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FOREWORD

The Department of Linguistics of the University of Victoria is pleased to present Volume 10 of the **Working Papers of the Linguistics Circle of the University of Victoria (WPLC)**. The articles appearing in this issue represent current research on language and linguistics at the University of Victoria. It is the editorial policy of the *Working Papers* to include an even representation of work by graduate students and established scholars.

Articles published in WPLC are considered working papers, and their appearance here does not preclude subsequent publication elsewhere. As working papers, the articles presented here are subject to reconsideration and revision, and comments regarding their form and content are welcome.

We wish to thank the Department of Linguistics and the Graduate Students' Society of the University of Victoria for their continuing financial support and encouragement. We also thank the authors for their forebearing and understanding in adapting to the new demands made this year with respect to the preparation of manuscripts. And we are grateful to all those who have contributed to WPLC over the past ten years, and in particular to Andrea Giles, who as senior editor during the past five years laid a solid foundation for the work of the present editors.

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ON *DE* IN THE CHINESE EXTENT ADVERBIAL CONSTRUCTION

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1. INTRODUCTION

The Chinese Extent Adverbial Construction[1] (henceforth CEAC) refers to sentences such as the following:[2]

(1) a.   ta   chi   de   hen   zixi.
            he   eat   DE   very   careful[3]
            "He eats very carefully."

      b.   ta   ku   de   yanjing zhong   le.
            he   cry   DE   eye   swell   PAST
            "He cried (so much) that his eyes became swollen."

One of the unique characteristics of these sentences is that there are two verbal elements in each[4]: (e.g. *chi* and *zixi* in (1a) and *ku* and *zhong* in (1b)). Another special characteristic of these sentences is that there is a constant morpheme *de* (glossed here simply as "DE" for lack of a better term) somewhere between the two verbal elements. If V1 and V2 are used to represent the two verbal elements, the structure of these sentences can be roughly formalized as follows:

(2)   (NP) V1 DE (NP) V2 (NP)

One hot debate in current literature concerns which of the two verbal elements is the main verb. Although it is clearly the case in the English translation that the element corresponding to the first verb, that is, V1, in a CEAC is the main verb, such clarity is not found in the Chinese sentences. In fact, Huang and Margione (1985) provide several pieces of evidence against treating V1 as the main verb. Their arguments are briefly presented in the following section.

2. HUANG AND MARGIONE'S ARGUMENTS

2.1. Inability to Form V-not-V Questions

The first argument produced by Huang and Margione (1985, henceforth, H&M) points to the fact V1 cannot form V-not-V[5] questions as main verbs normally can. The following examples illustrate their point:

(3) a.   i)   ta   chi   fan.
                he   eat   food
                "He eats (food)."

ii)		ta	chi	bu	chi	fan?
		he	eat	not	eat	food

"Does he eat (food)?"

b.   i)   ta   zixi.

           he   careful

           "He is careful."

     ii).   ta   zixi   bu   zixi?

           he   careful   not   careful

           "Is he careful?"

c.   i).   ta   chi   de   zixi.

           he   eat   DE   careful

           "He   eats   carefully."

     ii)   ta   chi   de   zixi   bu   zixi?

           he   eat   DE   careful   not   careful

           "Does he eat carefully?"

     iii)   *ta   chi   bu   chi   de   zixi?

           he   eat   not   eat   DE   careful

           ???

The (i) examples in the above are statements while (ii)s are questions derived from the statements. The derivation, called V-not-V question formation, is a process of suffixing a "not-V^1" sequence to the verb V^1 of the statements. There are two verbs that are involved here, *chi* "eat" and *zixi* "(be) careful". Both can form V-not-V questions in simple sentences, as shown in (aii) and (bii). Yet, when they appear in a CEAC, the verb in V1 position, *chi* "eat", cannot undergo this operation any more (ciii), while the verb in V2 position, *zixi* "(be) careful", can (cii).

H&M argue that any adequate grammar must explain the ungrammaticality of the sentence in (ciii), and treating V2 as the main verb seems to promise such an explanation.

2.2. Inability to Take an Aspect Marker

Another reason given by H&M for treating V2 as the main verb is based on the following observation.

(4)   a.   ta   ku   le.

              he   cry   ASP

              "He cried."

     b.   yanjing   zhong   le.

              eyes swell   ASP

              "(His) eyes became swollen."

     c.   ta   ku   de   yanjing zhong   le.

              he   cry   DE   eyes   swell   ASP

              "He cried (so much) that his eyes became swollen."

d.	*ta	ku	le	de	yanjing	zhong.
	he	cry	ASP	DE	eyes	swell
	???					

The above examples show that a verb can usually have an aspect marker such as *le* "PAST or PERFECTIVE" (glossed here simply as ASP) immediately follow it when the verb appears in simple sentences ((a) and (b)) and in V2 position (c), but it cannot do so as V1 in a CEAC (d).

It is thus argued by H&M that if V1 is treated as the main verb, such treatment would have difficulty explaining the above observation, whereas treating V2 as the main verb does not entail such a problem.

2.3. Inability to Be Negated

A third argument against treating V1 as the main verb comes from the observation that V1 cannot be negated by the negation morpheme *bu* "not" in the way that main verbs can in simple sentences.

(5) a.
ta	bu	chi	lingshi.
he	not	eat	junkfood

"He does not eat junkfood."

b.
ta	bu	zixi.
he	not	careful

"He is not careful."

c.
ta	chi	de	bu	zixi.
he	eat	DE	not	careful

"He does not eat carefully."

d.
*ta	bu	chi	de	zixi.
he	not	eat	DE	zixi
???				

Just as in (4), (a) and (b) in (5) are simple sentences, while (c) and (d) are CEAC sentences. It is clearly shown that a verb can be negated by *bu* "not" in normal sentences ((a) and (b)), and can still be thus negated in V2 (c). The same negation is, however, not permitted for V1 in a CEAC (d).

2.4. Inability to Form a "Complex Verb Compound"

H&M also point out that a verb which can normally form a "complex verb compound" as a main verb cannot do so in V1 position but can in V2:

(6) a.
ta	chi	zhemo	duo.
he	eat	so	much

"He eats so much."

b. ta   chi-bu-liao   zhemo   duo.
            he   eat   not   finish so   much
            "He cannot eat so much."

        c. fan   duo   de   ta   chi-bu-liao.
            food   much   DE   he   eat   not   finish
            "There is so much food that he cannot eat it all"

        d. *ta   chi-bu-liao   de   zhemo   duo.
            he   eat   not   finish DE   so   much
            ???

In (6), both (a) and (b) are normal sentences where both the verb *chi* "eat" in (a) and the derived complex verb compound *chi-bu-liao* "eat-not-finish" in (b) can occur as the main verb. However, a CEAC sentence is grammatical when the derived form appears in the V2 position (c) while ungrammatical when it appears in the V1 position (d).

2.5. Inability to Take a Post-Verbal Object

It has been argued convincingly by Sun and Givon (1985) that Chinese, just as English, is essentially a language with an SVO word order. However, H&M observe, V1 in a CEAC has to have its object preceding rather than following it.

(7) a. ta   chi   fan.
        he   eat   food
        "He eats (food)."

    b. ta   xia   de   bu   chi   fan.
        he   scared DE   not   eat   food
        "He is so scared that he stops eating."

    c. *ta   chi   fan   de   zixi.
        he   eat   food   DE   careful
        ???

    d. ta   fan   chi   de   zixi.
        he   food   eat   DE   careful
        "He eats (food) carefully."

In (a) where the sentence is a simple one, the verb *chi* "eat" and the object *fan* "food" are in the normal VO order. The same word order is found in V2 position in (b). When the same verb appears in the V1 position, the sentence becomes ungrammatical if the object occurs after the verb (c). This object has to appear before the verb as is shown in (d).

All of the above observations, argued H&M, seem to suggest that V2 be treated as the main verb.

3. HUANG'S ARGUMENTS

Huang (1988) provides several arguments to reject the V2-as-main-verb treatment. His arguments are based on observations having to do with scope of negation, scope of question and the homophonic state of *de*.
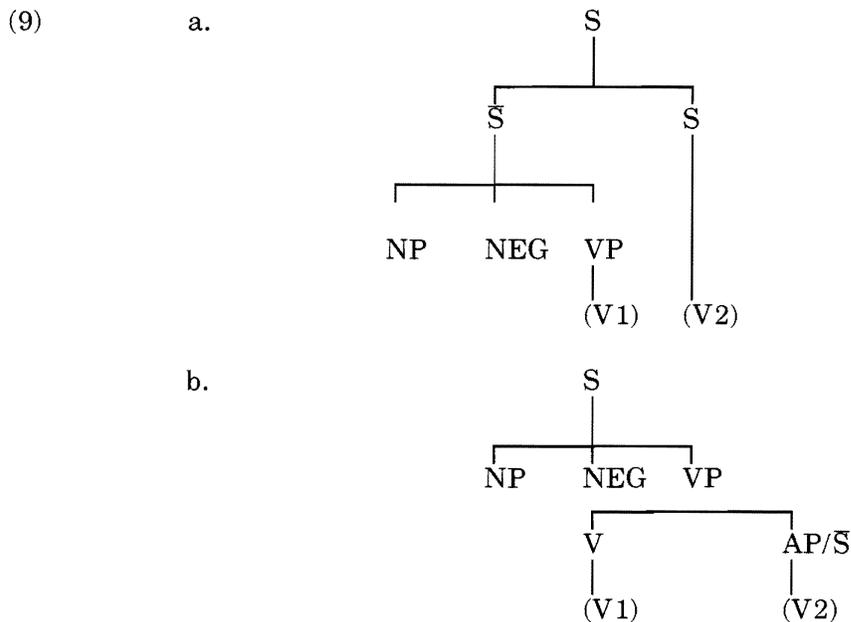
3.1. Scope of negation

Huang (1988) argues that although V1 cannot be directly preceded by the negative morpheme *bu* "not" (see Section 1.1.3.), its negation is nevertheless possible if the negation is carried out by two other morphemes with *bu* "not" as one of them. Huang then argues that when such negation operation occurs, the V2-as-main-verb position runs into a problem in wrongly predicting the scope of negation. The following examples illustrate his point:

(8) a. ta   bu   shi   pao   de   hen   kuai.
          he   not   be   run   DE   very fast
          "It is not the case that he runs fast."

     b. ta   bu   hui   pao   de   hen   kuai.
          he   not   will run   DE   very fast
          "He will not run fast."

The scope of negation by *bu shi* "be not" (a) or *bu hui* "will not" (b) in the above examples is over the entire string that follows which includes both V1 and V2.

Huang argues that if scope of negation, as generally understood, is determined by c-command, namely, the negative morpheme c-commands what is in its scope of negation, it follows that a grammar which treats V1 as being in a subordinate clause would wrongly predict that the scope of negation covers only V1 and nothing else. Compare (a) and (b) in the following:

(9)   a.

            b.

In (9a), the NEG node appears in the higher S̄, and thus c-commands only V1 and no others, yielding the incorrect result that its scope of negation is over V1 only. The configuration of (9b), on the other hand, correctly predicts that the NEG has scope over everything that follows it.

3.2. Scope of question

As mentioned previously, one of the problems pointed out by H&M (1985) is that V1 cannot form V-not-V questions (see Section 1.1.1.). Huang argues again that V1 can be "questioned" if the V-not-V is formed out of *shi* "be" or *hui* "will", just as in the case of negation.

He contends that when such question formation occurs, the position of treating V2 as the main verb runs into difficulty in wrongly predicting the scope of question.

(10) a.   ta   shi   bu   shi   pao   de   hen   kuai?
              he   be   not   be   run   DE   very   fast
              "Is it the case that he runs fast?"

     b.   ta   hui   bu   hui   pao   de   hen   kuai?
              he   will   not   will   run   DE   very   fast
              "Will he run fast?"

The scope of question by *shi bu shi* "be not be" in (a) or *hui bu hui* "will not will" in (b) is over the entire string that follows. Since scope is determined by c-command, the H&M's position (9a) applied on (10a or b) yields a false result. It wrongly predicts that the scope of negation is over V1 only, while it should be over the entire sentence.

3.3. DE-clash

Another argument by Huang is illustrated in the following:

(11)   ta   zheng   de   hen   lan.
            he/it   steam DE   very   soft
     a.   "He steamed it very soft."
     b.   "What he steamed is very soft."

The sentence in (11) is ambiguous allowing for two interpretations, (a) and (b). This ambiguity arises as a result of the homophony of *ta* "he" (a) and *ta* "it" (b), and of the CEAC *de* as in the (a) interpretation and the norminalizer *de* as in the (b) translation.

Huang argues that if the sentence in (11) is analyzed as having V1 in the subordinate clause, there is no way to differentiate the two interpretations structurally: both will have the same phrase structure. On the other hand, he argues, if the sentence is to be analyzed with V1 as the main verb, the two homophonic sentences may be distinguished structurally.

Huang also discusses the controversial issue of the Binding Conditions and the Chinese empty categories in CEAC sentences, but, again, due to the complicated nature of the problem, I have to refrain from getting into it here.[6]

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4. TOWARD A UNIFIED ACCOUNT

In the above sections, arguments from two competing theories regarding the phrase structure of the Chinese Extent Adverbial Construction were briefly reviewed. In this section, the position that V1 should be treated as the main verb is further defended, and a unified analysis is developed to account for the observations brought forth by H&M which are used as evidence against treating V1 as the main verb.

4.1. In Defence of the V1-as-the-Main-Verb Position

It is interesting to point out that H&M's position suffers a dilemma. That is, on the one hand, a verb may still be restricted exactly as V1 is even though it is clearly the main verb of a full sentence; on the other, a verb is not normally restricted as V1 is even if it is the predicative verb of a clause.

Recall that H&M argue that V1 cannot be the main verb of a CEAC because it is restricted from appearing in certain syntactic contexts. Their underlying assumption is that the main verb of a full sentence (versus that of a clause) cannot be thus restricted. This assumption is, however, not founded. There are clear cases where main verbs whose main-verb-hood is completely transparent are similarly restricted.

(12) a.　　　　ta　　chi　zhe　　　　lingshi.
　　　　　　　he　　eat　PROG　　　junk-food
　　　　　　　"He is eating junk-food."

　　　b.　(i)　*ta　　chi　bu　chi　zhe　　　　lingshi.
　　　　　　　　he　　eat　not　eat　PROG　　　junk-food
　　　　　　　　???

　　　　　(ii)　ta　　shi　bu　shi　chi　zhe　　　lingshi?
　　　　　　　　he　　be　not　be　eat　PROG　　junk-food
　　　　　　　　"It is the case that he is eating junk-food?"

　　　c.　(i)　*ta　　bu　chi　zhe　　　　lingshi.
　　　　　　　　he　　not　eat　PROG　　　junk-food
　　　　　　　　???

　　　　　(ii)　ta　　bu　hui　chi　zhe　　　　lingshi　　　kan　　dianshi.
　　　　　　　　he　　not　will　eat　PROG　　　junk-food　　watch　T.V.
　　　　　　　　"He will not be eating junk-food while watching T.V."

　　　d.　　　　*ta　　chi　le　　　　zhe　　　lingshi.
　　　　　　　　he　　eat　PAST　　　PROG　　junk-food
　　　　　　　　???

　　　e.　　　　*ta　　chi　lingshi　　zhe.
　　　　　　　　he　　eat　junk-food　PROG
　　　　　　　　???

    f.   *ta   chi-bu-liao   zhe   lingshi.
                   he   eat-not-finish   PROG   junk-food
                   ???

In the above examples, the verb *chi* "eat" is clearly the main verb in every case. However, it behaves almost exactly as V1 in a CEAC in terms of the restrictions on V1 observed by H&M. Like V1, it cannot, for example, transform into V-not-V shape (b-i), be negated by *bu* "not" (c-i), take the aspect marker *le* "PAST" (d), be followed immediately by its own object (e), or be a complex verb compound (f).

These examples clearly indicate that those restrictions on V1 cited by H&M as evidence against treating V1 as the main verb should bear no significance whatsoever in determining the main-verb-hood of a sentence.

In any event, by treating V1 as the verb of the subject clause, H&M have by no means solved the very problems they observe. This is because there is no reason for the verb of a subordinate clause to be thus restricted.

(13) a.   [[ta chi-bu-chi   rou] shi   jian da   shi].
              he eat-not-eat meat is   one   big   thing
              "Whether he eats meat or not is an important issue."

      b.   [[ta bu   chi   rou] shi   jian huai shi].
              he not   eat   meat is   one   bad   thing
              "That he does not eat meat is bad."

      c.   [wo zhidao   [ta   qu   le   zhongguo]].
              I   know   he   go   PAST   China
              "I know he has gone to China."

Each of the sentences in (13) contains a subordinate clause -- a subject clause in (a) and (b) and an object clause in (c). Contrary to the belief of H&M, the verb in these clauses is not at all prevented from turning into V-not-V shape (a), being negated by *bu* (b), being followed immediately by the aspect marker *le* (c), or being followed immediately by its own object (a and b).

Besides providing evidence to reject the assumption that only main verbs can appear in all of these contexts, the examples in (13) also suggest that the verbs which can appear in these contexts may not necessarily be the main verbs.

All the above cases clearly indicate that H&M's position has no empirical support and cannot be accepted, while the traditional position held by such linguists as Huang (1988) is indeed the right configuration.

4.2. The *de*-Constraint

If V1 is the main verb, why is it that it exhibits those "peculiar" syntactic behaviors observed by H&M? It is argued in this section that these behaviors are as a matter of fact the result of a surface structure constraint, called here the *de*-constraint, which is developed and expounded in the following paragraphs.

8

(14) *de*-Constraint

> In surface syntactic representation, the CEAC DE node must be the only overt sister node to V1.
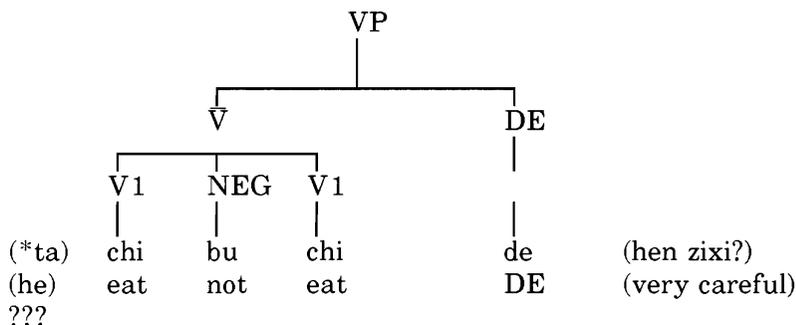
The *de*-constraint ensures that in the surface representation of a CEAC sentence, the node DE must form an immediate constituent with V1 and that this constituent has only DE and V1 as its overt (i.e. not including traces of movement) components.

In what follows, it is demonstrated that this constraint achieves a high degree of success in accounting for why it is that V1 cannot form V-not-V questions, be followed by the aspect marker *le*, be followed by its object, or be a "complex verb compound".

4.2.1. V-not-V Question Formation

As mentioned earlier in this paper, linguists who believe that V2 is the main verb argue that V1 cannot be the main verb of the sentence since it cannot undergo the V-not-V question formation (3ciii). Given the *de*-constraint, this fact is readily explained. The result of forming such a question "phrase" with V1 would violate the *de*-Constraint.

(15)

```
                                    VP
                                     |
            ┌────────────────────────┴────────────┐
            V̄                                      DE
     ┌──────┼──────┐                                |
     V1    NEG     V1                               |
     |      |      |                                |
(*ta)  chi    bu    chi           de        (hen zixi?)
(he)   eat    not   eat           DE        (very careful)
 ???
```

Sentence (15 = 3ciii) derived from (3ci) shows that after the V-not-V question formation, the node DE in the relevant local tree becomes the only sister node to the mother node which dominates V1, rather than to V1 itself. This violates the *de*-constraint and therefore the sentence is ruled ungrammatical.

The present theory not only uncovers the mystery why V1 cannot form V-not-V questions, it can also explain why it is that when another verb immediately precedes V1, as observed by Huang (1988), this preceding verb can form a V-not-V question "phrase." The answer lies again in the existence of the *de*-constraint.
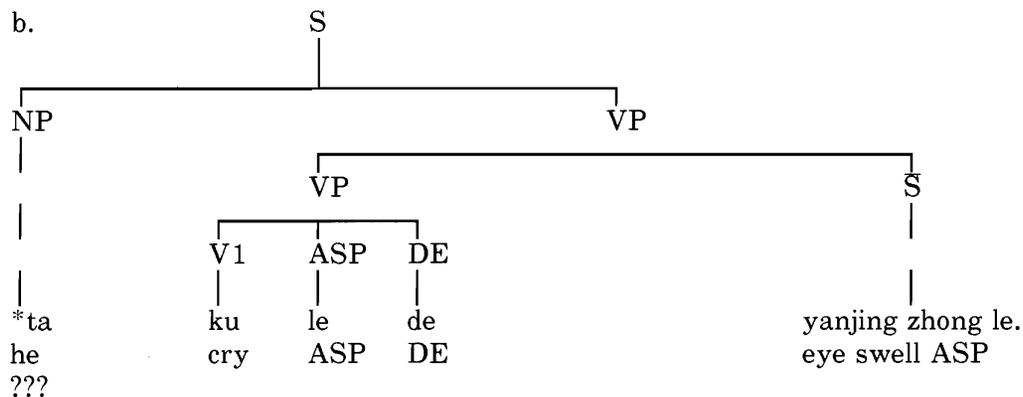
(16)

```
                            S
            ┌───────────────┴───────────────────┐
           NP                                    VP
            │                    ┌────────────────┴───────────┐
            │                    V̄                            VP
            │          ┌─────────┼─────────┐        ┌──────────┴──────┐
            │          V        NEG         V        VP               AP
            │          │         │          │   ┌─────┴─────┐          │
            │          V        NEG         V    V1         DE         │
            │          │         │          │    │          │          │
           ta         shi       bu         shi  chi         de        zixi?
           he          be       not         be  eat         DE       careful
```

"Is it the case that he eats carefully?"
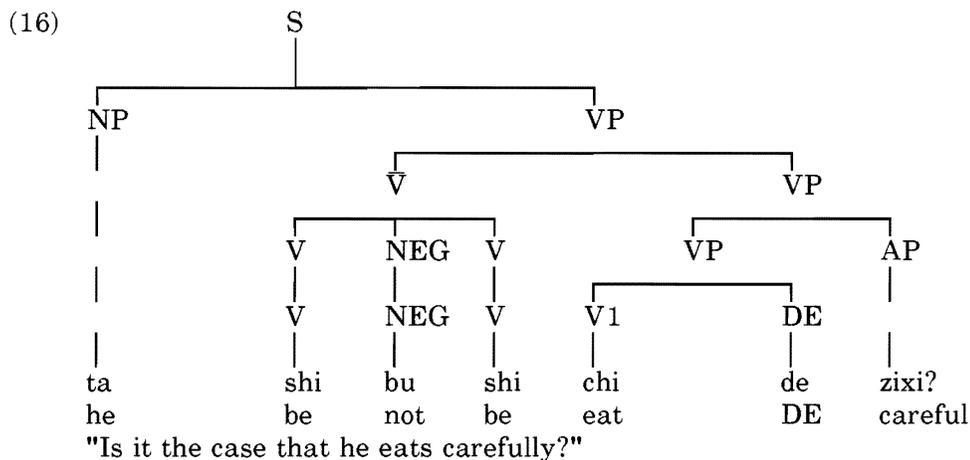
When another verb (e.g. *shi* "be") precedes V1, V to V-not-V transformation can be freely carried out with this preceding verb without affecting the syntactic relation between DE and V1 as designated by the *de*-Constraint. On the other hand, V1 would be "disconnected" from DE in such a manner that the *de*-Constraint is violated if it itself has to undergo the V-not-V transformation (see 15).

The above sentence suggests that the particle *de* somehow has to be a sister to a bar-zero V node. Such evidence provides further independent motivation for the *de*-Constraint.

4.2.2. The Aspect Marker *le*

The fact that when V1 has the past/perfective particle *le* immediately following it the sentence becomes ungrammatical (4d) is again nothing mysterious given the *de*-Constraint. The ungrammaticality is due to the fact that the ASP between V1 and DE causes the breaking down of the V1-DE "exclusive sister-hood" relation stipulated by the *de*-Constraint.

(17) a.

```
                            S
            ┌───────────────┴───────────────────┐
           NP                                    VP
            │                 ┌──────────────────┴──────────┐
            │                 VP                             S̄
            │          ┌──────┴──────┐                       │
            │          V̄            DE                       │
            │      ┌───┴───┐         │                       │
            │      V1      ASP        │                      │
            │      │        │         │                      │
          *ta     ku       le        de              yanjing zhong le.
           he     cry      ASP       DE              eye swell ASP
           ???
```

b.

```
                              S
          ┌───────────────────┴───────────────┐
         NP                                   VP
          │               ┌───────────────────┴──────────┐
          │              VP                               S̄
          │        ┌──────┼──────┐                        │
          │       V1    ASP     DE                        │
          │        │      │      │                        │
        *ta        ku     le     de          yanjing zhong le.
        he        cry    ASP     DE          eye swell ASP
        ???
```
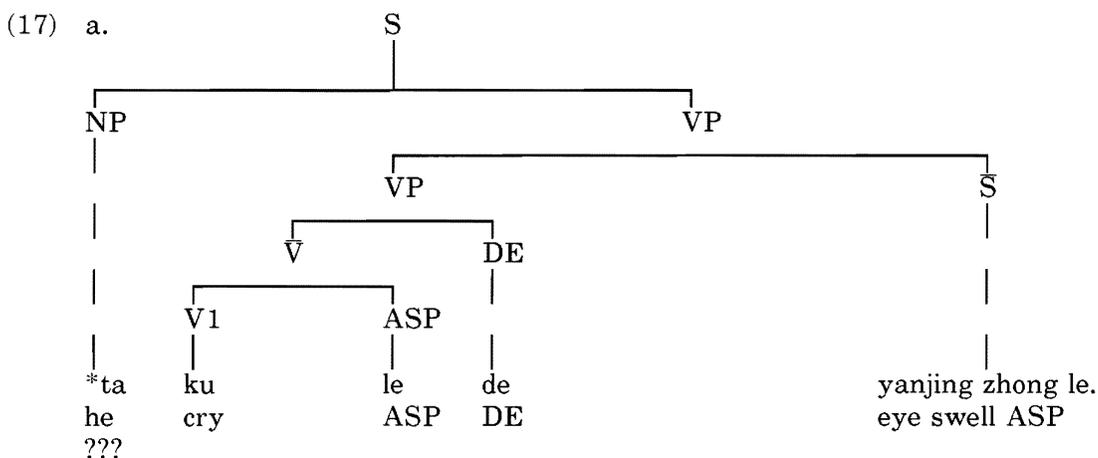
In (17a), the DE node and V1 are not sisters. In (17b), they are not the only overt sisters dominated by the same mother. In neither case, the *de*-Constraint is obeyed, and, therefore, the sentence is ruled out as ungrammatical.

