repeat the correct sentence. In this way, we can understand that the subject has a clear understanding of the usage of plural *-s*. In (8b), the puppet gives the sentence "She has pen." The subject is supposed to respond by saying "No." Then the puppet asks the subject to correct the error and say the correct sentence. In this way, we can determine that the subject clearly understands the usage of articles.

The first four pictures out of the total 50 are used to familiarize the subject with the experiment, and the answers for these four pictures are not counted. The number of the test sentences is 46. There are five test sentences for each morpheme examined, with the exception of plural *-s* having six test sentences.<sup>1</sup> For each morpheme, three out of the five test sentences are ungrammatical and two sentences are grammatical.<sup>2</sup> The test sentences are arranged randomly so that the subject will not notice our intention. Also, in order to avoid test effects, the test sentences are arranged in two different orders; one from the picture No. 1 to No. 46 and the other from No. 46 to No. 1.

### **3. Results**

In order to avoid unnecessary complication, we followed previous studies in the scoring procedure, for example, Dulay and Burt (1973, 1974) and Makino (1979). The results of the experiment are shown in (9). Each number shows the mean of the correct answers among the subjects. The results show that there is a significant difference between the means with repeated-measures one-way ANOVA.

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1. The reason that only plural *-s* has six sentences is as follows: in order to examine if the subjects can correctly produce three allomorphs of plural *-s*, namely [s], [z], and [ɪz], three sentences are given. Another sentence tests if the subjects know that mass nouns do not take plural *-s*. These four sentences are ungrammatical and the subjects are tested if they can correct the errors in these sentences. There are two grammatical sentences to test the subjects' judgment. Consequently, total six sentences are given to examine this morpheme.

2. The test sentences are given in Appendix.

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(9) Means of the correct answers.

Morpheme	Mean (%)	Difference between means
Regular-past	80.606	(3.182)
Irregular-past	77.424	(4.091)
Progressive	73.333	(0.454)
Copula	72.879	(2.576)
Auxiliary	70.303	(2.818)
Plural	67.485	(2.182)
Possessive	65.303	(4.091)
Third person singular	61.212	(9.697)
Article	51.515	

F (8, 256) = 12.79, ( $p < .01$ )

However, ANOVA does not allow us to locate the difference precisely. In other words, it does not provide us with any clues as for between which morphemes there is a significant difference. In order to pinpoint the location of the significant difference, we used Tukey's post hoc test. The obtained value is 10.997, as shown in (10):

(10) Tukey's test

HSD (*honestly significant difference*) = 10.997.

If the mean difference exceeds this number, there is a significant difference.

The following shows the obtained result. In order to examine our hypothesis, we compare articles, plural -s, and third person singular -s with progressive -ing, as shown in (11). The numbers in parentheses stand for the accuracy rates of the morphemes. The numbers in square brackets mean the differences of accuracy rates between the two morphemes.

(11)	<----- [5.848] ----->	Plural (67.485%)
Prog (73.333%)	<----- [12.121] ----->	3rd (61.212%)
	<----- [21.818] ----->	Art (51.515%)

From (11), we can determine that progressive *-ing* is significantly different from third person singular *-s* and articles. However, it is not significantly different from plural *-s*. At first sight, our hypothesis appears to be rejected. However, before we reach this conclusion, we have to deal with cross-linguistic effects and methodologies. The first question to be addressed here is whether there were any cross-linguistic effects that accelerated or delayed the acquisition of articles, third person singular *-s*, and plural *-s*. What causes plural *-s* to be acquired relatively earlier than articles and third person singular *-s*? Secondly, we have to deal with methodological issues concerning the acquisition of these morphemes.

#### 4. Discussion

##### 4.1. Negative transfer vs. developmental errors

##### 4.1.1. Negative transfer

Martin (1975) points out that there is no count/mass distinction of nouns in Japanese. All Japanese nouns are mass nouns, and thus there is no plural/singular distinction. There are no articles, and there is no verb suffix like third person singular *-s*. On the other hand, English has these morphemes. In the Contrastive Analysis framework, it has been claimed that the degree of difficulty in L2 acquisition depends on the extent to which relevant properties of the L2 are similar to or different from those of the L1. Where the two match, learning could take place easily through positive transfer, but where they do not match, learning difficulty arises and errors resulting from negative transfer are likely to occur (Richards, 1971; Dulay and Burt, 1974, among others). If we assume this analysis, we could predict that negative transfer occurs



## *Morpheme Acquisition*

when our Japanese L2 learners acquire English morphemes such as articles, plural *-s*, and the third person singular *-s*.

As we saw in (11), our results show that articles and third person singular *-s* were acquired significantly later than progressive *-ing*. However, it seems that plural *-s* was acquired relatively earlier than articles and third person singular *-s*. This appears to be problematic to our hypothesis, which does not predict any contrast between plural *-s* and articles/third person singular *-s*. Given that our hypothesis is correct, something extra must have happened to plural *-s*. In order to answer this question, namely, what has happened to plural *-s*, we first need to examine the numerals in Japanese and English.

The following (12) shows examples of a noun with a numeral in English and Japanese:

- (12) a. *three candies*  
b. *san-ko-no ame*

The English example (12a) literally means “three candies,” whereas the Japanese example (12b) literally means “candies in threes.” (Saito, 1990). He claims that the interpretation available in nouns like (12b) results from the hypothesis that Japanese numerals are predicates.<sup>3</sup>

Assuming that Saito is correct, we could suggest that the *-s* ending that our subjects used in this study were, in fact, used to differentiate “candies in ones” from “candies in twos, threes, etc.,” as shown in the contrast between (13a) and (13b):

- (13) a. *candies in ones*  
b. *candies in twos, candies in threes*

In other words, the subjects may not have used plural *-s* to tell “one candy” from “two candies,

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3. See also Miyagawa(1989) and Miyamoto(1994).

three candies, etc.,” as given in the contrast between (14a) and (14b):

- (14) a. *one candy*  
b. *two candies, three candies*

In short, our subjects transferred their Japanese numeral system to English. If this suggestion is correct, the relatively high accuracy rate of plural *-s* in the acquisition sequence does not necessarily mean that our subjects have acquired the concept of the count/mass distinction of nouns. Therefore, the high accuracy rate of plural *-s* which appeared to be problematic does not really pose any problems.

In addition, it can explain the late acquisition of articles. Japanese learners should naturally have much trouble with the usage of indefinite articles since they still have only the concept of mass nouns. This was, in fact, the case. Given the above analysis, it seems reasonable to suggest that transfer took place in our Japanese L2 learners concerning the usage of plural *-s*.

#### 4.1.2. Developmental errors

##### 4.1.2.1. Data from Czech learners

We suggested in the previous section that there was a case of transfer in the acquisition of mass nouns by our Japanese L2 learners. Then, is there any possibility of developmental errors concerning the acquisition of mass nouns? We would like to examine some data by Czech learners of English.

Duskova (1969) examines the English composition by adult Czech L2 learners of English, and reports the fact that the Czech learners make persistent errors in omitting plural *-s* even though they have plural markers in their L1. (15a) shows examples of singular and plural forms of Czech nouns. They have distinct plural markers in their L1. (15b) shows an example

## Morpheme Acquisition

of an error by Czech learners of English. They frequently omit plural -s endings even though plural markers are also present in their L1.

- (15) a. *muz - muzi* (man - men), *zena - zeny* (woman - women)  
b. *many other point*

Given the fact that Czech speakers make similar mistakes to the ones made by our Japanese learners, we should consider two possible causes of these errors by Czech speakers; one is transfer (as in Japanese learners), and the other is developmental errors.

In order to decide which of them is likely to be the case, the crucial point is to determine if there is the count/mass distinction of nouns in Czech. The position of a numeral in the sentence plays a crucial role in determining the noun system of the language. For example, an adjective occupies a predicate position, whereas a numeral cannot do so in English, as shown in (16a) and (16b) (Saito, 1990):

- (16) a. *Students are smart.*  
b. \**Students are three.*

On the other hand, both an adjective and a numeral can occupy a predicate position in Japanese, as shown in (17a) and (17b) (Saito, 1990):

- (17) a. *Gakusei-ga kashikoi.*  
student-nom smart  
'Students are smart.'  
b. *Gakusei-ga san -nin da.*  
student-nom three-CL cop<sup>4</sup>  
'Students number three.'

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4. The abbreviations used in the gloss are as follows: 'nom': nominative; 'CL': classifier; 'cop': copula.

Let us assume here that a numeral functioning as a predicate indicates that nouns of the language are all mass nouns, while a numeral behaving as a quantifier suggests that the language has the count/mass distinction of nouns. For example, Japanese belongs to the former, while English is an instance of the latter.

Now we turn to Czech examples. First, numerals always precede nouns in both Czech and English as in “three students,” and the position of “three” cannot be anywhere else. Also the Czech counterpart of the Japanese “Gakusei-ga san-nin da (Students number three).” is ungrammatical, which means that “three” cannot occupy a predicate position. This, in turn, indicates that Czech numerals are not predicates, like their English counterparts, which means that Czech employs the same numeral system as English. We can then reasonably assume that Czech has the count/mass distinction of nouns, and consequently, that the noun system of Czech is the same as that of English, but not that of Japanese. Given the hypothesis that Czech and English have the same noun system, one of the two causes of the errors made by Czech learners, namely, transfer, loses its possibility. Then, it seems reasonable to conclude that the error that Czech learners made, namely the dropping of the plural -s, is developmental. This could be interpreted further that the count/mass distinction of nouns, or the telic/atelic distinction in the broad sense, is acquired developmentally.

#### 4.1.2.2. The developmental aspect of our research

In the previous section, we have concluded that in the acquisition of plural -s, Japanese learners made errors from negative transfer, which coincided with correct forms, and that Czech learners made developmental errors. Then the question arises as to whether there is any developmental aspect to the acquisition of English by Japanese L2 learners, as in the case of Czech learners. In other words, should the acquisition pattern shown in (11) be explained only by transfer?

In 4.1.1., we have proposed an analysis that attributed the contrast between the

seemingly early acquisition of plural *-s* and the late acquisition of articles to transfer. However, another crucial point in (11) is the difference between progressive *-ing* and articles, which is statistically significant. Can this difference be explained only by transfer? In fact, the answer seems negative. Transfer could predict the late acquisition of articles, but it cannot predict that progressive *-ing* is acquired earlier than articles. In other words, an analysis based on transfer may not explain the acquisition of one morpheme in comparison with another. It then seems reasonable to conclude that transfer only may not have been responsible for the statistically significant difference between the acquisition of articles and progressive *-ing* in this study. On the other hand, if we assume the developmental aspect of the acquisition based on the telic/atelic distinction, this statistically significant difference between articles and progressive *-ing* naturally follows. Under this hypothesis, progressive *-ing* is acquired significantly earlier than articles in the sequence of acquisition, because progressive *-ing* is atelic and articles are telic. The telic/atelic distinction can predict that progressive *-ing* is acquired before articles in a straightforward way. However, in order that our hypothesis is supported, we still need to examine the reliability of methodologies.

#### 4.2. Methodology

As we mentioned earlier, the data elicitation tasks that were used in previous studies with Japanese learners are all different. For example, Makino (1979) uses a sentence completion task with picture cues which elicits written responses from his subjects. His obtained results show that articles are acquired early in the acquisition sequence of the Japanese L2 learners. In his task, however, there are three sentences where the subjects are expected to use articles, and one of them is the definite article “the” that occurs with a superlative adjective. It seems that the subjects did not have much trouble with this particular item, and it resulted in the high accuracy rate of the articles. He may not have been able to elicit accurate data that are appropriate to determine the acquisition order with this methodology.

Unlike the previous studies, we employed a controlled oral elicitation task as we explained in section 2. We believe that our task avoided all the complication that previous studies faced. For example, we controlled the number of test sentences and arranged them randomly so that there would be as few test effects as possible. As a result, we obtained a different order from previous studies.

## **5. Conclusion**

In this study, we have examined the acquisition of English morphemes by L2 learners in relation to the count/mass distinction of nouns. The data that we obtained from L2 learners supported our hypothesis that mass nouns are acquired earlier than count nouns. Under Quine's (1960) hypothesis, it may be interpreted such that the category of mass terms is acquired earlier than that of general terms. Therefore, our obtained results provided a piece of empirical evidence to support Quine's (1960) claim. Furthermore, the data we have obtained are consistent with Dahl's (1985) claim that the count/mass distinction could be explained in terms of the telic/atelic distinction.

In second language acquisition, the means of data elicitation has always been an important issue. Our study showed that different methods yield different results. Therefore, employing an appropriate methodology is crucial to the accuracy of the study itself.

## Morpheme Acquisition

### Appendix

46 test sentences for the experiment.

Morphemes	No. <sup>5</sup>	Sentence	Expected response
Articles	1	She is a student.	OK
	20	A book on the desk is blue.	The book
	40	She has pen.	a pen
	41	Man in the kitchen is tall.	The man
	53	This is an apple.	OK
Auxiliary	2	Yesterday he is running.	was running
	19	I am watching television now.	OK
	21	She loved by everyone.	is loved
	39	They running now.	are running
	42	The window is broken.	OK
Copula	3	Yesterday I be happy.	was
	18	I am tall.	OK
	22	She is your sister.	OK
	43	I a student now.	I am
	52	Last year they students.	They were
R-past	4	Last week we walked in the park.	OK [t]
	17	Yesterday I wait.	waited[id]
	23	Yesterday I open a box.	opened[d]
	38	Last year she studied English.	OK [id]
	44	Yesterday I watch a movie.	watched[t]
I-past	37	Last week we drove to Otaru.	OK
	5	Yesterday I wrote a letter.	OK
	16	Yesterday I eat a hamburger.	ate / eated
	24	Yesterday he break a window.	broke / breaked
	45	Yesterday John read[riyd] a book.	read[red] / readed
Plural-s	6	There are two flower.	flowers[z]
	15	There is milks in the glass.	milk
	26	There are three park in Sapporo.	parks[s]
	35	There are three house.	houses[iz]
	46	I have two books.	OK
Possessive -s	51	There are four seasons in a year.	OK
	7	This is the boy's dog.	OK
	14	I go to my uncle house.	uncle's
	27	I made my father's sweater.	OK
	34	This is Mary book.	Mary's
Prog -ing	47	This is Rumiko room.	Rumiko's
	8	He is run now.	running
	13	She is watch a movie now.	watching
	28	I am drinking milk.	OK

5. There are two arrangements of test sentences, using the numbers given here. One set is arranged from No.1 to No.46, and the other from No.46 to No.1.

	31	We are listening to music.	OK
	48	Tom is speak Japanese now.	speaking
3rd -s	9	He run every day.	runs[z]
	12	Taro speaks English every day.	OK
	29	Tom speak Japanese every day.	speaks[s]
	32	She watch television every day.	watches[iz]
	49	He lives in Sapporo.	OK

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## CATEGORIAL, AGREEMENT AND CASE FEATURES IN AGRAMMATISM

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### 1. INTRODUCTION

A lesion that damages the anterior portion of the left hemisphere of the brain usually results in Broca's aphasia. Agrammatism is the linguistic syndrome that is frequently associated with Broca's aphasia. Agrammatic production has traditionally been characterized by omission errors. The omission errors follow two patterns. The first is a distinction between functional and lexical categories: agrammatics show a significantly higher rate of omission of functional categories than of lexical categories (Grodzinsky, 1984b; among others). The second is a distinction between verbal and nominal categories: agrammatics display significantly greater difficulty with verbal categories than with nominal categories (Miceli et al., 1983; Jakobson, 1964). In order to provide a unified featural account of these two agrammatic characteristics, Sanchez (1995) modifies Déchaine's (1993) categorial feature system. Moreover, she argues for a theory of robustness whereby the more feature specifications a category has, the more robust it is, and the easier it is to access. Thus, she characterizes agrammatic behavior as better retention of robust categories.

However, agrammatic production errors are not limited to omissions. Agrammatics also produce substitution errors. The goal of this paper is to investigate the disparate nature of omission and substitution errors and consider the theoretical implications of these findings. I argue that the theoretical distinction between categorial features on the one hand and agreement and Case features on the other is a necessary one. Whereas agreement and Case features can be substituted, categorial features cannot. Moreover, I provide further evidence for the Principle of Robustness, this time with respect to agreement and Case features: the more of these features a category encodes, the less likely that category is to be omitted, and the more likely it is to undergo substitution.

### 2. AGRAMMATISM: CATEGORIAL FEATURES

Agrammatic production has traditionally been characterized by omission errors. Examples of these errors are illustrated in (1) (for English) and (2) (for Dutch (a), German (b), French (c), and Italian (d)), where omitted elements are in square brackets, '[ ]'. Let me briefly explain the data that is analyzed throughout this paper. All transcripts are from Menn & Obler (1990). The transcripts are of a collection of narratives tasks from agrammatic subjects. The narrative tasks include the following: open conversation, picture description, description of a sequence of pictures, and story telling (Little Red Riding Hood). Each language is represented by a single subject.

- (1) a. [he] is riding his kite  
b. the man carries [a] suitcase  
c. [the] witch [is] stirring the brew  
e. who [is] playing the violin  
f. the woman calls [the] boy
- Sanchez (1992)

- |  |                           |
|--|---------------------------|
| (2) a. ik [heb] nou 21 jaar gewerkt<br>I [have] now 21 years worked                  | Kolk et al. (1990)        |
| b. die Frau weckt [ihn] wieder<br>the woman wakes [him] again                        | Stark & Dressler (1990)   |
| c. peu après [il] contemple [la] récolte<br>little after [he] gazes at [the] harvest | Nespoulous et al (1990)   |
| d. Io [sono] stanco di stare qui<br>I [am] tired of being here                       | Miceli & Mazzucchi (1990) |

Although all categories may be subject to omission, functional categories (F-categories) show a higher rate of omission than lexical categories (L-categories) (Caplan, 1987; Grodzinsky, 1984b, 1990; Menn & Opler, 1990; and many others). This pattern is illustrated in table (3). Table (3) should be read in the following manner. 'Context' refers to the number of items that should have been produced in the individual's collection of narratives. 'Omission' refers to the number of items that were omitted, with the resulting percentage indicated to the right of the dash. In other words, for the narratives to be grammatical, the English subject should have produced 231 F-categories. However, 123 of these were omitted, resulting in a 53% omission rate for F-categories.

(3) F-category and L-category Omissions

F-categories	Context	Omission	L-categories	Context	Omission
English	231	123 - 53%	English	178	4 - 2%
Dutch	421	245 - 58%	Dutch	338	70 - 21%
German	385	57 - 15%	German	329	18 - 6%
French	445	86 - 19%	French	369	25 - 7%
Italian	301	69 - 23%	Italian	246	45 - 18%

Comparing F-categories to L-categories for each of the languages, we see that, in every case, F-categories show a higher rate of omission. English contrasts a 53% omission rate for F-categories with a 2% omission rate for L-categories. Although actual percentages are different for the other languages, the pattern is the same: Dutch contrasts 58% omission for F-categories with 21% for L-categories; for German, we see 15% versus 6%; for French, 19% versus 7%; and for Italian, 23% versus 18%.

A similar distinction can be found when comparing verbal and nominal categories. This is reflected in table (4). Table (4) should be read in the follow manner. For every syntactic category

## Categorial, Agreement and Case Features

(noun, determiner, verb<sup>1</sup> and auxiliary), we have 3 numbers to interpret. The leftmost number indicates the items omitted. The central number indicates the context i.e. the number of items that should have been produced. The rightmost number is the percentage of omission. In other words, for English nouns, 1 out of 92 nouns were omitted, resulting in an omission rate of (approximately) 1%.

Verb and auxiliary are considered the verbal categories. Noun and determiner are considered the nominal counterparts<sup>2</sup>. For each of the languages, we see that the verbal categories show a higher rate of omission than the nominal categories. English nouns and determiners show a 1% and 5% omission rate respectively. This contrasts with the omission rates of verbs and auxiliaries which are 4% and 28% respectively. For Dutch, the omission contrast is as follows: nouns at 2%, versus verbs at 19%; determiners at 72% versus auxiliaries at 100%. The omission rates for German parallel those above: nouns at 5% versus verbs at 13%; determiners at 13% versus auxiliaries at 50%. Although the noun-verb contrast for both French and Italian is marginal (.96% versus 1.03% for French nouns and verbs respectively; 2% versus 3% for Italian nouns and verbs, respectively), we observe the contrast in determiners and auxiliaries. For French, determiners show a 2% omission rate compared to a 9% omission rate for auxiliaries. For Italian, determiners show a 7% omission rate compared to a 25% omission rate for auxiliaries.