4.2.3. Object Raising

The *de*-Constraint that is proposed in (14) also correctly predicts that the V1 object has to move elsewhere from its normal post-verbal position. The following are two possible phrase markers for the ungrammatical sentence in (7c).

(18) a.

```
                              S
          ┌───────────────────┴──────────────────┐
         NP                                      VP
          │              ┌────────────────────────┴──────────┐
          │             VP                                   AP
          │       ┌──────┴──────┐                             │
          │       V̄            DE                            │
          │  ┌─────┴─────┐       │                            │
          │ V1          NP       │                            │
          │  │           │       │                            │
        *ta  chi        fan      de                          zixi.
        he   eat        food     DE                          careful
        ???
```

b.

```
                              S
          ┌───────────────────┴──────────────────┐
         NP                                      VP
          │              ┌────────────────────────┴──────────┐
          │             VP                                   AP
          │        ┌─────┼─────┐                              │
          │       V1    NP    DE                              │
          │        │     │     │                              │
        *ta        chi   fan   de                            zixi.
        he         eat   NP    DE                            careful
        ???
```

11
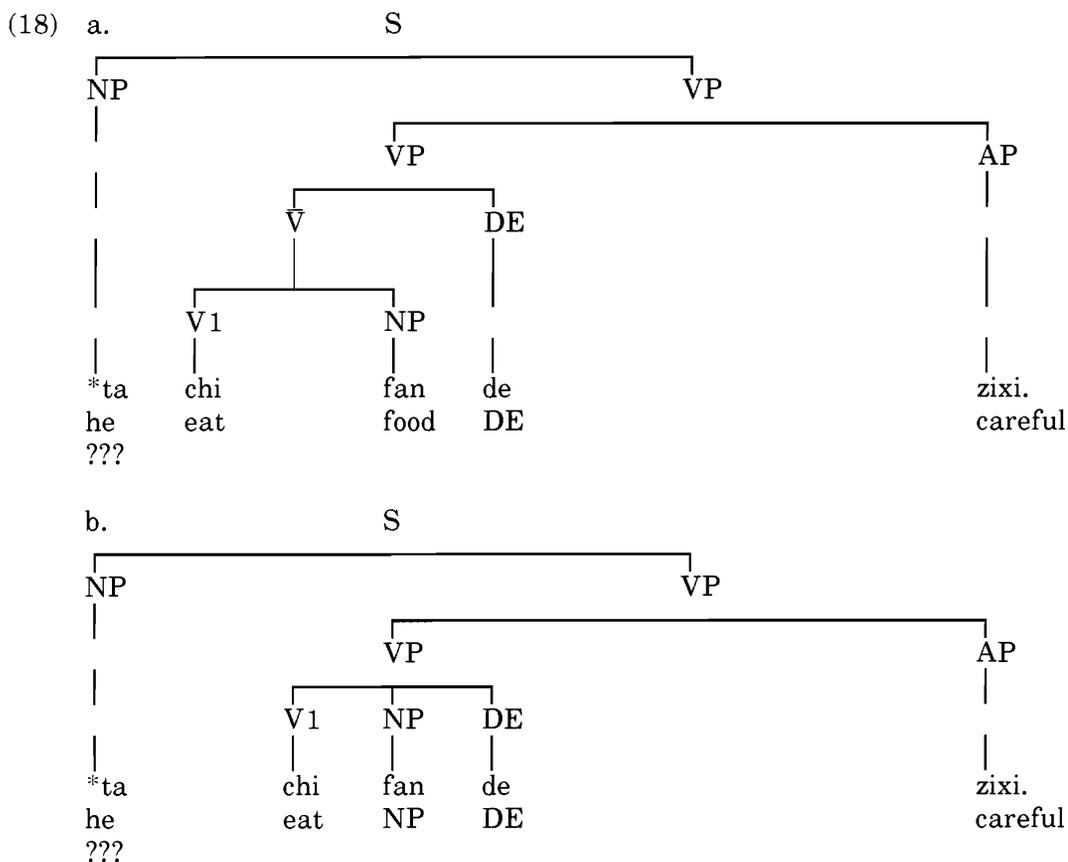
Both syntactic phrase structures in (a) and (b) fail to satisfy the *de*-Constraint by having the node DE not in the stipulated syntactic position with reference to V1. In (a), DE is a sister to a $\bar{V}$ rather than the V1, while in (b), although DE and V1 are sisters, there is also a third sister -- an overt NP node which shares, in violation of the *de*-Constraint, such a syntactic relation. On the other hand, when the object NP is preposed to the front of V1, the requirement of the *de*-Constraint is met and, consequently, the sentence becomes grammatical.

Given that Chinese is essentially an SVO language (Sun and Givon, 1985), the phrase marker (18a) (or 18b) can be regarded as the underlying representation from which the following surface representation is derived through object raising:

(19) SR


```
           S
           |
    ┌──────┴────────────┐
   NP                   VP
    |          ┌────────┼──────────┐
    |         NP        VP         AP
    |          |    ┌───┴───┐      |
    |          |   V1       DE      |
    |          |    |       |       |
   ta         fan  chi      de     zixi.
   he        food  eat      DE     careful
"He eats (food) carefully."
```
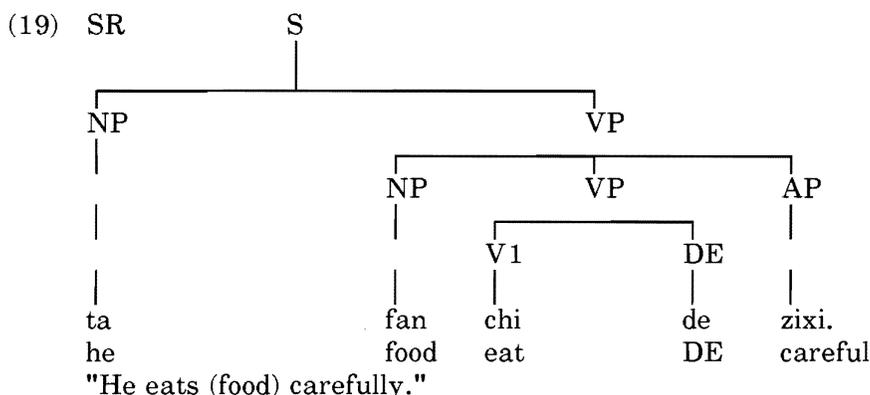
After the object *fan* "food" is moved to the other side of V1, DE and V1 become the only overt sister nodes in the local tree -- a result that no longer violates the *de*-Constraint. The sentence is consequently accepted as being grammatical.

4.2.4. V1 Reduplication

Further support for the *de*-Constraint comes from evidence that is related to the object raising cases. This is the case of V1 reduplication.

There is a type of CEAC sentences which contain two V1s. Presumably, the second in the sequence is a reduplication of the first. The following is an example of such a sentence.

(20) ta   chi   fan   chi   de   hen zixi.
      he   eat   food   eat   DE   very   careful
      "He eats his meal very carefully."
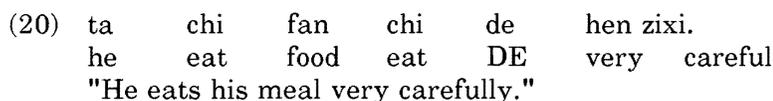
It should be noted that the sentence in (20) is "related" to that in (19). The relatedness of the two sentences comes from the fact that the two are in fact alternative ways of saying the same thing. It is interesting to see that the present theory actually provides a principled account for the identity in the meaning of the two sentences. In particular, the equivalence in meaning of the two sentences is due to the fact that both sentences are surface syntactic representations derived from the same deep syntactic structure (namely, either (18a) or (18b), depending on one's theory). The difference in the two surface structures are the result of two alternative transformation rules applied on the same single deep structure.

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As noted before, the transformation from the deep structure (e.g. 18b) to one of the surface structures is in fact triggered by the *de*-Constraint. Just as the object is raised so that V1 can be construed to form an immediate constituent with DE, V1 is reduplicated so that a local tree with this reduplicated V1 and DE as the only daughter nodes is created, as in (21). Either operation, object raising or V1 reduplication, is carried out on the same UR (either (18a or b)) in order to meet the requirements of the *de*-Constraint. If (18b) is taken as the underlying representation, the surface representation after the reduplication rule may be in (21). (21)   SR

```
                           S
                           |
        ┌──────────────────┴────────────────────────┐
        NP                                          VP
        |          ┌──────────────────────────┬─────────┐
        |          VP                          VP        AP
        |      ┌───┴────┐               ┌──────┴───┐     |
        |      V1       NP              V1         DE     |
        |      |        |               |          |      |
        ta    chi      fan             chi         de    zixi.
        he    eat      food            eat         DE    careful
```
"He eats (food) carefully."
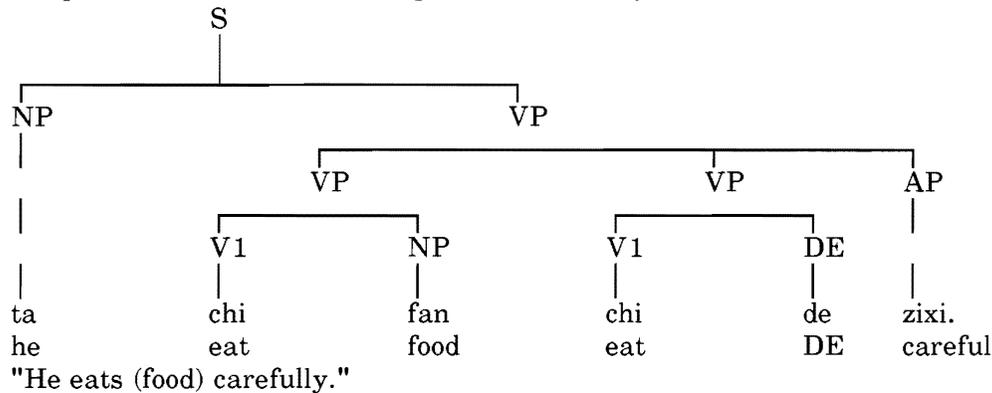
As is shown in (21), V1 reduplication is obligatorily performed in observation of the *de*-Constraint, and after V1 reduplication, the only sister node to DE becomes V1, and such a surface representation obeys the *de*-Constraint.

It has been shown that the present theory does provide a unified analysis for both the object raising and the verb reduplication processes; both of which are but one process of transforming an underlying structure to one that would satisfy the requirements of a surface structure constraint.[7]

4.2.5. "Complex Verb Compound"

The so-called "complex verb compounds" which we briefly mentioned earlier consist of two verbs each. Chao (1968) treats them as a type of verbal compound partly because the two component verbs always share the same arguments. There has, however, never been rigorous support provided to show that this is indeed the case. In fact, some researchers have challenged such a position with some very convincing evidence.

Hansell (1987), for instance, argues that such a construction is in fact a serial verb construction. He supports his argument by pointing out that while normal two-verb compounds denote only a single action (22a), the two component verbs of the so-called "complex verb compounds" denote separate actions, and usually the action denoted by the first verb must precede that denoted by the second (22b).

(22)	a.	jiao-xun	"teach"+"train"	"to chide"
		han-jiao	"yell"+"call"	"to yell"
		da-sao	"beat"+"sweep"	"to clean"
	b.	chi-liao	"eat"+"finish"	"finish eating"
		kan-dong	"read"+"understand"	"understand through reading"
		da-po	"beat"+"break"	"break by beating"

In addition, Hansell observes that a normal two-verb compound cannot have another morpheme such as *de* "DE" or *bu* "not" occur in between its two verbal morphemes, as in (23a), while a "complex verb compound" can, as in (23b).

(23) a. *jiao-de-sun   *jiao-bu-xun
          *han-de-jiao   *han-bu-jiao
          *da-de-sao   *da-bu-sao
      b. chi de liao   "can finish eating"   chi bu liao   "cannot finish eating"
          kan de dong   "can be understood"   kan bu dong   "cannot be understood"
          da de po   "can break"   da bu po   "cannot break"

If what Hansell argues for is true, and if we believe that it is a series of individual verbs rather than a compound that is concerned here,[8] the phrase structure for the ungrammatical sentence in (6d) can be represented as in (24) (irrelevant details of the phrase marker are ignored here).

(24)

```
                              VP
                ┌──────────────┴──────────────┐
                V̄                             DE
        ┌───────┼───────┐                      │
        V1     NEG      V                       │
        │       │       │                       │
(*ta)   chi     bu      liao                    de        (zhemo duo).
(he)    eat     not     finish                  DE        (so much)
???
```
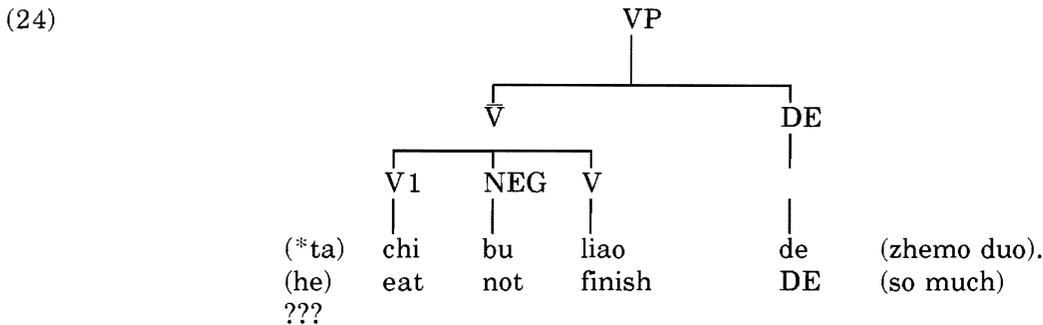
In (24), the DE node is a sister to a VP rather than a bar-zero V in violation of the *de*-Constraint. The sentence is consequently starred as ungrammatical.

4. SUMMARY

This paper has proposed a unified theory regarding the behavior of *de* in the Chinese Extent Adverbial Construction. It has been demonstrated that these "peculiar" distributional facts about V1 in CEAC sentences are best accounted for by assuming a constraint, called here the *de*-Constraint, which applies at the surface syntactic representation.

This *de*-Constraint has been very successful in providing a unified explanation for the non-occurrence in V1 position of such forms as the V-not-V question or the "complex verb compounds", for V1's inability to be immediately followed by an aspect marker such as *le* or by its own object, and for V1's inability to be immediately preceded by *bu* "not".

NOTES

1 The name, Chinese Extent Adverbial Construction, was proposed by Li and Thompson (1981).

2 Each of the example sentences in this paper contains three lines. The first is the Chinese sen-

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tence in the standard Chinese alphabetic system called *pinyin*. The second glosses each of the words in the sentence in linear order. The third contains the English translation of the Chinese sentence.

3 The vast majority of Chinese adjectives are also adverbs. The exact parts of speech of these are usually determined by their syntactic function in a sentence.

4 Adjectives in Chinese are "a species of verbs" (Chao, 1968) since they can function as predicates on their own.

5 V here stands for "verb". Another way to refer to the same form is *A-not-A*.

6 Binding Condition A (Chomsky, 1980, 1981) stipulates that the trace t of a moved NP be c-commanded by its antecedent in its governing category, namely, NP or S̄. However, this condition will have to be violated if V1 is treated as the main verb in the following CEAC sentence.

```
                        S
                        |
         ┌──────────────┴──────────────┐
        NP                             VP
         |                             |
         |                ┌────────────┴────────────┐
         |                V                         S̄
         |                |                         |
         |                |            ┌────────────┴────────────┐
         |                |           NP                         VP
         |                |            |                         |
         t             zui de      zhangsan              zhan-bu-qilai.
         t             drunk DE    Zhangsan              stand not up
```
"Zhangsan is so drunk that he cannot stand up."
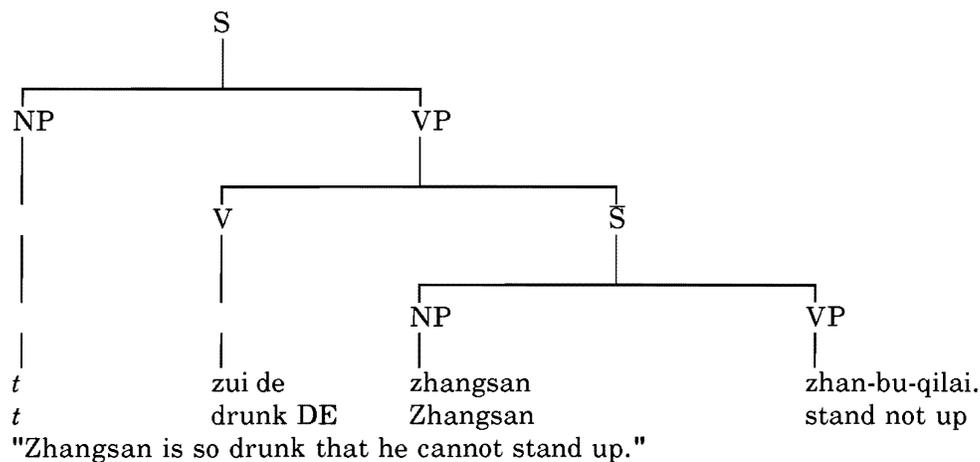
In (11), t and *Zhangsan* are co-indexed with each other, the latter being the antecedent of the former. If we are to assume the above syntactic analysis, the grammatical sentence in (11) has to be ruled out as ungrammatical since it violates Binding Condition A. The antecedent *Zhangsan* does not c-command its trace t but is c-commanded by it.

The issue of NP traces in Chinese is a very complicated one and currently under hot debate. Even a slight review of it needs quite lengthy space. Hence, the present paper will not address the issue any further. The interested reader is referred to Hou (1987), Huang (1982,1987) and Xu (1986).

7 This evidence has raised an interesting question that has to do with the interface between syntax and phonology. The present analysis allows phonological rules such as V1 reduplication rule to apply on underlying syntactic structure. It is not clear how this should happen.

Unfortunately, the present paper cannot possibly get further into this issue as the scope of this paper is limited. Nevertheless, in case any later researcher becomes interested in this problem, it may be helpful to point out that reduplication in Chinese has caused some problems for current phonological/morphological reduplication theories. Some researchers (for example,

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Zhang, 1987) have questioned the current phonological approach to reduplication by Marantz (1982) and Prince and McCarthy (1986).

8   As the reader may already know, Chinese is rich in serial verb constructions.

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A NOTE ON ECPO ID/LP GRAMMAR

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1. INTRODUCTION: ID/LP FORMAT AND THE ECPO PROPERTY

The theory of Generalized Phrase Structure Grammar, as given in Gazdar et al. (1985) -- henceforth GKPS, is defined in Immediate Dominance/Linear Precedence format, which states immediate dominance and linear precedence relations separately. Immediate Dominance (ID) rules specify the constituent relation between the mother and daughter categories but do not imply any particular linear order among sister categories. Linear order is handled by Linear Precedence (LP) rules. The motivation for adopting ID/LP format rather than traditional phrase structure (PS) format is largely that the traditional formulations of phrase structure grammars fail to express generalizations about linear order that natural languages exhibit. In a phrase structure, as is well-known, there are two distinct relations among syntactic categories: the immediate dominance relation between the mother category and the daughter categories, and linear precedence relations among sister categories. Traditionally, these two types of relations among categories were jointly encoded in phrase structure rules, as shown by the following:

```
(1) a.   S --> NP VP
    b.   VP --> V  NP
```

The rule in (1a) says that S immediately dominates NP and VP, and NP linearly precedes VP. The rule in (1b) says that VP immediately dominates V and NP, and V linearly precedes NP. However, it has been long observed that linear order is not an idiocyncratic property of individual grammatical rules. Ordering relations among sister categories exhibit regularities in many languages. For instance, in English the lexical head is always initial in verbal phrases as discussed in GKPS. The structures in (2) are some familiar examples.[1]

```
(2) a.   VP --> V + NP
    b.   VP --> V + NP + PP
    c.   VP --> V + NP + VP
    d.   VP --> V + S'
```

A grammar that states the ordering in each of these rules clearly fails to express an important generalization about English.

Futhermore, many languages in the world have rather free linear order among categories. For instance, in Latin the major constituents of a simple subject-verb-object sentence can occur in any order, as shown by the structures below:

(3) a. S --> NP$_S$ + V + NP$_O$
     b. S --> NP$_S$ + NP$_O$ + V
     c. S --> V + NP$_S$ + NP$_O$
     d. S --> NP$_O$ + V + NP$_S$
     e. S --> NP$_O$ + NP$_S$ + V
     f. S --> V + NP$_O$ + NP$_S$

In the structure above, NP$_S$ stands for the subject NP and NP$_O$ stands for the object NP. Assuming the traditional PS rule format, the structures above require six individual rules, where the immediate dominance relation and linear precedence relations are stated in each of the rules. Sells (1985) notes that if immediate dominance and linear precedence are treated separately in an ID/LP format, the six Latin structures can be expressed in terms of a single ID rule like that in (4), where the commas indicate that the categories are unordered with respect to each other.

(4) S --> V, NP, NP

In cases like the Latin one, since the order of constituents does not play any roles in the relevant structures, it is clearly not appropriate to encode such information in grammatical rules. Thus, there are good reasons for assuming ID/LP format (as opposed to PS format) in stating syntactic structures.

In the ID/LP theory adopted in GKPS, the set of expansions of any one category observes an ordering that is also observed by the expansions of all other categories. In other words, if we have a LP rule A < B in the grammar, we will always expect local trees in which a category A precedes a category B and this precedence relation holds for A and B regardless of the category from which A and B are expanded through an ID rule. This property is called Exhaustive Constant Partial Ordering (ECPO). Thus, the theory predicts that there is an ECPO property in a given language, which seems motivated in view of the word order phenomena found in English. As mentioned above, in English the lexical head is always initial in verbal phrases. In fact, it seems that in English lexical categories precede their phrasal sister categories across all constituents, regardless of categorial types, as shown by the structures in (5), in addition to the structures in (2) above.

(5) a. N' --> N + PP
     b. N' --> N + S
     c. A' --> A + PP
     d. A' --> A + S
     e. A' --> A + VP
     f. PP --> P + NP

In the following sections, we will show that while the assumption of ID/LP format is quite plausible, the claim of the ECPO property for the theory of grammar is too strong cross-linguistically.

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2. LINEAR ORDER IN CHINESE

Languages vary in terms of the way in which grammatical functions are encoded. For instance, in lanuages like English inflectional forms of agreement are used to encode subject-predicate relations, while in languages like Japanese, nominal particles are used to mark subjects and objects. In contrast, Chinese employs very few morphological devices; instead, word order plays a crucial role in signaling grammatical functions. The most basic phrase structures in Chinese are shown as follows (cf. Li and Thomspon 1981, and Huang 1982):

```
(6) Non-lexical structures:

    a.  S  --> NP + VP
    b.  S  --> NP + S
    c.  S  --> VP + S
    d. VP  --> ADVP + VP
    e. VP  --> PP + VP

    f. NP  -->  S + NP
    g. NP  --> VP + NP
    h. NP  --> AP + NP
    i. NP  --> PP + NP
    j. AP  --> ADVP + AP
    k. PP  --> ADVP + PP

    Lexical structures:

    l. VP  --> V + XP
    m. VP  --> V + NP + PP
    n. VP  --> V + S
    o. VP  --> V + NP + S
    p. AP  --> A + VP
    q. PP  --> P + NP
    r. NP  --> DET + N
```

Before getting into the discussion, we briefly comment on certain facts about the structures above. (6b) and (6c) refer to topic constructions. Since NP and VP are the most common categories which may occur as topics, we will concentrate on these two cases.[2] (6f), (6g), (6h) and (6i) describe the structures of NPs. NPs in Chinese can consist of a head noun plus other modifying elements, which, immediately followed by a modifier marker **de**, always occur before the head noun, and phrases of almost all categorial types may be used as prenominal modifiers. When a VP is used to modify a head noun, it can be regarded as a relative clause. An NP may also be modified by a clause, which may be a relative clause or an NP complement clause. Furthermore, the head of a Chinese complex NP (containing either a relative clause or an NP complement clause) is a phrasal category rather than a lexical category, since the clause may always precedes a full NP (a noun together with a determiner) as shown by the examples in (7) and (8).

(7)   women hezuo   de <u>nei-ge wenti</u>
        we cooperate MO that CL question
        'that question concerning our cooperation'

(8)   renmin xunqiu heping de <u>nei-yi fang'an</u>
        people seek   peace MO that CL plan
        'that plan that people seek peace'

Thus, the (local) constituent structures of Chinese in one way or another include the patterns in which S (or VP) precedes NP (cf. (6f)-(6i)), where we ignore some detailed features which we will come to discuss later.

In view of the structures given in (6), the formal advanteges of ID/LP format seems less apparent for Chinese, compared with languages such as Latin, which allow considerable degrees of word order freedom. An ID/LP grammar needs additional statements to express the generalizations about the linear order but will not drastically reduce the number of grammatical rules for a language like Chinese that relies heavily on word order to convey syntactic information. However, parallel to the situation for English, for Chinese there is at least one point that strongly motivates an ID/LP grammar. An ID/LP grammar, but not a PS grammar, may express the relevant generalization of word order in Chinese, while predicting that no structures like those in (9) will be expected to exist in Chinese:

(9)   a.   S --> VP + NP
      b.   VP --> NP + V
      c.   VP --> NP + V + PP
      d.   NP --> NP + S

3. A NON-ECPO PROPERTY AND THE NOTION OF HEAD

Given the structures in (6), however, it seems that the relevant structures in Chinese exhibit a non-ECPO property, since the set of expansions for a given category are closed under an (partial) ordering that is not constant for the expansions of all categories. Consider the following pairs:

(10) a.   S --> NP + VP
     b.   S --> NP + S

     c. NP --> VP + NP
     d. NP --> S + NP

The structure in (10a), for instance, seems to motivate an LP rule like (11), but this is contradicted by the structure in (10c).

(11) NP < VP

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In fact, each of the two structures seems to motivate one LP rule, which is in conflict with the other. If so, both of the structures would be impossible since either of the structures would violate one LP rule. Thus, the set of structures can not be directly converted into an ID/LP grammar.

The important generalizations about the word order in Chinese, as noted in Huang (1982), can be characterized straightforwardly: it is head-final at the phrasal level for all the major categorial types, while it is head-initial at the lexical level for all the major categorial types except for the expansion of NP, where the head-final rule applies. These generalizations can be observed clearly from the structures in (6). This seems to suggest that the notion of H(ead) is essential to stating the generalizations of the linear order in Chinese. By incorporating the notion of H, Chinese constituent structures can be expressed in ID/LP format with LP rules like those in (12).

(12) a. X < H[¬SUBCAT]
      b. H[SUBCAT, ¬N] < X

Unfortunately, the LP rules in (12) cannot be formulated under the definitions given in GKPS, where LP rules are statements of linear order among categories (i.e. feature specifications), and the symbol H is not a feature specification. According to GKPS, a constituent structure is LP-acceptable if and only if it contains no daughter categories that are respective extensions of the categories specified in a LP rule and the linear order exhibited by them does not violate the LP rule. Thus, LP rules in GKPS are not sensitive to the notion of H. A potential argument unfavorable for the use of H in LP rules is, as Shieber (1984) points out, that the symbol H as defined in Gazdar and Pullum (1981) and GKPS will extend the expressive power of ID/LP formalism and allow certain non-ECPO grammars to be encoded. Consider the grammar in (13), which is non-ECPO:

(13) a. A' --> B A
      b. C' --> A B C
      c. C' --> B A C
      d. C' --> B C A

By incorporating the notion H, this non-ECPO grammar can be sufficiently stated in an ID/LP grammar as in (14), since the syntactic category represented by H may change from one ID rule to another.

(14) i. a. A' --> B, H
         b. C' --> A, B, H

    ii. a. B < H

As shown above, the same is true of the word order facts in Chinese. Though the relevant Chinese structures show a non-ECPO property, they can be stated in an ID/LP grammar by incorporating the notion H in the formulation.

We now face two options. One is to return to encoding constituents and linear order in PS rules for Chinese, which is certainly undesirable for reasons discussed earlier. The other is to incorporate the notion of H in the formulation of an ID/LP grammar, but this requires redefinition of LP rules in the theory.

One possible way out of the dilemma is to distinguish categories according to the grammatical functions that the categories in question perform in the relevant constituent structures. Let us look, for instance, at the structures in (10) repeated in (15) again, which show conflicting word order.

(15) a. S --> NP + VP
     b. S --> NP + S

     c. NP --> VP + NP
     d. NP --> S + NP

With respect to these structures, there seem to be two ways in which we may characterize the linear order of the daughter categories. One way is to look at the relation between the mother category and the daughter categories. As we indicated earlier, a non-head category precedes a head category, regardless of the categorial types of the constituents in question. The other way is to distinguish categories by marking those which function as modifiers. An important difference between the structures in (15a-b) and those in (15c-d) is that the structures in (15a-b) are expansions of S and the daughter VP and S are head categories functioning as predicates, while the structures in (15c-d) are expansions of NP and thus the daughter VP and S are non-head categories functioning as modifiers. In fact, constituents functioning as modifiers in a structure are syntactically different from those functioning otherwise, regardless of their major categorial types. This is not just that modifying elements in Chinese show a peculiar linear precedence, constantly preceding the head they modify, but more importantly that constituents functioning as nominal modifiers are in general marked by the particle **de**, which denotes various modifying relations of the modifying elements to the head NP, as has been discussed before. For this reason, we may assume that all categories that function as nominal modifiers in ID rules are specified as [+DE]. Thus the structures in (15) can be restated as those in (16).

(16) a. S --> NP + VP
     b. S --> NP + S

     c. NP --> VP[+DE] + NP
     d. NP --> S[+DE] + NP

Accordingly, the relevant ID rules may be stated as in (17).

(17) a. S --> NP, VP
      b. S --> NP, S

      c. NP --> VP[+DE], NP
      d. NP --> S[+DE], NP

Now we are able to state the relevant linear order generalization in the form of a LP rule:

(18) XP[+DE] < NP

Clearly, we also need an LP rule like the following to express the linear precedence facts of the structure in (16a-b). Thus, we may formulate LP rules in which the head-final character is not expressed directly, but is gleaned individually from the facts that NP precedes VP and a modifier precedes NP.

(19) NP < VP

Note, however, that the LP rules in (18) and (19) have not yet solved the problem of the ordering conflicts. According to GKPS, a constituent structure is LP-acceptable if and only if it contains no daughter categories that are extensions of the categories specified in a LP rule and the linear order exhibited by the daughter categories does not violate the LP rule. The violation of one LP rule is enough to rule out the structure. The problem now is that though the structures in (16a-b) may be LP-acceptable with respect to the LP rule in (17), the structures in (16c-d) will be ruled out by (19) since the daughter categories are extensions of the categories specified in the LP rule (19) and the ordering of the daughter categories violates the ordering specified by the LP rule.

Furthermore, We have said nothing so far that prevents free instantiation of the feature specification [+DE] on non-modifying elements though there is no motivation at all for such an instantiation. This can be accomplished by means of a Feature Specification Default. We could propose that for the feature DE, the default specification is [-DE], which can be stated as:

(20) FSD: [-DE]

The feature specification [+DE] will be introduced only through ID rules, i.e. (17c-d). Thus, if nothing is mentioned by any principles or rules, a category must have the feature specification [-DE], according to the approach to defaults adopted in GKPS. With a slight modification, the two LP rules introduced in (18) and (19) can be restated as in (21):

(21) a. XP[+DE] < NP
     b. NP < VP[-DE]

Given this, the structures associated with the rules in (17c-d) no longer violate the LP rule in (21b), since the daughter categories associated with the rules in (17c-d) will never be unifiable respectively with the categories specified in the LP rules.

Besides the two LP rules in (21), we could add three more LP rules that correspond to the linear order facts reflected in the structures in (6). Thus, without resorting to the notion H, the LP rules necessary for Chinese would be like those in (22).

(22) a. XP[+DE] < NP
      b. NP < VP[-DE]
      c. [SUBCAT, ¬N] < ¬[SUBCAT]
      d. {PP, ADVP} < {VP, AP}
      e. ADVP < PP

This set of LP rules cover the most part of the linear order facts in Chinese. However, the LP rules in (22) are inadequate. One of the potential problems concerns topic constructions. As mentioned earlier, other types of phrases (e.g. VPs) as well as NPs may also occur in sentence initial position. Assuming a general rule like S --> XP, S for the constituents of the relevant structures,[3] nothing so far proposed in the grammar ensures that the XP always precedes the S.[4] Of course, one might be able to invoke a LP rule like [+TOP] < [-TOP]. Here we are not going to discuss the argument against or for such an LP rule and the related features, nor explore further the possibility for this direction. The point is that assuming a set of context-free rules, we can always encode such set of rules in an ECPO ID/LP grammar, as noted in Shieber (1984). However, to encode a set of non-ECPO strucutures in ECPO ID/LP format seems bound to increase the number of syntactic features and LP rules in the grammar.

On the other hand, the correct linear order with respect to topic constructions is straightforwardly ensured by the LP statements in terms of the notion of H(ead) that it is head-final at the phrasal level, as stated in (12) repeated in (23).[5]

(23) a. X < H[¬SUBCAT]
      b. H[SUBCAT, ¬N] < X

4. CONCLUSION

Given the discussion above, it seems clear that though an ECPO ID/LP grammar is possible for Chinese, one can hardly say that the LP rules stated in (22) have captured the relevant generalizations in a most straightforward and natural way, even though they are technically consistant with the definitions of LP statements given in GKPS. This indicates that we have to give up something. We can either insist on the ECPO property in the formulation of an ID/LP grammar by costing more syntactic features and LP rules, or accept the notion of Head in the formulation of an ID/LP grammar without worrying about the ECPO property.

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If the analysis above is correct, it seems to favor the latter approach. Certain cases from other languages also seem to have the same implication. One of the well-discussed cases is the word order phenomena in German. According to Uszkoreit (1987), the word order in German requires that LP rules be organized disjunctively. Each appropriate pair of daughter categories in a given constituent structure is LP well-formed if the order among them satisfies one of the LP·rules. Thus, one LP rule may override another.[6] This virtually gives up the ECPO property in the formulation of an ID/LP grammar for German. The point is that an adequate grammatical theory for a natural language should be not only formally restrictive but also linguistically well-motivated. In short, while ID/LP theory provides a powerful tool for expressing linear order generalizations, for languages such as Chinese which rely heavily on word order to convey syntactic information, the insistence on an ECPO property in the formulation of an ID/LP grammar could be as inefficient and unintuitive as a PS approach to languages with various degrees of linear order freedom.

NOTES

1 Forms like those in (2) are employed in this paper to represent instances of syntactic structures, where the symbol "+" is used, in contrast to phrase structure rules as given in (1) above. Given hierarchical structures, linear order pertains only to cases where the categories are sisters.

2 We will see that the possibility of other categories occuring as topics is not crucial to the analysis.

3 See Xu and Langendoen 1985, and Jiang 1989 for related discussion.

4 Assuming S as an instance of VP, the LP rule NP < VP has the effect of blocking a linear order like S < NP.

5 It should be noted that some word order phenomena in Chinese seem to posit problems for the set of LP rules in (23) as well as the LP rules in (22). Though Chinese is generally head-initial at the lexical level, sentences like the following seem to be counterexamples to this generalization.

(i)   Nei-jian shi [$_{VP}$ [$_{PP}$ yu Zhangsan] wuguan].
      that-CL thing   with Zhangsan have-no-relation
    'That has nothing to do with Zhangsan.'

In this structure, the PP is subcategorized by the verb **wuguan** 'have-no-relation'. This seems to indicate that the relevant local structure is one in which the PP precedes the V (i.e. VP --> PP + V). Note that though it is generally agreed that the PP is subcategorized by the verb, the relation between the PP and the V is looser than the one that we would find between a verb and a subcategorized complement, since we may always insert an adverb between the PP and the verb as the following example shows:

(ii) Nei-jian shi [$_{VP}$ [$_{PP}$ yu Zhangsan] wanquan wuguan].
      that-CL thing   with Zhangsan at-all have-no-relation
    'That has nothing to do at all with Zhangsan.'

This may be an evidence suggesting that the string **wuguan** 'have-no-relation' is not a lexical constituent, but rather a phrasal constituent, maybe a V'. This seems plausible, following the general assumption that adjunction is possible only at the phrasal level. In fact, it is general assumed that adjunction is possible only to a maximal projection (i.e. XP). However, there is also some discussion of adjunction to X', such as Fiengo and Higginbotham (1981), who argue for QR-adjunction to N'. The point here is that the possiblity of adjunction to the string **wuguan** 'have-not-relation' may indicate that it is not lexical category. If this is correct, the fact that the PP precedes the the string **wuguan** 'have-no-relation' follows from the generalization that the linear order is head-final at the the phrasal level or that PP precedes VP or V'. Thus, the example actually poses no problem for either of the formulations of the LP rules we have so far discussed. It should be noted here that if a subcategorized constitutient may not be a sister to the lexical head, i.e. the verb, this will pose potential problems for the GKPS treatment of sub-categorization. We are not going to discuss this topic in this thesis.

6 Also see Sag (1987) for discussion of English word order.

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A GPSG Analysis of Case Agreement in German

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1. Introduction

It is the purpose of this paper to explore the potential of a phrase structure grammar proposed by Gazdar, Klein, Pullum and Sag (GKPS) to account for case agreement in German. Firstly, I will review the data which includes both literary and conventional forms, and then proceed to the analysis, concluding with a brief evaluation of this approach.

2. Case and Lexical Qualities of Verbs and Prepositions

German has 4 cases: the nominative, the accusative, the dative, and the genitive. Prepositions and certain verbs require that their complements take a specific case. Verbs such as *werden* 'to become' require that their complements take the nominative case:

Der Fürst wird ein grüner Frosch.

'The prince became a green frog.'

$[_{NPnom}$ Der Fürst] $[_V$ wird] $[_{NPnom}$ ein grüner Frosch]

Verbs such as *nennen* 'to name' require that their complements take the accusative case:

Der grüne Frosch nennt den Grund für die Verwandlung.

'The green frog mentions the reason for the change.'

$[_{NPnom}$ Der grüne Frosch] $[_V$ nennt] $[_{NPacc}$ den Grund $[_{PP}$ für die Verwandlung]]

The dative case is required for the complements of verbs such as *glauben* 'to believe':

Die Fürstin glaubt dem grünen Frosch nicht.

'The princess does not believe the green frog.'

$[_{NPnom}$ Die Fürstin] $[_V$ glaubt] $[_{NPdat}$ dem grünen Frosch] $[_{neg}$ nicht]

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The genitive case is required for the complements of verbs such as *gedenken* 'to think of':

Sie gedenkt ihres hübschen Fürsten und weint.

'She thinks of her handsome prince and cries.'

[$_{NPnom}$ Sie] [$_V$ gedenkt] [$_{NPgen}$ ihres hübschen Fürsten] [$_{conj}$ und [$_V$ weint]]

In German there are, however, only a few verbs that require a specific case, whereas all prepositions require that their complements take a specific case. In fact, prepositions can be divided into groups by these cases:

Accusative Prepositions:
bis	'until'
durch	'through'
für	'for'

e.g.   für den grünen Frosch 'for the green frog'

[$_{PP}$[$_P$ für] [$_{NPacc}$ den grünen Frosch]]

Dative Prepositions:
mit	'with'
seit	'since'
zu	'to'

e.g.   mit dem grünen Frosch 'with the green frog'

[$_{PP}$[$_P$ mit] [$_{NPdat}$ dem grünen Frosch]]

Genitive Prepositions:
anstatt	'instead of'
während	'during'
wegen	'because of'

e.g.   anstatt des grünen Frosches 'instead of the green frog'

[$_{PP}$[$_P$ anstatt] [$_{NPgen}$ des grünen Frosches]]

There are a group of prepositions whose complements take either the dative or the accusative case:

Dative/Accusative Prepositions:
in	'in'
an	'at'
über	'over'

e.g.　　Der grüne Frosch wohnt in dem Teich.

　　　　'The green frog lives in the pond.'

　　　　$[_{PP}[_P$ in] $[_{NPdat}$ dem Teich]]

versus:

　　　　Der grüne Frosch springt in den Teich.

　　　　'The green frog jumps into the pond.'

　　　　$[_{PP}[_P$ in] $[_{NPacc}$ den Teich]]

It is apparent that the accusative case reflects a directed action, and the dative, a state.

2.1 Case and Grammatical Functions

In German, case also accounts for grammatical functions. The nominative expresses the subject, the accusative expresses the object, and the dative expresses the indirect object:

　　　　Die Fürstin gibt dem Bettler den grünen Frosch.

　　　　'The princess gives the green frog to the beggar.'

　　　　$[_{NPnom}$ Die Fürstin] $[_V$ gibt] $[_{NPdat}$ dem Bettler] $[_{NPacc}$ den grünen Frosch]

Given these examples, case, for the most part, reflects grammatical function as well as a lexical property of prepositions and some verbs.

2.2 Case marking of Determiners and Adjectives

Once the case of an NP has been determined, it is necessary for the determiner and the adjectives of that NP to agree in case, otherwise it is ungrammatical:

　　　　Eine Herzogin hat den hübschen Fürsten geküsst.

　　　　$[_{NPacc}[_{DETacc}$ den] $[[_{ADJacc}$ hübschen] $[_N$ Fürsten]]]

　　　　* Eine Herzogin hat dem hübschen Fürsten geküsst.

　　　　$[_{NPacc}[^*_{DETdat}$ dem] $[[_{ADJacc}$ hübschen] $[_N$ Fürsten]]]

　　　　'A duchess kissed the handsome prince.'

* Die Herzogin hat manch hübscher Fürsten geküsst.

[$_{NPacc}$[$_{DETacc}$ manch] [[*$_{ADJgen}$ hübscher] [$_{N}$ Fürsten]]]

'The duchess kissed many handsome princes.'

It is important to note that word order seems to affect the marking for case. If an adjective is prenominal, it must be marked for case as we have seen above. However, if it is postnominal, it is not marked:

die schönste Herzogin   'the most beautiful duchess'

[$_{NPacc}$[$_{DETacc}$ die] [[$_{ADJacc}$ schönste] [$_{N}$ Herzogin]]]

die Herzogin schönst   'the duchess, most beautiful'

[$_{NPacc}$[$_{DETacc}$ die] [$_{N}$ Herzogin] [$_{ADJ}$ schönst]]

It is not the case that only determiners and adjectives must agree in case within an NP; there are some nouns which reflect case.

2.3 Case Marking and Nouns

In German, most nouns in the genitive singular and in the dative plural reflect case:

Genitive singular (non feminine):

des grünen Frosches 'the green frog'

[$_{NPgen}$[$_{DETgen}$ des] [[$_{ADJgen}$ grünen] [$_{Ngen}$ Frosches]]]

Dative plural (non feminine):

den grünen Fröschen 'to the green frogs'

[$_{NPdat}$[$_{DETdat}$ den] [[$_{ADJdat}$ grünen] [$_{Ndat}$ Fröschen]]]

In addition to this group of nouns which reflect case, there is another which is also marked for case. However, it is only the singular non-nominative forms which reflect case:

Die Herzogin verlockt den Fürsten mit dem Reichtum.

'The duchess tempts the prince with riches.'

$[_{NPacc}[_{DETacc}$ den] $[_{Nacc}$ Fürsten]]

This group of nouns is very small in number.

The data reveals that case is assigned to an NP either by a lexical virtue of the preposition or verb, or it is assigned according to the grammatical function of that NP. However, there are some prepositions which are able to assign two cases. The determiners, prepositions, and adjectives of an NP must agree in case; and also, there appears to be some form of case agreement evident in nouns.

3. Case in the VP

According to Zwicky (1986), there are three approaches of case assignment to the complement NP's of a VP, subcategorization, agreement, and the stipulated feature approach. He argues on the basis of government that these approaches fail, and proposes his own version of the stipulated feature approach. This, in addition to the mechanisms of Declension Government (DG) and Declension Inheritance (DI), can account for case agreement between the constituents, DET and ADJ (Zwicky 1986:985). However, in this paper I will not be discussing the phenomenon of DET ADJ agreement in German, and I refer the reader to either Zwicky (1986), or Fenchel (ND) for a discussion in this area.

Zwicky's version of the stipulated feature approach differs a great deal from the GKPS framework which I will adopt in this paper. And in addition, DG and DI fail to offer any advantage over the Head Feature Convention (HFC) and the Control Agreement Principle (CAP) of GKPS. Therefore, I propose a GKPS approach to case agreement in German which in some ways resembles a combination of the subcategorization and the agreement approaches.

3.1 ID Rules for Grammatical Function

The ID rule for transitive VP's in GKPS (VP -> H[2], NP) and the Feature Specification Default (FSD) 10 ([+N,-V,Bar 2] *iff* [acc]) can account for transitive VP's in German. For example, consider the transitive VP in this sentence:

Der Bettler trug den grünen Frosch nach Hause.

'The beggar carried the green frog home.'

The projection of the ID rule would be the following:

$[_{VP}[_{V}$ tragen] $[_{NP}$ der grüne Frosch]]

And, the FSD 10 will ensure that the NP will be marked for the accusative case given that no other principles of the grammar apply:

[_{NP[acc]} den grünen Frosch]

The ditransitive verb ID rule can also be adopted with one adjustment. As shown in the data, case can express grammatical function, so a PP is not necessary to express the indirect object. The marking of NP for the dative case has the same effect. Then, the ditransitive ID rule for German would be:

VP -> H[3], NP[dat], NP

This ID rule in addition to the FSD 10 licenses a grammatical sentence like the following:

Der Bettler gab dem grünen Frosch den magischen Hut.

'The beggar gave a magic hat to the green frog.'

The projection of this rule would be:

[_{VP}[_V geben] [_{NP[dat]} dem grünen Frosch] [_{NP} der magische Hut]]

Again, the FSD 10 will ensure that the unmarked NP will be marked for the accusative case:

[_{NP[acc]} den magischen Hut]

3.2 ID Rules for Lexical Case

Those verbs whose lexical properties require either the dative or genitive cases can also be dealt with in a similar manner (Uszkoreit 1987). V's can be categorized by the cases they require of their complements. And, these are identified by different subcat values:

VP -> V[51], NP[dat]

VP -> V[52], NP[gen]

These ID rules license the following grammatical sentences:

Der grüne Frosch dankte dem Bettler.

'The green frog thanked the beggar.'

Aber der Hut entbehrte des Zaubers.

'But the hat lacked magic.'

The ID rule: VP[+aux] -> H[7], XP[+pred] can also be used to account for VP's taking a predicate complement in German.

Der grüne Frosch wurde kein hübscher Fürst.

'The green frog did not become a handsome prince.'

[$_{VP}$ [$_V$ werden] [$_{NP}$ ein hübscher Fürst]]

However, there must be an additional FCR to account for the lack of case marking on the NP[+pred]:

FCR 23:[+pred,+N] then *not* [case]

This FCR will override FSD 10 preventing the assignment of the accusative case.

3.3 Prepositions and Case

The assignment for the case of the NP complements of prepositions can be treated much the same way as it has been for verbs. The ID rule for prepositions with the subcat value of [39] is not required in German as the preposition, *aus* 'out of' requires an NP as its complement. The ID rule: P^1 -> H[38], NP in combination with FSD 10 can account for those prepositions which take the accusative case:

durch den Heroismus 'by means of heroism'

[$_{PP}$[$_P$ durch] [$_{NP}$ der Heroismus]]

FSD 10 will ensure that the NP takes the accusative case.

[$_{NP[acc]}$ den Heroismus]

It is necessary to propose two additional ID rules to account for the prepositions taking the dative or the genitive case:

$P^1 \rightarrow H[60], NP[dat]$

$P^1 \rightarrow H[61], NP[gen]$

These ID rules act much like those for lexical verbs which specify for a particular case. They ensure the following grammatical PP's:

mit einer guten Tat 'with a good deed'

$[_{PP}[_P$ mit$]$ $[_{NP[dat]}$ einer guten Tat$]]$

innerhalb eines Tages 'within one day'

$[_{PP}[_P$ innerhalb$]$ $[_{NP[gen]}$ eines Tages$]]$

3.4 Prepositions taking Accusative/Dative

To account for these prepositions additional ID rules cannot be proposed within this framework. Instead, they can be considered lexically distinct even though their phonological realizations are the same. Given this assumption the ID rules for subcat [38] and [60] will account for these cases.

By proposing additional ID rules and an FCR 23, the NP complement of V's and of P's can be appropriately marked for case. It appears that subcategorization can correctly account for case assignment in German. However, as Zwicky (1986) points out there are problems with this approach. He argues that distinct subcat frames for words that can be realized as phonologically identical cannot be treated as identical in coordination.

This phenomenon does not occur with the prepositions, but it does occur in the coordination of VP's with distinct subcat frames:

Der Fürst findet und hilft Herzoginnen.

'The prince finds and helps duchesses.'

Herzoginnen, in this case, is one phonological realization, but is the complement of two V's of differing subcat values, *helfen* which takes a dative NP, and *finden* which allows the NP to default to the accusative.

However, a potential solution for this problem is to assume the same stance that was taken with phonologically identical prepositions. Although Herzoginen is one phonological realization, it does not appear necessary to assume that it is one lexical element. Like *aus*, *Herzoginnen* can be realized as two lexically distinct NP's.

4. Agreement within the NP

Once the NP has been assigned case it is necessary to distribute this feature within the NP. As the data reveals, the determiner and the adjective both must reflect case. GKPS provides two mechanisms, HFC and CAP that can instantiate this feature on the necessary nodes of the NP.

4.1 Case and the HFC

GKPS specifies that case is a head feature, and is thereby subject to the HFC. I am assuming that the head of the NP is in fact the lexical head N, contrary to some proposals.

Fenchel and others have proposed a hydra construction for the NP where both the DET and N are heads. However, this has been introduced to account for DET ADJ agreement with which I am not concerned in this paper. Fenchel (ND), Uszkoreit (1986), and Kuh (1988) assume in their analyses that the HFC can account for the marking of case along the head path. Consider the following tree:

NP[acc] (1)
|
DET — N^1[acc] (2)
|
den — AP — N^1[acc] (3)
|
grünen — N[acc]
|
Frosch
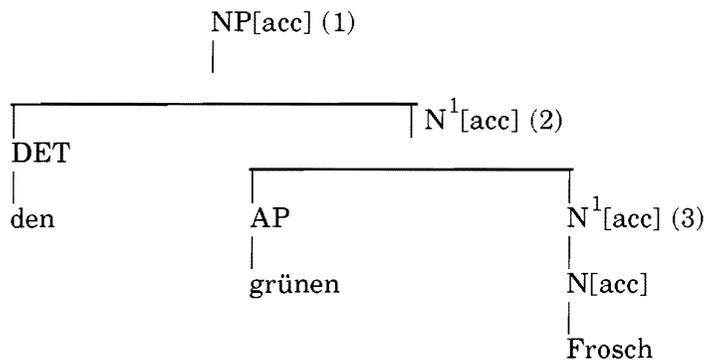
In the first local tree (1), the HFC ensures that the mother and the head of this tree agree in head feature specifications as there are no other principles in the grammar that prevent the head daughter from having this feature specification. This also occurs in the local tree (2) and (3) ensuring that [acc] occurs on the N^1 and N nodes. Nothing in the grammar prevents the lexical head from taking this feature.

4.1.1 Lexical N and Case

The HFC distributes properties such as case along the head path including the lexical head. Zwicky (1986) claims that this is one fault of the HFC in the analysis of case agreement, because these properties are not morphologically realized on the heads of these phrases. Considering that genitive and dative nouns can reflect case as shown in the data, it becomes clear that the HFC can be instrumental in the marking of these N's.

However, it is clear that there must be constraints on [case] to allow the HFC to forgive certain lexical N's for disagreeing with their mothers. The following FCR's would prevent [case] from being in the intersection of possible head feature specifications and those of the mother allowing the head to extend its mother. The HFC then forgives the disagreement.

FCR 40: [+FEM,-GEN,+PLU,SUBCAT] then *not* [CASE]

FCR 41: [+FEM,-DAT,-PLU,SUBCAT] then *not* [CASE]

However, this is a rather ad hoc approach to the problem. It also fails to account for the very small class of nouns that inflect for all cases in the singular. It is clear that this is a problem for the analysis of case agreement in German NP's, and I leave it a topic for further research.