### (4) Nominal and Verbal Omissions

Omission	Noun	Determiner	Verb	Auxiliary
English	1/92 - 1%	4/75 - 5%	3/69 - 4%	9/35 - 28%
Dutch	2/104 - 2%	66/92 - 72%	17/91 - 19%	22/22 - 100%
German	7/143 - 5%	17/129 - 13%	13/100 - 13%	7/14 - 50%
French	1/104 - .96%	2/98 - 2%	1/97 - 1.03%	3/35 - 9%
Italian	4/184 - 2%	5/72 - 7%	3/96 - 3%	2/8 - 25%

Sanchez (1995b) proposes a unified featural account of these two characteristics. She modifies Déchaine's (1993) categorial feature system, as shown in (5). The modified system captures the relevant distinctions using the privative features [Nominal], [Lexical], and [Referential]<sup>3</sup>.

<sup>1</sup> Here verbs are lexical verbs, which excludes possessive *have* and copula *be*.

<sup>2</sup> For a discussion of determiners as the nominal counterparts to auxiliaries, see Sanchez (in progress).

<sup>3</sup> See Déchaine (1993) for evidence for the features [Nominal], [Functional] and [Referential]. See Sanchez (1995b) for motivation behind the change from [Functional] to [Lexical].

(5)		C	T	V		K	D	N		P	A
	Lexical			✓				✓		✓	✓
	Nominal				✓	✓	✓				✓
	Referential		✓	✓		✓	✓				✓

Moreover, Sanchez (1995b) proposes a Principle of Robustness, as shown in (6), whereby the more feature specifications a category has, the more robust it is, and the easier it is to access. Agrammatic behavior is, therefore, characterized as better retention of robust categories.

(6) Principle of Robustness

The more feature specifications a category has, the more robust it is.  
 The more robust a category, the better retained it is.

The feature system in (5) combined with the Principle of Robustness in (6) predicts the following retention hierarchy, where ">" means "better retained than".

(7)<sup>4</sup>            N > V, A, D > P, T, K > C

The result is that the category Noun is most robust. It is predicted to be the category that is best retained in agrammatism. This prediction is borne out: in the most severe cases of agrammatism (that still allow some production), nouns are produced. A further prediction is that any given syntactic category has the same rate of omission across languages. As we see below, this is not the case.

3. AGRAMMATISM: AGREEMENT AND CASE FEATURES

Agrammatic production is further characterized by substitution errors. Substitution errors involve agreement features (person (8), number (9) and gender (10)) as well as Case (11) features (Sanchez, in progress). Substitutions are indicated by italics, and the content of the following rounded brackets represents the speaker's target. Crucially, substitutions do not involve crossing syntactic categories (Sanchez, in progress). In other words, a given syntactic category never substitutes for or is substituted by a different syntactic category (nouns do not substitute for determiners, for example). Although substitution errors affect all categories, this paper focuses on determiners, the feature breakdown for which is in table (12)

(8) Person substitutions

- |  |                           |
|--|---------------------------|
| a. the thief <i>case</i> (cases) [the] job | Menn (1990)               |
| b. e allora <i>sviene</i> (svengo)         | Miceli & Mazzucchi (1990) |
| and then <i>faints</i> (faint-I)           |                           |

<sup>4</sup> This retention hierarchy correctly predicts that nouns are better retained than verbs. However, most of the other detailed predictions (such as verbs, adjectives and determiners show a similar retention rate) have yet to be tested. I leave these for further research.

*Categorial, Agreement and Case Features*

(9) Number substitutions

- |  |                           |
|--|---------------------------|
| a. a <i>women</i> (woman)  | Menn (1990)               |
| b. les meubles modernes garnissent <i>les</i> (la) [pièce]<br>the furniture modern decorate <i>the</i> (singular) [room] | Nespoulous et al. (1990)  |
| c. il contadino mangia <i>i</i> (il) granone<br>the farmer eats <i>the</i> (singular) grain                              | Miceli & Mazzucchi (1990) |

(10) Gender substitutions

- |   |                          |
|---|--------------------------|
| a. <i>die</i> (der) Wolf sagt "Damit ich besser hören kann"<br><i>the:F</i> (M) wolf says "So that I better hear can" | Stark & Dressler (1990)  |
| b. de dief kwan binnen door <i>de</i> (het) raam<br>the thief came in through <i>the:M/F</i> (N) window               | Kolk et al. (1990)       |
| c. l'image représente <i>un</i> (une) cuisine<br>the picture represents <i>a:M</i> (F) kitchen                        | Nespoulous et al. (1990) |

(11) Case substitutions

- |   |                          |
|---|--------------------------|
| a. I [was] flat on <i>the</i> (my) back   | Menn (1990)              |
| b. <i>einen</i> (ein) Mann grüsst<br><i>a</i> (nom) man greets                              | Stark & Dressler (1990)  |
| c. pour mieux t'entendre <i>l'</i> (mon) enfant<br>to better you hear <i>the</i> (my) child | Nespoulous et al. (1990) |

(12) Determiner Substitutions

Determiner	Context	Tokens	Number	Gender	Case <sup>5</sup>
English	155	2		X	2 - 100%
Dutch	121	3		3 - 100%	
German	246	38	1 - 2%	25 - 66%	12 - 32%
French	210	14	3 - 21%	7 - 50%	4 - 29%
Italian	183	7	1 - 14%	6 - 86%	

<sup>5</sup> The use of the term 'Case' is somewhat misleading in the sense that it applies to different forms of Case within determiners. In all the languages, we find the distinction between *the* and *his*, for example. However, in German we also get the distinction between dative *the* and accusative *the*, for instance. The two types of Case and their influence on omission/substitution are discussed in Sanchez (in progress).

Table (12) should be read as follows. 'Context' indicates the number of determiners that should be present in the collection of narratives. 'Tokens' refers to the number of determiners that have undergone substitutions. The numbers under each of the three features (number, gender and Case) represent the number of determiners that were substituted for that specific feature and the corresponding percentage of substitution errors. In other words, the English speaking agrammatic should have produced 155 determiners. Two of these have undergone substitution. Of these two, both (therefore 100% of the substitutions) were Case substitutions.

Determiner substitutions involve three features: number, gender and Case. As mentioned above, English determiner substitutions involve Case. In contrast, Dutch determiner substitutions involves gender. Both German and French determiner substitutions involves all three features. Lastly, Italian determiner substitutions involve number and gender.

To get a better appreciation for substitution patterns, let us consider the specific feature identity of each shift. Tables (13)-(15) present these patterns in the following manner. The features along the leftmost column are the targets. The features along the topmost row are the outcome. To illustrate, for the French determiner substitutions there is one instance of plural determiner being substituted by a singular determiner, but two instances of a singular being substituted by a plural.

(13) French Determiner Substitutions

French Det Subst	Pl	Sg	M	F	Gen	Nom
Pl		1				
Sg	2					
M				3		
F			4			
Gen						2
Nom						

Within the French examples we see that plural (1 token) and singular (2 tokens) shift, feminine (4 tokens) and masculine (3 tokens) shift, and genitive (2 tokens) shifts.

Let us consider Dutch determiners. To repeat, only gender is involved.



*Categorial, Agreement and Case Features*

(14) Dutch Determiner Substitutions

Dutch Det Subst	M/F	N
M/F		1
N	2	

Here, we see that both the combined masculine/feminine (1 token) and the neuter (2 tokens) shift.

Lastly, let us turn to German determiners.

(15) German Determiner Substitutions

German Det Subst	Pl	Sg	M	N	F	Nom	Acc	Dat
Pl								
Sg	1							
M					10			
N			4		11			
F								
Nom							1	3 -P <sup>6</sup>
Acc								1
Dat						3	4	

<sup>6</sup> This 'P' stands for preposition and indicates that these substitutions take place within a prepositional phrase.

For German determiners, we find many more instances of substitutions. The singular (1 token) shifts; the masculine (10 tokens) and neuter (15 tokens) shift; and the nominative (4 tokens), accusative (1 token) and dative (7 tokens) shift.

The most striking characteristic of these substitutions is that they involve a single feature at a time. Shifts occur within a single feature; they do not cross features. Thus, I propose the principle in (16) as governing agreement and Case feature substitution.

(16) Single Feature Shift

Each instance of a substitution is restricted to one of the following features:  
 person, number, gender or Case

Recall the prediction that any given syntactic category has the same rate of omission across languages. Clearly this is not the case, given the data in table (17). Table (17) indicates the percentage of determiners that are omitted and that are substituted.

(17) Determiner Error Rate

Determiner	Omission	Subst.
English	23%	1%
Dutch	50%	2%
German	12%	16%
French	8%	7%
Italian	25%	4%

Let us focus on English and German. German determiners encode more agreement and Case features than do English determiners. German determiners encode 2 number features (singular and plural), 3 gender features (feminine, masculine and neuter) and 4 Case features (nominative, accusative, dative and genitive). English determiners encode marginally 2 number features (singular and plural<sup>7</sup>), no gender features, and no Case features<sup>8</sup>. English determiners

<sup>7</sup> It would be accurate to state that English *a* is specified for singular, but that *the* is unspecified for number. This results in English determiners encoding only a single number feature.

<sup>8</sup> English certainly encodes Case, as seen by the difference between *the* and *my*, for example. This distinction is also available in German. However, the Case distinctions which are relevant here are of a different nature, where the German equivalent of the encodes *the* 3 Case features.

have a 23% omission rate whereas German determiners have a 12% omission rate. Substitution rates show the reverse pattern, with English determiners at 1% and German determiners at 16%. I argue that this difference in omission and substitution results from Robustness. As with omission, substitution is governed by Robustness. The more agreement and Case features a category encodes, the better retained it is, and the more likely it is to suffer from substitution errors. Thus, German determiners, which encode more features than English determiners, are more robust. Consequently, they show a lower rate of omission but a higher rate of substitution.

#### 4. CONCLUSION

This paper has focused on characterizing omission and substitution errors. In so doing, we have investigated the behavior of various syntactic features as well as the principles governing their behavior. The agrammatic data discussed in this paper provides evidence for a grammatical distinction between categorial features on the one hand and agreement and Case features on the other. Despite their differences, both sets of features are governed by Robustness.

First, we saw that omissions are influenced by categorial features. The governing principle is Robustness, whereby the more features a category is specified for, the more robust it is, and consequently the better retained it is.

Second, we saw that substitutions involve agreement and Case features but not categorial features. The implications for a theory of syntactic features is that these two groups must somehow be computationally distinct.

Third, substitutions involve a single agreement and Case feature at a time. This Single Feature Shift has implications for how morphemes are stored and retrieved. However, further research on agrammatic substitution patterns is required before specific conclusions may be drawn.

Lastly, agreement and Case features also influence omission. One again, the principle of Robustness is at work. In this instance, the more features a category encodes, the more robust it is, and consequently, the better retained it is. Specifically, the more agreement and Case features a particular category encodes, the better retained it is, though the more likely it is to undergo substitution.

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## Right Dislocation as IP-Ellipsis

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In a Right Dislocation (RD) construction, such as the one in (1), a clause-internal pronoun is construed with a right-dislocated phrase:

- (1) He<sub>i</sub> arrived yesterday, John<sub>i</sub>.

Based on data from Modern Hebrew, this paper proposes an analysis of RD where the clause-internal pronoun is analyzed as a free pronoun, and the right-dislocated phrase binds a trace in a separate, elided clause. The analysis predicts the relationship between the pronoun and the dislocated phrase to be a relation of coreference rather than binding. Hence, the clause-internal pronoun in RD does not exhibit the behavior characteristic of resumptive pronouns.

### 1. Right- vs. Left-Dislocation

RD resembles Left Dislocation (LD), in that in both constructions a clause-internal pronoun is construed with a dislocated phrase. However, these constructions differ in several respects. In RD, for example, the clause-internal pronoun and the dislocated phrase cannot be separated by an island, as shown in the contrast between (2) and (3):

- (2) ha-uvda    Se    dibarti    ito,            im Dan,    lo    xaSuva  
the fact    that    I-talked with-him    with Dan    not    important  
'The fact that I talked with him, with Dan, is not important'
- (3) \*ha-uvda    Se    dibarti            ito            lo xaSuva,            im Dan  
the fact    that    I-talked            with-him not important            with Dan

In LD, on the other hand, the relation between the clause-internal pronoun and the dislocated phrase which binds it, is not governed by any locality constraints. This is illustrated in (4):

- (4) Dan<sub>i</sub>, ha-uvda      Se      dibarti      ito<sub>i</sub>      lo xaSuva  
 Dan, the fact      that      I-talked      with him      not important

The absence of locality effects in LD can be attributed to the fact that the pronoun in this construction is a resumptive pronoun (and as such, does not obey island constraints). The locality effects in RD, therefore, strongly suggest that the pronoun in that construction is not a resumptive pronoun. Moreover, as (5) shows, locality in RD cannot be attributed to any constraint which forces clause-boundedness, since the dislocated phrase need not be a sister to the first clause which contains the pronoun (the adjunct clause - *before he left* - modifies the matrix VP):

- (5) Dan    nisa    [lifgoS      ota]      lifney Se    hu azav, et    Mira  
 Dan    tried    to meet      Acc-her      before that    he left    Acc    Mira  
 ‘Dan tried to meet her before he left, Mira’

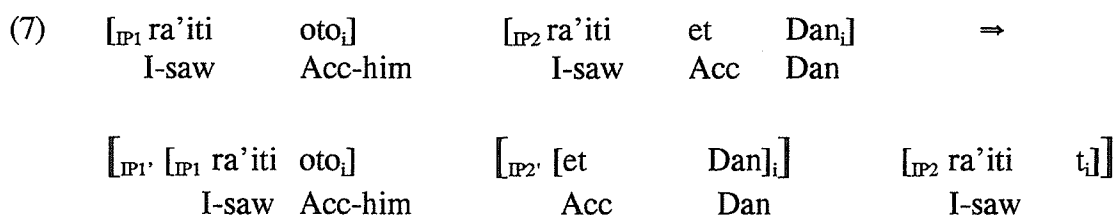
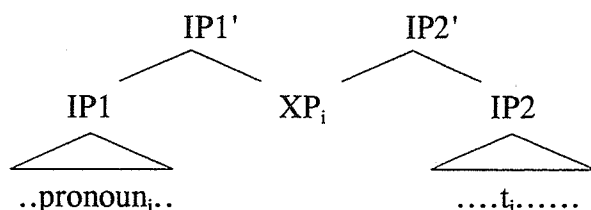
The contrast between (2) and (4) illustrates yet another difference between RD and LD: In RD, both the clause-internal pronoun and the dislocated phrase are overtly Casemarked, whereas in LD only the clause-internal pronoun is. This difference suggests that in RD, the clause-internal pronoun and the dislocated phrase belong to two distinct chains, with two distinct Case positions.

Based on the above observations, we conclude that RD does not have the same structure as LD. In other words, RD is not simple rightward adjunction.

## 2. RD as IP-ellipsis

### 2.1 *The proposal*

The analysis I propose follows Kayne (1993) in assuming that RD involves ellipsis. Contrary to Kayne, however, I propose that the elided constituent is a full IP (and not a VP), out of which the dislocated phrase is A'-moved. The structure is given in (6), and exemplified in (7):



According to (6), RD conjoins two clauses, not by a conjoining word (such as *and*), but rather via a phrase (namely,  $XP_i$ ) which belongs to both clauses. The two clauses (IP1 and IP2) have identical predicates, and identical or coreferring arguments.  $XP_i$ , which corefers with  $\text{pronoun}_i$ , is extracted from IP2 and is simultaneously adjoined to IP2 and IP1, creating two extended IP's (IP2' and IP1'). In IP1,  $\text{pronoun}_i$  is interpreted as a free variable, and the trace of  $XP_i$  is free in the domain of IP2 (although bound in the domain of IP2' by  $XP_i$ ). Since  $\text{pronoun}_i$  corefers with  $XP_i$ , and is coindexed with its trace, IP1 and IP2 have the same semantic interpretation. This semantic identity licenses deletion of IP2, so that at PF, only the sequence "IP1,  $XP_i$ " (or "IP1'") is pronounced.

The two important properties of (6), then, are (a) that IP1 and IP2 have coreferring arguments; (b) that  $\text{pronoun}_i$  is not a bound variable, since, although it is c-commanded by  $XP_i$ , it must corefer with it. Therefore,  $\text{pronoun}_i$  does not show the behavior characteristic of resumptive pronouns. In the following examples, I adopt (for simplicity) a notation which implies

that the extracted XP is adjoined to IP2. However, the reader should bear in mind that this XP is adjoined to IP1 and IP2 simultaneously.

The idea that IP1 and IP2 are conjoined by a “portemanteau” word<sup>1</sup> (which has two functions), is inspired by constructions such as (8), where *weird* serves both as the post-copular phrase of the first clause, and as the pre-copular phrase of the second clause:

- (8) a. He is weird is what he is.  
 b. [he is [weird] is what he is] = [he is weird] [weird is what he is]

I assume that the “portemanteau” strategy is restricted to arguments. This means that XP<sub>i</sub> cannot be a left dislocated phrase (and must be an A'-moved phrase). It follows then, that IP2 contains a trace, and not a resumptive pronoun.

The fact that XP<sub>i</sub> is A'-moved explains why the conjoined phrases are IP's, and not CP's. This type of A'-movement is a case of Topicalization, which involves movement to a pre-IP position, but not to a pre-complementizer position, as the following contrast shows:

- (9)    *nidme* *li*    *Se*    *et*    *Dan*    *lo*    *pagaSti*  
       seems to-me    Comp    Acc    Dan    not    I-met  
       'It seems to me that Dan, I didn't meet'
- (10)    \**nidme*        *li*    *et*    *Dan*    *Se*    *lo*    *pagaSti*  
       seems        to-me    Acc    Dan    Comp    not    I-met

If Topicalization involved movement to a pre-complementizer position, then in an embedded clause, we would expect the dislocated phrase to be followed by a complementizer. However, this is not allowed, as the following contrast shows (where the elided phrase is given in italics):

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<sup>1</sup>I am grateful to Ellen Prince for suggesting this idea to me.



- (11)    *nidme li*    *Se*    [<sub>IP1</sub> *pagaSti*    *oto*]    [<sub>IP2'</sub> *et Dan* [<sub>IP2</sub> *pagaSti t*]]  
           seems to-me Comp    I-met    Acc-him    Acc Dan    I-met  
           ‘It seems that I met him, Dan’
- (12)    \**nidme li*    [<sub>CP1</sub> *Se pagaSti*    *oto*]    [<sub>CP2'</sub> *et Dan Se*    [*pagaSti t*]]  
           seems to-me    Comp I-met    Acc-him    Acc Dan Comp I-met

Note that this proposal is different from Kayne’s (1993) VP-ellipsis analysis: the former allows any phrase to be right-dislocated, whereas the latter allows only for subject-RD, contrary to fact.

## 2.2 *Locality and Casemarking*

(6) predicts the double-Casemarking effect in RD (illustrated in (2) and (5)), because pronoun<sub>i</sub> and XP<sub>i</sub> belong to two different chains, each of them independently Casemarked. Since Hebrew does not allow Preposition-stranding (Borer (1983)), the extracted XP must be an entire extended projection (in the sense of Grimshaw (1991)).

The locality effect (observed in (2)) also follows from the proposed analysis: Since A'-movement obeys island constraints, movement out of an island in IP2 is banned, as shown in schema (13), and illustrated by the contrast between (14) and (15) (the LF structures of (2) and (3) respectively, where the “reconstructed” IP2 is given in italics):

- (13)    \*<sub>[IP1 ... pronoun<sub>i</sub> .....]</sub>    <sub>[IP2' [DP/PP<sub>i</sub>]</sub>    <sub>[IP2 .... [ISLAND-XP ....t<sub>i</sub>.....] .....]</sub>]]
- (14)    [<sub>DP the fact that</sub> [<sub>IP1 I talked to him<sub>i</sub>]</sub> [<sub>IP2' to Dan<sub>i</sub></sub> [<sub>IP2 *I talked t<sub>i</sub>*]]]    is not important.</sub>
- (15)    \*<sub>[IP1 [the fact that I talked to him<sub>i</sub>] is not important]</sub> [<sub>IP2' [to Dan<sub>i</sub>]</sub> [<sub>IP2 [*the fact that I talked t<sub>i</sub>*] is not important]]]</sub>

In (14), extraction of [to Dan] does not cross a complex-NP barrier, whereas in (15) it does. Other island effects are also attested in RD and are accounted for in the same way. This analysis, then,

predicts all cases of IP-ellipsis which involve movement out of an elided IP to be sensitive to island constraints. Potential counterexamples to this generalization are some cases of Sluicing, which do not exhibit the same locality effects as RD, as exemplified below:

- (16) [[Consulting someone] would help me], but I don't know  $who_i$  [<sub>IP</sub> [<sub>NP</sub> ..*vbl*<sub>i</sub> ..].. ].