4.2 Case Agreement and CAP

GKPS specifies that AGR and SLASH are control features. To allow the CAP to apply within the NP, we must allow AGR to apply to DET and ADJ. However, FCR 12 ensures that only V's can take this feature. I propose that this FCR be modified as follows to ensure the appropriate nodes in NP take AGR:

Modified FCR 12: [AGR] then [+V / +DET]

The value for AGR within the NP will be [case]. Consider the following tree:

NP[acc] (1)
|

| N^1[acc]

DET
[AGRacc]
|
den

AP (3)
[AGRacc]
|
grünen

N^1[acc] (2)
|
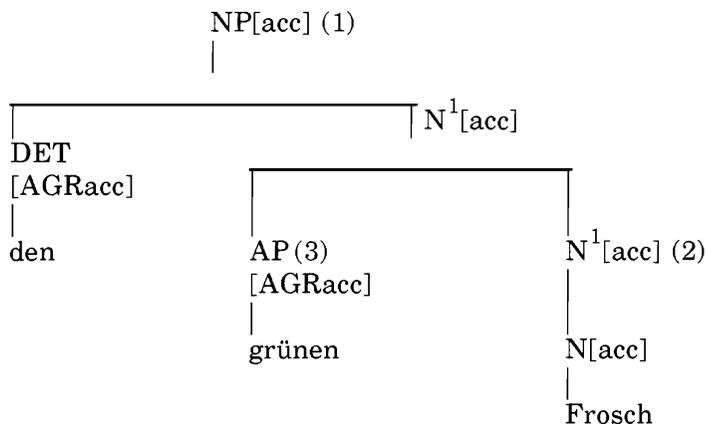
N[acc]
|
Frosch

In local tree (1), the control target is DET, and N^1 is the controller given that DET is (type(N^1), type(NP)). CAP i ensures that N^1 and DET agree in [acc]. Similarily in local tree (2), N^1 and AP will agree in [acc] given that AP is (type(N^1), type(N^1)) which specifies that N^1 is the controller

and AP is the control target. The HFC will ensure that [acc] is 'passed down' to the head of AP in local tree (3).

CAP will ensure that [acc] is properly distributed to DET and ADJ, but there is a problem with this analysis. Generally, the control target is a head, but in this case it is the non-head of the local tree that receives AGR. A stipulation is then required for CAP to work properly within the German NP. Clearly, this is another topic for further research.

5. Case and Linear Precedence

To account for the lack of case marking in postposed adjectives, Kuh (1988) proposes two linear precedence rules:

AP[AGR] precedes N

N precedes AP *not* [AGR]

The framework used here expands N^1 to AP and N^1 therefore, in adopting these LP rules in my analysis it is necessary to change N to N^1. Then if AP follows N^1, CAP i will not apply, for although AP is a control target, the LP overrides CAP ii, preventing AP from taking [case].

6. Summary

FSD 10 and the proposed ID rules for VP's and PP's ensure that the appropriate case is assigned to the NP complement, and FCR 23 prevents predicate NP's from being assigned [case]. HFC percolates [case] along the head path of the NP and AP, while CAP carries the feature over to the control targets, DET and AP. In the case of a postposed AP, LP rules prevent CAP from ensuring agreement between the controller and the control target, AP.

Given some alterations GKPS can provide a means of accounting for case agreement in German, however not without inherent difficulties. The HFC in combination with the proposed FCR's can account for most nouns being marked for case, but not all. Those like *Herr* which inflect for most cases in the singular have not been accounted for. In addition, the use of CAP in the German NP is rather stipulative for the control target is a non-head. It is clear that further research is necessary as this analysis and perhaps even the framework of GKPS cannot easily account for this phenomenon.

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WHAT IS IN A NAME?

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1. INTRODUCTION

Personal names serve as identity markers for the individuals who bear them. It is a way of distinguishing one individual from the other. Most personal names serve a referential function. The name "John", for instance, identifies its bearer and distinguishes him from one who bears the name "Peter". If you ask any "Peter" what his name means, he might tell you "rock" because we are told in the Bible that Jesus told Peter:

> Your name shall be Peter, for you are the rock upon which I shall build my church" (Matthew 16: 18).

Apart from the meaning "rock", all you can say about the name Peter is probably that he was the chief disciple of Jesus and that he was the son of so and so. But to the African in general, and to the Ewe in particular, personal names mean more than that. They are the embodiment of Ewe philosophical thought and the reflections of various circumstances surrounding the birth of a person.

What distinguish African personal names from others are:
1. their elaborate linguistic structure;
2. the complexity of their semantic content; and
3. their relationship to African value systems.

Akinnaso (1980) described two extreme types of personal names with a series of intermediate stages according to the degree of linguistic complexity and semantico-cultural significance of the names. He cites Balinese as one extreme, in which personal names are arbitrarily coined nonsense syllables and of marginal importance because the names do not refer to Balinese conceptual or social reality, nor do they express any concrete characteristics of the individuals to whom they are applied. Balinese personal names, according to Akinnaso (ibid), have no literal meaning of any sort, and are not drawn from any established pool of lexicon. At the other extreme are African names with their elaborate linguistic structure and socio-cultural significance.

A word, conventionally, is an image of the thing it represents. According to Adler (1978), a word is so closely identified with the thing itself that not to have a name is not to exist. It is believed in certain cultures that to know a person's name is to have power over him; so personal names are not easily disclosed to strangers in some cultures even today, because it is feared they might be used in a magical manner (cf. Young, 1931:112, quoted in Adler 1978). This shows how some people treasure personal names, and the Ewe are no exception.

1.1. Principles Underlying naming among the Ewes

Two major principles are found to underly the naming of people among the Ewe. I shall call these :

1. The Home Context Principle (following Akinnaso, 1980)
2. The Philosophical Principle

The Home Context Principle (HCP) specifies the salient social or circumstantial context for personal names, while the Philosophical Principle (PP) specifies contexts which pertain to philosophical thought, belief systems and general world view of the Ewes, which are reflected in the personal names.

1.2. Home Context Principle

There are several types of Home Context (HC). The most basic of them all involves the day of the week on which the person is born. Each of the seven days of the week has corresponding names for male and female. This is shown in the table below.

Table 1: Ewe names corresponding to the days of the week.

Day of Week	Ewe Equivalent	Corresponding Ewe Name
Sunday	Kɔsida	Kɔsi/Kɔsiwa*
Monday	Dzoda	Kɔdzo/Adzo
Tuesday	Blada	Kɔbla/Abla
Wednesday	Kuda	Kɔku/Aku
Thursday	Yawoda	Yao/Yawo
Friday	Fida	Kofi/Afi
Saturday	Memlida	Kɔmi/Ama(Ami)

* The names in this column correspond to male and female respectively.

Any person called "Kofi", for example, is a male child born on a Friday. This is normally the first name one gets at birth, except there is a special circumstance surrounding the birth which warrants a special name to commemorate the event. Some of these circumstances or events are the following:

a) If the child comes out of the womb with the face down, it is called *Lumɔ* if it is male, and *Lumɔsi* if it is female.

b) A woman may labor and give birth on a way to the farm or market. That child is normally named *Mɔta* for male and *Lifosi* for female.

c) If the child is born in the market it is called *Asigbi* for male and *Asinu* for female.

d) Twins are given names depending on the combination of the sexes. Two males are named *Atsu* and *Tse*, the former given to the one who comes out second, while the first to come out takes the latter name. The one who comes out last is said to be the elder. The philosophy behind this is that when an elderly person is going out with a younger one the latter is always put in front to protect him or her from any enemy who might attack from behind. Two females are named *Eyi* and *Yitsa*. Male and female are named *Atsu* and *Atsufi* respectively.

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These few examples demonstrate how certain events and circumstances surrounding a person's birth are reflected in his or her personal name. As noted earlier, the name reflecting the day of the week of birth is the most basic, but the special circumstance or event factor can have precedence over it, depending on how salient the event is to the family. In some cases, the person uses both the basic and the special name.

1.3. The Philosophical Principle

This pertains to names that reflect the philosophical thought of the Ewes: their belief systems and their general view about life and the world. It is said that the Africans worship stones, trees etc. It is true that Africans have their traditional religion in which many deities function. But the fact also remains that the African believes in a supreme or omnipotent God, who they believe should be worshipped through intermediary gods. So when the fetish priest or priestess prays s/he first calls on the Almighty, who is referred to by the Ewes as *Mawuga* "Supreme God". This thought of the supremacy of the Almighty is reflected in such names as *Mawunyega, Mawuko* or *Mawusi*.

Worshippers of other deities give names to their children in praise of those deities. The name *Afayome*, for instance , is given to a female child of an adherent of the divination cult which is known in Ewe as *Afa*, the first part of the name. The other part *-yome* means "following". So the name *Afayome* means "I shall always follow *Afa* (the cult)". It is the belief that children are the gift of the gods, so they sing praises to the gods through the names. Some "barren" women are able to have children after consulting a shrine, so the child who is born ostensibly through the help of a deity is normally given a name in praise of the deity. For example, the name *Sonyo* means "*So* (a deity) is good".

The Ewes also value life and abhor death. They believe that while there is life there is a way. So they have such names as :

1.

        a) *Agbenyega* (life is most important).
        b) *Agbemafle* (life cannot be bought).
        c) *Agbeko* (only life is required).
        d) *Kugblenu* (death destroys things)

The Ewes also consider human beings to be more valuable than all the riches of life. To them, when you have children you are rich. People are proud to have as many children and grandchildren as possible (as much as God can give them). That is why some people turn deaf ears to family planning slogans and campaigns. Names such as :

2.

        a) *Amewuga* (a person is worth more than money) and
        b) *Amenyo*(a person is good)

are an indication of how the Ewes value human beings.

Some families suffer constant death of their children. It is believed that in order to turn away "the evil eyes of death" from the family, the next child or children should be given names that would not be appealing to death. In that way he (death) will leave the child alone. One, therefore finds such names as:

3.

    a) *Adukpo* (incinerator)
    b) *Kpɔxa*(human faeces)
    c) *Akaga* (vulture)
    d) *Kokloku* (a dead fowl).

Christianity has also got its fair share of Ewe personal names. With its advent people began to take names that are foreign. Some people, however, do not see the need for such foreign names when they can make up beautiful names from local resources. The result is the emergence of such Ewe Christian names as :

4.

    a) *Dela* (savior)
    b) *Yayra* (blessing)
    c) *Xɔlali*(the savior lives)
    d) *Makafui* (I will praise him).
    e) *Mawufemɔ*(God's way)

2. GRAMMATICAL ANALYSIS OF EWE PERSONAL NAMES

The linguistic complexity of Ewe personal names is a direct consequence of the variety and richness of the semantic load and socio-cultural information that the names are made to carry.

Depending on the amount of information being encoded, Ewe personal names can be derived from nominals or from full sentences of varying degrees and complexity.

2.1. Names derived from nominals

These names can be said to be derived from the rule

        Nominal -------> Name

These nominals can have different grammatical structures. We have names that are derived from simple nouns, compound nouns and complex noun phrases.

2.1.1. Simple Personal Names

These are short and simple nouns that can be said to be arbitrary identifiers of the people that bear them. They are made up of single morphemes and have unique meanings corresponding to the special circumstances for which they stand. Examples of this category are the personal names corresponding to the days of the week mentioned earlier.

2.1.2. Complex Personal Names

This category of personal names are those that lend themselves to morphological analysis. They are the result of various morphological and syntactic processes of the Ewe language. The following structural types can be identified.

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5.

    A)   N + N ---------------------------- > Name

         i.   agbe + dɔ ---------------------------- > *Agbedɔ*

                  life + work -------------------------- > 'life's work/service'

         ii.   ame + tefe --------------------------- > *Ametefe*

                  person + place -------------------- > 'in place of a person'

    B)   N + Adj. -------------------------- > Name.

         i).   gbe + eve -------------------------- > *Gbeve*

                  voice + two ------------------------ > 'two voices'

         ii).   gbe + mumu ---------------------- > *Gbemu*

                  grass + green --------------------- > 'green grass'

    C)   N + LOC. + N ---------------- > Name.

                  xɔ + me + ku ------------------ > *Xɔmeku*

                  room + LOC + word ----------- > 'death from one's own house'

    D)   N + NEG + HAB + V -------- > Name.

                  agbe + me + a + fle ------------ > *Agbemafle*

                  life not can buy ------------------ > 'life, which cannot be bought'

    E)   N + POSS. + N + LOC. ----- > Name

                  ame (fe) ta   me ---------------- > *Ametame*

                  person   head in ---------------- > 'a person's thoughts'

In the last example, the possessive is covertly marked; that is, it is not found in the surface form. These types of possessive constructions are referred to as inalienable possessive constructions.

    Some of the personal names are derived from complex noun phrases involving relative clauses. The underlying relative clauses are clipped to obtain the surface form of the personal name. Consider the following.

6.

    a)   vi + gbe + dɔ ----------------------------- > *Vigbedɔ*

            child refuse work --------------------------- > 'a child who refuses errands'

    b)   dze + fle + ga ------------------------------ > *Dzeflega*

            salt   buy money --------------------------- > 'money that can buy salt'

    c)   agbo + da + ze ----------------------------- > *Agbodaze*

            ram + cook + pot ----------------------- > 'pot that a ram can be cooked in'

The above names are derived from the following relative clauses respectively:

7.

    a)   vi si gbe dɔ

            child REL. refuse work ----------- > 'a child who refuses errands'

    b)   ze si da agbo

            pot REL cook ram------------------ > 'a pot that a ram can be cooked in'

    c)   ga si fle dze

            money REL buys salt ------------- > 'money that salt can be bought with'

The example 6a above is derived from 7a by deletion of the relative pronoun *si* When the same process is applied to 7b and 7c the result is quite different from the surface forms of the corre-

sponding names. We have *zedagbo* and *gafledze* instead of *agbodaze* and *dzeflega* respectively. To account for these surface forms, the notion of instrumentality is invoked. The subjects of the relative clauses 7b and 7c, *ze* (pot) and *ga* (money) are semantic instruments. They are also inanimate, and, therefore, not capable of playing agentive roles. So in the derivation, those instrumental constituents are placed last and the "patients" foregrounded. Instead of *ze-da-agbo* and *ga-fle-dze*, we have *agbo-da-ze* and *dze-fle-ga* In 7a, however, the subject of the relative clause is the agent (not the "instrument") and it is "animate". Therefore, there is no change in word order in the derivation; the only process is the deletion of the relative pronoun. This seems to be the case when we compare the following nominalizations from underlying relative clauses.

8.
a). ame si wɔ-a afe ------------------------------- > amewɔafe
   person REL. make-HAB. filth ------------------ > 'a filthy person'
b) ame si wɔ-a dɔ ------------------------------------ > amewɔdɔ
   person REL. do-HAB. work --------------------- > 'a person who works'
c) ati si wo tsɔ da-na akple ----------------------- > akpledati.
   stick REL.3pl.take cook-HAB. corn-meal --- > 'a stick used in cooking corn-meal'
d) ze si wotsɔ de-a tɔme -------------------------- > tɔmedeze.
   pot REL. 3pl.take go-HAB. river ------------- > 'pot used for fetching water'

In examples 8a and 8b, we have relative clauses involving animate agents "person". So in the nominalization, the relative pronoun is deleted and the agent noun, the verb and the patient are put together in that order to form a noun. But in 8c and 8d, the relative clause involves patients and instruments. So in the nominalization process, the patient is foregrouded, the verb retains its position and the instrument comes last. In other words, the instrument and the patient NP positions are permuted.

2.1.3. Sentence-type personal names.

Apart from personal names derived from NPs of all sorts, Ewe personal names are also derived from sentences. This can be stated by the rule:

Sentence --------> Name

Most of these types are derived from simple sentences. For example,

9.
a) ku + gble + nu ----------------------------- > *Kugblenu*
   death spoil thing ----------------------------- > 'death is a destroyer'
b) dzi + wɔ + nu ------------------------------- > *Dziwɔnu*
   heart do thing -------------------------------- > 'a strong heart does anything'
c) Mawu + nye + ga -------------------------- > *Mawunyega*
   God be great ----------------------------------- > 'God is great'
d) ame + ade + tɔ + wu --------------------- > *Ameadetɔwu*
   person INDEF. owner exceeds ------------ > 'Someone's is worse'

Some of the personal names are of the type "if the cap fits, wear it". They may show resentment of someone against a particular class class of people or neighbors. For example, the name

"*Ezunukpenawo*" ('they are ashamed'), may be given to a child by a family to show resentment against a neighbor who probably did something for which they later regretted. Names of this category are very common among the Ewes.

10.
   a) *Lɔnyelawoli* --'I also have people who love me'
   b) *Dafeamekpɔ*--'go to the house and see'
   c) *Senyuidzɔwo*--'they have been born by good fate'

The above names are all derived from simple sentences.

There is a category of personal names which is quite interesting in its own right. Names belonging to this category are often referred to as "praise appelations" (a label I find inappropriate). These names are normally taken by a person himself in adulthood. But sometimes parents give such names to children in memory of a deceased family member who bore that name, especially when the child is believed to be a reincarnated family person or when the child is born soon after the death of a family member with that name. There is a special name given to a child born soon after a family member dies (*Ametefe*- 'in place of a person'), but the family has the prerogative to give to that child the name of the deceased member of the family in memory of him. The names in this category are referred to as

11.
   aha + no nkɔ + wo -----> ahanonkɔwo
   drink(n) drink(v) name PL.---> 'drinking names'

Probably they are labelled "praise appelations" because they praise a person or draw attention of other people to him. These names are usually invoked when men meet in drinking bars, hence the label "drinking names". It was originally taken by only men, but women are also taking such names now.

The peculiar characteristic of the category of personal names is that they represent whole discourses, reflecting people's experiences in life, people's reactions to other people's behavior or a reflection of their thoughts about what life should be. For example, the name

   Gbe + eve ------> GBEVE
   voice/language two ---> 'two voices/languages'

is a message which literally translates as:

   Two voices/languages do not raise a child; you will spoil the child for its owner.

The bearer of this name simply wants to put across the message that a child who is subjected to two different kinds of instruction at home will grow into a spoiled child. That is, both parents have to agree on what is good for the child. While the bearer of the above name wants to air his views about child raising, another comments on love life. He takes the name

   ahia + eve ------> AHIAVE
   concubine + two ----> 'two concubines'

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whose full citation form is

> *Someone who takes two concubines does not become a bachelor; if one rejects him the other will remain.*

This name also has a figurative or proverbial meaning which is almost equivalent to the English proverb *"Don't put all your eggs in one basket"*. Some of these names are also of the "if the cap fits wear it" type. An example is the name

    fe + vlo ------> FEVLO.
    nail useless-----> 'useless claws'

whose full citation form is

> *They have useless claws. The claws that should be given to the eagle to prey are given to the vulture to be used only on the refuse dump.*

One other characteristic of this category of names called "praise appelations" is that the full citation forms are seldom used. Instead, a clipped form comprising the salient constituent or the "theme" of the discourse is adopted. But on certain occasions, especially when friends meet at a bar or at funerals, the full citation forms are vocalized. It is ritualized in the following way. When A meets B at a bar or any appropriate place, A calls B by uttering part of the citation form and B completes the discourse.

12.

    A to B :   GBE-VE me-nyi-a vi o.
                 voice-two NEG.-raise-HAB. child NEG.
                 "two voices do not raise a child"
    B   :   a-va gble vi na vi tɔ
                 FUT.-come spoil child give child owner
                 you will spoil the child for the owner.

The discourse mostly consists of two or three clauses or sentences. In the citation, the first person utters the first clause, not only the clipped name. The clipped forms of these names are used to refer to the bearer on most ordinary occasions. On special occasions, however, (e.g. funerals, social gatherings or festive occasions), the full citation form is evoked. These occasions serve as fertile grounds for the dissemination of the information embedded in their names, and which they wish to put across.

3. CONCLUSION

In this paper, I have tried to show that Ewe personal names, like most African names, transcend the vocative function. Because they, inter alia, code Ewe cultural and philosophical thought, they must be viewed as denotatively and connotatively relevant. Like diaries, Ewe personal names provide a system through which information is symbolically stored and retrieved. These diaries are partially open in that the names are public, being the primary mode of address. They are partially

closed because the nature and range of information stored in a given name may not be known to every member of the community. There are, however, names like those corresponding to the days of the week which the whole community knows about. Most of the names that relate to special circumstances (e.g twins, someone born in a farm or market) are also easily discernible. In other words, names associated with the Home Context Principle do not pose much problem pragmatically. I have also shown that most Ewe personal names are derived from simple as well as complex, and productive syntactic processes of the Ewe language. Most of the Ewe personal names are not drawn from a stock of stereotyped forms, but rather, naming is a productive process. The study of these names, therefore, can be said to be a study of the language itself.

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METAPHOR AS THE CREATIVE ORIGIN OF LEXICAL AMBIGUITY IN ENGLISH AND JAPANESE

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1. INTRODUCTION

A metaphor is a word or phrase applied to an object or concept that it does not literally denote, in order to suggest a comparison with another object or concept. Psychology and linguistics have been particularly interested in metaphor of late, because of current research in linguistic performance and the processes involved in the comprehension of metaphor. Cognitive psychologists are concerned with when and why people use metaphors, and with how they understand them. The psychologist is concerned with the processes presumed to underlie their use and comprehension, and how, if at all, these processes differ from and are related to those involved in literal uses of language. The linguist, on the other hand, is concerned with the formal properties of metaphors and the semantic and pragmatic relations that they have to their literal counterparts (Ortony, 1980).

Using a metaphor himself, Paivio (1979) has suggested that for the student of language and thought, *metaphor is a solar eclipse*. An eclipse obscures the object of study while at the same time revealing its most salient and interesting characteristics when viewed through the right telescope. Here the object is linguistic meaning, with metaphor obscuring the literal and commonplace aspects of meaning, while permitting a new and subtle meaning to emerge. In this way, metaphor encourages semantic creativity, the capacity of language users to create and understand novel linguistic combinations that would in a literal sense be nonsense.

Similarity and relation are inferred in applications of metaphor. According to Paivio (1979:152), linguistic metaphor involves "the application of a word or expression that properly belongs to one context to express meaning in a different context because of some real or implied similarity in the reference involved". Similarly, Fraser (1979:176) has called attention to the analogic basis of metaphor, "an instance of the nonliteral use of language in which the intended propositional content must be determined by the construction of an analogy". It is not whether metaphors rest on semantically acceptable or unacceptable expressions; rather, the point is that, acceptable or not, the speaker *intends* the expression to be taken nonliterally.

Another feature of metaphor is the juxtaposition of referents not normally associated (see MacCormac, 1985). Lakoff and Johnson (1980:289) suggest that "the essence of metaphor is understanding and experiencing one kind of thing or experience in terms of another". Hoffman and Honeck (1980) describe metaphors as resulting in the creation of a perception or an image that need not be filled in with details, yet has rich potential for detail and symbolism. And for others like Fogelin (1988), figurative meaning arises through a mutually recognised mismatch of literal meaning with context.

The simplest way to characterize a metaphor is as a comparison statement with the comparative particles left out. This is, in fact, the traditional view of metaphor (Miller, 1979:227). Indeed, a metaphor is often seen as a type of analogy, or an implicit comparison. In contrast, a simile is an explicit comparison, and perhaps for this reason Aristotle saw the simile as a metaphor with a preface.

But what is the point of uttering metaphors which create ambiguity in their range of meaning? Unlike typical ambiguity, where ambiguity arises unintentionally, metaphors are produced with the intention that the extended range be recognised! The answer is that a metaphor makes us attend to some likeness, often a novel or surprising likeness, between two or more things. A simile overtly tells us, in part, what a metaphor gently nudges us into noting (Fogelin, 1988:54).

2. THE BASIS OF METAPHOR

Explanations for the basis of metaphor are divided into three types. Feature matching theories examine metaphor as if it were anomaly, and make sense of anomaly by computing a match of shared features to determine meaning. The assumption is that metaphor is first recognised as a comparison statement, with the features of the vehicle being compared to, or mapped onto, the features of the topic. Features that the topic and vehicle do not share are ignored and attention is focused on those features that could be shared and that might be salient to the comprehension of the metaphor. Such features would then be transferred from vehicle to topic and the metaphor would thereby be understood.

Comparison theories see metaphor as either analogy or a statement of similarity. Meaning is computed by analogy or by comparing the statement of similarity with salient features to determine meaning. Feature matching and comparison views share common notions in that meaning is derived through shared features. In contrast, interaction theories advocate that the ground is not an expressed similarity, but is rather a novel, hitherto unseen, relationship between topic and vehicle. Metaphor is comprehended through the interaction of concepts to create a new meaning.

3. METAPHOR: FUNCTION AND COMPREHENSION

The aspects of metaphor that have been of interest to researchers in psychology and linguistics may be organised under the areas of identity, function, and comprehension. That is, what is metaphor and how is it identified? How does it work? And how does it foster semantic creativity in language? And lastly, what is the difference between literal versus nonliteral language, and how does this distinction affect psycholinguistic processing?

Figurative language is extremely common, and may therefore have a psychological function. Many scholars have proposed that analogic and metaphoric reasoning form the basis of all cognition (see Miller, 1979; Sternberg, Tourangeau, & Nigro, 1979). In an ethnographic sense, figurative language is essential data in the anthropologist's analysis of the premises and values of an entire socio-cultural group. Figurative language extends to every problem of general language comprehension and semantic analysis-- that is, encoding, implication, inference, world knowledge, contextual constraints, imagery, semantics, the relation of language and perception, and so on, and therefore is important to communication and cognition.

Deciding whether a sentence is a metaphor, a line of poetry, a literal statement, intentional nonsense, or genuine anomaly cannot be done on the basis of the sentence alone, but requires accessing the store of world knowledge as well as discourse context. For example, *whole sentence metaphors*, like *The old rock was becoming brittle with age*, can be literal in one context and figurative in another, as in reference to either geology or to an aging professor (Reddy, 1979; Ortony, 1979b).

One factor in the interpretation of figurative language arises from imagery. Even an abstract metaphor (e.g., *A theory is a wish*) will act as an "invitation to perceive a resemblance" (Verbrugge, 1977). Metaphors result in vivid images because of their emotional content, often because of the bizarre or surreal character of the meaning they may suggest when taken literally. Thus, Paivio (1971, 1979) has argued that images themselves may be the medium for discovery of the figurative meaning, and are part of the comprehension process. These speculations fit nicely with psychological studies of learning that show how mental imagery seems to facilitate acquisition and retention of verbal material (Hoffman & Honeck, 1980).

How do metaphors work? Some scholars treat metaphor as an elliptical simile, attributing to it no significant cognitive function, while others clearly distinguish simile from metaphor, claiming that the latter plays a cognitive role not open to the former (Johnson, 1980:52). The latter may be illustrated by the semantic interaction view (see Black, 1962), which insists that the tensive element is fundamental to metaphor. It sees the metaphoric form of "A is B" as involving a semantic strain which results in novel meaning and the induction of insight. While not denying the limited truth of the comparison view (namely, that the metaphor "A is B" implies its correlative simile, "A is like B"), this theory goes beyond the former to claim a distinctive cognitive function, that the metaphor implies *more* than its correlative simile (Johnson, 1980). In the metaphor "A is B" (e.g., *Man is a wolf*), the system of associated features attaching to A interacts with that which attaches to B to produce an emergent metaphoric meaning. The associated features are just those things generally held to be true about the object, person, or event with which they are associated. The interaction of these two systems of implications results in the selection of appropriate features of one object that are then applied, in the same or some modified sense, to the other object. The "interaction" involved here is not merely the intersection of two sets to form a new intersect set; rather, it involves a mutual influence of one system of features upon another (Johnson, 1980).

For Black, then, a metaphor is a mechanism for imposing a categorical scheme from one domain onto another, and metaphors are thus generators of new meanings (see also Ortony, Reynolds, & Arter, 1978). The argument is that metaphor results from a cognitive process that juxtaposes two or more rarely associated referents, producing semantic conceptual anomaly and thus tension.

Not everyone agrees with this premise. MacCormac (1985) denies the contention that metaphors necessarily express falsity when interpreted literally. MacCormac proposes that metaphors possess a fluidity with respect to truth and falsehood, and further suggests that there is no reason to assume that the truth or falsity of a metaphor is an *either/or* matter. Consider, for example:

> *The brain is an enchanted loom where millions of flashing shuttles weave a dissolving pattern.*

While the identification of *brain* with an *enchanted loom* is a false assertion, the metaphor suggests an insightful way of looking at the brain rather than intentionally proposing a false assertion. Thus, metaphors can be understood as insightful and as conveying partial truth, without first understanding the metaphor as an intentional expression of falsity. In its favor, such an interaction view presents a dynamic view of the function of metaphor as essential to creative thought. We could not speak of new perceptions and insights about how objects or ideas fit together in a language that has only fixed meaning.

4. METAPHOR AS THE CREATIVE ORIGIN OF POLYSEMY

Inference and context are certainly involved in matters of literal meaning-- in resolving ambiguity, for example. With metaphor, there are two meanings, a literal one and a metaphorical one, and the listener is required to infer which one was intended. Morgan (1979) even suggests that metaphor is no different from any other kind of lexical ambiguity, with its duality of meaning.

But, in fact, there is an important difference. In the case of most lexical ambiguity, the relation between the two meanings is a coincidence of the language, so that the same two meanings might well be translated into separate sentences in another language. This is true except in the case of lexical ambiguity derived from metaphor, where one of the meanings of a word is derived in some way from the other. Metaphor can give rise to polysemy, a feature of lexical ambiguity which appears in one form or another in all languages and at all times (see Kess & Nishimitsu, 1990; Billow, 1977).

Polysemy occurs when a word has more than one meaning. Many words in a language have more than one meaning, and some very common words have a great many meanings. For example, English nouns and verbs like *thing* and *do* are of this type. In Japanese, words like *mono* and *suru* are examples of equivalents which are extremely common and which have a large number of meanings. There are other types of ambiguity in natural language, but lexical ambiguity is probably the most common and certainly the type of ambiguity that we are most aware of.

There are two types of polysemy, or lexical ambiguity, that find their origins in the metaphoric extension of the meaning of a word to a new, and in the first instance, related meaning. An example of one type can be seen in metaphoric extensions like the English *eye of the storm* or the Japanese *taifuu no me*, where the metaphoric extension is still transparent.

A second type ultimately results in an opaque polysemy, because the metaphoric extension is no longer transparent. An example of this second type of polysemy is found in the word *pipe*, with its meanings of a plumber's *pipe* and the meaning of a *pipe* for smoking. Both of these meanings refer to a longish, narrow opening for liquid, smoke, or gas to pass through, but the process of metaphoric extension has been lost as a readily available etymology. That is, to most users of English, the fact that the two words *pipe* are one and the same is no longer self-evident. Words like *pipe* are instead located in the category of lexical ambiguity which contains instances of unrelated polysemy, as for example, words like *port*, which have two completely unrelated meanings. A similar phenomenon occurs with Japanese, *kiseru* 'tobacco pipe' (originally from Cambodian *khsier*), which has a metaphoric extension with the meaning 'stealing a ride on a train with no ticket for the middle part of the way'. The connection between the two senses is not self-evident, but they both refer to something long, with the middle part void. In general, such transparency is

not as easily lost in Japanese, given the cues provided by the kanji characters, but such instances of polysemy do occur. Other examples include *mimi* 'ear', as in to *pan no mimi* 'the crust of bread', and *miso* 'bean paste', also meaning something like 'good point', 'charm', or 'knack'. The kanji character suggests that the latter is the result of metaphoric extension of the former, but the process is no longer transparent to most Japanese speakers. And the kanji can only offer direct clues in the written version of the words. The end result of this process is that modern language exhibits either opaque or transparent polysemy for those words which have undergone this metaphoric extension.

Even very young children appreciate such metaphoric extensions in their early lexical items. For example, there is early exposure to dual-function terms, or words that can refer to either physical or psychological phenomena (that is, i.e., "cold water" versus "cold people"). The physical is held to be literal, and the psychological application is regarded metaphorical. Similar examples can be found in Japanese as well, though the correspondence between the two languages is not complete. *Tumetai* 'cold' and *atatakai* 'warm', for example, are used either in the physical or in the psychological sense in much the same way as in English. Incongruity occurs, however, in such words as *suzusii* 'cool'. It is mostly used only in the physical sense (except in the set phrase *suzusii kao* 'cool face', meaning 'innocent look'); the English loan word *kuuru* 'cool' is instead used for the psychological extension. Another example of incongruity, *amai* 'sweet' allows the psychological application, but in a different way from that of English; that is, it means 'too generous' or 'spoiling' and has negative connotations. Asch and Nerlove (1960) found that physical meanings of dual-function terms are invariably appreciated first, that a mastery of psychological terms emerge only in the middle years of childhood, that the dual property of the terms is realised last, and often only with prompting, and that the capacity to appreciate and produce good metaphors does not emerge until adolescence.

Lesser and Drouin (1975) verified these basic findings on dual-function terms and suggested, moreover, that words with tactile referents (i.e., "warm") are understood earlier in a dual sense than words with visual referents (i.e., "bright"). Kogan (1975, 1976), using picture-sorting techniques, discovered that as children reach the pre-adolescent years, they prove more capable of effecting the metaphoric link. Winner, Krauss, and Gardner (1975) have also documented that the ability increases with age.

Other studies have examined the capacity of children to paraphrase various kinds of metaphor (Billow, 1975; Winner, Rosenstiel, and Gardner, 1976). Billow (1975) presented children with proverbs and with two types of metaphor: similarity metaphors, which equate two similar terms (e.g., *Hair is spaghetti*), and proportional metaphors, which involve an analogic relationship among four terms, one of which must be inferred (e.g., *My head is like an apple without a core*). Billow attempted to show that the development of genuine comprehension of metaphor is related to the child's ability to deal with formal operations in the Piagetian sense. Billow found that the ability to understand similarity metaphors emerges first and is correlated with the acquisition of concrete operations; and that proportional metaphors, which require analogic thinking, are only understood at pre-adolescence. The similarity metaphors, the proportional metaphors, and the proverbs differ with respect to difficulty. For example, proverbs involve more complicated syntactic constructions, a greater proportion of relatively low-frequency words, and far more complicated demands on knowledge of the world. The increase in comprehension with age may merely reflect a greater probability of a prior acquaintance with more of the proverbs. Similarly, the proportional metaphors are much more complex in structure than are the similarity metaphors, and they too involve more knowledge of various kinds.

The same developmental process must also be assumed for the comprehension of the metaphorical (idiomatic) expressions in Japanese. For example, *Asi ga boo ni naru* 'My legs have turned into sticks (because of too much walking)' is an instance of a similarity metaphor, and is easier to comprehend than such proportional metaphors as *Kaeru no tura ni mizu* '(Whatever you say to him), he is like a frog with water splashed over his face (and thus does not care at all)'. Another such proportional metaphor is seen in *Mimi ni tako ga dekiru* 'I have got a corn (callus) formed in my ear (from hearing the same story over and over again)'. Since *tako* 'callus' is homophonous with 'octopus', a form with which children are usually more familiar, the comprehension of this sentence can be further impeded.

Winner, Rosenstiel, and Gardner (1976) asked subjects ranging in age from 6 to 14 to paraphrase metaphoric sentences such as *After many years of working in the jail, the prison guard had become a hard rock that could not be moved.* Winner, Rosenstiel, and Gardner hypothesized three levels of metaphoric understanding prior to mature comprehension. The first level is the "magical" level, the second the "metonymic", and the third the "primitive metaphoric." Each of these levels, they suggested, can be regarded as a stage in the development toward the mature comprehension of metaphors. At the magical stage the interpretation is made literal by the mental construction of a suitable scenario, at the metonymic stage the terms of the metaphor are taken to be somehow associated, and at the primitive metaphoric stage true metaphoric comprehension is partially present. The investigators found that only the adolescents could compare the guard and the rock reliably in a variety of dimensions. The results do suggest that older children are more likely to select or offer genuine metaphoric interpretations than are younger children. This study, and all the experimental results noted above, suggest that for children metaphoric polysemy exists, but that its origins are opaque until their metalinguistic abilities are more fully formed around the stage of adolescence.

5. METAPHOR: SIMILARITY OR ASYMMETRY?

Similarity has played a fundamental role in theories of knowledge and behaviour. It serves as an organising principle by which individuals classify objects, form concepts, and make generalizations, and there is a close tie between the assessment of similarity and the interpretation of metaphors. In judgements of similarity, one assumes a particular feature space, or a frame of reference, and assesses the quality of the match between the subjects and the referents.

Considerable emphasis has been placed on semantic relatedness in the metaphor comprehension literature (Johnson & Malgady, 1979; Malgady & Johnson, 1976). In regard to the role of semantic similarity, there is much evidence that the number and saliency of features shared in common by concepts is a strong predictor of perceived metaphor goodness (e.g., Johnson & Malgady, 1979, 1980). However, a metaphor achieves much of its power by highlighting a similarity in otherwise dissimilar concepts (MacCormac, 1986; Ortony, 1979a, 1979b). This is often done by selecting a comparison from a semantically dissimilar domain (Kittay & Lehrer, 1981; Trick & Katz, 1986).

Marschark, Katz, and Paivio (1983) found semantic relatedness was also positively related to measures of figurativeness with their data indicating that high semantic relatedness is positively associated with the perception of a sentence as being easy to imagine and comprehend. Katz (1989), however, found that the preferred vehicle was one only moderately close (or similar) to the

topic in semantic memory. This finding is consistent with Kittay's (1982) suggestion that vehicles are chosen which maximize differences while at the same time highlighting similarities. As well, people tend to choose a vehicle to complete a metaphor in which the semantic distance between domains (i.e., the superordinate categories from which the topic and vehicle come) is less than the semantic distance on the more specific features shared by topic and vehicle.

Marschark and Hunt (1985) found semantic relatedness was not strongly related to recall, and when it was a predictor, the relationship was negative. Apparently, the semantic overlap between a topic and a vehicle may be important in arriving at an interpretation of a metaphor, but is less important for memory and may even interfere if the interpretation is too obvious. This contradictory evidence suggests that the relationship between semantic relatedness and metaphoric properties like figurativeness, are curvilinear rather than linear. That is, if semantic relatedness is too high, as in *A canary is a bird*, a sentence may be perceived as nonfigurative; if too low, as in *A turtle is a dance*, a sentence may be considered anomalous. The same holds true for the Japanese equivalents of these sentences; namely, *Kanaria wa tori da* and *Kame wa odori da*.

The most popular linguistic theory of metaphor comprehension is that of feature matching, which derives from the early work by Katz and Fodor (1963). Proponents of this view suggest that a metaphor is understood in terms of a process of matching features shared by the topic and vehicle of metaphor. Thus, to understand *Man is a wolf*, a listener would first derive the features of the vehicle (*wolf*) and of the topic (*man*). Those features that the topic and vehicle do not share would be ignored and attention would next be focused on those features that could be shared and that might be salient to the comprehension of the metaphor. Such features would then be transferred from the vehicle to the topic and the metaphor would thereby be understood.

Word meanings are represented as static long-term memories containing basic, literal semantic features. Sentence comprehension (for both literal and metaphorical sentences) involves comprehending such features and sets of features, and remembering is a matching of features or sets of features. These feature matching theories deal exclusively with the relation between a metaphoric topic and its vehicle, such as the similarity of topic and vehicle as assessed by the associative strength between them or the number of shared semantic features between them (Johnson & Malgady, 1979), the imagery value of the topic and/or the vehicle (Marschark, Katz, & Paivio, 1983), or the relative locations of topic and vehicle in a multidimensional semantic space (Tourangeau & Sternberg, 1981).

Tourangeau and Sternberg (1982) note that almost all theorists, including many who reject other aspects of the comparison view, assume that the ground of a metaphor consists of common category memberships, or a set of features, shared by a topic and a vehicle (Malgady & Johnson, 1976; Ortony, 1979b; Tversky, 1977; van Dijk, 1975). And they typically assume a transfer process to handle cases with an unfamiliar topic. The features of the vehicle are transferred to the unfamiliar topic, unless the transfer contradicts something known about the topic. This transformation view assumes that, whatever the surface form of the metaphor, the deep structure of the metaphor includes an explicit comparison between the topic and vehicle. Transformational or parsing mechanisms take the surface metaphor, producing a reading of its literal frame, and put the metaphoric elements themselves into a canonical form. Once the metaphor has been transferred into this standard form, the special comparison or transfer processes apply to the underlying comparison.

Malgady and Johnson (1976) assume that the meaning of a metaphor can be conceived of as an additive combination, or synthesis, of the underlying features which encode the meaning of each noun compared in the metaphor. The degree of constituent similarity, which may be influenced by the addition of adjective modifiers, will determine the integrity of the product. Highly similar but deviant constituents will be synthesized into a well-organised representation; consequently, subjects can readily interpret the metaphor and view it as a good figure of speech. Dissimilar constituents will ordinarily form a disintegrated representation which is difficult to interpret; hence subjects judge metaphor goodness on the one dimension of constituent similarity. In other words, the better the comparison, the better the metaphor.

Assuming that both the A and B terms of a metaphor consist of semantic features of the B item to A, Johnson and Malgady (1979) have shown that the degree to which people rate the topic and the vehicle as being similar, and the degree to which the topic-vehicle combination is rated along a metaphoric goodness dimension, is predicated by the overlap of properties.

Similarity has been viewed by both philosophers and psycholinguists as a prime example of a symmetric relation, and this explanation is normally extended to metaphor. But in contrast to this tradition, Tversky (1977) has provided evidence for asymmetrical similarities, arguing that similarities should not be treated as symmetric relations. Similarity judgements are an extension of similarity statements, that is, statements of the form, "A is like B". Such a statement is directional; it has a subject, "A", and a referent, "B", and it is not equivalent to say "B is like A". In fact, the choice of subject and referent depends, in part, on the relative saliency of the objects. We tend to select the more salient stimulus, or the prototype, as a referent, and the less salient stimulus, as a subject. Consider, for example:

The portrait resembles the person versus *The person resembles the portrait.*

Margarine tastes like butter versus *Butter tastes like margarine.*

Note that the same feature of directionality holds true for the Japanese equivalents of these sentences:

Sono syoozoo wa sono hito ni nite iru versus *Sono hito wa sono syoozoo ni nite iru.*

Maagarin wa bataa no yoo na azi ga suru versus *Bataa wa maagarin no yoo na azi ga suru.*

The directionality and asymmetry of similarity relations are particularly noticeable in metaphors. One says, for example, *Turks fight like tigers*, rather than *Tigers fight like Turks*. Tversky reported a number of experiments showing that, in general, people do not rate the similarity of the two terms in similarity statements to be the same for both orders.

Ortony (1986) has also observed that reducing metaphors to similarity statements does not work, because the kind of similarity statements to which metaphors can be reduced are themselves metaphoric. But there is little doubt that judgements of similarity constitute a fundamental ingredient of cognition and cognitive development. Similarity is a powerful tool for constructing new representations from old ones, largely because it enables properties of one object to be inferred from properties of another. Ortony (1986) thus proposes a complementary model of simi-

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larity called the "salience imbalance model". The model is a variant of Tversky's (1977) contrast model, but unlike Tversky's model, it predicts the asymmetry that is evidenced in metaphors. Tversky explains asymmetries in judged similarity by arguing that in similarity judgements, subjects tend to focus on the A term more than on the B term. In the imbalance model, the salience of the intersection is computed in terms of the salience of each element relative to the second term. With this model, a literal comparison (e.g., *Margarine is like butter*) can be viewed as one in which the two concepts denoted by the terms are likely to share many features, at least some of which are of relatively high salience for both. In contrast, a metaphoric comparison (e.g., *Man is a wolf*) can be viewed as a similarity statement in which the shared attributes tend to be of high salience for the B term but of relatively low salience for the A term. Because the salience of the intersection is determined by the salience of the shared properties of the B term, the measure of saliency should be relatively high.

One important feature of the imbalance model is that the asymmetry of any similarity statement (metaphorical or literal) can be due to a difference in the salience of (at least some) properties in the intersection -- a difference that is caused by term reversal. This account is different from that of the contrast model where the salience of the intersection cannot change as a result of a reversal.

There is also disagreement about how much similarity is good for a metaphor. First, there are those who argue simply that the greater the resemblance between two things, the better their metaphoric comparisons (Johnson & Malgady, 1979; Malgady & Johnson, 1976). But as many researchers have pointed out, (Ortony, 1979a; Tourangeau & Sternberg, 1981; Tversky, 1977; Verbrugge, 1980) one must acknowledge the fact that in general "*liquid*" makes a poor metaphor for "*water*", because the two are literally too similar. Most agree that a moderate degree of similarity makes a good metaphor (Ortony, 1979a; Tourangeau & Sternberg, 1981; Tversky, 1977).

A number of theorists have argued that the topic and the vehicle play asymmetrical roles in metaphor (Ortony, 1979a, 1979b; Sternberg, Tourangeau, & Nigro, 1979; Tversky, 1977). Tourangeau and Sternberg (1982) go so far as to suggest that because metaphors make assertions, not comparisons, they are asymmetrical. The strongest evidence for asymmetry comes from studies in which the task allows the participants to learn that the topic-order is being varied. Studies in which metaphor topic-vehicle order is inverted have confirmed the idea that the reverse-order sentences are regarded as poorer metaphors (Connor & Kogan, 1980; Malgady & Johnson, 1980; Verbrugge, 1980) and take more time to comprehend (Gerrig & Healy, 1983).

Camac and Glucksberg (1984) went beyond the level of the semantic features of individual words and isolated sentences to explain the internal semantics of metaphors. They wondered whether the comprehension of novel metaphor relies on previously known associations, as in the semantic feature set-overlap notions of Ortony and Tversky. It has been claimed (e.g., Black, 1962; Richards, 1936) that metaphor involves the creation of new meanings or associations, rather than the combination or recombination of old meanings or associations. Psycholinguists have typically used semantic similarity judgement tasks, finding that "good" metaphors tend to be those with moderately similar topics and vehicles, even when the topic and vehicle terms are rated in isolation from their metaphor sentence contexts (Malgady & Johnson, 1980; Marschark, Katz, & Paivio, 1983; McCabe, 1983). However, it might be the case that the comprehension of metaphor produces the similarity (feature overlap), rather than the other way around (Camac & Glucksberg, 1984).

According to the comparison hypothesis, the metaphoric relation between topic and vehicle is comprehended by means of a feature matching operation, whereby a listener or reader estimates the degree to which the semantic features of the two nouns in question overlaps. The greater the feature overlap, or semantic similarity, the better and more interpretable the metaphor. But feature matching theories are not rich enough to account for metaphor comprehension. The problem with these theories is that they ignore a critical characteristic of metaphors: they are asymmetrical. Clearly, a nondirectional feature matching and comparison process cannot account for asymmetries (e.g., *The butcher is a surgeon* vs. *The surgeon is a butcher*) in property features (cf. Camac & Glucksberg, 1984; Glucksberg, 1989). To say that a butcher is a surgeon is quite different from saying a surgeon is a butcher. The force of these statements does not lie in any pre-existing or arbitrary association or relationship between the concepts (or words) *surgeon* and *butcher* (Camac & Glucksberg, 1984). Instead, it lies with the influence of the speaker's intended meaning-- in one case to make a positive statement about a butcher, and in the other to make a negative statement about a surgeon. The force of directionality in asymmetrical relations applies as well to the Japanese equivalents of these sentences: *(Sono) nikuya wa gekai da* 'The butcher is a surgeon' versus *(Sono) gekai wa nikuya da* 'The surgeon is a butcher'.

Traditional views of language comprehension adhere to the assumption that textual constraints ensure effective communication between speakers and listeners (e.g., Anderson & Bower, 1973; Kintsch, 1974). According to this assumption, word meaning is constrained in the sense that words are presumed to have relatively fixed features, properties, or markers that distinguish them from other words, and sentences are presumed to be the sum or amalgamation of these relatively fixed lexical entries. This approach to language comprehension, however, leads some theorists to identify metaphors as a special case of anomaly. For example, Kintsch (1974) supposes that all metaphors are necessarily semantically anomalous, proposing that a metaphor is recognised as an anomalous input string and is therefore converted into an explicit comparison. The anomaly view emphasizes the dissimilarity of the semantic features of topics and vehicles (Campbell, 1975). Normally, selectional restrictions are said to be violated when predicates do not fall into the exclusive category ranges determined by their subject. But as Kintsch himself observes, this mechanism suffers from an inability to distinguish metaphors from uninterpretable nonsense and irrelevant falsehoods. Furthermore, it is by no means clear that every metaphor can be readily converted into an explicit comparison. This explanation implies that metaphors represent an exceptional or infrequent phenomenon in everyday language. Such an interpretation, however, is not supported by recent studies (Pollio & Burns, 1977; Pollio & Smith, 1979) and the fact that metaphor and figurative language is as common as its literal counterpart. And when one considers the inventory of lexical items in the vocabulary of a language, it becomes obvious that most words have a range of meaning instead of a single referent, and that this semantic range is the result of extension. The conclusion that must come out of all this is that any semantic theory which sees figurative language as a problem to be explained away and refuses it equal footing with literal language must surely prove inadequate.

6. CONCLUSIONS: METAPHOR VERSUS POLYSEMY

Almost any sentence can be taken as metaphorical given the right context. Recall our earlier sentence: *The old rock was becoming brittle with age.* In the context of a geology class, the sentence is perfectly logical and literal: it is nonredundant and grammatically acceptable. However, if uttered in reference to a professor emeritus, the sentence suddenly becomes a metaphor and vio-

lates semantic rules. Context-dependence is an aspect of figurative language that makes one hard-pressed to distinguish the metaphorical from the literal in any reliable way. Technically, metaphors are anomalies since they violate the rules for putting word meanings together. But in many instances, metaphors are no longer anomalous uses of word meaning in their limited semantic range. The extension of the semantic range now becomes the range itself, and the lexical item can now be said to be polysemous if the extension was based on a metaphoric extension. The realisation or awareness of metaphoric meaning then depends on context and on individual differences in etymological origins of the word's meanings. Such examples of polysemy will no longer even be considered to be metaphoric because they are no longer contextually anomalous. The original distinction between literal and metaphorical is then one of degree, with intermediate and borderline cases which only reflect metaphoric origins in semantic shifts.

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LEXICAL AND STRUCTURAL AMBIGUITY IN JAPANESE AND SOME COMPARISONS IN ENGLISH

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1. INTRODUCTION

There is no doubt that ambiguity is evident in all natural languages of the world. Would it be correct, however, to say that one language or one culture is more ambiguous than any other? Which situations would we have to look at to prove that one language is more ambiguous than its neighbour? Non-native speakers of the language may well say that a certain language is difficult to learn because it is very ambiguous compared to their own language. This would not be enough to really prove that the language is in actual fact more ambiguous. Does the language seem ambiguous even for its native speakers? Is it difficult for their children to grasp the hidden meanings within the language? Or do these native speakers feel that they comfortably understand, or do not even notice, most ambiguous situations in their own language?

Lexical, structural or syntactic, and discourse are the standard categories used to distinguish different types of ambiguity in natural language. Lexical ambiguity constitutes ambiguity mostly on the word level. Structural or syntactic ambiguity looks at sentential sequences. Discourse ambiguity considers the overall linguistic situation, including context, topic of discussion, and speech acts. Most languages embrace all these forms of ambiguity in some sense.

In this paper the categories of lexical ambiguity and structural ambiguity will be briefly discussed in relation to Japanese. Then the ways in which people understand ambiguity within their own language will be briefly reviewed. Finally, some problems in the translation of ambiguity between English and Japanese will be discussed.

2. LEXICAL AMBIGUITY

Parisi and Castelfranchi (1988: 134) have indicated that lexical ambiguity may be either mostly semantic, where the ambiguity occurs due to multiple readings in the semantic component of the words, or mostly syntactic, where the ambiguity is not due to any given word, but is due to the syntactic placement of the word. Homonymy and polysemy would constitute ambiguity at the semantic level. Categorical ambiguity would be mostly at the syntactic level of lexical ambiguity. The term mostly is used because there would be some overlap in the roles of the components between syntax and lexicon.

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2.1. Homonymy

Homonymy is a very common source of lexical ambiguity. Words which sound alike are called homonyms, and words which are written alike are called homographs. Although the words sound or look identical, they have different meanings. English is rich in homonyms; just a few examples are: *spoke* as in 'wheel part' and 'talked'; *spring* as in 'jump' and 'season', *press* as in 'news' and 'push', *refrain* as in 'chorus' and 'stop'.

Japanese has an extensive number of homonyms as well. In some extreme cases such as the word kanchou, as many as twelve homonyms can be counted representing one phonological shape (Nishimitsu 1990). Therefore, in spoken discourse, there are many opportunities for ambiguous situations to arise due to homonymy. The following are examples[1] where homonyms play a role in lexical ambiguity.

(1)   a. Kono hon wa atsui desu.
           this book TM thick/serious is
          'This book is thick.'
    ????'This book is serious.' (Maybe used in literary sit.)

        b. Toufu-wo agete kudasai.
           tofu OM fry/lift please
          'Please fry the tofu.'
          'Please raise/lift the tofu.'

        c. Kono yakimono-wa atsui desu.
           this pottery TM thick/hot is
          'This pottery is hot.'
          'This pottery is thick.'

Homographs are words that look alike in their written form. Most homographs in English have identical phonological shapes. However, English has a few examples of homographs which do not match phonologically. Some examples are bow as in the sentences 'He gave a mocking bow to the ladies' and 'She had a bow in her hair', and bass as in 'He caught a bass on his fishing trip' and 'The bass on these speakers is not very good'.