However, according to the IP-ellipsis analysis of Sluicing proposed in Chung, Ladusaw and McCloskey (1995), the A'-chain headed by *who* in (16), is not a chain created by movement, since *who* binds *someone*, and not a trace, in the "reconstructed" IP.

### 3. Further predictions

(6) predicts two additional differences between RD and LD, concerning: (a) the range of XP's licensed in the dislocated position; and (b) bound variable anaphora.

#### 3.1 Range of dislocated XP's

Since, according to (6), pronoun<sub>i</sub> in IP1 and the extracted XP in IP2' are in a relation of coreference, the extracted XP cannot be a non-referential quantified expression (see also Ziv (1994)). This rules out the ungrammatical (17) and (18):

- (17) \*<sub>[IP1]</sub> *dibarti ito<sub>i</sub>*, <sub>[IP2']</sub> [*im kol gever*]<sub>i</sub> <sub>[IP2]</sub> *dibarti t<sub>i</sub>*]  
 I-spoke with-him with every man I-spoke  
 'I spoke with him, with every man'

- (18) \*<sub>[IP1]</sub> *lo dibarti ito<sub>i</sub>*] <sub>[IP2']</sub> [*im af gever*]<sub>i</sub> <sub>[IP2]</sub> *lo dibarti t<sub>i</sub>*]  
 not I-spoke with-him with no man not I-spoke  
 'I didn't speak with him, with no man'

Although in (17) and (18) IP2' alone is grammatical (e.g., "with every man, I spoke"), the entire RD is ungrammatical, since *every man* and *no man* do not corefer with *him*. This follows from (6), because the relation between pronoun<sub>i</sub> in IP1 and the extracted XP in IP2' is a coreference

relation, and not a binding relation. In LD, on the other hand, where the relation between the dislocated phrase and the pronoun is a binding relation, a quantified expression in the left-dislocated position is allowed, although usually it must be accompanied by a modifying expression<sup>2,3</sup>:

- (19) [kol baxur \*(Se ani pogeSet)]<sub>i</sub>, ani roca lacet ito<sub>i</sub>  
 every guy that I meet I want to go out with-him  
 ‘Every guy that I meet I want to go out with’
- (20) [af yeled \*(kan ba-gan)]<sub>i</sub>, hor-av<sub>i</sub> lo bau ito<sub>i</sub>  
 no child here in-the-day-care parents-his not came with-him  
 ‘No child in this day-care, dis his parents come with him.’

In RD, a quantified expression is always excluded from the dislocated position, even when modified. (17), for example, cannot be salvaged with a modifying expression (e.g., “I spoke with him, with every man that I know”). However, a quantified expression with a group reading, such as *all of N*, is allowed in RD (e.g., “I saw them in class, all of the kids”), since, in this case, a coreference relation holds between the plural pronoun<sub>i</sub> and XP<sub>i</sub>.

### 3.2 Bound variable anaphora

As (21) shows, (6) predicts that if the extracted XP in IP2' contains a variable bound by a quantified expression in the subject position of IP2, then pronoun<sub>i</sub> in IP1 is also interpreted as bound by the same quantified expression:

- (21) [<sub>IP1</sub> kol geve<sub>r</sub><sub>i</sub> ohev ota<sub>j</sub>], [<sub>IP2'</sub> [et im-o<sub>i</sub>], [<sub>IP2</sub> kol geve<sub>r</sub> ohev t<sub>j</sub>]]  
 every man loves Acc-her Acc mother-his every man loves  
 ‘Every man loves her, his mother’

---

<sup>2</sup>This has to do with the D-linked status of the dislocated phrase.

<sup>3</sup>Although resumptive pronouns do not license sloppy identity in VP-ellipsis (see Ziv (1994)).

The pronoun *her* corefers with *his mother*, itself interpreted as bound by *every man*. As a result, the reference of *her* covaries with the reference of *his mother*. This fact can be explained under our analysis, if we adopt Chierchia's (1991) analysis of functional wh-traces, which proposes that the trace of the wh-phrase in a wh-question such as (22), carries two indices: a function-index (bound by *who* in (22)), and an argument-index (bound by *every man* in (22)). This indexation licenses answers naming functions such as "his mother":

- (22) Q: Who<sub>i</sub> does every man<sub>j</sub> love t<sub>j</sub>? A: his mother.

Likewise, in (21), the trace in the elided phrase can be functional. Its argument-index is then analyzed as bound by *every man*, and its function-index determines that the function relates men to their mothers. Now, note that if pronoun<sub>i</sub> in IP<sub>1</sub> is also treated as functional, the coreference requirement between it and XP<sub>i</sub> is satisfied:

- (23) [IP<sub>1</sub> Every man<sub>i</sub> loves her<sub>j</sub>]<sub>i</sub> [IP<sub>2</sub> [his<sub>i</sub> mother]<sub>j</sub>] [IP<sub>2</sub> every man<sub>i</sub> loves t<sub>j</sub>]<sub>i</sub>

It has been independently argued (Cooper (1979), Engdahl (1986)) that free pronouns can be interpreted as functional, based on the assumption that their semantic representation may contain a free variable over functions. This explains the double-indexing of *her* in (23) and its bound interpretation, which is also attested with other quantifiers, such as *no* and *most*:

- (24) [af gever<sub>i</sub> lo somex ale-ha<sub>j</sub>]<sub>i</sub> [[al im-o<sub>j</sub>]<sub>j</sub> [af gever<sub>i</sub> lo somex t<sub>j</sub>]<sub>i</sub>]  
 no man not trust on-her on mother-his no man not trust  
 'No man trusts her, his mother'

- (25) [rov ha-gvarim<sub>i</sub> soxrim ota<sub>j</sub>]<sub>i</sub> [[et ha-mexonit Sela-hem<sub>j</sub>]<sub>j</sub> [.. t<sub>j</sub>...]<sub>i</sub>]  
 most the-men rent Acc-it Acc the-car theirs  
 'Most men rent it, their car'

If *her* in (23) were a resumptive pronoun, the coreference relation between it and *his mother* would not have been possible. The reason for this is, I argue, that resumptive pronouns

lack a variable over functions in their semantic representation, and therefore do not induce functional interpretations. This claim is supported by an observation from Doron (1982) regarding binding possibilities in A'-constructions, which is illustrated in the contrast between the Topicalization in (26) and the LD in (27):

(26) [et im-o<sub>i</sub> ]<sub>j</sub> ,                      kol    gever<sub>i</sub> ohev t<sub>j</sub><sup>i</sup>  
       Acc    mother-his                      every man loves

(27) [im-o]<sub>j</sub>,                      kol    gever<sub>i</sub> ohev ota<sub>j</sub>  
       mother-his                      every man loves Acc-her

(26) is ambiguous between a bound reading (where *his* is bound by *every man*) and a non-bound reading. (27), where *his mother* binds a resumptive pronoun, has only the second reading. Note that (26) is like IP2' in (23): both contain an A'-trace which induces a functional interpretation. But (23) also contains a free pronoun (namely, *her*). If *her* were a resumptive pronoun, the functional interpretation would be blocked, as is indeed the case in (27). Therefore, the contrast between (23) and (27) further supports the claim that the clause-internal pronoun in RD is not a resumptive pronoun.

#### 4. Conclusion

This analysis of RD, where the clause-internal pronoun is analyzed as a free pronoun, and the dislocated phrase binds a trace in a separate clause, accounts for special properties of RD regarding Case, locality and anaphora. Differences between RD and LD were shown to follow from their different structures. In addition, it was argued that unlike free pronouns and traces, resumptive pronouns cannot be interpreted as functional.

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# Contrastive and Exhaustive Focus Readings in Korean<sup>1</sup>

Mean-Young Song

## 1. Introduction

The purpose of this paper is to provide syntactically and semantically proper account of the fact that, in Korean, the subject NP marked by the topic -un /-nun<sup>2</sup> yields a contrastive focus reading, as illustrated in (1a), while the subject NP marked by the nominative marker -i /-ga<sup>3</sup> allows an exhaustive focus reading, as illustrated in (1b):

- (1) a. *ingan-un isungjeok dongmul-ita*  
man TOP rational animal-is  
Man is a rational animal  
b. *ingan-i isungjeok dongmul-ita*  
man NOM rational animal-is  
Man is a rational animal

The only difference between (1a) and (1b) is that in (1a) the topic marker is attached to the subject NP *ingan* “man”, whereas in (1b) the nominative case marker to the subject NP. A sentence like (1a) is ambiguous: a generic reading and a contrastive reading. On the contrastive focus reading, (1a) means that no other living things than human beings are rational. A sentence like (1b) is also ambiguous: a neutral reading and an exhaustive focus reading. On the neutral reading, (1b) just describes the state that man is a rational animal. On the exhaustive focus reading, it means roughly that of all the things salient at this point, it is human beings that are rational. From the

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<sup>1</sup> I am grateful to Paul Portner, Héctor Campos, and Toshiyuki Ogihara for their valuable comments and discussion. I also thank the anonymous audience at NWLC for their comments. All remaining errors are exclusively my own.

<sup>2</sup> There are two distinctive topic markers in Korean: -un and -nun. There is no syntactic or semantic difference between them. The distinctive two forms of the topic markers purely come from the phonological reason, that is, when a word ends with a consonant, -un is used, and when a word ends with a vowel, -nun is used. I will use -nun as a representative form of the topic marker.

<sup>3</sup> The nominative case marker also have two different form: -i /-ga. Like the topic marker, this is purely due to phonological reason. When a word ends with a consonant, -i is used, and when a word ends with a vowel, -ga is used.

above examples, we can tell that the topic marker -nun is responsible for the contrastive reading, while the nominative marker -i for the exhaustive focus reading. As a matter of fact, both the topic marker and the nominative case marker yield several different readings, as we will see in section 2.1, but in this paper, I will confine the topic to the subject with the topic marker -nun and the subject with the nominative case marker -i which are responsible for a contrastive reading and an exhaustive focus reading respectively, because the purpose of this paper is to account for the contrastive -nun and the exhaustive focus -i.

This paper is divided into two major parts. In the first part of this paper, I will discuss the syntactic positions for the contrastive focus -nun and the exhaustive focus -i. In the second part of this paper, I will discuss how we can interpret the contrastive focus -nun and the exhaustive focus -i in terms of the alternative semantics Rooth (1992) proposes.

## 2. Contrastive -nun and Exhaustive -i

### 2.1 Problem

Generally speaking, the subject with the topic marker nun allows four readings: a generic reading, a neutral reading, pure topic reading, and a contrastive reading (or a contrastive focus reading). Consider the following sentences:

- (2) a. ingan-un isungjeok dongmul-ita<sup>4</sup>  
man TOP rational animal-is  
Man is a rational animal (Generic Reading)  
No other living things than human beings are rational (Contrastive Reading)
- b. Hankook-un san-i manhta  
Korea TOP mountain-NOM many  
Speaking of Korea, there are many mountains (pure Topic Reading)
- c. John-nun hakkyo-e gassessta  
TOP school-to went  
John went to school (Neutral Reading)  
No other person than John went to school (Contrastive Focus Reading)

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<sup>4</sup> I repeat (1a) for convenience's sake.



(2b) is the example of the pure topic reading when the subject NP is marked by -nun. Notice that both (2a) and (2c) are ambiguous but not (2b). (2a) allows both a generic reading and a contrastive reading, and (2c) has both a neutral reading and a contrastive reading. The neutral reading of (2c) describes the event that ‘John went to school’, while the contrastive reading of (2c) means that no other person in the domain of discourse than John went to school. Of all the readings the topic marker -nun may have, I will focus on the contrastive reading since the other readings are not what we are concerned with in this paper.

The subject with the nominative case marker -i allows two readings: a neutral reading and an exhaustive reading, as illustrated in (3):

- |   |   |
|---|---|
| (3) John-i hakkyo-e gassessta<br>NOM school-to went<br>John went to school<br>It was John that went to school | (Neutral Reading)<br>(Exhaustive Focus Reading) |
|---|---|

As Kuroda (1965) and Kuno (1973) noted from Japanese, (3) is ambiguous. It can have a neutral reading or an exhaustive reading. On the neutral reading, (3) describes the event of John’s going to school. On the exhaustive focus reading, it roughly means that of all the people salient at this point, it was John who went to school. I will focus on the exhaustive focus reading in this paper.

In the examples I have given so far, I have intentionally excluded any connection individual predicates and stage-level predicates may have to the topic marker -nun and the nominative marker -i just to describe how many readings are available in the sentences with these two markers. If we relate the individual-level predicates and the stage-level predicates to both the topic marker and the nominative case marker in Korean, we can find an interesting fact: the subject NP with the topic marker is ambiguous irrespective of the predicate type, whereas the subject NP with the nominative case marker yields only an exhaustive focus reading when its predicate is an individual-level predicate. Consider the following sentences:

- |   |  |
|---|--|
| (4) a. John-nun chack-lul ill-ko-issta<br>TOP book-ACC read-Prg-DEC<br>John is reading a book<br>No other people than John are reading a book | (Stage-Level Predicate)<br>(Neutral Reading)<br>(Contrastive Exhaustive Reading) |
|---|--|

- b. John-i chack-lul ill-ko-issta (Stage-Level Predicate)  
NOM book-ACC read-Prg-DEC  
John is reading a book (Neutral Reading<sup>5</sup>)  
It is John that is reading a book (Exhaustive Reading: or Focus Reading)

- (5) a. John-nun youngriha-ta (Individual-Level Predicate)  
TOP smart-DEC  
John is smart (Neutral Reading)  
No other people than John are smart (Contrastive Exhaustive Reading)

- b. John-i youngriha-ta (Individual-Level Predicate)  
NOM smart-DEC  
It is John that is smart (Exhaustive Reading, or Focus Reading)  
(a neutral reading is not available)

(4a) and (4b) are the examples where the topic marker -nun and the nominative case marker -i are used with the stage-level predicates, while (5a) and (5b) are the sentences where these two markers are used with the individual-level predicates. When the subjects marked not only by the topic marker but by the nominative case marker are combined with the stage-level predicates, as seen in (4), sentences like (4a) and (4b) are ambiguous: (4a) allows a neutral reading a contrastive reading, and (4b) a neutral reading and an exhaustive focus reading. When the subjects with the topic marker and the nominative case marker are used with the individual-level predicates, as seen in (5), we get an interesting fact: in (5a), the subject with the topic marker -nun is still ambiguous, allowing not only a neutral reading but also a contrastive reading, but in (5b), the subject with the nominative case marker -i has only an exhaustive focus reading. In this paper, I will try to answer the following question: how can we account for the fact that the subject NP marked by the topic marker -nun yields a contrastive exhaustive reading, while the subject NP marked by the nominative case marker allows a exhaustive focus reading?

## 2.2 Syntactic Position for Contrastive -nun and Exhaustive Focus -i

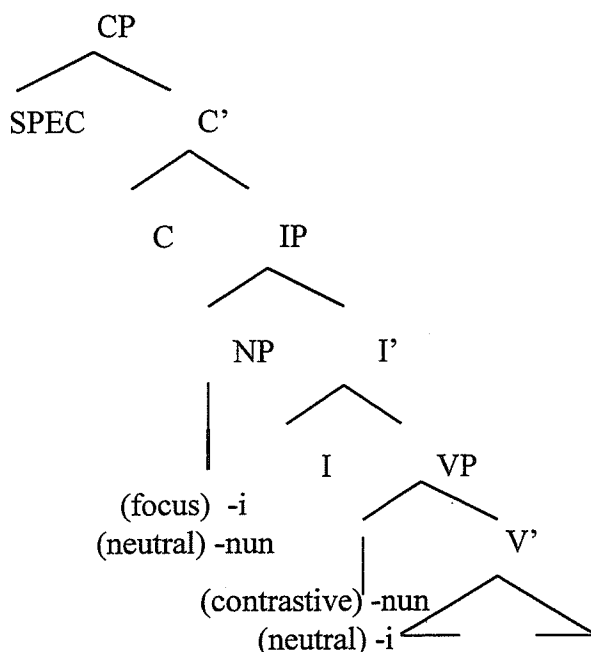
In this section, I am going to discuss which syntactic position is available for the topic marker

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<sup>5</sup> When a sentence has a neutral meaning, it has a narrow focus, as in “[<sub>F</sub> John ] is reading a book”. On the contrary, when a sentence has an exhaustive reading, it has a wide focus, as in “[<sub>F</sub> John is reading a book]”.

-nun yielding a contrastive reading and the nominative case marker -i yielding an exhaustive focus reading. I propose that the NP with the topic marker -nun allowing the contrastive reading appear in the SPEC of VP, and the NP with the nominative case marker -i allowing the exhaustive focus reading appear in the SPEC of IP, as illustrated in (6). If we think conversely, this means that neutral reading -nun appears outside of the SPEC of VP, and neutral reading -i appears inside of the SPEC of VP. This can be described in the tree diagram (6).

(6) Syntactic Positions for Contrastive -nun and Exhaustive Focus -i



The first evidence is that the topic marker -nun can be attached to XPs that are generated within VP, yielding a contrastive reading. Notice that unlike the topic marker the nominative case marker -i cannot be attached to a constituent that is VP-internally generated. Consider the following sentences:

- (7) a. John-i [<sub>VP</sub> haebyeon-nun joahanda]  
 NOM beach-TOP like  
 John likes the beach, not other things (Contrastive (Focus) Reading only)
- b. John-i [<sub>VP</sub> Chenchenhi-nun umsik-lul meokul-suissta]  
 NOM slowly-TOP food-ACC eat-can  
 Lit: John can eat food slowly (John can eat food only if he eat slowly)  
 (Contrastive Focus Reading only)

- c. John-i [<sub>VP</sub> Mary-lul eoje-y-nun boass-ta]  
 NOM ACC yesterday-TOP saw-DEC  
 It was yesterday, not other day or time, that John saw Mary  
 (Contrastive Reading Only)
- d. eoje-y-nun John-i [<sub>VP</sub> Mary-lul eoje-y-nun boass-ta]  
 yesterday-TOP NOM ACC yesterday-TOP saw-DEC  
 Speaking of yesterday, John saw Mary (Not Contrastive Reading, or Purely Topic Reading)
- e. John-i \*illbureo-nun (illbureo) [<sub>VP</sub> Mary-lun manness-ta]  
 NOM intentionally-TOP (intentionally) ACC met-DEC  
 John intentionally met Mary

In (7a), the NP haebyeon “beach” is the object of the verb joahanda “like”, so it is generated inside of VP. It should be marked by the accusative case marker -lul in a normal sentence since it is the object of the verb. Since it is marked by the topic marker instead of the accusative marker, only a contrastive reading is available in (7a). Since the adverb chenchenhi “slowly” modifies the verb in (7b), it is generated inside of VP. (7b) allows only a contrastive reading since it is marked by the topic marker. Compare (7c) and (7d): (7c) allows a contrastive reading, while (7d) does not. The time adverb eoje “yesterday” in (7c) occupies a position within VP, and it is marked by the topic marker, hence only a contrastive reading is available. On the contrary, even if the time adverb eoje “yesterday” is marked by the topic marker in (7d), a pure topic reading, not a contrastive reading, is available since it occupies a position outside of VP. In general, illbureo “intentionally” in (7e) is said to occur outside of VP since it is always associated with the subject in a sentence. If we attach the topic marker -nun to a constituent (i.e. illbureo “intentionally”) that is generated outside of VP, as in (7e), it will be ungrammatical. This means that the topic marker cannot be attached to constituents that appear outside of VP. In other words, (7d) and (7e) show that when the topic marker -nun is attached to an XP that is VP-internally generated, it does not allow a contrastive reading, as in (7d), or the sentence is unacceptable as in (7e). Thus, it is reasonable to say that every XP marked by -nun appears within VP when it allows a contrastive reading, and that every XP marked by -i appears outside of VP.