Japanese ideographic kanji allow a few phonologically nonidentical homographs as does English. The lack of phonological correlation between the Japanese kanji and the phonological form of the words in question may even permit more of this type of homograph. The written form of the words *seibutsu* 'living things' and *namamono* 'raw food', *mokka* 'at present' and *meshita* 'inferior', *taisei* 'general situation' and *oozei* 'multitude' are three examples of homographs formed from kanji compounds (Nishimitsu 1990).

The multiple readings of individual kanji (non-compound) are extensive and could constitute a form of ambiguity in written discourse. However, a full discussion of the intricacies of kanji is beyond the scope of this paper.

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2.2. Polysemy

Another source of ambiguity is when a single word has numerous meanings which are related to one another. This is called polysemy. In English one example of polysemy would be the word *open*, which can mean 'to expand', 'to reveal', 'to begin' and more (Kess, Uda, Copeland-Kess 1990).

Polysemy is extremely common in Japanese. One word may have many semantically related meanings. For example, the word *hayai* can mean both 'quick' and 'early', and the verb *akeru* can mean 'to open', 'to dawn', and 'to empty'. The difference may come not only in the full meaning of a word, but also in the non-explicit nuances contained in the meaning which may change the scope of the word's usage. For example, the word *hakaru* means 'to measure' with the nuances of 'to weigh', 'to measure height', 'to gauge' and the like.

2.3. Categorical Ambiguity

Categorical ambiguity includes words varing with respect to speech class; that is, whether they be a verb, a preposition/postposition, an adjective, a noun or a determiner. Words which differ categorically may have related meanings, or conversely they may be semantically unrelated. In some cases it is debatable whether categorical ambiguity should be treated as lexical ambiguity or as structural ambiguity. Categorical ambiguity occurs frequently in both English and Japanese.

The following sentences compare the postpositional conjunction *kara* meaning 'from' (2a), 'because' (2b) or 'after' (2c), the noun *kara* meaning shell (2d), and finally the adjective *kara* meaning 'empty' (2e). The first three examples are neither semantically related to one another nor are they related to the last two examples. Examples (2d) and (2e) are related to one another, but are not identical.

```
(2)    a. Paatii-wa hachiji   kara    hajimarimasu.
          party TM 8 hour   at/from start
          'The party starts at (from) eight o'clock.'


       b. Bangohan-wo tabete kara    eiga ni itta.
          supper    OM eat     after   movie to went
          'After eating supper, I went to a movie.'


       c. Kyou- wa isogashii desu kara   ashita   kite   kudasai.
          today TM busy       am   because tomorrow come   please
          'Please come tomorrow because I'm busy today.'


       d. Kono tamago-no kara- wo   sutete    kudasai.
          this    egg   PM shell OM   throw out please
          'Please throw this egg shell out.'
```

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e. Kono hako-wa kara desu.
           this box TM empty is
           'This box is empty.'

Categorical ambiguity is the type of ambiguity leading most often to the "garden path" phenomenon in English. Consider the following sentences from Kawamoto (1988: 198). The words old and rash may be read adjectivally and as nouns. The word dog may be read as a noun and as a verb. Kawamoto believes the adjectival reading of the words old and rash will cause interference with the reading of the verb dog:

(3)   a. The old dog the footsteps of the young.

        b. The rash dogs the animals of the forest.

The word *aru* in Japanese could cause the equivalent of a garden path sentence. This word can be used as a verb in a relative clause meaning 'to exist', and as a form of determiner meaning 'a certain ...'. In the following sentence, there are two possible readings depending on the meaning of the word *aru* (Azuma and Tsukuma 1990). However, the ambiguity in this case can also be described as surface structure ambiguity. This will be further discussed under surface structure ambiguity.

(4)   Hanako wa toshokan ni aru   hon wo mottekita.
            Hanako TM library in was   book OM brought
            Hanako TM library in a certain book OM brought

            a.'Hanako brought over the book which was (existed) in
               the library.'

               In this case aru is used as a verb in
               a relative clause.

            b. 'In the library, Hanako brought over a certain book.'

               In this case aru is used as a
               determiner for hon 'book'.

3. STRUCTURAL AMBIGUITY

When there is more than one interpretation for any given sentence, structural ambiguity is usually the cause. There are two forms of structural ambiguity: deep structure ambiguity and surface structure ambiguity. The interpretations that come from deep structure ambiguity are from different logical interpretations which underlie the same surface structure of a given sentence. The ambiguity within the deep structure of a sentence can usually be best explained using

two short, simple sentences. Surface structure ambiguity involves an analysis of the constituents within one sentence. The constituents within the sentence can be broken into smaller parts with different relationships. Both types of structural ambiguity occur in Japanese and in English.

3.1. Surface Structure Ambiguity

One form of surface structure ambiguity occurs when phrases incorporating coordinating conjunctions are modified by adjectives or numbers. Consider the following ambiguous Japanese sentences (Nagata 1989 and Nishimitsu 1990):

(5)   a. San'in dewa utsukushii umi to hitobito ni kangeki shita.
          San'in in   beautiful sea and people by impressed did

          'I was impressed by the [beautiful [sea and people]] in
           the San'in district.'

          'I was impressed by the [[beautiful sea] and people]] in
           the San'in district.'

       b. Kare no hare no ensetsu ni san-nin   no musuko to musume
          he   PM   speech   to 3 people PM son   and daughter
          to tomo ni kikihaitte ita.
           with   listen   did

          'She listened to his speech with their three sons and
           one daughter.'

          'She listened to his speech with their three sons and
           three daughters.'

Using Immediate Constituent analysis, an ambiguous sentence can be broken into constituent parts. Categorical ambiguity and surface structure ambiguity can overlap in their analyses here. The following examples in English and Japanese use square brackets to indicate the constituents to be placed together in each reading (Kess 1990 and Nagata 1989):

(6)   a. Hanako wa [[toshokan ni aru] hon] wo mottekita.
          Hanako TM   library in was book OM brought over
          'Hanako brought over the book which was (existed) in the
           library.'

          [toshokan ni aru] is part of a relative clause.

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b. Hanako wa toshokan ni [aru hon]   wo mottekita.
   Hanako TM library in a certain book OM brought over
   'In the library, Hanako brought over a certain book.'

   [aru hon] is a determiner plus a noun.

c. They [were entertaining] guests.

   Here, entertaining is part of the paraphrastic past
   progressive verb tense.

d. They were [entertaining guests].

   Here, entertaining is used as a predicate adjective.

In the following sentences only an analysis under structural ambiguity and not lexical ambi-
guity could be used to explain the different meanings involved (Nagata 1989):

(7)   a. [Kawaii [kodomo no youfuku]] ni botan ga mittsu tsuite ita.
            cute   child PM clothes   to button SM 3 piece attach did
           There were three buttons attached to the [cute
           [child's clothes]].

        b. [[Kawaii kodomo] no youfuku] ni botan ga mittsu tsuite ita.
             cute   child   PM clothes   to button SM 3 piece attach did
           There were three buttons attached to the
           [[cute child's] clothes].

        c. Shinnin   kyoushi wa [[shizuka ni kiite iru] seito] ni rekishi
           new person teacher TM [[quietly listen do] student] to history
           wo kattata.
           OM spoke
           'A new teacher spoke about history to his [pupils [who were
           listening quietly]] to him.'

        d. Shinnin   kyoushi wa [[shizuka ni] [kiite iru seito ni rekishi
           new person teacher TM [[quietly] [listen do student to history
           wo] kattata].
           OM] spoke
           'A new teacher [[spoke [softly]] to his pupils about
           history].'

3.2. Deep Structure Ambiguity

Deep structure ambiguity can be explained by showing how two different logical interpretations in the one sentence came from shorter, simpler sentences originally (Kess 1990: 12). Consider the following Japanese sentences (Kess, Uda, Copeland-Kess 1990 and Nagata 1989):

(8)   a. Syotyou wa keikan-tati ni insyu-kinsi wo meijita.
           Chief   TM police men to drinking-ban OM ordered
           The chief ordered the policemen to stop drinking.

           Comes from the sentences i, and ii or iii:

           i. Syotyou wa keikan-tati ni meijita.
              Chief   TM police men to ordered
              'The chief ordered the policemen.'

          ii. Keikan-tati wa insyu-kinsi wo shimashita.
              police men   TM drinking-ban OM did
              'The policemen stopped drinking.'

         iii. Keikan-tati wa dareka   ni insyu-kinsi wo   sasemashita.
              police men   TM someone to drinking-ban OM   caused to do
              'Someone stopped the policemen from drinking.

        b. America no ijuumin wa atarashii shuukan wo mananda.
           america PM immig. TM   new   customs OM learned
           'American immigrants learned new customs.'

           Comes from the sentences i, and ii or iii:

           i. Kono ijuumin wa atarashii shuukan wo mananda.
              this immig. TM   new   customs OM learned
              'These immigrants learned new customs.'

          ii. America ni ijuumin ga iru.
              america in immig. SM are
              'Immigrants are in America.'

         iii. Kono America-jin wa ijuumin desu.
              this   american TM immig. are
              'These Americans are immigrants.

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The passive formation and the honorific formation of verbs in Japanese involves the use of the suffix *(r)are*. This double use for verb suffixes causes deep structure ambiguity within the functional role of the nouns in a sentence. The following sentences from Kess, Uda, and Copeland-Kess exemplify the ambiguity involving honorific/passive sentences in Japanese.

```
(9)     a. Sensei  ga nigaoe   wo kak-areta.
           teacher SM portrait OM draw-honorific
    or     teacher SM portrait OM draw-passive

        The two meanings for this sentence are:

        i. 'The teacher drew a portrait of somebody.'
           Honorific reading.

       ii. 'The teacher had somebody draw his portrait.'
    or        'The teacher had his (own) portrait drawn.'
           Passive reading.


       b. Yamada-san wa Tanaka-san ni  denwa     sareta.
          Yamada Mr. TM Tanaka Mr. to telephone did-honoific
    or    Yamada Mr. TM Tanaka Mr. by telephone did-passive

        The two meanings for this sentence are:

        a. 'Mr. Yamada gave a call to Mr. Tanaka. '
           Honorific reading.

        b. 'Mr. Yamada was phoned by Mr. Tanaka.
           Passive reading.
```

4. PARSING AMBIGUITY

Sometimes ambiguity is used deliberately to form jokes or sarcasm. With most forms of ambiguity, however, if the context is relatively clear, we are not aware of more than one meaning being involved. When we are speaking to one another, or are reading text, what makes something clear when it should actually be ambiguous? A person will make use of many cues within the context of a situation to understand ambiguity. Some cues acting simultaneously to provide the information needed to decipher ambiguity in discourse are: word order, tone of voice, topic of conversation, body posture, dialog partner, and medium of communication.

Nishimitsu (1990) claims that there seem to be languages which are more context dependent than others. Context dependent languages would allow much more ambiguity within each word or sentence than would a context independent language. Nishimitsu claims that in a context dependent language there is a more indeterminate relationship between given and new information.

The amount of redundancy within context dependent languages would also be higher, allowing the same information to be conveyed at various levels.

In a context independent language, the meanings of words would be more restricted with respect to the distance between given and new information. The amount of redundancy within a text would also be much less. In this definition, Japanese would be considered a closer to a context dependent language and English more of a context independent language.

Although the role of context in resolving ambiguity is well noted, the ways in which this occurs has been widely debated (Kawamoto 1988: 196). Some argue that all meanings of any one word or sentence are activated as soon as it is seen or heard. The meaning appropriate to the context will be chosen from the activated list. Others argue that only the contextually appropriate meaning will be activated when a word or sentence is accessed. Carpenter and Daneman (1981) maintain that the frequency with which a word is used in the language - its relative dominance - may affect how quickly the meaning of a word is accessed. They also argue that context will play a role in the speed of comprehension of lexical ambiguity.

4.1. Pitch and Pause in Spoken Discourse

In Spoken discourse, Japanese distinguishes some of its homonyms using word accent or pitch, similar to the English use of stress to distinguish such words as desert and dessert. The word *hashi* in Japanese has three common meanings, 'chopsticks', 'bridge', and 'edge'. As single words, each has a different accent. The word *hashi* meaning 'chopsticks', has the accent on the first syllable; the one meaning 'bridge' on the second syllable; the one meaning 'edge' has no accent on either syllable.

Within the sentence, however, the individual words may shift from their original pitch, making it more difficult to differentiate lexical ambiguities (Nishimitsu 1990). Dialect differences in accent are also extremely diverse in Japan, making pitch a rather unreliable cue as a lexical differentiator.

Pitch can be a reliable indicator when considered on the sentential level. Clearly, in written discourse pitch and pause do not play a role. However, in conversation pitch and pause play an important role in disambiguation. Consider the following sentence which was discussed previously:

(10)   a. Hanako wa [[toshokan ni aru] hon] wo mottekita.
            Hanako TM   library in was   book OM brought over
          'Hanako brought over the book which was (existed) in the
           library.'

          [toshokan ni aru] is part of a relative clause.

```
   b. Hanako wa toshokan ni [ aru hon ]      wo mottekita.
      Hanako TM library  in [a certain book] OM brought over
      'In the library, Hanako brought over a certain book.'
```

```
      [aru hon] is a determiner and noun.
```

In spoken Japanese discourse, the ambiguity of the above sentence would be reduced. According to Azuma and Tsukuma (1990), in the phrase [aru hon] where *aru* is a determiner, a higher pitch is placed on the first syllable in the word *aru*, and a pause occurs before the word. In the case of the relative clause, the pitch in the first syllable of the word *aru* is much lower, and there is less of a pause before the word. English would also use pause to disambiguate such garden path sentences in spoken discourse.

4.2. Grammatical cues

In Japanese, the formation of nouns from adjectives usually requires the use of the suffixes *-sa* or *-mi* which would quickly indicate any change in category and therefore ward off some forms of categorical ambiguity. English also employs such suffixes as *-y* and *-ness* to indicate categorical change. Such suffixes are not mandatory in many English words, however, allowing such noun doublets as red and redness, weak and weakness. Japanese adjectives are almost always distinguished from their nominal counterparts.

```
(11)  a. Kare wa tsuyo-i hito desu.
         he   TM strong  person is
      'He is a strong person'.

         Adjective is indicated by -i
         Kare no tsuyo-sa   wa yuumei desu.
         he   PM strength   TM famous is
      'His strength is well known'.

         Nominalization is indicated by -sa.


      b. Kore wa aka-i enpitsu desu.
         this TM red   pencil  is
      'This is a red pencil'.

         Adjective is indicated by -i.

         Aki-  no aka-wa sugoku kirei   desu.
         autumn PM red TM  very   beautiful is
      'The red of autumn is very beautiful'.

         No marker is attached to aka
```

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Word order would also deter the chances of a categorically ambiguous noun and adjective set from coming into contact with one another. Japanese is an SOV language, which indicates case using postpositional particles rather than word order. The postpositional particles such as *-wo*, *-wa*, and *-ni* indicate a noun's case thereby also indicating that a word is a noun and not an adjective. Some examples are shown below:

```
(12)    a. Toshiyori-wa hon- wo takusan yomimasu.
           old per.  TM book OM a lot   read
          'The old read books a lot'.
          -wa is the topic marker
          indicating that Toshiyori is a noun.
          -wo is the direct object marker.


        b. Midori pen-wo agete kudasai.
           green  pen OM give  please
          'Please give me the green pen'.

           There is no case marker after the adjective midori.
           Therefore it would not be read as a noun.


        c. Yama-  no midori-wo mite, kirei  deshou.
           mount. PM green   OM look  pretty isn't it
          'Look at the greenery on the mountain, its pretty isn't it?'

           The noun midori
            is marked as direct object, using -wo.
```

4.3. Medium of Communication

Whether the communication is written or spoken may help to indicate the extent to which ambiguity is understood. Deep structure ambiguity occurs in the Japanese passive/honorific doublets. Knowing which medium is being used may help to communicate the correct sense of the ambiguous sentence faster.

Although passive and honorific sentences can be observed in both written and spoken speech, their relative frequency in each is different. Passive sentences are used much more often in written discourse than in spoken discourse. Conversely, honorific sentences are used more often in spoken discourse or perhaps letters than they are in reports or books.

4.4. Kanji

In written Japanese discourse, ambiguity becomes more complex with the added dimension of kanji. Kanji have little correlation between phonological form and graphic form. If a kanji has

not been seen before by the reader, there are few, if any, clues how to pronounce it. Therefore, rote memorization is required in the learning of most kanji. If one has accomplished the monumental task of memorizing enough characters to be considered literate, kanji can sometimes help with the disambiguation of text.

With respect to some homonyms, kanji may help to distinguish between each meaning. Although phonologically the homonyms would be identical, graphically they may have many different shapes. In English, we also have this phenomenon, although not to the same extent. For example, the words 'hair' and 'hare' are phonologically equivalent, yet their graphically written shapes and their meanings are different. In Japanese, the word *kagaku* has the separate meanings of 'chemistry' and 'science'; the word *atsui* can mean 'thick', 'hot', or 'serious'; the word *tatsu* has the four separte meanings of 'stand erect', 'cut', 'start' or 'elapse'. In these examples, the phonological forms of the words are essentially the same, but their written forms reveal the differences in meaning. Each graphic form quickly indicates which meaning is to be conveyed. Although the phonological forms are identical, no ambiguity should occur when reading the characters.

The use of kanji can, however, further complicate polysemy in Japanese. Words which are really only separated by nuance can be split more clearly in writing using kanji, creating a sense that there is more to the difference in nuance than there really is. The word *kawaru* uses four different kanji to represent the nuances 'change', 'take the place of', 'interchange', and 'change'. The word *hakaru* basically means 'to measure', but in writing three different kanji distinguish between the specific types of measurements taking place. The word *atsui* uses two kanji to represent the nuances of 'hot (weather)' and 'hot (to touch)'.

5. PROBLEMS IN TRANSLATION

Ambiguity may or may not be a concern within one's own language. When it comes to translation between two languages which use ambiguity differently, however, problems can arise. Both lexical ambiguity and structural ambiguity create problems in translation. Not only words and sentences could create an obstacle, but a whole linguistic situation could be difficult to convey to a foreign party. If indeed the speakers of one language are more receptive to different types of ambiguity, or are more comfortable with ambiguous situations, clarifying ambiguous yet self-evident situations for these cultures may appear superfluous and perhaps rude. Conversely, those more comfortable with ambiguity may be perceived as being deceptive or calculating if the other party finds that too much information has been omitted from the discourse. If each group is aware of the other's linguistic style, the negative repercussions occurring otherwise can be reduced.

Polysemy is one case where translation between English and Japanese becomes very intricate. Unless the author of a text is directly available, one can only assume which nuances of a word within the discourse are correct, leading to a high degree of ambiguity. The Japanese themselves may be quite comfortable with this type of ambiguity. In fact, the use of such ambiguity tends to show that the speaker trusts the listener to understand his implied meaning, creating a feeling of comradeship. The need for further explanation could break the bonds between conversants. For many English speakers, the opposite is true. If one cannot be forthright with one's conversation partner, the two are most likely just acquaintances. When dealing with people from other nations, such different uses of ambiguity can create confusion.

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Inoue (1987) suggests that polysemy caused just such confusion in the drafting of the Japanese constitution in 1945. Because the Japanese Constitution was drafted in two languages through many translations and much bilingual negotiation, misunderstanding developed in the form of ambiguity. The one phrase 'advice and consent', in Article III of the English version of the constitution can be used as an example of polysemy within Japanese which did not translate precisely enough into English.

Article III reads as follows: "The advice and consent of the Cabinet shall be required for all acts of the Emperor in matters of state, and the Cabinet shall be responsible therefore". The Japanese translated the phrase "advice and consent" with the term *hohitsu* meaning 'assistance/ advice', with no mention of consent (Inoue 1987: 598). The Americans did not accept this translation, and insisted on a term with the meaning of 'consent'. The Americans decided upon *hohitsu-sandoo*, a term meaning 'assistance/advice - consent'. The Japanese did not accept this term and changed it again to *hosa-to dooi* meaning 'assistance - agreement'. This did not meet with the American's approval either. After a series of volleying terms back and forth, the phrase finally agreed upon was *jogen-to shoonin* meaning literally 'advice and consent'. The two meanings 'advice and consent' are implied in the one word *hohitsu*. Making the term more explicit would be superfluous for the Japanese way of thinking. It may even be considered rude with respect to the Emperor.

In order to translate the semantic relationships within a sentence correctly, a good knowledge of grammatical relationships is very important. If grammatical words such as prepositions and particles have many homonyms, it could be very difficult to precisely translate them into another language. Prepositions and particles are most often very idiomatic in any language. Context would not be of much help when trying to grasp the meaning of these idiomatic grammatical markers, and trying to render them in the other language correctly.

In Japanese, particles often have many different semantic derivations. One extreme example would be the various uses of the postpositional particle *ni*. The English prepositions and prepositional phrases 'to', 'in order to', 'on', 'from', 'at', and 'in' can all be translated using the one Japanese particle *ni*. This is a case of either polysemy, or homonymy depending on the semantic relationship between the meanings of the particle.

Makino and Tsutsui (1986: 303) indicate that the particle *ni* has a general meaning of 'contact'. The semantic derivations of the particle *ni* is divided into five categories: direct contact, direction, indirect object, source/agent, point of time. Examples of these would be:

(13)   a. Direct Contact

        kokuban   ni   e   o   kaita.
        blackboard on pic. OM drew
        'I drew a picture on the blackboard.'

b. Direction

```
Watashi  wa  Rondon  ni  itta.
   I     TM  London   to  went
'I went to London.'
```

c. Indirect Object

```
Taroo  wa  Hanako  ni  hon   wo  kashita.
Taro   Tm  Hanako  to  book  OM  lent
'Taro lent a book to Hanako.'
```

d. Source/Agent

```
Bobu  wa  Meari  ni   kippu  wo  moratta.
Bob   Tm  Mary   from tick.  OM  recieved
'Bob received a ticket from Mary
```

e. Point of Time

```
Niji    ni  tomodachi  ga  kita.
2 hour  at  friend     SM  came
'A friend of mine came at 2 o'clock.
```

The first two semantic categories, direct contact (13a) and direction (13b), are further derived into locational existence and purpose, respectively:

13. a) Direct Contact - Locational Existence

```
Koko  ni  denwa  ga  aru.
here  in  tele.  SM  is
'Here is a telephone.'
```

13. b) Direction - Purpose

```
Boku  wa  sakana  wo  kai  ni  itta.
  I   TM  fish    OM  buy  to  went
I went to (in order to) buy fish.
```

As can be seen from these examples, particles and prepositions which have various meanings may result in translations that do not give the correct nuance in either or both languages. There

are a significant number of other situations that can cause discrepancies in translation as a direct result of ambiguity. A complete discussion of these is beyond the scope of this paper.

6. CONCLUSIONS

A great deal of ambiguity occurs in both Japanese and English, yet the ambiguities do not necessarily correspond: a category of ambiguity common in Japanese is not necessarily common or may not even exist in English, as was shown in the passive/honourific form of structural ambiguity within Japanese (-rareru). The same may be true for English categories of ambiguity that are not present in Japanese, such as sarcasm, which was not covered extensively in this paper.

Lexical ambiguity and structural ambiguity have been described in relation to Japanese. As was shown, Japanese has a great deal of ambiguity at both the lexical and the structural levels. Homonyms are extensive in both Japanese and English. However, homographs were shown to have a different dimension in Japanese because of kanji. Japanese appears to be more ambiguous than English with respect to polysemy, and categorical ambiguities have less correlation between the two languages.

Structural ambiguity seems to have a number of parallels between Japanese and English, although the difference in word order creates fewer parallels than would be expected between other more closely related languages. Japanese uses case to distinguish between the words in a sentence, whereas English uses word order to do this.

Within any specific language, people learn how to detect and parse ambiguity. It has been shown that Japanese speakers use both pitch and pause to detect ambiguity in spoken discourse. In written discourse, however, kanji can be used to resolve ambiguity. Context is a deciding factor in the resolution of most ambiguity. Contextual factors such as the medium of communication, the conversation partner, body language, topic and the like help to disambiguate discourse.

Ambiguity can invoke difficulties in translation. To translate from one language to another calls for precision in deciphering meaning and nuance. When words or structure are ambiguous within one language, the choice of words for the translation can become an obstacle to communication.

NOTES

1 The following abreviations are used in the examples: TM indicates 'topic marker'; OM indicates 'object marker'; SM indicates 'subject marker'; PM indicates 'possesive marker'.

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'Sculduggery' and the Lord's Prayer: Sound Change, Emigration, and Cultural Attitudes as Factors in the Solution of a Disputed Etymology

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In every language, there are words whose provenance is at best uncertain and at worst unknown, and they present a fascinating challenge to the historical linguist and etymologist, a challenge that is impossible to resist. Such a word in English is *sculduggery*.[1] The very sound of the word raises thoughts of secrecy, of underhandedness, of a mystery needing to be solved. Like most speakers of North American English, I have used the word fairly often and read it even more often without, except in passing, particularly wondering about its source. "People have always used words without knowing where they 'came from' and what they once denoted. Such knowledge would not be of any use to a speaker anyway..." (Sornig 1981:11); it is only etymologists, either amateur or professional, who are suddenly struck by the feeling described by Northrop Frye (1982:220) as "there is more to be got out of this...not necessarily something we have overlooked before, but [coming] rather from a new context in our experience." In this case, the new context was a teaching aid, a hand-out featuring the Lord's Prayer in a dozen IE languages, one of which was Swedish. In that Swedish Paternoster occurs the line "Förlåt oss våra skulder såsom ock vi förlåta dem oss skyldiga äro." Did *skyldiga äro* have any relationship to "sculduggery"? I was asked. After a brief digression in the direction of i-umlauting, palatalization, and other Germanic sound shifts, I promised to try to find out. It seemed to me intuitively realistic to suggest that the connection between those who trespass against us, *dem oss skyldiga äro*, and the trespass itself, the sculduggery, should be close, especially considering the frequent historical and linguistic contacts between speakers of the languages involved.

Watkins (1989) says,

> After nearly a decade of studying the preservation, diffusion, transformation, and revitalization of a single formula..., I am more firmly than ever convinced of the extraordinary longevity of surface phraseology and verbal behaviour when it serves as the expression of an enduring cultural theme. A proper linguistic theory must be able to account for the creativity of human language; but it must also account for the possible long-term preservation of surface formulaic strings in the same or different linguistic traditions over millenia.

The problem, therefore, was to track down the traces of this particular "surface formulaic string," using both linguistic and cultural clues. A good etymological dictionary seemed to be the logical starting point.

Many dictionaries label *sculduggery* as slang or informal usage, and those published in Great Britain regard it as an Americanism. One of the major problems of tracing the origin of lexical items regarded as slang is the comparative lack of written records, and the further back in time one goes, the fewer records there are. This lack, as Sornig (1981: 9) points out, "invites conjectures of the most outlandish kind," folk-etymologies that create familiar sound patterns and apparent conjunctions of existing morphemes that can then be re-analysed as explaining the source of an otherwise mysterious word. Responsible popular works of the "Where did it come from?" type usually ignore items such as *sculduggery* for which there is no accepted explanation, but some of the less scholarly ones indulge in shameless folk-etymologizing, and it was in one of the latter[2] that I found the following wonderful example of Sornig's "conjectures of the most outlandish kind":

Skullduggery [sic] *How did evil actions come to be called "skullduggery"?*

> Grave robbing was once a common crime and a grave robber was called a "skull digger." From this, any criminal activity--especially one practiced at night--came to be called "skulldigging" or "skullduggery."

This is even less satisfactory than most folk-etymologies, as it raises the question of why the putative originators of the term should choose to change from a gerundive compound of the object-verb type which would have done perfectly well as it was (cp. *muckraking, plane-spotting*) to a participial-compound (again object-verb) plus derivational suffix, a much less common type of compound formation especially where metaphors are concerned.[3] A further problem arises from the fact that the sources of slang are more difficult to uncover than those of the standard lexicon because of the meaning shifts involved. To quote Sornig again (1981: 8f):

> Slang etymology is frequently faced with different and far more complicated problems of reconstruction than normal philological etymology, if only because of the variety and obscurity of the source languages, and the various stages of their linguistic and sociolinguistic development and assessment which have to be taken into consideration.

Most dictionaries, building as they must on the work of their predecessors, note the origin of *sculduggery* either as unknown (for example, *The American Heritage Dictionary* and *The Oxford Dictionary of English Etymology*)[4], or as from a Scottish dialect term *sculduddery* or *sculdudry*, meaning 'fornication, grossness, obscenity, filthy talk; vulgar, low people; rubbish, tatters' (as in Warrack, 1911), and "itself of obscure origin" (Partridge 1984). Few attempts have been made to trace the source back beyond this etymon. One 19th century source (Barrere and Leland, 1897) gives the etymology as "From Low Dutch slang (thieves) *schooldogery, schoel*, a villain," and comments that it is "(American)....A Western word." Spitzer, in an article in *American Speech* (1944:25), while agreeing with the majority that *sculduggery* has its origin in English or Scots *sculduddery*, decrees the latter to be "traceable to French origin, and like *culprit*, a word derived from legal procedure." He bases his argument in the first place on the meaning of the word in its earliest (1713) attestation, i.e. 'fornication', deriving it from O.Fr. *esco(u)lo(u)rgier* 'to slip' from Vulg. Lat. **excollubricare*, with an extended meaning 'to slip morally, to sin.' Semantically, Spitzer's argument makes sense, but the phonological changes required to derive *sculduddery* from *esco(u)lo(u)rgier* are somewhat baroque. First, one would need to posit a derived noun, **escoulourgerie* which, as Spitzer (1944:27) remarks, "is not attested (the abstract noun generally found being *escolourgement*)." If we allow that such a noun as **escoulourgerie* may have existed, then the derivation (expanded and phonemicized from Spitzer's) should be something like:

1. /ɛskul ur ʒəri/ (hypothetical etymon)

2. / skul ur ʒəri/ (borrowed into English)

3. / skəl ərdʒri/ (vowel weakening, intrusive stop)

4. / skəldə dʒəri/ (a second intrusive stop and assimilation of the liquid)

5. / skəldə d əri/ (a second assimilation)
    and/or /skəldədri/ (by analogy with *ribaldry, husbandry,* etc.)

At some point in this development, the stress must have shifted from the final syllable (the usual place for tonic stress in OF) to the antepenult, possibly about stage (3) with the introduction of the first intrusive /d/. (The loss of the /r/ preceding this stop in a dialect area that is to this day rhotic is difficult to explain, and Spitzer makes no attempt to do so.) It then becomes necessary to account for the North American form with a velar rather than an alveolar stop at the onset of the third syllable, a change which Spitzer feels is attributable to analogy with *humbuggery, doggery,* etc. (1944:27). A colleague of mine[5] who is a semanticist suggests that given the connotations of illegal and immoral sexual activity attached to the Scots word, the American *sculduggery* is more likely formed by analogy with *buggery,* if it is, in fact, a variant of *sculduddery* and not an independent development. All this might be relatively convincing, were it not that even Spitzer admits that the OF forms are "etymologically intransparen[t]" and that "there was no word stem with which the popular mind could connect the derivative of Vulgar Latin *excollubricare*" (1944:27).

I would suggest that the etymon of both *sculduddery* and *sculduggery* is to be found not in Proto-Romance but in Proto-Germanic, and that the transmission of this etymon into both Scots dialect and American English slang is from Scandinavian sources. In all the Germanic languages there exist members of a class of words with the basic meaning 'sin' or 'guilt,' apparently related to a verb root *skl-* 'owe, ought, must' (Feist, 1923), and traceable to a Proto-Indo-European root *skel-* 'to be under an obligation.'[6] Thus we find sets like

1. **Goth.**: *skulds ist* 'it is lawful'; *skula* 'owing, in debt, guilty', (as a noun) 'debtor'

2. **ON**: *skyldr* 'obligatory', *skyldu past inf.* of 'should'

3. **OI**: *skolo* 'ought', *skuldr* 'guilty', *skuld* 'guilt'

4. **OE**: *sculan* 'ought', *scyldful* 'guilty', *scyld* 'guilt'

5. **OSax**: *scolan, skuld*

6. **OHG**: *scolan, scult, sculd(a)*

7. **OFries**: *skela, skelda,*

(The last three sets all have the same 'guilty' meanings as the previous ones.)

Other Indo-European languages have sets that are apparently cognate with these; for example,

1.   **Lith**. *skeliu* 'I am guilty' and *skola* 'guilt', as well as an *s*-less form *kaltas* 'guilty'

2.   **OPruss**. *skalisnan (accus.)* 'obligation, duty', *skellants* 'guilty,' and *poskulit* 'admonish'.

It seems likely that **Arm**. *sxalem, sxalim* 'staggering, confused,' **OI**. *skhalati* 'stumble', and **Greek** σφαλλω 'make fall', σφαλλομαι 'stumble, fail, meet with mischance' are also related (Feist, 1923), as well as **Latin** *scelus, -eris* 'crime, evil deed, impious action' and its derivatives *scelero, -are* 'to pollute, profane with guilt', *sceleratus* 'polluted, profaned with guilt' (with its French descendant *scelerat*); *scelerosus* 'full of guilt, wicked, accursed'; and the literary form *scelestus* 'wicked, accursed, infamous'. **Old English** has a particularly impressive set of **skl*-derived items: *scyldan* 'to accuse', *scyldfrecu* 'wicked craving', *scyld-hata* 'enemy,' *scyldigung* 'sum demanded as *wergeld* 'compensation, value of a man's life'', and *scyldigian* 'to sin, place in the position of a criminal, render liable to punishment'.[7] Nor does Modern English lack for related terms. Consider *scalawag* or (19th C.) *scallywag*, and also the earlier terms *scaldrum* 'beggar' and *skellum* 'rascal, scoundrel, villain'. This last is first attested for 1611 (Shipley, 1968), and is also found in Burns' "Tam o'Shanter"; its immediate etymon is **Du**. *schelm*. Geipel (1971) notes that *skellum* is common from Shetland south to East Anglia and Northampton. It is found in South Africa in the Afrikaans form *skelm*; South African English also has in its lexicon the word *skolly* or *skollie* 'a Coloured street hoodlum, usually a criminal or potential criminal and member of a gang' (Branford, 1980), presumably from **Du**. *schoelje* 'rascal, scamp, rogue'. A good argument can also be made for the relationship of *scold* in its use as a noun dating from the 13th century, 'a ribald or abusive person, especially a woman'; Geipel (1971) lists *scold* (n) among words of Middle English derived from Old Norse, with the meaning 'a person given to ribaldry and then to fault-finding', from whence the verb 'to abuse verbally'. *Scold* (n.) is generally held to be derived from **ON** *skald* 'poet' in the dyslogistic sense in which it is found in compounds such as *skaldskapr* having in Icelandic law books the specific sense of libel in verse (DEE). The semantic development from 'be under an obligation', to 'owe', to 'ought' to 'guilt[y]' (of sins of both omission 'those things we ought to have done' and commission 'those things we ought not to have done'), to 'one who is guilty', to whatever one is guilty of, is an easy path to follow.

The pertinent lines in the Lord's Prayer in the older Germanic languages (the words that in their modern Swedish form started this whole inquiry) show this relationship very neatly, especially when one remembers the traditional English versions, "Forgive us our *debts/trespasses* as we forgive our *debtors/those who trespass against us*":

1.   **Gothic**: Jah aflet uns þatei *skulans* syaima, swase jah weis afletam þam *skulam unsairam*.

2.   **Old Norse**: Ok fyrerlat oss ossar *skulder*, sua sem ver fyrerlatom ossom *skuldo-nautum*.

3.   **Heliand (OHG)**: ...endi alat us mangoro *mensculdio*, al so uue othrum mannum doan.

4.   **Tatian (OHG)**: ...inti furtaz uns unsara *sculdi*, so uuie furlazemes unsaren *sculdigon*.[8]

It is immediately apparent that these older forms have not yet undergone the vowel mutation and subsequent palatalization of the velar stops that appear in the modern versions:

1.   **Swedish**: Förlåt oss våra skulder såsom ock vi förlåta dem oss *skyldiga* äro.

2.   **Norwegian**: Og forlat oss var *skyld*, som vi og forlater vare *skyldnere*.[9]

However, since the palatalization of the velar consonants began only towards the end of Old Scandinavian (as Haugen terms the Medieval stage of the language), and continued until at least 1300 (Haugen, 1976:268), any borrowing into the dialects of the northern British Isles at the time of the Danelaw, or for some time after, would not show this change. As for the unmutated root vowel of *sculduggery*, two possibilities exist. The first is that it is simply a later spelling pronunciation resulting from the practice of writing the front rounded vowel as <u>. The second possibility is that the root never did undergo mutation in the dialects of the speakers of Old Norse who settled in the Danelaw and the western and northern parts of Scotland; this area, which included Lowland Scots, was invaded and settled by Danish Vikings, and mutation was much less common in East Norse than it was in West Norse (Walshe, 1965:39, 41). According to Geipel (1971:62), "The presence of the unmutated form *lagu* ['law'] in early English adds weight to the supposition that U Mutation may not have been particularly characteristic of the variety of Norse carried to the Danelaw....the development was much less widespread in Denmark and southern Sweden...than in Norway and Iceland." The suffix *-ig* that underlies the /əg/ of *sculduggery* is common to all the Germanic languages, and is a development of PG *-aga-* from PIE *-oqo-* (Wright,1910:177). As the suffix was unstressed, the vowel would have tended to be unstable, even to the point of weakening to /ə/. If, as posited above, *skuldig* arrived in the Danelaw before the palatalization of velar stops had taken place, the final consonant would have remained hard. Its shift from velar to dental in *sculduddery* can be accounted for by assimilation under the influence of a shift in stress, caused by the addition of the further suffix *-ery*. This final suffix came through French borrowings into Middle English, but very soon became productive in its own right. The close relationship between France and Scotland in the late Middle and Early Modern English periods doubtless ensured its productivity in Scots English as well. The end result is thus the realization of the Scots form /skəldədəri/. This same suffix had also been adopted into Old Scandinavian from French via Middle Low German at the time of the Hanseatic League's great influence, and has remained productive in the Scandinavian languages (Walshe, 1965:48f). This fact is important for the hypothesized origin of the North American variant *sculduggery* (see below).

The rest of the evidence for the Scandinavian origin of *sculduggery* is essentially sociolinguistic, having regard to the external history of the English language in Britain and America. The effect of the Danish invasions on the English language is well known. The area affected covered northern England and much of Scotland including the outer islands; McIntosh (1989:104) describes the spread of Scandinavian influence thus:

> Apart from the direct linguistic impact of the settlements in South West Scotland, and from the rather late and fairly small influx of words southwards from Caithness, Orkney and Shetland, the Scandinavian element in Scots as a whole must largely have its origin in the speech of emigrants and refugees from England (and mainly the northern part of England) who made their way to Scotland in the two centuries after the Norman Conquest.

In some of these areas, especially in ~~Scotland~~ Shet land, Norse in some form was spoken for nearly a thousand years. Geipel (1971:56) cites a verse from Shetland collected by J. Jakobsen in the late 1800's, of which only the first three lines were translated:

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Enga bonga loru        (My own dear child, sleep,
Bel skola reena        The evil shall stream out
Bel skola beti...      We shall chase the evil...)
                              [emphasis mine. BPH]
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where the word for 'evil' is clearly related to the present discussion. Even in those places where the use of Norse died out after a mere half-millenium, "the presence of so many Danes certainly resulted in varieties of English that were strongly tinged with Norse accentuation and stiff with Scandinavian turns of phrase" (*ibid.*: 58). Geipel further notes that it is in the dialects of northern England and of Scotland that we find the greatest number of Norse terms even today, and that most of these terms have never made their way into the standard or literary language. As far as cultural influences are concerned, Sornig (1981:63) points out that the focus of interest of any speech community influences its vocabulary, and that there is always a "topic no.1," Watkin's "enduring cultural theme." What more natural in a society so preoccupied with its moral well-being as was Scotland after the Reformation and under the religious rule of the Calvinists than the adoption of a perhaps archaic or obsolete dialect term as a euphemism for the all-too-common sin of fornication?

The socio-religious climate was much the same for the 19th century Scandinavian settlers in the mid-western United states. The first emigrants from Scandinavia to North America set sail in 1825, and although their immediate destination was New York, they soon pushed westwards. It was not until mid-century, however, that the effect of increasing Scandinavian settlement, especially in Minnesota, was apparent; by 1875, Scandinavians accounted for 52% of the foreign-born residents of that state (Lungmark, 1971:1), and indeed (as noted later), the earliest citation for our word is from that very state as well. There were also sizeable Scandinavian populations in Wisconsin, North Dakota, Illinois (Scott, 1975:284), and later, Montana (Ferguson and Heath, 1981:353); in nearly all areas, Norwegians constituted the largest part of the immigrant populations (Scott, *loc.cit.*). Their church became, as it had been in their homeland, the focus of community life, and that church was Lutheran, like Calvinism rigid in its denunciation of "sinful delights" (Semmingsen, 1978:81). In this atmosphere, then, *skyldig* was no doubt a common word. (Its pronunciation in Nynorsk is /skuldi/, unmutated and unpalatalized, although Bokmål has /sjyldi/.) The productivity of the borrowed suffix *-eri* has been noted above; why not attach it to an old root to form a new noun referring to the sinful delights of the New World? Geipel (1971:57) notes that "Scandinavians abroad have never been particularly faithful to their mother tongue," and it is certain that once isolated from its homeland, the language of the Scandinavian-Americans began to change; all sources comment on the kind of pidgin Norse-English that arose. A kind of blending like the one that took place in Middle English must also have occurred as the different Scandinavian groups intermarried and moved ever further west. Haugen (1963:356) comments that American Norwegian speakers were unaware of changes in their pronunciation, and also that "[t]he forms of their BL are generally pure spelling pronunciations"; thus the pronunciation of the initial cluster of *skyldig* would be consistent with Nynorsk, and the final <g> might also be pronounced "hard" when reading prayers. As well, consider the closeness in sound of the suffix *-ery* to the following *äro* of the Lord's Prayer.

That the non-Scandinavian linguistic groups borrowed from the Scandinavian settlers is attested to by Mencken (1977:254), who remarks, "In Minnesota and adjacent states many Swedish and Dano-Norwegian terms are in common use." As the Scandinavians moved westward, they must have encountered the descendants of the Scots fur-traders already resident in many northwestern states; if anyone knew the meaning of *sculduddery*, it was the mountain men! And who knows but what the repetition of *skyldiga äro* by the devout Lutheran settlers might not have triggered the final semantic connection needed to create *sculduggery*? By the late 19th century, however, the word *sculduggery* apparently referred to a less mortal sort of sin. The newest edition of the OED (1989), while still attributing the word to an alteration of *sculduddery*, gives the following as the earliest citation:

> 1867 A.D. Richardson *Beyond Mississippi* "From Minnesota had been imported the mysterious term 'scullduggery' [*sic*], used to signify political or other trickery."

From Scandinavia across the North Sea to Scotland, from Scandinavia across the North Atlantic to America a thousand years later, two linguistic streams meet and reinforce each other, a living example, to paraphrase Watkins, of the preservation of surface phraseology over time and space, because of the endurance of a cultural theme -- in this case, that of sin, guilt, in a word, "sculduggery."

NOTES

1 This is a revised version of a paper presented at the Annual Meeting of the Philological Association of the Pacific Coast, at San Jose State University, November 1990.

2 An anonymous (with good reason) work entitled *Why Do We Say It? The Stories Behind the Words, Expressions and Cliches We Use* (Secaucus: Castle, 1985), which does not deserve to be listed under "Works Cited." My only excuse for owning it is that I bought it sight unseen; the author's only possible excuse for writing it is as a test of his readers' gullibility.

3 Both these types of nominal compound formation are quite uncommon, but the second is considerably more uncommon than the first. In the data I have collected for nominal compounds in Canadian English, 82 (.013%) items out of a grand total of 6,274 have the form Noun + Gerund, and only 5 have the form Noun + Participle; two of these are borrowed directly from French, and none has the suffix *-ery*.

4 Definitions and etymologies, unless otherwise stated, are from *The Oxford Dictionary of English Etymology* (DEE), and reconstructed Indo-European roots are from *The American Heritage Dictionary* (AHD).

5 James Arthurs, p.c., June 9, 1989.

6 This is, of course, the same verb root that turns up in the preterite-present modals, e.g. Eng. *shall*, having not only a predictive sense as in 'I shall', but retaining the original mandative sense in 'I should,' 'he shall,' etc.

7   This last, given the Scandinavian influence on the phonology of the northern dialects, could also
     have contributed to the development of our word, since one who has been 'render[ed] liable to
     punishment' has undoubtedly committed some form of sculduggery.

8   Old English does not use cognates of the *skl- forms in the Paternoster, but rather two other
     items from an unknown source (DEE), *gyltas* and *gyltendum*. But is it beyond the realm of pos-
     sibility that generations of illiterate speakers gabbling their prayers could have produced the
     slight changes needed to go from *skyld* (which, after all, meant 'guilt' in OE) to *gylt*? The sound
     changes involved are typical of those made by young children (cp. /tap/ for *stop*), and an
     increasing number of psycholinguists consider that it is children who are the real innovators of
     language change (p.c. Ron Hoppe, 10 October, 1990).

9   This version came from a locket in the possession of one of my students. Neither she nor any
     of her family knew exactly where it was from; another student tentatively identified it as a dia-
     lect of Danish, while yet another source, a retired linguist, decreed it to be an archaic form of
     Norwegian. The whole prayer reads as follows; the spelling and punctuation are exactly as
     they appeared on the locket and the slashes indicate the ends of lines (it was engraved as if
     poetry):

          FADAR VAR!/ Du som er I himmelen!/ Helliget vorde ditt navn:/ Komme dit
          rike;/ Ske din vilje som I himmelen,/ Sa og pa jorden. Giv oss idag vart daglige
          brod./ Og forlat oss var skyld,/ Som vi og forlater vare skyldnere og led oss/
          Ikke inni fristelse men fri oss fra det onde,/ For ditt er riket,/ Makten og aeren
          ievighet. Amen.

     Roslyn Raney (p.c., June 24, 1989), after identifying some spellings as typically Norwegian
     and others as more likely Danish, says, "If I had to guess, I'd say the text is *Riksmal* or Dano-
     Norwegian from the late 19th/early 20th century." Paul Hopkins remarks (p.c., July 22, 1991)
     that after some further investigation, he feels that it is Norwegian *Bokmål* (previously known
     as *Riksmål* or, before WW 2, *Riksmaal*) of a fairly recent date (viz. *vare* [= *våre*] for *vore*), and
     further that the locket was perhaps produced in North America, possibly engraved by a non-
     Scandinavian speaker; this deduction is based on the lack of diacritics and some outright errors
     in spelling (e.g. ditt vs. dit). I would add that the locket's provenance and the design on the
     front (a ship in full sail) provide further evidence for P.H.'s conclusion.

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THE GODDESS AND THE HORSEMEN
A discussion of the origins of the Greek Language

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1. THE ORIGINS OF THE GREEK LANGUAGE

> In Classical times, it was believed by many that the Hellenes had originated with
> Hellen. That meant that the Greeks had been around longer than anyone else, for
> Hellen was the firstborn son of Deucalion and Pyrrha, the parents of all man-
> kind...to ancient scholars the story symbolized the larger truth that the Greeks had
> lived in Greece since earliest times (Drews, 1988: 3)

In the discussion to follow, two basic questions concerning the origins of the Greek language will be addressed: (1) who were the original speakers of the language which is now referred to as Greek, and (2) how did their language come to dominate and/or characterize a particular region and people. An examination of some of the issues surrounding the origins and movements of the (Proto) Indo-Europeans, emphasizing the coming of the Greeks to Greece - will address the first question. Other issues to be considered will include the re-evaluation of traditional theories which have envisioned the spread of the Indo-European (and Greek) languages as an essentially histori-cally unprecedented "Volkswanderung", or mass migration - an idea which will be seen to rest on questionable scholarly presuppositions concerning the Aryan race (Drews, 1988, Eisler, 1987).

It will be argued that a more plausible explanation for the development of the Indo-European languages from a (hypothetical) proto-language (i.e. Proto-Indo-European, or PIE) may be derived from processes both attested to in records of the period, and having analogues throughout history. These processes will be seen to include small scale immigration and/or military takeovers. The lin-guistic and archaeological evidence presented will demonstrate that the coming of the Greeks to Greece may best be characterized in terms of military conquest (or "takeover" in the terms of Drews, 1988) by a relatively small number of warrior kings, who by virtue of their superiority in chariot warfare were able to impose their language and/or culture on the pre-Greek Minoan civili-zation.

The divergence of the Greek language from the proto-language (PIE) to become a language distinct from its "sister" languages (i.e. Sanskrit, Latin, etc.) will also be reconsidered in light of the often ignored linguistic evidence of a pre-Greek influence on Linear B and Mycenaean Greek [see Chadwick and Baumbach, 1963]. Finally, the implications of this neglect, which has persisted despite growing archaeological and linguistic evidence indicating the existence of an advanced civi-lization in Greece on the islands of Crete and Thera, whose decline appears to coincide with the coming of the Greeks to Greece, ca. 1600 B.C. (Drews, 1988; Eiser, 1987; Gimbutas, 1989), will be examined. The relevance of this discussion to the field of linguistics in general, and to historical linguistics in particular, lies in the challenge it presents to the implicit assumption of language

spread as something separate from the movement of its speakers. In addition, this paper will attempt to shed light on the frequently ethnocentric, racist and/or patriarchal Western foundations upon which much of contemporary historical linguistic theory appears to have been built.

2. The origins of the Indo-Europeans: Chariots & kings

It is interesting to note that whereas early Indo-Europeanists such as Franz Bopp (in 1833) tended to locate the Indo-European homeland in southern regions, such as Afganistan, based on analysis of shared IE words for certain flora and fauna (e.g. "bear" and "beech tree") native to that region of the temperate zone [see Drews, 1988: 4], the rise of European nationalism at the turn of the century brought with it a parallel shift in theories concerning the origins of the Proto-Indo-Europeans (PIEs). Perhaps to fill a personal desire for an auspicious ancestry [see Drews (1988) and Mallory (1989)], the predominately Northern European linguists began to propose a Northern European homeland for the "Aryan race". The questionable origins of such hypotheses can best be exemplified by the work of Poesche, who:

> ...convinced that the original Indo-Europeans were an exceptionally white race, surveyed the world to find a place where albinism, or depigmentation, is pronounced. The place he found was the Pripet Marshes, or the Rokitno swamp, between the Pripet, the Dnieper and the Beresina rivers [in eastern Poland and Western Russia] (Drews, 1988: 26).

The cumulative effect of such unchallenged racist assumptions led to conclusions such as "nothing Indo-European could have been indigenous to Asia Minor" being simply assumed by all scholars; and, arguably, to the Third Reich's ideology concerning a (Germanic) Aryan master-race (Drews, 1988). Other allegedly biologically-based theories linking linguistic and racial characteristics include observations concerning the "racial affinities" of the Hittites and the Indo-Europeans (e.g. prominent noses) leading to the conclusion that "if the Hittites were Indo-European, at some time and place, the Hittite nation must have invaded Asia Minor" (p. 53). Given their obvious shortcomings, if not complete fallacy, it is surprising that the influence of these beliefs can be seen to persist throughout the literature, most notably in the continued adherence to the theory of the movement of the Proto-Indo-Europeans in a "Volkswanderung":

> Meyer, Beloch and Breasted imagined it as a massive movement of pastoralists, and in many quarters that's how it is imagined today: a large, disadvantaged (and probably dispossessed) nation on the move, coming from the pasture lands of the Eurasian steppe, descends into the Balkan peninsula and makes the place Greek (Drews, p. 6).

Breasted's description (cited in Drews, p. 46) of the break-up of the "great white race" also provides evidence of ethnocentrism. He states:

> ...divided into numerous tribes, they wandered at will, seeking pastures for their flocks...They were the most gifted and the most highly imaginative people of the ancient world.

That this wonderfully romantic image holds considerable emotional appeal to those who would be the linguistic descendants of such Northern European Aryans (i.e. the majority of Indo-Europeanists) presumably accounts for its persistent popularity.

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Based on the assumption by early archaeologists that changes in the pottery style of a particular community could be taken as indication of cultural (and/or linguistic) change, archaeological research initially appeared to support the "Volkswanderung" hypothesis. However, as noted by Drews (1988) and others (i.e. Eisler, 1987; Gimbutas, 1989; Mallory, 1989), this type of extrapolation, based on essentially technical variations, is now considered by many to be an unstable foundation for meaningful reconstructions[1] Thus, in the case of the Indo-Europeans, there is a much higher probability (if we consider the historical precedents to be elaborated below) invading barbarians would tended to have acquired such mundane necessities of life as pots from the locale through which they were travelling, rather than transporting large amounts of clay pottery with them across considerable distances [see Drews, 1988; Eisler, 1987]. When the inadequacies of the use of pottery for historic dating became apparent (with the advent of Carbon-14 dating), and a number of researchers redirected their focus to non-pottery archaeological evidence, they discovered an apparent relationship between the domestication of the horse, the development and perfection of the light horse chariot, and the spread of the (Proto) Indo-Europeans and the Indo-European languages (i.e. Drews, 1988; Gamkrelidze and Ivanov, 1990; Gimbutas, 1989; Mallory, 1989).