Second, Diesing (1988) argues that focus can project from the VP-internal subject, consequently, yielding a wide focus reading, whereas focus cannot project from the VP-external subject, consequently, yielding a narrow focus reading, as illustrated in (8):

- (8) a. [<sub>F</sub>Blowfish] are poisonous  
 b. [<sub>F</sub>Blowfish are available]

To explain sentences like (8a) and (8b), Diesing argues that the subjects of individual-level predicates are generated outside of the VP and the subjects of stage-level predicates inside of the VP. Thus, focus projection is not possible in (8a), yielding a narrow focus reading only, while focus is possible in (8b), yielding a wide focus reading only.

If we assume that Diesing's observation is correct, we can predict that if a subject with the topic marker -nun appears within VP (or SPEC of VP) and a subject with the nominative case marker -i appears outside of VP (or SPEC of IP), then focus projection from the subject NP will be possible in the case of the topic marker responsible for a contrastive reading, yielding a wide focus reading, whereas focus projection from the subject is blocked in the case of the nominative case marker responsible for an exhaustive focus reading, as illustrated in (9):

- (9) a. [<sub>F</sub> John-nun Mary-lul joahagi-man] [<sub>F</sub> Kim-un Mary-lul saranghan-ta]  
           TOP      ACC like-but                  TOP      ACC love  
           John likes Mary but Kim loves Mary
- b. \* [<sub>F</sub> John-i Mary-lul joahagi-man] [<sub>F</sub> Kim-i Mary-lul saranghan-ta]  
           NOM      ACC like-but                  NOM      ACC love  
           John likes Mary but Kim loves Mary

The grammaticality of (9a) can be accounted for by the fact that the contrastive focus of the subjects "John" and "Kim" are projected position into each predicate of theirs from the VP-internal subject position, and the ungrammaticality of (9b) comes from the fact that the exhaustive focus of the subjects "John" and "Kim" cannot be projected into each predicate of theirs. Assuming Diesing's (1988) proposal is correct, we can conclude from (9) that it is reasonable to say that the topic marker responsible for a contrastive reading appears within VP, and the nominative case marker responsible for an exhaustive focus reading appears outside of VP.

Third, the double subject constructions in Korean provide another piece of evidence for the argument that the contrastive -nun appears within VP, while the exhaustive focus -i appears outside of VP. Consider the following sentences:

- (10) a. Seoul-un [<sub>VP</sub> salam-un manhta ] (Contrastive reading on Salam)  
top person-top many  
Speaking of Seoul, it is people, not others, that are many
- b. Seoul-i [<sub>VP</sub> salam-i manhta ] (Focus on Seoul)  
NOM person-NOM many  
It is Seoul that has many people
- c. Seoul-un [<sub>VP</sub> salam-i manhta ] (Neutral reading of salam)  
TOP person-NOM many  
Speaking of Seoul, there are many people

If we assume that in the double subject constructions, one subject appears outside VP and the other appears within VP, this supports that the contrastive -nun occurs within VP, and the exhaustive focus -i appears outside of VP. (10a) has a contrastive reading on salam “people” since it appears inside of VP. Seoul cannot have a contrastive reading, even though it is marked the topic marker -nun, because it occupies a position outside of VP. Seoul in (10a) leads to a pure topic reading. (10b) has an exhaustive focus reading on Seoul since it appears outside of VP. The other subject salam “people” cannot have an exhaustive reading even if it is marked by the nominative case marker -i, because it appears inside of VP, yielding a neutral reading. There is no exhaustive focus reading or contrastive reading in (10c). Seoul with the topic marker -nun allows a pure topic reading, since it occupies a position outside of VP, and the other subject salam “people” with the nominative case marker -i allows a neutral reading since it appears inside of VP. Thus, we can draw a conclusion from the above fact that the topic marker that appears inside of VP is responsible for a contrastive reading, whereas the nominative case marker that appears outside of VP is responsible for an exhaustive focus reading.

### 3. Focus Interpretation of -nun and -i

In this paper, I will explain how to interpret the contrastive -nun and the exhaustive focus -i in terms of Rooth’s (1992) focus interpretation theory (or “alternative semantics”). His theory is a kind of in-situ theory since no movement occurs in the interpretation of focus. Originally, his interpretation of focus is based on presupposition sets or p-set. His idea of p-sets comes from

Jackendoff's (1972) analysis of focus based on presupposition. For example, the following sentence

(11) [<sub>F</sub> John] walks

presupposes that someone walks. This can be represented by (11a):

(11a)  $\lambda x[x \text{ walks}]^6$

(11a) denotes the set of individuals who have the property of walking. Based on this, Rooth proposes a **p-set**, or a set of alternative propositions, and the focus feature F is a crucial factor in determining the p-set, as we will see below.

### 3.1 Interpretation of the Exhaustive Focus -i

According to Rooth (1992), there are two dimensional semantics: the ordinary semantics and the focus semantics, and the latter is involved in the focus interpretation<sup>7</sup>. The alternative semantic value is the set of propositions obtained by substituting for a focused phrase the ordinary semantic values of a phrase corresponding to the focused phrase. Let  $D = \{\text{John, Mary, Sue}\}$ . For illustration, consider the following examples:

(12) John introduced [<sub>F</sub> Mary] to Sue

Since *John*, *Sue*, and *introduced* are not marked by the focus feature F, each of them has its ordinary semantic values  $\|\text{John}\|^0 = j$ ,  $\|\text{Mary}\|^0 = m$ , and  $\|\text{introduced}\|^0 = \text{introduce}$

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<sup>6</sup> The semantic interpretation of  $\lambda$

For every variable  $u$  of type  $a$ , and every expression  $\phi$  of type  $b$ ,

$\|\lambda u\phi\|^{M,w,g} = \text{that function } f \in D_{\langle a,b \rangle} \text{ such that for any } \alpha \in D_a, f(\alpha) = 1 \text{ iff } \|\phi\|^{M,w,g(\alpha/u)} = 1$

<sup>7</sup> Rooth (1992) uses the notation " $\|\cdot\|^0$ " for ordinary semantic values, and the notation " $\|\cdot\|^f$ " for alternative semantic values. I will follow these two notations in this paper.

respectively, while  $[_F \text{ Mary}]$  has the focus semantic value  $\| \text{Mary} \| ^f = \{ \text{John, Mary, Sue} \}$ . Thus, we can say (12) has the following p-set:

- (13)  $\{ \| \text{John introduced Mary to Sue} \| , \| \text{John introduced John to Sue} \| , \| \text{John introduced Sue to Sue} \| \}$

(13) says that the alternative semantic values for (12) is the set of propositions of the form “John introduced  $x$  to Sue”. If *Sue* is focused in (12) instead of *Mary*, as in “John introduced Mary to  $[_F \text{ Sue}]$ ”, then the alternative semantic value for this is the set of propositions of the form “John introduced Mary to  $x$ ”. This can be stated in a formal way:

- (14) a.  $\| \text{John introduced } [_F \text{ Mary}] \text{ to Sue} \| ^f = \{ \text{introduce}(j,x,s) \mid x \in D \}$   
 b.  $\| \text{John introduced Mary to } [_F \text{ Sue}] \| ^f = \{ \text{introduce}(j,m,y) \mid y \in D \}$

Now let's return to the example of the exhaustive focus reading  $\text{-i}$ . For convenience's sake, I will repeat (4b) as (15):

- (15)  $[_F \text{ John-i}]$  chack-lul ill-ko-issta (Stage-Level Predicate)  
 NOM book-ACC read-Prg-DEC  
 It is John that is reading a book (Exhaustive Reading: or Focus Reading)

The same focus interpretation as we saw above can be applied in the case of the exhaustive focus reading  $\text{-i}$  as seen in (15). (15) presupposes that there is someone who is reading a book. Its p-set can be stated as follows:

- (16) P-set of (15)  
 $\| [_F \text{ John-i}] \text{ chack-lul ill-ko-issta} \| ^f = \{ \text{read}(x,b) \mid x \in D \}$

And its truth condition can be stated as following:



(17)  $\| \text{[}_F\text{ John-i] chack-lul ill-ko-issta} \| \stackrel{f}{=} 1$  iff for any  $w \in W$ ,  $\text{[}_F\text{John]}^8$  reads a book in  $w$ .

### 3.2 Interpretation of the Contrastive -nun

The interpretation of the contrastive -nun can be obtained by using the scalar implicature Rooth (1992) discusses since if we look at the English translation of (4a), we can know (4a) roughly means “John is the only person to read a book in the domain of discourse”.

Before I go on, I will talk about what the scalar implicature is. A scale is composed of a set of contrastive expressions of the same grammatical category, which can be arranged in a linear order by degree of semantic strength as in  $\langle a_1, a_2, \dots, a_n \rangle$ . If a speaker asserts a weaker point on the scale, he implicates a stronger point does not obtain. In other words, if a speaker asserts  $S(a_2)$ , then he implicates  $\neg S(a_1)$ . For example, suppose we have a scale of quantifiers like this:  $\langle \text{all, most, some, a few} \rangle$ . If a speaker says “Some students voted for Tom”, then he implicates that not all the students voted for Tom.

One of the focus interpretations Rooth (1992) is the interpretation obtained by using the tool of the scalar implicature. For example:

(18)  $\text{[}_F\text{ John]} \text{ walks}$

(18) means that Mary and Sue in  $D$  do not walk. (18) has the following scale  $C$ :

(19)  $\langle \text{walk}(j+m+s),$   
 $\text{walk}(j+m), \text{walk}(j+s), \text{walk}(m+s),$   
 $\text{walk}(j), \text{walk}(m), \text{walk}(s) \rangle$

If a speaker says “ $\text{walk}(j)$ ”, he implicates that John and Mary do not walk.  $\text{walk}(j+m)$  is false if  $\text{walk}(j)$  is false or  $\text{walk}(m)$  is false. And if  $\text{walk}(j)$  is true and  $\text{walk}(j+m)$  is false,  $\text{walk}(m)$  must be false. Thus, asserting that John walks implicates that Mary does not walk. Because Rooth (1992)

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<sup>8</sup> For example, in the domain of individual  $D$  we supposed above,  $\text{[}_F\text{ John]}$  is  $D$ , that is,  $\{\text{John, Mary, Sue}\}$ .

notes that C in (19) is a small set of proposition of the form “x walks”, he proposes the Constraint on Scales according to which C must be a subset of the alternative semantic value:

(20) Constraint on Scales<sup>9</sup>

In constructing a scale of alternative assertions determining the scalar implicatures of a sentence a, choose an underlying set C such that  $C \subseteq ||a||^f$ . (Rooth (1992), p83)

According to (20), (19) is a subset of  $||[_F \text{ John}] \text{ walks}||^f$ .

Let's return to our example. The same reasoning we have just seen above can be applied to the contrastive -nun. I will repeat (4a) as (21) for convenience's sake:

(21)  $[_F \text{ John-nun}] \text{ chack-lul ill-ko-issta}^{10}$  (Stage-Level Predicate)

TOP book-ACC read-Prg-DEC

No other people than John are reading a book (Contrastive Exhaustive Reading)

Unlike the presupposition of (15), (21) presupposes all the other people in the domain of discourse are not reading a book. Judging from the contrastive focus reading of (21), Mary and Sue in D are not reading a book. This is a situation similar to one we have just seen above. We can write the scale C of (21):

(22)  $\langle \text{read}(j+m+s,b),$   
 $\text{read}(j+m,b), \text{read}(j+s,b), \text{read}(m+s,b),$   
 $\text{read}(j,b), \text{read}(m,b), \text{read}(s,b) \rangle$

According to the constraint on scales (20), we can say that (22) is a subset of  $||[_F \text{ John-nun}] \text{ chack-lul ill-ko-issta}||^f$ . The reasoning for (21) is, for example, like this: read(j,b) implicates both John and Mary (or read(j+m,b)) do not read a book. If read(j,b) is true and read(j+m,b) is false, read(m,b) must be false. Thus, asserting that read(j,b) implicates ¬read(m,b). In the same way, we can reason about Sue, that is, asserting that read(j,b) also implicates ¬read(s,b).

<sup>9</sup> Rooth (1992) proposes general constraints on Focus Interpretation. (see Rooth (1992), p86)

<sup>10</sup> I omit a neutral reading of (19) since it is not what we are concerned with in this paper.

Eventually, from this, we can get the meaning of (21) that no other person than John is reading a book.

#### **4. Conclusion**

Generally speaking, in Korean, the subject with the topic marker -nun allows a generic reading, a neutral reading, a pure topic reading, and a contrastive reading, while the subject with the nominative case marker -i allows a specific reading, a neutral reading, and an exhaustive focus reading. In this paper I focused on the topic marker and the nominative case marker allowing a contrastive reading and an exhaustive focus reading respectively, and attempted to account for why the subject with the topic marker yields the contrastive reading, while the subject with the nominative case marker yields the exhaustive focus reading. In the first part of this paper, I discussed the syntactic positions for the contrastive -nun and the exhaustive focus -i: the contrastive -nun occurs VP-internally, while the exhaustive focus -i occurs VP-externally. In the second part of this paper, I discussed how we could interpret the contrastive -nun and the exhaustive focus -i in terms of the alternative semantics Rooth (1992) proposes.

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## **Assimilation, Weakening and Geminate Inalterability**

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### **1. Introduction**

In standard generative phonological approaches, rules are designed to match against input. Thus, geminate blockage or inalterability has been understood to be the result of an input constraint on the application of rules. That is, the rules are designed to affect only non-geminates, and by doing so they account for geminate inalterability. However, those rules cannot affect geminates and cannot be verified in any empirical sense (Scobbie 1992). Furthermore, there exist cases in which geminates are not immune to phonological processes (cf. Churma 1988). Since inalterability of geminates cannot be properly accounted for by the way in which the rules match against input, a prediction about phonological behavior of geminates should be made by some other approach.

In this paper, however, contrary to previous accounts, geminate inalterability is explained in a radically different way. That is, inalterability is attributed to Optimality Theory (Prince & Smolensky 1993, McCarthy & Prince 1993, among others) in which input-output pairs are produced by an evaluation procedure that checks all possible outputs for some input against a set of constraints. The constraints are universal and language variation is explained by the different rankings of constraints.

### **2. The Nature of Geminate Inalterability**

Schein and Steriade (1986), and Hayes (1986) understand geminate blockage or inalterability to be the result of an input constraint on the application of rules. However, the proposal I defend here is that geminate inalterability is a consequence of constraint interactions. To this purpose, it is first necessary to examine the fundamental nature of geminate inalterability.

#### *2.1 Weakening and Assimilation*

According to Churma (1988), most of the inalterability cases are weakening examples (cf. Selkirk 1990, and Scobbie 1992). Thus, recognizing a distinction between “weakening” and “assimilation” rules can allow for a theory which has significantly greater predictive

power than those of Hayes (1986) and Schein and Steriade (1986). Churma (1988) also observes that geminate inalterability can be partly explained by examining the intrinsic feature content of the rules that are blocked. That is, the inherent “strength” of geminate consonants is assumed to resist any weakening process other than degemination.

Since in the majority of cases, the rules that are blocked from applying to geminates are weakening rules, the fact that geminates are immune to such rules has to be explained in connection with the theory of weakening (or lenition) covering both geminates and singletons.

Traditionally, weakening is defined as given in (1).

(1) Weakening:

A weakening process has as output a segment that is higher than the input on the sonority hierarchy without the spreading of the features.

On the other hand, assimilation is defined as follows.

(2) Assimilation:

An assimilation process involves autosegmental spreading.

(Churma 1988, Hayes 1986)

Our discussion of geminate inalterability starts from the observation that geminates behave differently with respect to weakening and assimilation. Weakening affects only simplex consonants. On the other hand, assimilation affects simplex and geminate consonants indiscriminately. Since assimilation is understood not as weakening but as autosegmental spreading, geminates cannot be restricted from being a target of the autosegmental spreading. Assimilation is the matter of spreading of the features, not the matter of weakening of the inherent “strength” of features (cf. Churma 1988, Schein & Steriade 1986).

Weakening occurs according to the following system known as strength hierarchy.

(3) Strength Hierarchy

geminates > voiceless noncontinuants > voiced noncontinuants > voiceless  
fricatives > voiced fricatives > approximants > zero

(cf. Lass 1984, Churma 1988)

As we can see in (3), geminates are ranked atop in the strength hierarchy as a separate category. Because of this inherent strength of geminates as a unit, geminates resist any weakening process other than degemination. In order to reflect this point, we propose the following constraint.

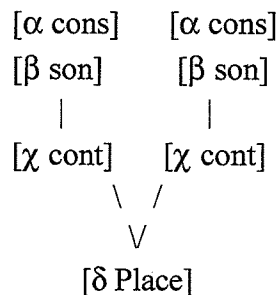
(4) \*Wgem: Geminates must not be weakened

\*Wgem is motivated to capture the general observation that geminates are not weakened cross-linguistically. This constraint is essential in barring the change of both the elements of geminates.

## 2.2 Two-Root Representation of Geminates and Inalterability

Selkirk (1990) proposes that phonological rules alter geminates only when the output would be well-formed. The following is the summary of Selkirk's (1990) proposal.

(5) A Two-Root Theory of Geminate Structure (Selkirk 1990, cf. McCarthy 1988)<sup>1</sup>



A relevant well-formedness constraint is the Dependent Linking Principle (DLP).

(6) DLP (Selkirk 1990)

A multiply linked dependent feature must have identical heads.

This DLP together with a two root theory of geminates and the Place-Stricture Dependency (PSD) is necessary to derive geminate inalterability.

Root nodes are constituted of specifications for the features consonantal and sonorant (cf. McCarthy 1988). These specifications (i.e. the root node) can be the head of any features dependent on them. Next, PSD holds that the place node is dependent

upon [cont]. Thus, DLP would predict the blockage of rules changing such feature values as [cons], [son], and [cont] in just one half of a geminate.

If any weakening rules like spirantization and sonorantization change the values of the above-mentioned features in just one half of the geminates, then it will destroy the identity between the heads of the dependent (Place) features of geminates, which creates an ill-formedness according to DLP.

It seems desirable that Selkirk (1990) tries to explain geminate inalterability from the perspective of output constraints. However, some problems concerning this approach are identified (cf. Cho and Inkelas 1992): First, homorganic nasal obstruent clusters violate DLP. Second, Place features other than stricture features (cons, son, cont) can cause geminate inalterability (e.g. Latin). Thus, I propose a revised version of DLP, which is termed the Head Identity Constraint (HIC).

The HIC is composed of two parts: Root Identity and the Strict Dependent Linking Constraint (SDLC) as shown in (7).

(7) Head Identity Constraint (HIC)

- a. Root Identity: Multiply-linked structures must have identical root node heads
- b. Strict Dependent Linking Constraint (SDLC): Multiply-linked dependent features must have immediately dominating identical heads

The HIC is motivated to ensure the identity between the corresponding heads of the geminates and linked structures. These constraints will be called upon according to the nature of the processes in question. In most of the cases, geminates and linked structures seem to satisfy SDLC. However, homorganic nasal obstruent clusters violate Root Identity, although they satisfy SDLC.

The HIC will be essential in barring the change of half of the elements of geminates.

To summarize so far, we have defended the hypothesis that geminate inalterability is a consequence of interactions of the universal constraints, which are violable in nature. Following Churma (1988), weakening, which weakens only simplex consonants in general, will be distinguished from assimilation (i.e. autosegmental spreading of features), which affects both simplex and geminate consonants indiscriminately.

In order to derive the desired result of geminate inalterability, we assume that geminates have a representation with two root nodes. In addition, \*Wgem and the HIC (Root Identity and SDLC) are introduced as universal constraints together with feature geometry having headships in the Place node as well as stricture nodes.



In the following section, we will analyze Hausa data. The two proposed geminate-related constraints will interact with other constraints to derive the inalterability effect in the phonological processes.

### 3. Palatalization and Klingenheben's Law in Hausa

In this section, as a case study for the illustration of the difference between assimilation and weakening with respect to geminates, I investigate Hausa palatalization and Klingenheben's Law by which only sonorants appear in the coda position. As we have observed in the previous section, inalterability matters only when we deal with weakening processes. Therefore, as expected, assimilation (here, palatalization) can freely affect both simplex and geminate consonants indiscriminately. In this regard, Hausa provides a good example for that purpose.

In this Optimality Theoretic approach, these two types of processes are explained through the result of the constraint interactions. The three highly ranked constraints, OCP, HIC (Root Identity and SDLC), and \*Wgem ensure that weakening cannot change geminate structures.

Aside from the Optimality Theoretic elements of this analysis, an interesting point here is that recognizing a distinction between "weakening" and "assimilation" can make the current analysis more predictive and explanatory than the standard generative phonological approaches, such as Hayes (1986), and Schein and Steriade (1986) (cf. Churma 1988).

#### 3.1 Data

##### (8) Weakening: Klingenheben's Law (Hayes 1986, and Cho & Inkelas 1993)

a. /sabroo/	[sawroo]	`mosquito'
/biyad/	[biyar]	`five'
b. gulma		`mischief-making'
abinci		`food'
c. dabbaa		`animal'
littaafi		`book'
salla		`prayer'
yamma		`afternoon'

(9) Assimilation: Palatalization (Cho & Inkelas 1993)

a. sa:t-a:	`steal (-verb)'
sa:č-e:	`steal (-before pron. obj.)'
sa:č-i	`steal (-before noun obj.)'
b. fans-a:	`redeem'
fanš-e:	`redeem (-before pronoun obj.)'
fanš-i	`redeem (-before noun obj.)'
c. ga:d-a:	`inherit'
ga:j-e:	`inherit (-before pronoun obj.)'
ga:j-i	`inherit (-before noun obj.)'
d. ci:z-a:	`bite (-verb)'
ci:j-e:	`bite (-before pronoun obj.)'
ci:j-i	`bite (-before noun obj.)'
e. fas-a:	`break'
fas-ašš-e	`broken one (m.)'
f. zant-uka:	`conversation-pl'
zanč-e:	`conversation'
g. bat-att-u:	`lost one(s)'
bat-ačč-iyā:	`lost one (f.)'

As we can see in the examples (8a) and (8b), only sonorants appear in the coda positions (cf. Klingenberg's Law). However, obstruents appear in the coda so long as they are geminates as shown in the first two examples in (8c).

If we look at palatalization data, obstruents /t,s,d,z/ palatalize to [č,š,ž,ʝ], respectively before front vowels /i,e/ (9a,b,c,d). Hausa palatalization can affect geminates as well as simplex coronal obstruents (9e,f,g).

For the analysis of geminate integrity and anti-integrity effects which can be found in weakening (Klingenberg's Law) and assimilation (palatalization), we propose the following constraints for Hausa.

### *3.2 The Constraints Needed for Hausa*

Below is a list of the constraints that are necessary for the Optimality Theoretic account of geminate behavior in Hausa.

#### (10) Proposed Constraints

- a. OCP: \*FF, where F is a parsed feature specification (cf. Myers 1993)
- b. Head Identity Constraint (HIC):
  - Root Identity: Multiply-linked structures must have identical root node heads
  - Strict Dependent Linking Constraint (SDLC): Multiply-linked dependent features must have immediately dominating identical heads
- c. \*Wgem: Geminates must not be weakened (cf. Churma 1988)
- d. PARSEseg/ $\mu$ : Every segment/ $\mu$  must be parsed into a syllable (cf. Sherer 1994)
- e. FILL $\mu$ : Moras must have phonological content (Sherer 1994)
- f. Coda[son]: Codas must be sonorants
- g. PARSEfeat: Features must be licensed by a higher prosodic unit
- h. RECfeat: Features must be morphologically affiliated

These constraints are not new except the HIC and \*Wgem. OCP prohibits adjacent parsed feature specification (Myers 1993). OCP seems to be unviolated and so undominated by other constraints.

The HIC is motivated to ensure the identity between the root nodes and between the immediately dominating heads of the geminates and linked structures (cf. Mester 1986, McCarthy 1988, Selkirk 1990).

\*Wgem is motivated to capture the general observation that geminates are not weakened except by degemination synchronically and diachronically, cross-linguistically (cf. Foley 1976, Lass 1984, Hooper 1976, Churma 1988).

The two PARSE constraints, PARSEseg/ $\mu$  and PARSEfeat require that different elements must be parsed into higher levels of prosodic structure. This is based on the prosodic licensing and stray erasure effects of Itô (1986). Accordingly, whenever some elements can not be integrated into the prosodic structure of the word, the PARSE constraints will be violated. That is, PARSEseg/ $\mu$  prohibits the deletion of segments and/or moras at the surface, and PARSEfeat prohibits the deletion of the underlying features at the surface.

RECfeat states that features should be affiliated in the lexicon of the input. Thus, this constraint bars addition of any features at the output structure.

FILL $\mu$  militates against any empty mora. Insertion of an epenthetic vowel will commit the violation of FILL $\mu$ . This constraint explains why epenthesis does not occur freely all the time. That is, the violation of this constraint will cost the grammar.

Coda[son] constraint is motivated from onset/coda licensing asymmetry, which roughly says that coda requires more sonorous segments (Itô & Mester 1993, Prince & Smolensky 1993). This further implies that obstruents universally make worse moras than do sonorants (cf. Sherer 1994).

### 3.3 Ranking Arguments

In the following, I give the ranking arguments for Hausa. The first ranking argument comes from /sabroo/ 'mosquito'. This argument concerns Coda[son], PARSEfeat and RECfeat. Of the two candidates [sabroo] and [sawroo], Coda[son] is violated by the first candidate [sabroo]. The constraints PARSEfeat and RECfeat are violated by the second candidate [sawroo], which has a coda sonorant. In the following, I give a summary of the candidates matched with their constraint violation.

(11) /sabroo/--->[sawroo] 'mosquito'

[sabroo]:	Coda[son]
☞ [sawroo]:	PARSEfeat, RECfeat

Because the second candidate [sawroo] is the actual output form, we can draw the following ranking relationship:

(12) Coda[son] >> PARSEfeat, RECfeat

The second ranking argument is made from the same form /sabroo/ 'mosquito'. The constraints that are concerned here are PARSEseg/ $\mu$ , FILL $\mu$ , PARSEfeat and RECfeat. Of the three candidates [sab\_\_roo], [sa<b>roo], and [sawroo], FILL $\mu$  is violated by the first candidate [sab\_\_roo]. The constraint PARSEseg/ $\mu$  is violated by the second candidate [sa<b>roo]. Finally, the third candidate [sawroo] violates PARSEfeat and RECfeat. The following is a summary of the candidates and their constraint violation.

(13) /sabroo/--->[sawroo] 'mosquito'

[sab__roo]:	FILL $\mu$
[sa<b>roo]:	PARSEseg/ $\mu$
☞ [sawroo]:	PARSEfeat, RECfeat

Since the actual output form is [sawroo] which violates PARSEfeat and RECfeat, the ranking relationship should be like the following.

(14) PARSEseg/ $\mu$ , FILL $\mu$  >> PARSEfeat, RECfeat

The third ranking argument comes from the geminate data /dabbaa/ 'animal'. This argument concerns HIC, \*Wgem and Coda[son]. Of the three candidates, [dawbaa], [dawwaa] and [dabbaa], HIC (twice) and \*Wgem are violated by the first and the second candidates, respectively. The constraint Coda[son] is violated by the third candidate [dabbaa]. Below is a summary of the candidates and their constraint violation.

(15) /dabbaa/--->[dabbaa] 'animal'

[dawbaa]:	HIC (**), (PARSEfeat, RECfeat)
[dawwaa]:	*Wgem, (PARSEfeat, RECfeat)
☞ [dabbaa]:	Coda[son]

As we have seen in (12), PARSEfeat and RECfeat are ranked lower than Coda[son], and thus they do not affect the ranking relation between Coda[son], HIC and \*Wgem. I use a parenthesis notation for these constraints to express that fact. However, the third candidate [dabbaa] which violates Coda[son] is the actual output form. Thus, we can draw the ranking relationship as shown in (16).

(16) HIC, \*Wgem >> Coda[son]

The last ranking argument can be made from the form /bat-att-iyaa/ 'lost one (f)'. This ranking argument involves the constraints OCP, PARSEseg/ $\mu$ , FILL $\mu$  and RECfeat. Of the four candidates, [batattiyaa], [bata<t>ɕiyaa], [batat\_\_ɕiyaa] and [bataɕɕiyaa], the first three candidates crucially violate OCP, PARSEseg/ $\mu$ , and FILL $\mu$ , respectively. Finally, Coda[son] and RECfeat are violated by the fourth candidate [bataɕɕiyaa]. The following is a summary of the candidates and their constraint violation.

(17) /bat-att-iyaa/--->[bataɕɕiyaa] 'lost one (f)'

[batattiyaa]:	OCP, Coda[son]
[bata<t>ɕiyaa]:	PARSEseg/ $\mu$ , (RECfeat)
[batat__ɕiyaa]:	FILL $\mu$ , (RECfeat)
☞ [bataɕɕiyaa]:	Coda[son], (RECfeat)

Because the actual output form is [batač̣ɕiyaa] which has the violation of Coda[son] and RECfeat, we can argue that the following should be the correct ranking.

(18) OCP, PARSEseg/μ, FILLμ >> Coda[son] >> (RECfeat)

The above discussion provides all the ranking arguments which can be made directly from the various forms. In the next section, I give a summary of these ranking arguments on the basis of transitive as well as direct rankings.

### 3.4 Summary of Rankings

Below is a summary of the rankings which are discovered in the above section.

(19) (a) Coda[son] >> PARSEfeat, RECfeat  
 (b) PARSEseg/μ, FILLμ >> PARSEfeat, RECfeat  
 (c) HIC, \*Wgem >> Coda[son]  
 (d) OCP, PARSEseg/μ, FILLμ >> Coda[son], RECfeat

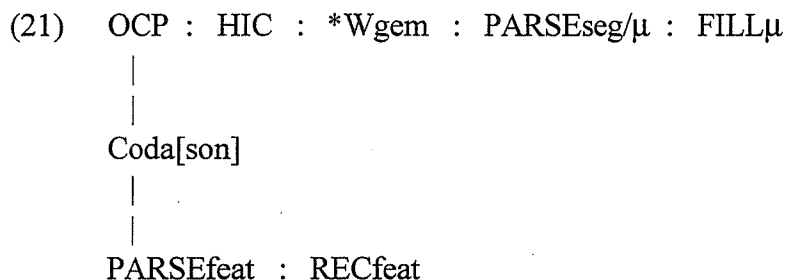
The ranking relation of OCP with respect to other constraints such as HIC, \*Wgem, PARSEseg/μ and FILLμ is not clear. However, I will put this at the top of the ranking hierarchy, considering the general tendency that OCP is not dominated by other constraints cross-linguistically.

Below is the summary of the ranking relationship of the constraints in Hausa discussed so far. The ranking relationship given below is set up either directly or by transitive ranking through the combination of the above four rankings.

(20) Ranking of the Constraints

OCP, HIC, \*Wgem, PARSEseg/μ, FILLμ >> Coda[son] >> PARSEfeat, RECfeat

The following diagram will be useful in capturing the overall hierarchy of the constraints in descending order of rank. Constraints with equal ranking are represented next to each other.<sup>2</sup>



As can be easily noticed by the above constraint ranking hierarchy diagram (21), we can predict the following cases in Hausa: (i) PARSEfeat and RECfeat can be violated to satisfy the more highly ranked constraint Coda[son] (e.g. Klingenheben's Law data: /sabroo/--->[sawroo]). (ii) Coda[son] can be violated to meet the higher ranked constraints HIC, \*Wgem, PARSEseg/μ and FILLμ (e.g. Klingenheben's Law data: /dabbaa/--->[dabbaa]). (iii) RECfeat is violated to satisfy top ranked constraints such as OCP, PARSEseg/μ and FILLμ (e.g. palatalization data: /saat-i/--->[saaɕi]). (iv) Coda[son] and RECfeat constraints can be violated to satisfy OCP, PARSEseg/μ and FILLμ constraints which are top ranked in the ranking hierarchy (e.g. palatalization data: /bat-attiyaa/--->[bataɕɕiyaa]).

In the next section, we will inspect all the above predicted cases in detail, providing full tableaux for the relevant forms. As has been assumed in the previous section, geminates are represented as moraic underlyingly.

### *3.5 Klingenheben's Law in Hausa*

A historical change known as Klingenheben's Law in Hausa which sonorized (weakened) coda obstruents (labials and velars --->/w/, alveolars---> /r/) became the synchronic condition that only sonorants appear in the coda position (Hayes 1986, Cho and Inkelas 1993). However, this rule fails to affect geminates; thus, obstruents can occur in the coda only when they are geminates. For convenience, we repeat the data below.

#### (22) Weakening (Klingenheben's Law)

a. /sabroo/	[sawroo]	'mosquito'
/biyad/	[biyar]	'five'
b. gulma		
abinci		'mischief-making'
		'food'

c. dabbaa	'animal'
littaafi	'book'
salla	'prayer'
yamma	'afternoon'

As we can see in the examples (22a) and (22b), only sonorants appear in the coda positions. However, obstruents appear in the coda as long as they are geminates as shown in the first two examples in (22c). As can be seen in the last two examples in (22c), sonorants can appear in the coda when they form geminates.

In Hausa, labial and velar stops are weakened to /w/ and /r/, respectively. In other words, Hausa shows weakening of stops to approximants /w/ and /r/, resulting in the coda sonorantization effect. However, we need to make it clear that the weakening phenomenon at issue occurs according to the systematic strength hierarchy shown in (23) again for convenience.<sup>3</sup>

(23) Strength Hierarchy

geminates > voiceless noncontinuants > voiced noncontinuants > voiceless  
fricatives > voiced fricatives > approximants > zero

(cf. Lass 1984, Churma 1988)

Thus, according to this hierarchy, when evaluated, nasal consonants are excluded from the consideration of the possible candidates for weakening processes. For that reason, hereafter we will not consider nasals as possible candidates in the discussion of weakening. When considered from the viewpoint of weakening (or lenition), this is a natural movement since each step to the right increases the permeability of the vocal tract to airflow, which causes weakening phenomenon (cf. Lass 1984).

The case of non-geminate coda (22a) is analyzed with tableau (24). In this weakening data, PARSEfeat and RECfeat are violated to satisfy more highly ranked constraint Coda[son], which has been predicted in the previous section.



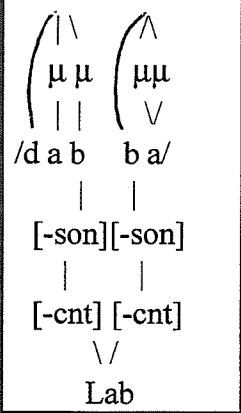
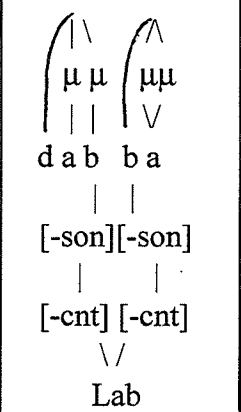
(24) /sabroo/--->[sawroo] `mosquito`

$\sigma \quad \sigma$  /sab ro/ [-son]	OCP	HIC	*Wgem	PARSE seg/μ	FILL μ	Coda [son]	PARSE feat	REC feat
a. $\sigma \quad \sigma$  sab ro [-son]						*!		
b. $\sigma \quad \sigma$  saw ro [+son] <-son> <-cont>							**	*
c. $\sigma \quad \sigma \quad \sigma$  sa b _ ro [-son]						*!		
d. $\sigma \quad \sigma$  sa<b> ro [-son]				*!				

In the above tableau, (24c) and (24d) are first eliminated by violating  $\text{FILL}\mu$  and  $\text{PARSEseg}/\mu$ , respectively. Between (24a) and (24b), candidate (24b) wins---even though it violates  $\text{PARSEfeat}$  and  $\text{RECfeat}$ , it satisfies all the proposed higher ranked constraints. That is, the violation here is minimal, and thus it is selected as the optimal output. On the other hand, competing candidate (24a) is eliminated by violating  $\text{Coda}[\text{son}]$  whose violation is crucial compared with the violations committed in (24b).

Now, we turn to the geminate coda case, which shows inalterability effect. In this data,  $\text{Coda}[\text{son}]$  is violated to meet the higher ranked constraints  $\text{HIC}$ ,  $\text{*Wgem}$ ,  $\text{PARSEseg}/\mu$  and  $\text{FILL}\mu$ .

(25) /dabbaa/--->[dabbaa] `animal`

$\sigma$ $\sigma$  /d a b    b a/ [-son][-son] [-cnt] [-cnt] Lab	OCP	HIC	*Wgem	PARSE seg/ $\mu$	FILL $\mu$	Coda [son]	PARSE feat	REC feat
a. $\sigma$ $\sigma$  d a b    b a [-son][-son] [-cnt] [-cnt] Lab						*		

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<p>b. <math>\sigma</math>      <math>\sigma</math></p> <p><math>\left( \begin{array}{c} \wedge \\ \mu &lt; \mu &gt; \\ \wedge \end{array} \right) \left( \begin{array}{c} \wedge \\ \mu \mu \\ \vee \end{array} \right)</math></p> <p>d a w    b a</p> <p>              </p> <p>[+son] [-son]</p> <p>              </p> <p>[+cnt] [-cnt]</p> <p>  \        /</p> <p>    Lab</p> <p>&lt;-son&gt;</p> <p>&lt;-cnt&gt;</p>	<p>*!*</p>			<p>**</p> <p>**</p>
<p>c. <math>\sigma</math>      <math>\sigma</math></p> <p><math>\left( \begin{array}{c} \wedge \\ \mu \mu \\ \wedge \end{array} \right) \left( \begin{array}{c} \wedge \\ \mu \mu \\ \vee \end{array} \right)</math></p> <p>d a w    w a</p> <p>              </p> <p>[+son] [+son]</p> <p>              </p> <p>[+cnt] [+cnt]</p> <p>  \        /</p> <p>    Lab</p> <p>&lt;-son&gt;</p> <p>&lt;-cnt&gt;</p>	<p>*!</p>			<p>**</p> <p>**</p>
<p>d. <math>\sigma</math>      <math>\sigma</math></p> <p><math>\left( \begin{array}{c} \wedge \\ \mu &lt; \mu &gt; \\ \wedge \end{array} \right) \left( \begin{array}{c} \wedge \\ \mu \mu \\ \vee \end{array} \right)</math></p> <p>d a &lt;b&gt; b a</p> <p> </p> <p>[-son]</p> <p> </p> <p>[-cnt]</p> <p> </p> <p>Lab</p>		<p>*!*</p>		

In tableau (25), candidates (25b) and (25c) are first eliminated; (25b) violates HIC, PARSEfeat and RECfeat, but the violation of HIC is fatal. In (25b), the feature Lab constitutes linked structure, and thus its immediately dominating heads should be identical to satisfy HIC. However, one head is [+cont] and the other one is [-cont], which leads into the violation of HIC (i.e. SDLIC). The root nodes are not identical, either. Thus, it violates HIC again (i.e. Root Identity). (25c) violates \*Wgem, PARSEfeat and RECfeat. However, the violation of \*Wgem is counted as fatal. Here, geminate /bb/ is weakened to [ww], violating \*Wgem constraint. Next, candidate (25d) is also eliminated by the violation of PARSEseg/ $\mu$  (twice). In Hausa, deletion of a segment/mora (or insertion of a mora) constitutes more severe violation than Coda[son] and just deletion or insertion of the phonological features (i.e. PARSEfeat and RECfeat). Consequently, (25a) is chosen as the optimal output regardless of the Coda[son] violation, since the violation is minimal among the competing candidates.

In summary, as we can see in the analysis of the weakening data in Hausa, simplex obstruents become sonorants at the cost of violating PARSEfeat and RECfeat to meet more higher ranked constraint Coda[son] (cf. 24b). However, geminates resist weakening of the obstruents to the sonorants, showing inalterability effect. If geminates change half or both of the geminates, then it will produce either HIC or \*Wgem violation, which are top ranked in the ranking hierarchy. Insertion or deletion of the segments at issue is also not effective. Thus, it is better to remain unchanged since it violates constraints minimally by doing so (cf. 25a). In this way, the effect of geminate inalterability is accounted for in the weakening process known as Klingenheben's Law in Hausa.

### 3.6 Palatalization in Hausa

In Hausa, obstruents /t,s,d,z/ palatalize to [č,š,ʝ,j], respectively before front vowels /i,e/. The following examples are repeated for convenience.

- (26) a. sa:t-a:           `steal (-verb)'  
       sa:č-e-e:       `steal (-before pron. obj.)'  
       sa:č-i           `steal (-before noun obj.)'
- b. fans-a:       `redeem'  
       fanš-e:       `redeem (-before pronoun obj.)'  
       fanš-i       `redeem (-before noun obj.)'
- c. ga:d-a:       `inherit'  
       ga:ʝ-e:       `inherit (-before pronoun obj.)'  
       ga:ʝ-i       `inherit (-before noun obj.)'

d. ci:z-a:	'bite (-verb)'
ci:ʃ-e:	'bite (-before pronoun obj.)'
ci:ʃ-i	'bite (-before noun obj.)'

What is interesting is that Hausa palatalization can affect geminates as well as simplex coronal obstruents, exhibiting no geminate inalterability effects---a case of anti-inalterability, as shown in (27).



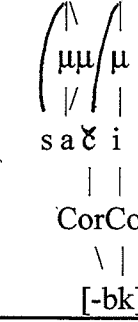
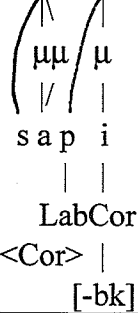
(27) a. fas-a:	'break'
fas-aʃʃ-e	'broken one (m.)'
b. zant-uka:	'conversation-pl'
zantʃ-e:	'conversation'
c. bat-att-u:	'lost one(s)'
bat-aʃʃ-iy-a:	'lost one (f.)'

This kind of data poses an interesting question about the geminate inalterability issue. Within a language, geminates behave differently according to the nature of the processes. That is, in Hausa, geminates behave differently with respect to weakening and assimilation. In weakening (Klingenheben's law), geminates are not affected at all. On the other hand, assimilation (palatalization) affects both simplex and geminate consonants indiscriminately. Thus, inalterability issue seems to matter only when we refer to weakening processes. As we have assumed at the outset of this paper, assimilation (here, palatalization) is distinguished from weakening in that the former is defined as involving autosegmental spreading of the features. Whereas, the latter is defined as raising the sonority of the segment on the output form.<sup>4</sup>

Since by definition assimilation is different from weakening, the constraint \*Wgem is not relevant in the analysis of the palatalization. Instead, OCP and HIC will play pivotal roles in explaining of palatalization. Especially, the constraint OCP will prohibit the occurrence of Cor-Cor sequence in that tier in Hausa. Thus, \*tj, for example, will be excluded by violating this OCP constraint. Additionally, the constraint RECfeat, which says that features must be morphologically affiliated, will be violated in exchange for the satisfaction of the top ranked OCP. These are the main strategies of the coronal palatalization process.

The effect of these constraints are illustrated with the data containing both simplex and geminate consonants in tableaux (28) and (29), respectively. Let us consider non-geminate coronal case first. In this case, RECfeat is violated to satisfy top ranked constraints such as OCP, PARSEseg/ $\mu$  and FILL $\mu$ .

(28) /saat-i/--->[saaci/ `steal (-before noun obj.)'

$\sigma \quad \sigma$  /s a t - i /     CorCor   [-bk]	OCP	HIC	*Wgem	PARSE seg/ $\mu$	FILL $\mu$	Coda [son]	PARSE feat	REC feat
a. $\sigma \quad \sigma$  s a t i     CorCor   [-bk]	*!							
b. $\sigma \quad \sigma$  s a č i     CorCor     [-bk]								*
c. $\sigma \quad \sigma$  s a p i     LabCor <Cor>   [-bk]							*	*!

<p>d. <math>\sigma</math>     <math>\sigma</math></p> <p><math>\left( \begin{array}{c} \mu\mu \\ \mu \end{array} \right)</math>     <math>\mu</math></p> <p>s a &lt;t&gt;     i</p> <p>             </p> <p>      Cor Cor</p> <p>           </p> <p>          [-bk]</p>				*!						
<p>e. <math>\sigma</math>     <math>\sigma</math>     <math>\sigma</math></p> <p><math>\left( \begin{array}{c} \mu\mu \\ \mu \end{array} \right) \left( \begin{array}{c} \mu \\ \mu \end{array} \right)</math>     <math>\mu</math></p> <p>s a t _     i</p> <p>             </p> <p>      Cor Cor</p> <p>           </p> <p>          [-bk]</p>					*!					

In tableau (28), the first candidate (28a) is eliminated by violating OCP, which prohibits consecutive parsed coronal features. Next, candidates (28d) and (28e) are also eliminated by the violation of PARSEseg/ $\mu$  and FILL $\mu$ , respectively. Finally, between the two candidates (28b) and (28c), (28b) is selected as the optimal one, since it violates only RECfeat; whereas, (28c) has PARSEfeat violation in addition to RECfeat.

Now, let us turn to the geminate case, which shows anti-inalterability effect. The following tableau (29) demonstrates that the underlying geminate coronals are palatalized, against the general principle of geminate inalterability. This kind of anti-inalterability case which has been recalcitrant to the past accounts of geminate inalterability can be readily accounted for within the current approach. In this data, Coda[son] and RECfeat constraints are violated to satisfy OCP, PARSEseg/ $\mu$  and FILL $\mu$  constraints which are top ranked in the ranking hierarchy.

(29) /bat-att-iy a:/--->[bata<sup>Y</sup>ɕi:ya:] 'lost one (f.)'

<p>σ σ σ σ    /bat-a tt - iy a/  V    Cor Cor     [-bk]</p>	OCP	HIC	*Wgem	PARSE seg/μ	FILL μ	Coda [son]	PARSE feat	REC feat
<p>a. σ σ σ σ</p> <p>bat a tt i y a  V    Cor Cor     [-bk]</p>	*!					*		
<p>b. σ σ σ σ</p> <p>bat a ɕɕ i y a  V    Cor Cor     [-bk]</p>						*		*
<p>c. σ σ σ σ</p> <p>bat a t ɕ i y a         CorCorCor     [-bk]</p>	*!					*		*



<p>d. σ σ σ σ</p> <p>bat a&lt;ɾ&gt;ɕ i y a</p> <p>Cor Cor</p> <p>[-bk]</p>			*!			*
<p>e.</p> <p>σ σ σ σ σ</p> <p>ba ta t ɕ i y a</p> <p>Cor Cor</p> <p>[-bk]</p>			*!	*		*

In tableau (29), candidates (29a) and (29c) are first eliminated by the crucial violation of OCP. Candidates (29d) and (29e) are also excluded from the optimal output; (29d) violates PARSEseg/ $\mu$ , and (29e) violates PARSEseg/ $\mu$  and FILL $\mu$ . As a result, candidate (29b) is selected as the optimal output, even though it violates Coda[son] and RECfeat. That is, to satisfy the higher ranked OCP, RECfeat is violated by spreading [-bk] from the front vowel /i/ to the coronal obstruents. In this way, the so-called anti-inalterability effect of geminates is explained in assimilation cases like palatalization in Hausa.

#### 4. Conclusion

In this paper, we have shown that Hausa geminates behave differently with respect to weakening and assimilation. In weakening, geminates are not affected at all, exhibiting geminate inalterability effect. On the other hand, assimilation affects both simplex and geminate consonants indiscriminately, showing a case of anti-inalterability. The conclusion we draw from this discussion is that geminate inalterability matters only when we deal with weakening processes (e.g. spirantization, sonorantization, etc.). Furthermore, unlike previous approaches, we can freely operate on the geminate

structures and use the constraints to block all but the optimal output. Thus, inalterability (and anti-inalterability) is explained as the result of the interaction of the constraints, which are universal and violable in nature.

### Endnotes

\* I would like to thank Diana Archangeli, Michael Hammond, Rachel Walker, Susan Blake, and Vern Lindblad for their insightful comments on this paper, and Christopher Fryer for correcting my English. All errors are my own.

1. Unlike Selkirk (1990), however, we assume geminates are represented with an underlying mora.
2. This kind of technique is introduced in Sherer (1994: 117).
3. Weakening hierarchy is just the inverse of the strength hierarchy.
4. In order to exclude nasal consonants from the possible candidates of weakening process, it would be better to define weakening as increasing the permeability of the vocal tract to airflow, while at the same time raising the sonority of the segment whose combined effects cause weakening phenomenon (cf. Lass 1984).

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# **The Discourse Function of WA-marking in Japanese<sup>1</sup>**

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## **0. Introduction**

The goal of this paper is to establish the discourse function of WA-marking in Japanese. I propose that 1) WA-marked NPs must satisfy the discourse conditions on Topicalization of NPs proposed by Ward & Prince (1991), 2) the discourse function of WA-marking is to create an S-topic in the sense of Büring (1994, 95), and 3) the former derives from the latter. In order to establish the properties in 1) and 2), I will compare WA-marked object NPs with fronted o-marked NPs. (-o is the accusative case marker.) Hence, I will restrict the focus of this paper to object Topicalization. I will also correlate WA-marking in Japanese with the discourse functions of Topicalization in English.

## **1. Previous Analyses of WA-marking**

### **1.1. Kuno (1973): Two Types of WA**

In Japanese linguistics, Kuno's (1973) view of WA-marking is widely accepted. Kuno claims that there are two types of WA, i.e., thematic WA and contrastive WA. Consider the following examples.

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<sup>1</sup>I am grateful to Hamida Demirdache and Michael Rochemont for their encouragement and guidance from the earlier versions of this paper. I would also like to thank Henry Davis, Rose-Marie Déchaine, Susumu Kuno, and Eric Rosen for their comments and suggestions. This research was supported by SSHRC Grant 410-92-1379, awarded to Michael Rochemont.

- (1) a WA for the theme of the sentence: Speaking of..., talking about...

Gengogaku-wa Tom-ga yoku benkyoositeiru  
 linguistics-wa Tom-nom well studying  
 "Linguistics, Tom is studying hard."

- b WA for contrasts: "X..., but..., as for X..."

Gengogaku-wa Tom-ga yoku benkyoositeiru kedo,  
 linguistics-wa Tom-nom well studying but,  
 "Linguistics, Tom is studying hard, but  
     Suugaku-wa Mary-ga yoku benkyoositeiru.  
     Math-wa Mary-nom well studying  
     Math, Mary is studying hard."

Kuno (1973) claims that WA marks either the theme or the contrasted element of the sentence; further, the theme must be either anaphoric or generic while there is no such constraint for the contrasted element.

### 1.2. Problems with Kuno's (1973) Analysis

I show that Kuno's definitions of WA require some modifications. First, it is not clear how to define a theme, and in particular, how to distinguish WA-marking from o-marking (where -o is the accusative marker). Consider the examples in (2) in (3).

- (2) a Mary-ga keeki-o katekite, daizi-ni reezooko-ni simatteoita.  
 Mary-nom cake-acc bought-came valuably refrigerator-in kept  
 "Mary bought a cake and kept it in the refrigerator dearly (i.e. like a treasure)."
- b Sikasi, keeki-o John-ga damatte tabetesimatta.  
 but, the cake-acc John-nom without permission finished eating  
 "But, John finished eating the cake without her permission."
- (3) a Mary-ga keeki-o katekite, daizi-ni reezooko-ni simatteoita.  
 Mary-nom cake-acc bought-came valuably refrigerator-in kept  
 "Mary bought a cake and kept it in the refrigerator dearly."
- b Sikasi, keeki-wa John-ga damatte tabetesimatta.  
 but, the cake-wa John-nom without permission finished eating  
 "But, John finished eating the cake without her permission."

(2b) and (3b) are identical except in one respect: the sentence initial NP in (2b) is marked by -o (the accusative marker) whereas in (3b), the sentence initial NP is WA-marked. In both (2b) and (3b), "the cake" functions as a sentence topic (that is, specifies what the sentence is about), marking the point of departure for subsequent discourse. Thus, Kuno's definition in (1a) is insufficient to distinguish WA-marking from accusative marking.

Secondly, Kuno claims that thematic WA must be anaphoric whereas contrastive WA does not have to be anaphoric. This must be defined more accurately. Consider the following examples.

- (4) Thematic WA

- a Mary-ga keeki-o katekite, daizi-ni reezooko-ni simatteoita.  
 Mary-nom cake-acc bought-came valuably refrigerator-in kept  
 "Mary bought a cake and kept it in the refrigerator dearly."

- b Sikasi, *keeki-wa* John-ga damatte tabetesimatta.  
but, the cake-wa John-nom without permission finished eating  
"But, the cake, John finished eating without her permission."

(5) Contrastive WA

- a Mary-ga dezaato-o kattedekite, daizi-ni reezooko-ni simatteoita.  
Mary-nom dessert-acc bought-came valuably refrigerator-in kept  
"Mary bought desserts and kept them in the refrigerator dearly."
- b Sikasi, *keeki-wa* John-ga damatte tabetesimatta.  
but, cake-wa John-nom without permission finished eating  
"But, the cake, (I don't know about the other desserts...) ·  
John finished eating without her permission."

What do we mean by "anaphoric"? "The cake" in (4b) refers back to "a cake" in (4a). Here, a one to one identity relationship holds between the WA-marked element "the cake" and its antecedent "a cake". However, how can we analyze (5) where the relation between "the cake" and "desserts" is not a one to one identity relation but a relation of inclusion: "the cake" in (5b) is a subset of the superset "desserts" in (5a). Is this relation one of anaphora or not? In other words, does the subset have an anaphoric relation to (the subset of) the superset? This use of WA might be analyzed as contrastive WA provided that contrastive WA need not be anaphoric (cf. Kuno 1973). However, to utter (5b), the superset "desserts" must have been previously evoked in the discourse and the speaker must know that the superset "desserts" contains "the cake".<sup>2</sup> In other words, "the cake" is anaphoric to a member of the superset "desserts". This suggests that the WA-marked element "the cake" in (5b) is not only contrastive but also anaphoric.

Finally, the assumption that WA is contrastive is not sufficient to explain its distribution. In (6) and (7), "the cake" is the contrasted element of the sentence - Note crucially that, in (6), "the cake" is o-marked whereas, in (7), it is WA-marked.

- (6) Sono keeki-o John-ga tukutta.  
that cake-acc John-nom made  
"John made that cake."  
Sosite, kono keeki-o Mary-ga tukutta.  
and, this cake-acc Mary-nom made  
"and Mary made this cake."

- (7) Sono keeki-wa John-ga tukutta.  
that cake-wa John-nom made  
"That cake, John made."  
Sosite, kono keeki-wa Mary-ga tukutta.  
and, this cake-wa Mary-nom made  
"and this cake, Mary made."

<sup>2</sup>If the superset is not evoked in the previous discourse, it must be inferable from the discourse context. Notice that (4b) and (5b) cannot be uttered out of the blue, irrespective of the definiteness of the WA-marked element.

#Keeki-wa John-ga damatte tabetesimatta. (out of the blue)  
A/The cake John-nom without permission finished eating  
"#A/The cake, John finished eating without permission." (out of the blue)

The sentence above is uninterpretable unless it is uttered in a bakery, where employees often eat some products on the sly.

We have seen that Kuno's (1973) notion of thematic/contrastive and anaphoric is not sufficient to derive the distribution of WA-marking, and hence, to explain its discourse function.

### 1.3. Thematic WA as a Subcase of Contrastive WA

In the previous section, we have seen that contrastively marked WA NPs must also be anaphoric to a previously evoked referent. In this section, I will establish that thematic WA is a subcase of contrastive WA. Consider the following examples.

(8) Out of the blue

#keeki-wa Mary-ga katta  
 cake-wa Mary-nom bought  
 "Cakes, Mary bought."  
 (thematic interpretation \*)  
 (contrastive interpretation \*)

(9) Context: An appropriate referent is not provided.<sup>3</sup>

- a John-ga Mary-o mita  
 John-nom Mary-acc saw  
 "John saw Mary."
- b #Keeki-wa Mary-ga katta  
 Cake-wa Mary-nom bought  
 "Cakes, Mary bought."  
 (thematic interpretation \*)  
 (contrastive interpretation \*)

Notice that in (8) and (9), the WA-marked elements do not have a referent evoked in the previous discourse. Thus, the uninterpretability of (8) and (9b) indicates that a WA-marked NP requires a referent which has been established in the previous discourse. Conversely, (10b) and (11b) are interpretable because the WA-marked elements are anaphoric to the previously evoked referent.

(10) Context: An appropriate referent is provided

- a John-ga keeki-o katta (**Identity**)  
 John-nom cake-acc bought  
 "John bought cakes."

<sup>3</sup>The following example shows that accommodation is possible if a WA-marked element and a previously evoked referent have something in common.

John-ga keeki-o katta  
 John-nom cake-acc bought  
 "John bought a cake."

Purin-wa Mary-ga katta (thematic interpretation \*)  
 pudding-wa Mary-nom bought (contrastive interpretation OK)  
 "A pudding, Mary bought."



- b Keeki-wa Mary-ga yaita  
cake-wa Mary baked  
"Cakes, Mary baked."  
(thematic interpretation OK)  
(contrastive interpretation \*)

(11) Context: An appropriate referent is provided

- a John-ga keeki to purin-o katta (Superset - Subset)<sup>4</sup>  
John-nom cake and pudding-acc bought  
"John bought cakes and puddings."
- b Keeki-wa Mary-ga yaita  
cake-wa Mary baked  
"Cakes, Mary baked."  
(thematic interpretation OK)  
(contrastive interpretation OK)

The only difference between (10) and (11) is that the former has a singleton set (which only allows a thematic interpretation) whereas the latter has a multi-member set (which allows either a thematic or a contrastive interpretation). Therefore, thematic WA is a subcase of contrastive WA: both thematic WA and contrastive WA respectively must stand in an anaphoric relation to an antecedent. The difference between thematic WA and contrastive WA is whether the WA-marked element stand in a one to one identity relation with a previously evoked element or stand in a relation of inclusion with a previously evoked superset.

## 2. WA-marking in Japanese and Topicalization in English

In this section, I will show that Topicalization in English and WA-marking in Japanese have two properties in common: 1) Topicalization/WA-marking is possible irrespective of the definiteness of NPs. 2) Topicalized NPs/WA-marked NPs MUST stand in a salient set anaphoric relation to an element which has been established in the previous discourse context. (cf. Prince (1988), Ward & Prince (1991))

### 2.1. Definiteness

Ward & Prince (1991) claim that Topicalization is possible irrespective of the definiteness and specificity of the topicalized NP. They demonstrate that, in English, for NPs to be topicalized, they do not need to be definite (non-specific definites or specific definites). In (14B) and (15A2), we see that a non-specific indefinite NP and a specific definite NP are topicalized respectively.

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<sup>4</sup>The judgements are the same even if the members of the superset are not explicitly given.

- John-ga dezzaato-o katta  
John-nom dessert-acc bought  
"John bought desserts."  
Keeki-wa Mary-ga yaita (thematic interpretation OK)  
cake-wa Mary-nom baked (contrastive interpretation OK)  
"Cake, Mary baked."

- (12) Non-specific Definite A: Which part of procedures do you dislike most?  
 B: The job talk, I like. But the interview makes me nervous.  
 BJ: Zyobutooku-wa sukida.<sup>5</sup> Demo mensetu-wa kintyoosuru  
 Job talk-wa like but interview-wa nervous-be  
 "In general, the Job talk, I like.  
 But the interview makes me nervous."
- (13) Specific Definite A1: I'll have to introduce one new principle in today's class.  
 A2: But, this principle, I will introduce after the break.  
 A2J: Kono genri-wa, bureeku-no atode syookai-simasu.  
 This principle-wa, break-gen after introduce-do  
 "This principle, I will introduce after the break."
- (14) Non-specific Indefinite A: Do you think you'd be more nervous in a job talk or a job interview? (W&P 1991: p168)  
 B: A job talk, I think you'd have somewhat more control over.  
 BJ: Zyobutooku-wa mootyotto nantokanaru to omou  
 Job talk-wa somewhat manageable comp think prt  
 "A job talk, I think you'd have somewhat more control over."
- (15) Specific Indefinite A1: I'll have to introduce two principles. (W&P 1991: p168)  
 A2: One I'm going to introduce now and one I'm going to introduce later  
 A2J: Hitotu-wa ima syookai-site, moo hitotu-wa atode syookai-simasu.  
 One-wa now introduce-do, another one-wa later introduce-do  
 "One I'm going to introduce now and one I'm going to introduce later"

This is also true for WA-marking in Japanese. In (14BJ) and (15A2J), we see that elements need not be definite to be marked by WA in the sentence initial position. Thus, WA-marked elements need not be definite as is often claimed in the literature. Accordingly, the definiteness of NPs does not explicate the distribution of object Topicalization in Japanese (WA-marking in the sentence initial position), either.

## 2.2. Salient Set Relations

Prince (1988) and Ward & Prince (1991) claim that, in English, preposed NPs must satisfy either one of two discourse conditions: the NP must be either anaphoric to an entity evoked in the discourse (Anaphoric Relation) or stand in a salient partially ordered set relationship to previously evoked referents (Salient Set Relation). In section 1.3, I have shown that these two conditions can be collapsed by assuming that the former is a subcase of the latter: a topicalized NP/a WA-marked NP must stand in a salient set anaphoric relation to a previous discourse referent. When this set is a singleton set, the relation between the topicalized NP and its antecedent is anaphora (identity).

With this in mind, let us turn to WA-marking in Japanese. Consider (16), in which the speaker's empathy is put on "the cake" in (16b). We see that "the cake" in (16b) is anaphoric to "a cake" in (16a), and hence, satisfies the singleton set relation.

<sup>5</sup>(J) represents the Japanese equivalent of an English example. For instance, (12BJ) is the Japanese equivalent of (12B).

- (16) a Mary-ga keeki-o kattedekite, daizi-ni reezooko-ni simatteoita.  
Mary-nom cake-acc bought-came valuably refrigerator-in kept  
"Mary bought a cake and kept it in the refrigerator dearly.
- b Sikasi, *keeki-wa* John-ga damatte tabetesimatta.  
but, the cake-wa John-nom without permission finished eating  
"But, John finished eating the cake without her permission."

However, the notion of the salient set anaphoric relation alone is still insufficient to derive the distribution of WA-marking, as opposed to o-marking. A fronted NP marked by -o (the accusative marker) can also satisfy the anaphoric relation as in (17b)

- (17) a Mary-ga keeki-o kattedekite, daizi-ni reezooko-ni simatteoita.  
Mary-nom cake-acc bought-came valuably refrigerator-in kept  
"Mary bought a cake and kept it in the refrigerator dearly."
- b Sikasi, *keeki-o* John-ga damatte tabetesimatta.  
but, the cake-acc John-nom without permission finished eating  
"But, John finished eating the cake without her permission."

Consider the following examples in which the fronted NP stands in a subset to superset relation.

- (18) a Mary-ga dezaato-o kattedekite, daizi-ni reezooko-ni simatteoita.  
Mary-nom dessert-acc bought-came valuably refrigerator-in kept  
"Mary bought desserts and kept them in the refrigerator dearly."
- b Sikasi, *keeki-wa* John-ga damatte tabetesimatta.  
but, cake-wa John-nom without permission finished eating  
"But, John finished eating the cake without her permission."
- (19) a Mary-ga dezaato-o kattedekite, daizi-ni reezooko-ni simatteoita.  
Mary-nom dessert-acc bought-came valuably refrigerator-in kept  
"Mary bought desserts and kept them in the refrigerator dearly."
- b Sikasi, *keeki-o* John-ga damatte tabetesimatta.  
but, cake-acc John-nom without permission finished eating  
"But, John finished eating the cake without her permission."

In (18) and (19), either the WA-marked NP or the acc-marked NP can satisfy a salient set anaphoric relation to the set "desserts". Thus, the notion of a salient set anaphoric relation is not sufficient to distinguish the discourse function of WA-marking from that of o-marking.

Then, what is the difference in WA-marking and o-marking? I propose that the difference is that a WA-marked element **MUST** stand in a salient set anaphoric relation to a referent which has been established in the previous discourse. In contrast, an o-marked element can but **NEED NOT** stand in a salient set anaphoric relation. Consider the following examples.

- (20) Out of the blue

Kinoo *keeki-o* John-ga tabeta.  
yesterday cake-acc John-nom ate  
"John ate a cake yesterday."

(21) Out of the blue

#Kinoo *keeki-wa* John-ga tabeta.  
 yesterday cake-wa John-nom ate  
 "John ate a cake yesterday."

Notice that both (20) and (21) are uttered out of the blue; thus, "keeki-o" in (20) and "keeki-wa" in (21) cannot stand in a salient set anaphoric relation to a referent in the previous discourse. We see that (20), containing an o-marked element, is interpretable whereas (21), containing a WA-marked element, is not. The uninterpretability of (21) indicates that a WA-marked NP MUST satisfy a salient set anaphoric relation whereas the interpretability of (20) indicates that an o-marked NP NEED NOT. The question we face is what explains this difference and how to derive this difference.

### 3. WA-marking and S-topics

I will now show that once we adopt Büring's (1994,95) notion of an S-topic, we can explain the difference between WA-marking and o-marking.

#### 3.1. Büring (1994, 95)

In this subsection, I will introduce the notion of an S-topic, proposed by Büring (1994, 95), from which the following examples are adopted.

- (22) A: Who know the pop stars?                    D-topic: Someone knows the pop stars.  
 B: [MARY]<sub>F</sub> knows the pop stars.            D-topic: Someone knows the pop stars.

The Focus part of the sentence is the information which is asked for by A's question. The background or Discourse Topic (D-topic) for Büring consists of the information which is taken for granted. In (22), the D-topic, i.e., "someone knows the pop stars." is established by A's question. Now consider the following discourse.

- (23) A: Who knows the pop stars?                    D-topic: Someone knows the pop stars.  
 B: #[MARY]<sub>F</sub> knows the female pop stars.    D-topic: Someone knows the female pop stars.

In (23), Büring argues that B's answer is not felicitous because it violates the laws of discourse: B conveys less information than A has asked for. B's answer is infelicitous because there is a mismatch between the topic in B's answer (i.e., "x knows the female pop stars) and the D-topic established by A's question ("x knows the pop stars). More precisely, B's answer is not felicitous because it is not exhaustive with respect to the D-topic - B's answers as if A asked only about the female pop stars.

However, if a bridge contour is placed over "/[FEMALE]<sub>T</sub> pop stars\" as in (24), B's answer becomes felicitous even though it is not a complete answer to A's questions.<sup>6</sup>

- (24) A: Who knows the pop stars?  
 B: [MARY]<sub>F</sub> knows the [FEMALE]<sub>T</sub> pop stars.

Büring argues that [FEMALE]<sub>T</sub> marks the Sentence-internal Topic (S-topic). The role of the S-topic is to narrow down the D-topic such that an exhaustive answer can be given. A bridge contour on "/[FEMALE]<sub>T</sub> pop stars\" narrows down the D-topic from "x knows the pop stars" to "x knows the female pop stars." Once the D-topic has been narrowed down to an S-topic, B's

<sup>6</sup>/ indicates the LH pitch accent; \ indicates the HL pitch accent.

answer becomes felicitous: it is exhaustive with respect to the S-topic.

### 3.2. The Discourse Function of WA-marking in Japanese.

We have seen that there is a clear difference between WA-marking and o-marking. A WA-marked NP MUST be anaphoric to either a singleton set or to a subset of a superset previously evoked in the discourse. In contrast, o-marked NPs NEED NOT satisfy this relation.

In (25) and (26), the o-marked NP and the WA-marked NP are anaphoric to a member of the salient set "dishes". Thus, both (25B) and (26B) are grammatical.

- (25) A: kinoo pot luck-ga atte, Ironna tabemono-ga arimasita.  
yesterday pot luck existed various dish-nom existed  
"There was a pot luck last night..." "There were various kinds of dishes."  
B: *Nani-o* dare-ga mottekita no?  
what-acc who-nom brought  
"What did who bring?"
- (26) A: kinoo pot luck-ga atte, Ironna tabemono-ga arimasita.  
yesterday pot luck existed various dish-nom existed  
"There was a pot luck last night..." "There were various kinds of dishes."  
B: *Nani-wa* dare-ga mottekita no?<sup>7</sup>  
what-acc who-nom brought  
"What did who bring?"

However, in the following examples, where no salient set such as "various dishes" is given in the previous discourse, (28B) is uninterpretable because the WA-marked NP is not anaphoric to a previously evoked discourse referent. Conversely, in the same context, (27B) with o-marking is still grammatical without satisfying a salient set anaphoric relation.

- (27) A: kinoo pot luck-ga arimasita.  
yesterday pot luck existed  
"There was a pot luck last night."  
B: *Nani-o* dare-ga mottekita no?  
what-acc who-nom brought comp  
"What did who bring?"
- (28) A: kinoo pot luck-ga arimasita.  
yesterday potluck existed  
"There was a pot luck last night."

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<sup>7</sup>Some speakers may find (26B) a little awkward. Given the following context, however, the sentence should sound natural, especially with a bridge contour over the sentence.

(/Nani-wa dare-ga mottekite\,) /Nani-wa dare-ga mottekita\ no?  
what-wa who-nom brought, and what-wa who-nom brought comp  
"(What did who bring, and) What did who bring?"

The bridge contour in Japanese forces the first WA-marked element under the bridge contour, i.e., "Nani-wa" in the above example, to be interpreted as a non singleton set.

- B: #*Nani-w a* dare-ga mottekita no?  
 what-acc who-nom brought comp  
 "What did who bring?"

I will now show that this contrast between WA-marking and o-marking follows from a simple hypothesis: the discourse function of WA-marking, as opposed to o-marking, is to create an S-topic.

- (29) WA-marking establishes an S-topic: it serves to narrow down a D-topic such that a felicitous answer can be given.

To establish this, consider the following dialogues.

- (30) A: Dare-ga pop star-o sitteita no?  
 who pop star-acc knew comp  
 "Who knew the pop stars?"
- B: *Onna-no pop star-w a* Mary-ga sitteita yo.  
 female-prt pop star-wa Mary-nom knew prt  
 "[MARY]<sub>F</sub> knew the [FEMALE]<sub>T</sub> pop stars."
- (31) A: Dare-ga pop star-o sitteita no?  
 who pop star-acc knew comp  
 "Who knew the pop stars?"
- B: #*Onna-no pop star-o* Mary-ga sitteita yo.  
 female-prt pop star-acc Mary-nom knew prt  
 "Mary knew the female pop stars."

Recall that WA-marking differs from o-marking in one fundamental respect. A WA-marked NP MUST stand in a salient set anaphoric relation with a previously evoked referent: this relation can be one of inclusion or identity. In contrast, an o-marked NP NEED NOT stand in such a relation. We can state this difference in terms of the interaction of a D-topic with an S-topic.

- (32) An S-topic narrows down a D-topic, then  
 1) the S-topic is a subset of the D-topic - and  
 2) the D-topic has been established in the immediately preceding discourse.

Hence, WA-marking can narrow down a D-topic to an S-topic because the D-topic has been previously evoked in the discourse.

Consider the following examples.

- (33) A1: Kinoo concert-ni ittara  
 yesterday concert-to went then  
 "I went to the concert yesterday."
- A2: *Onna-no pop star-o* Mary-ga sitteita n da  
 female-prt pop star-acc Mary-nom knew mood  
 "Mary knew the female pop stars."

- (34) A1: Kinoo concert-ni ittara  
yesterday concert-to went then  
"I went to the concert yesterday."  
A2: #Onna-no pop star-wa Mary-ga sitteita n da  
female-prt pop star-wa Mary-nom knew mood  
"Mary knew the female pop stars."

We see that (33A2) is felicitous because an o-marked element need not stand in a salient set anaphoric relation. However, (34) is infelicitous because "the female pop stars" cannot serve as an S-topic because it does not stand in a salient set relation to a previously evoked referent. In other words, "the female pop stars" cannot stand in a salient set relation because no D-topic has been established in the previous discourse.

Now, I will give a final example to show that WA-marking creates an S-topic.

- (35) A: [Who]<sub>F</sub> loves [who]<sub>F</sub>?      AJ: Dare-ga dare-o aisiteiru no  
who-nom whom-acc love  
"[Who]<sub>F</sub> loves [who]<sub>F</sub>?"  
B: [CATHY]<sub>F</sub> loves [BOB]<sub>F</sub>.      BJ: *Bob-o* Cathy-ga aisiteiru.  
Bob-acc Cathy-nom love  
"[CATHY]<sub>F</sub> loves [BOB]<sub>F</sub>."

A's question establishes a D-topic (Someone loves someone), which following Büring, we assume to be a set of propositions, such as (36), for instance.

- (36) 

Ann loves Bob
Ann loves Cathy
Bob loves Ann
Bob loves Cathy
Cathy loves Ann
Cathy loves Bob

In normal circumstances, B's answer will be taken to be complete. In other words, after B's answer, the speaker B assumes that only the last proposition is true. Following Büring, we assume that B's answer has the effect of removing all the propositions other than "Cathy loves Bob" from the D-topic in (36). Now consider the following dialogue.

- (37) A: [Who]<sub>F</sub> loves [who]<sub>F</sub>?  
D-topic: Someone loves someone.      AJ: Dare-ga dare-o aisiteiru no  
who-nom whom-acc love  
"[Who]<sub>F</sub> loves [who]<sub>F</sub>?"  
B: [CATHY]<sub>F</sub> loves [BOB]<sub>F</sub>.  
S-topic: Someone loves Bob.      BJ: *Bob-wa* Cathy-ga aisiteiru.  
Bob-wa Cathy-nom love  
"[CATHY]<sub>F</sub> loves [BOB]<sub>F</sub>."

The effect of that WA-marking in Japanese in (37) like that of the bridge contour on "Bob" in English narrows down the D-topic in (36) to the following set of propositions.

- (38) 

Ann loves Bob
Cathy loves Bob

In particular, B's answer in (37) is exhaustive only with respect to the question of "Who loves

Bob?" It could be the case, for instance, that "Cathy also loves Ann." This time, B's answer only has the effect of removing the four first propositions the D-topic in (36). In other words, the status of all the propositions in (36) other than "Ann loves Bob" (which is assumed to be incorrect) and "Cathy loves Bob" (which is assumed to be correct) are still under dispute.

## 5. Conclusion

In this paper, I have shown that the discourse function of WA-marking is to create an S-topic in the sense of Büring (1994, 95). The role of an S-topic is to narrow down a D-topic. This, in turn, establish that 1) the S-topic is a subset of the D-topic, and 2) the D-topic must have been established in the immediately preceding discourse. In other words, WA-marking can narrow down a D-topic to an S-topic iff the D-topic has been previously evoked in the discourse. Therefore, the hypothesis that the discourse function of WA-marking is to create an S-topic explains why WA-marked NPs MUST satisfy the salient set discourse condition (Ward & Prince 1991). Conversely, acc-marking does not create an S-topic, and thus, it need not stand in a salient set anaphoric relation to a D-topic. This explains why an acc-marked NP can but NEED NOT satisfy the salient set discourse condition.

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## An Analogical Approach To Plural Formation in German

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### 1.0 INTRODUCTION

Students of the German language are immediately struck by the hopelessly intricate relationships between nouns in the singular and their corresponding plural forms. Although we perceive islands of predictability, no comprehensive system to generate the plural is evident. This becomes quite obvious upon consideration of even a small sample of German singular and plural forms (1):

**(1) Sample of German Singular and Plural Forms**

<u>Gloss</u>	<u>Singular</u>	<u>Plural</u>	<u>Plurality Morpheme</u>
“back”	Rücken	Rücken	-Ø ( <i>umlauted vowel in singular also</i> )
“adviser”	Berater	Berater	-Ø
“father”	Vater	Väter	“-Ø
“farmer”	Bauer	Bauern	-n
“bear”	Bär	Bären	-en ( <i>umlauted vowel in singular also</i> )
“motor”	Motor	Motoren	-en
“day”	Tag	Tage	-e
“gate”	Tor	Tore	-e
“dog”	Hund	Hunde	-e
“association”	Bund	Bünde	“-e
“mouth”	Mund	Münder	“-er
“guest”	Gast	Gäste	“-e
“stream”	Bach	Bäche	“-e
“bond”	Band	Bande	-e
“ribbon”	Band	Bänder	“-er
“book”	Buch	Bücher	“-er
“auto”	Auto	Autos	-s
“guardian”	Vormund	Vormunde <i>or</i> Vormünder	-e <i>or</i> “-er

Scholars have been especially frustrated in attempts to predict the appearance of the umlauted vowel as a plural marker. As Salmons (1994) remarks:

“By any standard, the German plural system is highly marked and its connection to umlaut especially problematic. . . . The role of umlaut in German morphology is . . . challenging, bringing forth a range of proposals . . . . Morphological uses of umlaut have wrought havoc in such prominent theoretical frameworks as Lexical Phonology/Lexical Morphology . . . . [T]his indicates unambiguously that German plural marking and German morphological uses of umlaut represent particularly difficult phenomena for linguistic analysis.” (p. 213)

The inability of previous approaches to yield a straightforward account of German plurals suggests a reexamination of methodology is in order as well as an openness to considering alternative proposals.

Royal Skousen (1989) has put forward a new *analogical* model of language which offers a compelling contrast to standard linguistic theories. Its great elegance is that it employs nothing more than what all previous theories have already assumed: the lexicon and the ability to draw analogical relationships in the mind. This paper will contrast this new theory with previous methodology and show how initial investigations indicate that it holds great promise for resolving the puzzle of German plural formation.

## 2.0 PREVIOUS APPROACHES TO GERMAN PLURALS

Before considering the analogical approach, it is helpful to review the assumptions of traditional morphophonology. Linguists have long followed the reasoning of Chomsky and Halle that “[r]egular variations are not matters for the lexicon, which should contain only idiosyncratic items” (Chomsky & Halle, 1968, p. 12). Inflectional morphology is modeled as assembling morphemes and applying transformational rules to make adjustments to the form. In German, we might thus hope to define a rule to umlaut the internal vowel where necessary. We would hope to predict the plural of *Tag* (“day”) as *Tage*, but the plural of *Gast* (“guest”) not as *\*Gaste* but rather *Gäste*. This picture of mental processes believed for language production has shaped both linguistic study and language instruction.

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For a comprehensive comparison of approaches to German plural formation, we would need to examine in detail various proposals concerning predictability and markedness put forward by Wurzel (1984), Carstairs (1987), and others. An exhaustive study however, is beyond the scope of this initial investigation, so we must content ourselves here with a somewhat superficial comparison of the analytical approach with another account of German plurals, the system advanced by Lieber (1980).

As with many rule approaches, Lieber's system requires a large amount of theoretical apparatus. Lieber begins by positing that the regular plural suffix in the German nominative case is the schwa (2):

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### (2) Lieber (1980) Regular Inflections for German Plurals

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<u>Case</u>	<u>Singular</u>	<u>Plural</u>
Nom	-∅	-ə
Gen	-s (masc, neut) -∅ (fem)	-ə
Dat	-∅	-n
Acc	-∅	-ə

Next, she proposes a set of morpholexical rules to implement other plural markers such as umlauting the internal vowel, adding -s, adding -r while also umlauting the internal vowel, and others (3):

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### (3) Lieber (1980) Morpholexical Rules

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$C_0VC_0 \sim C_0VC_0$	(vowel umlauts)
$X \sim Xs$	(plural takes -s)
$C_0VC_0 \sim C_0VC_0r$	(plural takes -r and vowel umlauts)
$X \sim Xn$	(plural takes -n)
$X \sim Xə$	(plural takes -ə)

None of these rules specify an environment for application, but Lieber goes on to define six classes for German nominals. Each class is associated with one or two morpholexical rules which define its plural form. As Lieber explains, "The lexical entry for a particular noun will list its class membership, as well as the root and stems related by the morpholexical rules defining this class" (1980, p. 12). The morpholexical categories are shown in (4):

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**(4) Lieber (1980) Nominal Classes**

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- Class 1:**  $C_0VC_0 \sim C_0VC_0$  (vowel umlauts)  
 roots: Bach, Vater, Kloster, Mutter  
 stems: Bäch, Väter, Klöster, Mütter
- Class 2:**  $X \sim Xs$  (plural takes -s)  
 roots: Streik, Auto  
 stems: Streiks, Autos
- Class 3:**  $C_0VC_0 \sim C_0VC_0r$  (plural takes -r and vowel umlauts)  
 roots: Geist, Mann, Buch  
 stems: Geister, Männer, Bücher
- Class 4:**  $X \sim Xn$  (plural takes -n; no umlaut in singular)  
 roots: Staat  
 stems: Staaten
- Class 5:**  $X \sim Xn$  (plural takes -n; umlaut in singular)  
 roots: Bär  
 stems: Bären
- Class 6:**  $X \sim X\emptyset$  (plural takes - $\emptyset$ ) and then  $X \sim Xn$  (plural takes -n)  
 roots: Aff, Aug  
 stems: Affe, Auge, Affen, Augen

To make the entire system work, Lieber must also selectively apply rules of schwa-deletion, schwa-epenthesis, and degemination (5):

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**(5) Lieber (1980) Additional Rules**

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- (i)  $\emptyset$ -deletion: Deletes  $-\emptyset$  if it follows an unstressed  $\emptyset$  plus sonorant.  
 (Nominative plural  $Väter+\emptyset \rightarrow Väter$  but  $Bäch\emptyset \rightarrow Bäch\emptyset$ )
- (ii)  $\emptyset$ -epenthesis: Inserts an  $-\emptyset$  between two consonants separated by a morpheme boundary.  
 (Dative plural  $Väter+n \rightarrow Väter+\emptyset n$  by  $\emptyset$ -epenthesis and finally  $\rightarrow Vätern$  by  $\emptyset$ -deletion)
- (iii) degemination: Deletes  $-n$  dative plural suffix when added to plural stem ending in  $n$ .  
 ( $Namen+n \rightarrow Namen$ )

For example, although *Vater* (“father”) and *Bach* (“brook”) are both assigned to the first class causing the internal vowel to umlaut, the rule of schwa-deletion applies to the plural of *Vater* but not to the plural of *Bach* to produce *Väter* and *Bäche* respectively. Finally, Lieber notes that “not all nouns in German belong to one of the six classes . . . . Some nouns, like *Hund* ‘dog’, . . . and *Ufer* ‘bank’, have only a single stem allomorph. . . . These items therefore belong to no lexical class” (1980, p. 12). A small sample of exceptions to Lieber’s morphological system are shown in (6):

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### (6) Lieber (1980) Exceptions

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“dog”	<i>Hund</i>	These items belong to no lexical class
“summer”	<i>Sommer</i>	
“gate”	<i>Tor</i>	
“bank”	<i>Ufer</i>	(etc.)

In all, Lieber’s model incorporates suffixes, morpholexical rules, nominal classes, a lexicon with stems, roots, and class specifications, special rules, as well as exceptional forms.

Essentially, whatever plural morphology a particular nominal requires is just satisfied by assigning it to a class whose principle characteristic is that it supplies exactly that plural morphology. The system does not explain why a particular noun might fall into one or another of the classes. Therefore, the system does not actually predict the plural form given a new word without first being told the class of that word which is tantamount to being told the plural form anyway. If categories exist, how is it that speakers formulate these categories and assign new words to them without being told?

### 3.0 AN ANALOGICAL APPROACH

A promising alternative to complex descriptive systems is the elegant analogical model developed by Skousen (1989). The model relies only on the lexicon and the power of analogy, which makes a great deal of sense from the standpoint of learnability. When children begin to acquire language, they presumably have no rules, categories, or classes whatsoever. Initial acquisition of morphological patterns presumably begins with straightforward memorization. We know for a fact that large scale memorization must occur to some extent, because the forms of single-morpheme words are completely arbitrary and must therefore be memorized. Since words are new to the child at the start, there would be no way to distinguish between forms which we categorize as behaving regularly and those which are considered exceptions. At the outset, a child would simply memorize all forms indiscriminately as they are encountered.

From the very beginning however, analogy is also available. The existence of analogy as a human cognitive faculty is not in dispute. Virtually every linguistic theory has incorporated analogy in some fashion. Analogy can also prove useful for predicting unknown forms

in the plural. All that must be done is to search through the lexicon for a likely singular form and its plural which might serve as a model for creating this new plural. To this end, the analogical method, which the reader is encouraged to study in detail in Skousen (1989), predicts a number of interesting properties: *proximity*, the *gang effect*, and *heterogeneity*. These effects are a consequence of the mathematical basis for comparison used in the analogical method and are thus not independently motivated phenomena.

Skousen defines *proximity* as: "The more similar the example is to the given context, the greater the chances of that example being selected as the analogical model" (Skousen, 1992, p. 5). In our current problem, proximity would refer to a similarity in phonological form. Thus, if the child already knows that the plural of *Löwe* ("lion") is *Löwen*, the child is very likely to use this pair as a model when forming the plural of *Möwe* ("sea gull") correctly as *Möwen*.

Also important in the analogical model is the phenomenon of the *gang effect*: "If the example is surrounded by other examples having the same behavior, then the probability of selecting these similarly behaving examples is substantially increased" (Skousen, 1992, p. 5). Suppose a child has already learned a large number of words that bear a striking similarity in that all end in *-ung* and all take a plural with the suffix *-en*. When considering how to make the plural of *Abteilung* ("department") for the first time, the army of similar examples makes it a virtual certainty that the form *Abteilungen* will be generated.

Most notably, we must consider the effect of *heterogeneity*: "An example cannot be selected as the analogical model if there are intervening examples, with different behavior, closer to the given context" (Skousen, 1992, p. 5). The effects of heterogeneity can be seen in the formation of the plural of the relatively infrequent word *Vormund* ("guardian"). The official plural form as cited in German dictionaries is *Vormunde* which follows the gang effect of other plurals such as *Hunde* ("dogs") and *Pfunde* ("pounds"). However, the set of words ending in *-und* also contains exceptional patterns including the isolated word *Mund* ("mouth") with its plural *Münder*. Because this word is closer to *Vormund* in pronunciation, *Mund* may sometimes and for some speakers be selected as the analogical model to produce the form *Vormünder*. Some dictionaries list this form as an alternate formation of the plural or explain it as a plural formed by

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analogy with *Mund* (*Duden*, p. 1694). Incidentally, *Mund* itself displays some vacillation in its plural with the infrequently occurring forms *Munde*, formed by analogy with a plural such as *Hunde*, and even *Münde*, formed by analogy with a plural such as *Gründe* (“reasons”).

This last example also demonstrates another significant point. Actual language behavior suggests a fuzziness between categories. Even if we are successful in cutting through the arbitrary use of plural morphology to create rigid classes for German nominals, we run into difficulties when we begin assigning nouns to membership in these classes. With the most frequent words in German usage, we are generally successful. As we move to the more infrequently encountered plurals however, we discover a confusion of alternate forms. The sharp demarcations at boundaries between contexts that we get when using rule systems force us to commit a word to one category or another. If we decide to settle the question by choosing the category which predicts the most frequent form (e.g. *Vormunde*), how do we interpret what is occurring when the less frequent forms arise again and again in actual language use (e.g. *Vormünder*)?

### 4.0 IMPLEMENTING THE ANALOGICAL APPROACH

By comparison, the analogical model is specifically designed to allow for such drift across categories. In order to demonstrate his analogical model, Skousen has written a Pascal program which identifies analogical patterns given any set of examples (1989, pp. 191-204). This program may be used to predict any analogical behavior in language including the plural of a German noun when given a set of examples upon which to base decisions. The program itself contains no rules of German plural formation, but merely compares an input form with those in a data set and makes an educated guess at its plural from a list of possible outcomes (7):

---

#### (7) Options for Plural Morphology

---

A -e	I -s
B -"e	J -a/-en
C -er	K -ten
D -"er	L -ien
E -n	M -man/-leute
F -en	N -ium/-ien
G -	
H -"	

In initial trials, outcomes were limited to these 14 possibilities. Comparison is carried out by considering similarities and differences between variables in the input and existing forms in the data set. The larger the set specified, the more accurate are the predictions made by the model. Nevertheless, even a small set can model important generalizations.

In this study of German plural formation, I created a data set comprising 703 German examples and gave it to the analogical computer model to consider (8):

---

(8) Portion of Data Set

---

E f===vUn+d\*V wound 172/209  
 B m=====vUnSC wish 1139/303  
 E f==vUr+T\*LC root 245/246  
 F f=====TaLC numeral 2135/1006  
 F f==Ta+lUNC payment 964/267  
 G n===T\$+X\*nC sign 1122  
 F f==T\$X+nUNC drawing 291/174  
 F f=====T\$tC time 14529/1741  
 A nT\$t+pUNkC moment 298/122  
 F fT\$t+SrIftC magazine 449/181  
 F f==T\$+tUNC newspaper 684/389  
 A n=====T#gC thing 141/286  
 E f==T#g+nIsC report 508/152  
 A n=====TilC goal 1306/643  
 G n===TI+m\*rC room 1379

The first column in the data set identifies the plural of a sample word by code letter. By comparison with the list in (7), we can see that the plural of the first noun on the list is option E, that is, this is a plural taking *-n*. The next characters are the variables specifying the word itself. The word at the top happens to be *Wunde* (“wound”). The first variable identifies its grammatical gender as feminine. The phonemes of the word are entered from back to front. I use a variety of keyboard characters to represent the various phonemes of the German language in a consistent way. An asterisk (\*) is used for the schwa, and so on. Any unused variable slots are marked with the equal symbol (=). Syllable breaks are marked with a plus (+). The final variable specifies whether the last phoneme is a vowel (V) or a consonant (C). The variables are followed by a gloss of the word in English and its frequency in singular and plural forms. The information in the gloss is ignored by the computer.



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I adapted the program only very slightly from Skousen's original code (Skousen, 1989) so it would run on a Power Macintosh 7200/90 MHz computer with 16 MB of RAM. Memory limitations allowed a maximum of only 13 or 14 variables to be compared, although alternate sets with fewer variables were tried as well. A complete description for each word in the data was impossible and choices were necessary in deciding what variable specifications would best imitate lexical entries for a German speaker. As shown above, the version of the data set in (8) specifies the gender of the noun, the individual phonemes and syllable breaks, and whether the last phoneme is a vowel or consonant. The question certainly arises however, if each of these variables is equally important to native speakers in forming the plural. The program treats each variable as being of equal importance.

Which words to include on the list was also somewhat problematic. In theory, the most frequently used words in the language have the greatest analogical effect. For a very rough initial investigation, a group of words were drawn from the frequency lists in *Deutsche Sprachstatistik* (1967) compiled by Helmut Meier. If a word occurred more than 100 times in the singular as well as more than 100 times in the plural, it was included. For words which have the same form in the singular and the plural, that form needed to appear at least 300 times. Adjectival nouns were excluded but could potentially be incorporated and studied in the future. This data set was by no means ideal, although it proved sufficient to demonstrate the basic direction of the research. More helpful than many other sources in separating use of nouns in the singular versus the plural, Meier's lists are based on 11 million words drawn from texts rather than from speech. Thus, terminology such as *Aktiengesellschaften* ("joint stock companies") satisfies the cutoff, while more typical nouns in speech, which might also exhibit statistically significant plural morphology, do not appear. For example, *Autos* ("cars"), does not make the list. In short, more work will be required in fine tuning the specification of variables and studying frequency lists of spoken German to develop a more accurate analogical set.

Despite such practical drawbacks in the trials, initial results are very encouraging. First of all, without ever being told a morpholexical rule, the model is able to unhesitatingly predict plurals for many forms which behave categorically in their formation of the plural (9):

---

(9) Output of "Ente"

---

Reading in the data and the outcomes  
 Give the generalized file description: GERMAN  
 Give the probability that data will be remembered: 1.0  
 Give the number of data entries to be read in (out of 703): 703  
 12345678901234  
 Specify the given context (14 variables): ff====en+t\*\*V  
 Do you want to exclude this context from the data? (Y/N) y  
 Do you want to exclude null variables? (Y/N) y  
 number of active variables: 10  
 number of active contexts: 1024

ANALOGICAL SET

total frequency = 14249

E	1104	77
E	1104	77
E	276	19
E	403	28
E	1622	114
E	240	17
E	1104	77
E	1104	77
E	1104	77
E	120	8
E	1104	77
E	390	27
E	1104	77
E	403	28
E	1104	77
E	403	28
E	390	27
E	390	27
E	390	27
E	390	27

STATISTICAL SUMMARY

-n 14249 1000

For feminine words ending in schwa, such as *Ente* ("duck"), the program chooses the ending in *-n*. For words ending in *-ung*, the program very confidently selects the plural in *-en*. Note that in the particular trial shown above, I specified several variables twice. These were the gender, the final phoneme, and that the final phoneme was a vowel. This was a way to experiment with the effects of weighting variables differently.

## *An Analogical Approach to Plural Formation*

Even more intriguing is the model's behavior when presented with a form such as our earlier example of *Vormund*. When *Mund* and its plural are left out of the data set, the program selects the standard plural of *Vormunde* with some slippage towards *\*Vormüunde* caused by the presence of *Gründe* (10):

---

### (10) Output of "Vormund" without Mund in Data Set

---

```
Reading in the data and the outcomes
Give the generalized file description: GERMAN
Give the probability that data will be remembered: 1.0
Give the number of data entries to be read in (out of 703): 703
                                     12345678901234
Specify the given context (14 variables): mm=vor+mUnddCC
Do you want to exclude this context from the data? (Y/N) n
Do you want to exclude null variables? (Y/N) y
number of active variables: 13
number of active contexts: 8192
```

#### ANALOGICAL SET

total frequency = 403

A	84	208
B	16	40
A	16	40
F	1	2
E	1	2
A	124	308
B	161	400

#### STATISTICAL SUMMARY

A	-e	224	556
	-"e	177	439
	-n	1	2
	-en	1	2

Why the variant plural form with an umlaut does not manifest in spoken German (unless possibly as a production error in speech) would be an interesting point to address in further trials. Skousen's model predicts outcomes without regard to the supposed contrast of performance versus idealized competence. Another possibility to contend with is the effect of semantics on the model, certainly the most difficult variable to model confidently. *Vormund* may be perceived as semantically connected to *Mund* but not to *Grund*.

When the single entry of *Mund* is added to the data set, the effect on plural selection for *Vormund* is considerable. Suddenly a major variant form in *Vormünder* appears in the output and is in fact modeled as the most popular form (11):

---

(11) Output of "Vormund" with Mund in Data Set

---

Reading in the data and the outcomes  
 Give the generalized file description: GERMAN  
 Give the probability that data will be remembered: 1.0  
 Give the number of data entries to be read in (out of 703): 703  
 12345678901234  
 Specify the given context (14 variables): mm=vor+mUnddCC  
 Do you want to exclude this context from the data? (Y/N) n  
 Do you want to exclude null variables? (Y/N) y  
 number of active variables: 13  
 number of active contexts: 8192

ANALOGICAL SET

total frequency = 425

A	72	169
D	240	565
E	1	2
A	48	113
B	56	132
A	8	19

STATISTICAL SUMMARY

A	-e	128	301
	-e	56	132
	-er	240	565
	-n	1	2

While still far from modeling the exact percentages of variation in German usage, the analogical model is already able to capture the variation and drift across categories so characteristic of infrequently encountered German plurals.

## 5.0 THE HISTORICAL PERSPECTIVE OF GERMAN MORPHOLOGY

The data set incorporates the body of regular and exceptional correspondences in frequently occurring words which are presented from the previous generation of speakers to the next by the oral tradition of language transmission through time. We have a very clear

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picture of how the Modern High German (Mod G) inflectional morphology has evolved from Proto-Indo-European (PIE) through Proto-Germanic (PG), Old High German (OHG), and Middle High German (MHG). A historical perspective of the problem is very helpful.

Consider the history of the singular/plural pairs *Tag/Tags* and *Gast/Gäste* (based on Voyles, 1992). Complete historical declensions are seen in (12):

**(12) Historical Declensions of *Tag* and *Gast***

	<i>Tag</i> ("day")		<i>Gast</i> ("guest")	
<b>PIE (stem + theme vowel + suffix)</b>				
<u>Case</u>	<u>Singular</u>	<u>Plural</u>	<u>Singular</u>	<u>Plural</u>
Nom.	*d <sup>h</sup> óg <sup>hw</sup> os	*d <sup>h</sup> óg <sup>hw</sup> os(es)	*g <sup>h</sup> óstis	*g <sup>h</sup> ósteies
Gen.	*d <sup>h</sup> og <sup>hw</sup> óso/éso	*d <sup>h</sup> og <sup>hw</sup> óm/?ém	*g <sup>h</sup> ostéso	*g <sup>h</sup> ostióm/?ém
Dat.	*d <sup>h</sup> og <sup>hw</sup> í/ói	*d <sup>h</sup> og <sup>hw</sup> ómis	*g <sup>h</sup> ostói	*g <sup>h</sup> ostímis
Acc.	*d <sup>h</sup> óg <sup>hw</sup> om	*d <sup>h</sup> óg <sup>hw</sup> ons	*g <sup>h</sup> óstim	*g <sup>h</sup> óstins
<b>PG (stem + theme vowel + remnant of suffix)</b>				
<u>Case</u>	<u>Singular</u>	<u>Plural</u>	<u>Singular</u>	<u>Plural</u>
Nom.	*dágaz	*dágōs/ōz	*gástiz	*gástīz
Gen.	*dāges	*dāgō	*gāstes	*gástijō
Dat.	*dāgē	*dāgamz	*gástē	*gástimz
Acc.	*dāga	*dāgā	*gāsta	*gástī
<b>OHG (stem + suffix formed from old theme vowel — original suffixes mostly lost)</b>				
<u>Case</u>	<u>Singular</u>	<u>Plural</u>	<u>Singular</u>	<u>Plural</u>
Nom.	tág	tága	gást	gásti
Gen.	tāges	tāgo	gāstes	gāsto
Dat.	tāge	tāgun	gāste	gástin
Acc.	tág	tága	gást	gásti
<b>MHG (stem + suffix reduced to schwa)</b>				
<u>Case</u>	<u>Singular</u>	<u>Plural</u>	<u>Singular</u>	<u>Plural</u>
Nom.	ták	tágə	gást	géstə
Gen.	tāgəs	tāgə	gástəs	géstə
Dat.	tágə	tāgən	gástə	géstən
Acc.	ták	tágə	gást	géstə

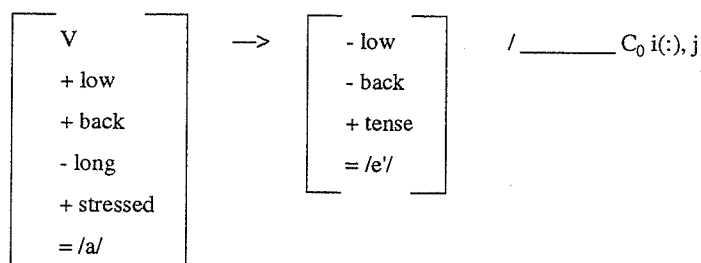
**(12) Historical Declensions of *Tag* and *Gast* (Continued)**

	<i>Tag</i> ("day")		<i>Gast</i> ("guest")	
Modern German				
Case	Singular	Plural	Singular	Plural
Nom.	ták	tágə	gást	géstə
Gen.	tágəs / s	tágə	gástəs	géstə
Dat.	ták	tágən	gást	géstən
Acc.	ták	tágə	gást	géstə

According to current reconstructions, a PIE nominal consisted of the pattern *stem + theme vowel + suffix*. PIE had a movable stress throughout the case forms but in PG the stress became fixed on the root syllable. The stabilizing of the stress accent had a profound effect on German phonology. It caused a progressive sloughing off of the phonetic elements in final position (Waterman, 1976, p. 23). Already noticeable in the PG forms, the loss of final elements is even more pronounced in OHG.

Beginning in OHG and continuing into MHG, a vowel harmony (umlauting) rule came into effect (13):

**(13) Umlauting Rule Took Effect in OHG**



The result of this rule for plural nouns was to umlaut noun stems marked with i-theme vowels (*gásti* → *géste*), while leaving nouns marked with a-theme (PIE o-theme) vowels (*táge*) or other theme vowels untouched.

In the MHG period, the fixed stress continued its influence by reducing all the old PIE theme vowels to schwa. The original phonological motivation for the umlauting rule was obliterated. The plural of *Gast* thus inherited the umlauted vowel while the plural of *Tag* did

not, although the plurals share the same ending. We discover that since its original phonological motivation was lost, the distribution of umlaut in Modern German plural forms is random in a fundamental way. Each word is simply based on its earlier form handed down through the generations.

The analogical method can thus give us one possible explanation for the distribution of umlaut in the German plural which has caused linguists so much difficulty. For the most common words of the language, those handed down over time, the distribution of the umlaut is essentially random. To use our computer model as a reference, forms such as *Tage* and *Gäste* are simply examples in the data set which are given to us as language learners. These initial examples however, are referred back to again and again in language use when forming new or infrequent plurals such as for *Vormund*. The illusion of the application of rules results from the influence of proximity, the gang effect, and heterogeneity.

## 6.0 CONCLUSION

Previous approaches such as Lieber's will always remain useful as generalizations made about language behavior. Rule systems effectively summarize language use but are sometimes unable to answer deeper questions of the use of language in the real world. As we see in the formation of the plural in German, the analogical approach explains the productive use of umlaut by claiming that speakers rely on previously encountered forms to generate new ones. The highly marked quality of the data set results in great variety and variation of application of plural markers such as the umlauted vowel. Although standard accounts make talking about language behavior more convenient, the analogical approach offers hope in disambiguating intricate linguistic patterns such as the plural in German.

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**NWLC 12**  
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