As will become apparent in the discussion to follow, the superiority of "Horse and Chariot"-oriented theories over the "Volkswanderung" (pastoral) theories can be seen in their ability to tie together both linguistic and archaeological research, in addition to proposing (with varying degrees of success) specific mechanisms for such language spread. For example, proponents of the former theory have been credited with bringing into doubt the "Northern homeland" hypotheses, as the result of a complete lack of evidence of horses (domesticated or otherwise) in Northern Europe until after the era in question [see Drews, 1988; Mallory, 1989]. One advocate of the "Horse and Chariot" theory, Drews (1988), completely discredits arguments concerning a Volkswanderung by arguing that such an influx is nowhere attested to in the records of regions wherein linguistic evidence of "Indo-Europeans" has been found (e.g. proper names, etc.). He notes that the scribes who apparently "overlooked" the arrival of masses of Indo-Europeans (i.e. evidence of a Volkswanderung) did mention the rare instances of "nations on the move", such as the Doric migrations in Greece. Drews also points out that what *is* frequently commented upon in the ancient texts, however, are the more mundane human dynamics of (1) immigration from less prosperous, or less civilized, areas to more urban areas, and/or (2) the chaos caused by upstart military leaders, whose resulting military games were played out on living chessboards (Drews, 1988; Eisler, 1987; Gimbutas, 1989). To back his claims, Drews cites Mesopotamian documents that record incidents of barbarian harassment, which the scribes characterize as "harassment by would-be Great Kings" (Drews, 1988).

An important distinction in the definition of processes of language spread is also made by Drews when he distinguishes "immigration" from "takeovers" and/or "pious atrocities". He defines "takeovers" as "coups d'état", in which a relatively small military group disposes of the incumbent ruler, and thereafter assumes for itself the position of governing body. "Takeovers" differ from "pious atrocities" of Great Kings insofar as the latter may result in the complete destruction of city states that do not acknowledge the Great King's overlordship (i.e. by plunder, pillage, burning, etc.). Thus, while "pious atrocities" might result in genocide, and hence "language death" (in its most literal sense), they would not be responsible for language change per se. The dynamics and linguistic repercussions of "takeovers", however, could be quite different. While a "takeover" might show comparatively minor impact on the native population (in terms of death and destruction), a stronger influence could very well be felt in terms of linguistic change. For example, the

language of the "conquerers" could become dominant at administrative levels - historical examples of which can be found in the status of Latin as the language of administration in the Roman Empire, the prestige of French as the language of the court after the Norman invasion of England, the spread of the "colonial languages", and (arguably) most recently, the status of English as the international language of business in the wake of American economic domination after World War II. Although the possible causes of such language status changes are numerous, it may be argued that simple expediency may often play a influential role: i.e. if the majority of the new "administrators" is not fluent in, or completely ignorant of, the language of the general populace, business would tend to be conducted in the language in which they were the most comfortable: "He who has the biggest sword (makes the) rules"! Furthermore, if the conquerers brought with them - and for reasons of interest or intimidation the "natives" adopted - new gods and/or technology, another mode of language transfer and/or mixing could occur with the adoption of lexicon, phraseology, and ideology from the incoming superstrate as a result of language being transferred/learnt in the context of stories, beliefs, etc. In addition, while the native, or "substrate", language would tend to be more conservative with respect to syntactic and morphological features, phonological change would be expected as the result of the substrate (indigenous) speakers imposing their native phonological system on the new language.

The impact of the language contact would also be mediated by temporal considerations. For example, if the foreigners were in power for only a short period as a result of not being liked by, or not having assimilated to, the native population, presumably all that would remain to mark their presence would be mention in records and/or descendents bearing foreign proper names. Both the former and latter are attested to the ancient texts (Drews, 1988). The ancient texts cited by Drews (1988) also detail the sixteenth century B.C. conquests by "Hyksos" (Egyptian: lit. "foreign chiefs") and "Amorites" (Akkadian: amurru, lit. "westerners"). Such references may be offered as evidence of a sudden influx of foreign (i.e. Proto-Indo-European) military - especially since the Hyksos, who were responsible for the conquest of Egypt, appear to have been a *heterogeneous* group of asiatics, whose superiority in chariot warfare won them, collectively, a considerable kingdom.

Chronologically, the linguistic evidence for "takeovers" (as opposed to a "Volkswanderung") can be summarized in the data cited below: (1) an absence of any records bearing Aryan names in 1800 B.C., (2) by 1500 B.C., Aryan kings are shown to be in control of a great number of city states, (3) by 1400 B.C. Aryan no longer appears to be a dominant language in many of the countries (Drews, 1988). Additional information concerning the rise of the Indo-Europeans based on military power (rather than the inundation by numbers) comes from texts citing Palestinian and Syrian cities controlled by men with Hurrian and Aryan names *in the palace and armies*; in contrast to a general population in which 90% of the names were Semitic. If had there in fact been "Volkswanderung", foreign or immigrant names would be expected to be represented cross-occupationally, and/or socio-economically. The frequent citing of the warrior class, the "maryannu" [plural in Skt: "marya" - young warrior; see also the Skt word for "stallion" - "açva, marya"] throughout the Indo-European invaded areas, has also been interpreted as indicative of the superiority of the barbarians (Indo-Europeans) in the art of warfare.

Drews comments (p.153):

All the Indo-European movements of the Bronze Age that we know about are take-
overs, date no earlier than ca. 1600 BC, and are associated with chariot war-

fare...in short, mastery of chariot warfare explains sufficiently and cogently what the PIE speakers (and their charioteering neighbours) were able to do in the middle of the second millenium BC [i.e. conquer the known world], and why they did it.

The pervasiveness of the Indo-European horse terminology - in reference to the animal itself, as well as related motifs - can be seen throughout the Indo-European languages [from Buck, 1988: 164]:

	Horse	Stallion	Gelding	Mare	Colt/Foal
Grk:	ιππος	ιππος οχειον	ιππος εκτεμνομενος	ιππ ος	πωλος
	[ippos]	[ippos, ocheion o (masc)]	[ippos ektemnomenos]	[ippos, i (fem)]	[polos]
NGrk:	αλογο	βαρβατο αλογο	αλογο μουνουχισμενο	φο παθα	πουλαρι
	[alogho]	[varvato alogho, ati]	[alogho mounouchi- smeno]	[fopatha]	[poulari]
Lat:	equus	(equus) admissārius	cantērius	equa	pullus
It:	cavallo	stallone	cavallo castrato	cavalla	puledro
Fr:	cheval	étalon	hongre	jument	poulain
Sp:	caballo	caballo padre	caballo castrado	yequa	potro
Rum:	cal	armăsar	jugan	iapă	mînz
Skt:	açva-, haya-	açva-, marya-	------	açva-, vadaba-	kiçora-
OE:	hors, mearh	stēda	hengest	mere (myre)	fola, colt
ME:	hors	stalon	geldyng	mere	fole, colte
*IE:	*ekwo-				

Perhaps the most persuasive support for a Proto-Indo-European (or PIE) strength based on superiority in chariot warfare comes from the *Kikkuli*. This text records in intricate detail the horse training program as set down by the master horsetrainer, Kikkuli. Although the version

that survived the millennia is written in Hittite, its inclusion of Aryan glosses suggests the glossed terms to be "traditional and venerable terms" borrowed from the original source language (Drews, 1988: 140). The Hittite text presents an instruction in Hittite terms, and then for good measure adds the Aryan "technical term": "he (the trainer) lets them trot for half a danna and twenty iku (two and a half miles), and then gallops them for another twenty iku, which is the *aika vartanna* [lit. "one turn" in Aryan]" (p. 140).

In addition to the linguistic data cited above, the "vehicles" of language transfer (i.e. discourse/pragmatic considerations) should also be examined. It is apparent that the (Proto) Indo-Europeans would have brought with them not only a language - but also an ideology and theology based on their cultural relationship with horses [i.e. the patriarchial "Horse Cult" - see Drews, 1988; Eisler, 1987; D'Eaubonne, 1976; Gimbutas, 1989; Mallory, 1989; Martin, 1987; Nilsson, 1932]. The Aryan term "marya" cited above [lit. "charioteer", or "chariot fighter"], became the Egyptian and Akkadian "maryannu", or warrior class. The root, "marya-", was also maintained in Sanskrit to signify both "young man", and also "stallion" [a analogy persisting in Western culture]. In Greek, the derived term μεραs [meras] can denote either "girl" or "boy".

Drews (1988: 150) cites Aryan personal names and army positions to support the theory of the Horse Cult's military orientation, and superiority based on the horse, and the light horse chariot. In the records concerning the "greatest of Great kings of Mitanni" (predominately Amorites - ca. 2000-1700 B.C.), the following names are found:

Tushratta: [lit. "having the chariot of terror"](also cited as sending greetings to his
Pharoah *and his horses*)
Bardashwa (from Nuzi): [lit. "possessing great horses"]
Biridashwa (prince of Yanuamma): [lit. "he who owns a grown horse"]
Zurata (prince of Accho): [lit. "one who owns a good chariot"]

In addition to the equestrian terminology mentioned previously, the earliest recorded "Greek" texts (e.g. Mycenaean Linear B accounting tablets ca. 1500-1250 B.C.; and the Homeric epics ca. 800 B.C.) include terms for the parts of the chariot derived from an "IE technical vocabulary" [see Buck, 1988; Drews, 1988]. These words include: the Greek words for wheel, yoke, axle, and those specific to a light, spoke-wheeled cart (i.e. one that a horse could pull): spoke, felloe, nave, cab, rail, and the parts and whole of the carriage and chariot itself (Drews, p. 170). Furthermore, the religious and/or ideological systems of the early Indo-European cultures show considerable consistency cross-culturally (and cross-linguistically) in the dominance of the Horse motif. For example, the Vedic ritual known as Ashvamedha [*PIE: ash-wash = horse] parallels the early Roman ritual of the October horse, in which a chariot race (with two horses) was run, with the right-side horse of the winning team being sacrificed to the gods. In addition, the ancient Greek religion is rife with equestrian and warrior symbolism: e.g. the winged horse, Pegasus; the glorification of war [personified by the god, Zeus, who frequently assumes the *shape of a stallion* to visit earth, and whose domination is based on (meta)physical strength]; Zeus' daughter, Athena (whose pre-Greek origins will be discussed later), goddess of both wisdom and war; and, the two-horse chariot "twin" analogy [e.g. also seen in the Roman stories of Romulus and Remis (founders of Rome), the Biblical Cain and Abel, etc.] (Drews, 1988; Eisler, 1987; Grant, 1987; Mallory, 1989; Martin, 1987; Nilsson, 1932; Shipp, 1979).[2]

On the connection between the development of the light horse chariot and the "coming of the Greeks to Greece", it is generally agreed:

> that the chariot, however used, was of central importance in Late Helladic Greece [ca. 1600 B.C.] is obvious. Less obvious is the link between the arrival of the chari- ot in Greece and the arrival of PIE. The language and the vehicle arrived together (Drews, 1988:24).

Archaeological support for the coming of the Greeks as a form of military "takeover" based on chariot warfare centers primarily on the "shaft graves" at Mycenae (in the Argolid). Excavations have found the earliest of these graves (ca. 1600 B.C.) to contain only the skeletons of very large men [i.e. foreigners: racially different from the indigenous population]. Later graves, dating from the mid-sixteenth century (ca. 1500 B.C.), were, by contrast, found to contain over four hundred gifts for the dead - including gifts of substances and/or designs not native to the Mycenaean region such as amber from the Baltic, and death masks and other religious artifacts most closely resembling those of the distant "Kurgan culture" of southern Russia (Drews, 1988; Gimbutas, 1989; Mallory, 1989; Van Royen and Isaac, 1979). These findings have also been interpreted as indicating strong ties between the rulers of such distant regions as the Steppes and Mesopotamia - as would be expected if the (Proto) Indo-European Hyksos, Amorites, and other "barbarian kings-by-takeovers" were, literally, related to each other.

Further support for the "takeover" hypothesis comes from the lack of evidence of any major power in the region of Mycenae prior to the sixteenth century ascendency of the Myceneans (i.e. coinciding with the arrival of the Greeks), in contrast to the overwhelming evidence of a sophisticated, non-militant Minoan civilization which thrived in the islands from ca. 2500 B.C. (no signs of fortifications have yet been found on either Crete or Thera). Based on such evidence, the "coming of the Greeks to Greece" appears remarkably similar to the "takeovers", within a few generations of the perfection of the light chariot ca. mid 17th century B.C., of North West India by the Aryans, southern Mesopotamia by the Kassites, Egypt by the Hyksos, Mitanni by the Aryans, and the small Levantine states by Aryan and Hurrian maryannu. In other words:

> If one dates the arrival of the Greeks in Greece to the beginning of the (fifteenth/ sixteenth centuries) one tends to picture the first Greeks as warriors rather than herdsman. And instead of a massive Volkswanderung, what comes to mind is a conquest of the indigeneous population by a relatively small number of intruders (Drews, p. 24).

This version of the arrival of the Greeks also seems to best account for the total absence of Greek legends concerning the "coming of Greeks in Greece" - in direct contrast to the "arrival stories" seen in India, as well as other Indo-European regions [see Drews, 1988; Mallory, 1989]. As will be discussed below, the lack of an "arrival story" agrees with the archaeological evidence indicating that when the (Proto) Indo-Europeans descended on the Grecian peninsula ca. 1600 B.C., they found it to be already occupied.

3. The Pre-Greeks: the Minoan Civilization

The existence of the "pre-Greeks", or the non-Indo-European Minoan civilization, long hinted in the myths and artifacts, yet long ignored by scholars, has been revealed primarily through the

excavations at Knossos (on the island of Crete), and at the site of Akrotiri (on the island of Thera, or Santorini). These excavations have left little doubt that the "Minoans" had not only a high level of technical expertise as evidenced by sophisticated multi-level architecture, paved roads, etc. - but also provided evidence of literacy in the form of the non-Indo-European Minoan Linear A script and the Phaestos disk [see Eisler, 1987]. Although beyond the scope of this paper - as little research appears to have been done in this area - a brief comment should be made concerning apparent similarities between Linear A script and the "language of the Goddess" illustrated and discussed by Marija Gimbutas. Gimbutas (1989), while exhaustively cataloguing what had previously been marginalized as "geometric designs" on artifacts dating from the Paleolithic era (ca. 6500 B.C.) onwards, became aware of a systematic and consistent use of specific patterns by followers of the Earth Goddess religion in Greece, as well as Her followers throughout the continent; although the Minoan civilization appears to have been one of the last surviving non- patriarchal societies. The author argues persuasively that the "geometric designs" represent an ideographic, or pictographic, script [in constrast to the Phonecian-type alphabet (which arrived in Greece at a considerably later date [for a study of the archaic scripts of Greece (ca. 800 B.C - 450 B.C) - see Jeffery, 1990]). These similarities between her "goddess language" and the ideographic script found on the Phaestos disk and in Minoan Linear A script are very intriguing, and beg further investigation [for additional discussion concerning evidence of wide-spread non-patriarchal civilizations pre-dating the PIE expansion, see D'Eaubonne, 1976; Eisler, 1987; Gimbutas, 1989; Walsh, 1981].

Literary and linguistic evidence of the cultural and ideological influence of the Minoans on the development of both the Greek language and Greek culture manifests itself on many different levels, some more subtle than others. For example, the need for the institution of a reversal of belief systems by the invaders resulted in historical (and other forms of) revisionism. Dating from coming of the Greeks, this can be found in the earliest reconstructed "history" of the "Heroic Ages". Based on recent research, it now appears that the "Heroic Ages" were, in actuality, a "dark age" lasting from approximately 1700 B.C. to 1400 B.C.; and, thus coinciding with the arrival of the PIEs and the decline/destruction of the Minoan civilization (Eisler, 1987).

One particularly transparent and symbolic myth (myths being a traditional conduit of oral history) recalls the slaying of the serpent Pyrhha, at Delphi, by Zeus, who thereupon became the most powerful of the gods of Olympus (Eisler, 1987; Nilsson, 1932). Given that the snake (serpent) was a symbol of good and wisdom in the Minoan (and other Earth Goddess) religions, it should not seem surprising that the (PIE) invaders' version of the conflict came to dominate. In fact, much of this symbolism (of the feminine associated symbols as evil) persists: e.g. in the Biblical story of Eve (and the serpent). The ancient Greek and contemporary symbols of the medical profession, however, hark back to the reverence of an earlier time. As the site of Delphi (famous from pre-Greek times for its *female*, prophetic oracles) was also sacred to the Minoans, it becomes apparent that the "killing of the snake" represents the overthrow of the Old Religion. Myths concerning the "Amazons" (warrior women) have also been interpreted as evidence of continued opposition to the "New Order" brought by the PIE Horse Cult. As can be attested to throughout history [see Eisler, 1987] , overcoming opposition to a new rule is facilitated by the adaptation (or co-opting) of the symbolism of the opposing group [e.g. the pagan accoutrements of Christmas: the yule log, holly and ivy, etc.]. Manipulation of Goddess symbols by the newcomers (i.e. induced semantic shift) can also be seen in the reversal of the denotation of "black", from fertile (symbolizing the life-giving soil = good), and "white" (the color of (dead) bones = bad, evil), to the opposite meaning in Western culture (Eisler, 1987; Gimbutas, 1989). In fact, the so-called "Greek" Pantheon appears replete

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with borrowed Minoan concepts and terminology, including the home of the Gods, Mt. Olympus, and arguably, Zeus himself. Commenting on the origins of the latter, Grant (1987) suggests that in the Minoan Pantheon, Zeus was probably only a minor weather deity in control of lightning and thunder, etc., whose home, not surprisingly, was found in a high place, such as a mountain (a Minoan "olympus"). The role of a god whose power was one of flash, noise, and destruction would understandably not have been as prominent in a religion focussed on the cycle of life and nurturing (i.e. the Goddess religion), as it would in a belief system glorifying the prowess of the warrior (i.e. the Horse Cult).

Other Minoan loan words include the following place names:

Mukĕnai: "Mycenae" [Baldi, 1983: 67]
Athĕnai: "Athena" (i.e. Athens; and/or goddess, Athena) [ibid]
Olympus: "mountain" [Nilsson, 1932: 236]
Ida: "forest-clad mountain" [ibid]

In a paper entitled "Homeric $\alpha\nu\theta os$" [anthos], in Chadwick and Baumbach's discussion of Mycenaean Greek and Linear B (1963: 271-278), J. M. Aitchison provides - albeit unintentionally - additional evidence of the influence of Minoan on the development of the Greek language. In Aitchison's questioning of the traditional interpretation of $\alpha\nu\theta os$ [anthos] as "flower", we note the similarities between $\alpha\nu\theta os$ and the above cited Minoan word "Athĕnai", the name of the goddess after whom the city of Athens was named, and who has been identified as the pre-Indo-European Earth/fertility Goddess (see Eisler, 1987). The proposed relationship between $\alpha\nu\theta os$ and Minoan "Athĕnai" is based on Aitchison's disagreement with the traditional definition of the "word (and its derivatives)...(having)..to be regarded as metaphorical in at least six of the contexts in which it occurs" (p. 271). He proposes that a more "natural meaning" for $\alpha\nu\theta os$ based on analysis of the contexts in which it is found, is "upward, visible growth" (p. 272). This interpretation agrees with other "earth/fertility goddess" connotations to be found in adjectives derived from $\alpha\nu\theta os$ which the author cites to support the meaning "growth". Aitchison offers the following examples (p. 273):

$\epsilon\nu\alpha\nu\theta\eta s$ [enanthis]: "well-growing"
$\beta\alpha\theta\iota\alpha$ [bathia]: "thickly growing"
$\alpha\nu\iota\nu o\theta\epsilon$ [aninothe]: "spring forth, rise upwards"

This term also appears as a medical term, $\alpha\nu\theta\iota$ $\pi\rho o\sigma o\pi\upsilon$ [anthi prosopou]: "breaking out, rash, eruption".

Aitchison also comments on an apparent connection between $\alpha\nu\theta os$ and the Greek Pantheon. He states (p. 275):

Underlying the twelve Olympians was the primitive (sic) worship of the fertility of Nature: this mysterious productive power is ascribed generally to Demeter or Gē, but also to others. Several gods were worshipped under cult names derived from ανθος; these cults seem to have been connected with vegetation in general, rather than with flowers alone.

It is therefore curious that despite the additional evidence the author himself presents, he seems unable to acknowledge the obvious relationship between the origins of the term ανθος and the fertility cults. While noting (p. 276) the use of ανθεα [anthea] in reference to the goddesses (rather than gods) Hera (Ανθεα ι Ηρα [anthea i Hera]), and Aphrodite (ανθεα Αφροδητε [anthea Aphrodite]) - and even going so far as to cite Welcker's theory that Hera was "originally an earth goddess" and that "she was...undoubtably connected with growth and fertility... (since)...ears of corn were called ανθεα Ηερης, [anthea Heris], Aitchison balks - stating that such theories have "met with strong opposition" (p. 276). It is thus ironic that Aitchison, having reviewed the etymological theories on the origins of ανθος., yet unable to accept a Minoan contribution to Greek, bemoans the "absence of convincing cognates in other IE languages" (p. 277)!

4. A brief sketch of the development of the Ancient Greek dialects

On the development of the Greek language, it has been commented:

> the evidence of the Greek dialects and their distribution points to a rather late date, say around 1400, for the introduction of Greek speech to the Peloponese....Greeks were in Thessaly before they appeared in the Peloponese, but...we have no linguistic evidence for Greek speech in any part of Greece prior to 1600 B.C. (Drews, 1988: 38).

A number of theories have been forwarded concerning the development of the Greek language from Proto-Indo-European - a summary of which may be found in the Appendix. One of the earliest theories, based on the "Volkswanderung" hypothesis of the movement of the PIEs, was the "wave theory" proposed by Caskey [1952 - cited in Drews, 1988] to account for the Ancient Greek dialects. According to Caskey, each dialect represents the arrival of a new wave of (PIE) immigrants. This theory was mainly disproved by Porzig [1954 - cited in Drews, 1988] when he showed that Caskey's "first wave dialect", Ionic, was not the most ancient Greek dialect, and that Ionic and Arcado-Cypriote were both descended from a common "East Greek" (Drews, p. 38).

Risch [1955 - cited in Drews, p. 39], elaborating on Porzig's ideas, proposed the existence in the Late Helladic period (ca. 1400 B.C.) of two dialects: one in the Mycenaean South (i.e. central Greece, the Peloponese, and Crete - roughly equivalent to Porzig's "East Greek"), and the other in the North (i.e. North Greek in Boeotia). Of particular interest to the reader, however, should be the mechanisms Risch suggests to account for the creation of dialectal differences. First, he suggests a divergence of dialects from a common Proto-Greek that evolved in Greece, rather than Porzig's waves of (non-native) immigrants. In addition, the sociolinguistic processes the author invokes to explain these variations are thought-provoking. He suggests that the Ionic dialect emerged when the socio-economic climate was such that the speakers of South Greek came under influence (or dominance) of North Greek speakers, resulting in a status shift lending prestige to the latter dialect; and therefore encouraging South Greek speakers to adopt characteristics of

North Greek into their speech, presumably to facilitate social advancement. His finding that the South Greek Arcado-Cypriote dialects were more conservative may also be accounted for by Risch's theory for the following reasons. Since the Cypriots lived at a considerable distance from the North Greek strongholds, they would have been under less direct control (and/or influence) of the North Greeks.

Risch proposes a similar explanation for the Aeolic dialects, which date to ca. 1200 B.C., and are believed to represent the last of the Mycenean Greek languages [encoded in Linear B script - see Chadwick and Baumbach, 1963], with one variation. In the case of Aeolic, he suggests a North substrate was overlaid by a South Greek superstrate when the South became dominant, with North-West Greek and Doric preserving more North Greek characteristics. Risch thus hypothesizes that both dialects had arisen from Proto-Greek, in Greece, and as a result of a "language spread over a geographical area too large and politically divided to be linguistically unified" (Drews, p. 39). The contribution of such an analysis of the development of the Greek dialects to historical linguistics is that it begins to capture, or attempt to account for, the complexity of the human processes involved in language change - as does the more recent "takeover" hypothesis (e.g. Drews, 1989). All of which appears to support the benefit of interdisciplinary approachs (in this case, linguistic and archaeological) to comprehensive language reconstructions.

Drews (p. 40) identifies the crux of the problem in the following quotation:

> Today many linguists are quite aware that linguistic change has not always proceeded at a glacial pace. In preliterate societies, language may change rather rapidly: literature has a conservative influence upon both vocabulary and grammar, and a people without literature might be relatively uninhibited in its linguistic innovation. Arabic, for example, has changed less in thirteen hundred years than some nonliterary languages have changed in the last two centuries. It is quite certain that the rate of linguistic change for Greek was far more rapid before Homer's time than after. The same may have been true for Sanskrit before and after the Vedas were composed.

In societies in chaos, as appears to have been the case in "Greece" upon the arrival of the "Greeks", the loss of literacy and the conflict of ideologies (among others) may easily have resulted in such rapid change as suggested in the quotation above.

5. Conclusions: The Goddess and the Horsemen

In this paper, two basic questions concerning the origins of the Greek language were considered: (1) who were the original speakers of the language which is now referred to as Greek, and (2) how did their language come to dominate and/or characterize a particular region and people. The result of the examination of some of the issues surrounding the origins and movements of the (Proto) Indo-Europeans and the coming of the Greeks to Greece appears to be supportive of the "Horse and Chariot" theories of language spread, and a rejection of the "Volkswanderung" as insufficient to account for the linguistic and archaeological research findings. In addition, the proposed "Volkswanderung", or mass migration, was seen to rest on questionable scholarly presuppositions concerning the Aryan race (Drews, 1988, Eisler, 1987). It has thus been concluded that the search for an explanation for the development of the Indo-European languages from Proto-Indo-European should focus on processes both attested to in records of the period, and having analogues

throughout history (i.e. small scale immigration and/or military takeovers). In conclusion, the linguistic and archaeological evidence appears to strongly suggest that the "coming of the Greeks to Greece" may best be characterized as a military conquest (or "takeover" in the terms of Drews, 1988) by a relatively small number of warrior kings, who by virtue of their superiority in chariot warfare were able to impose much of their language and/or culture on the non-Greek Minoan civilization, although vestiges of the latter remain.

NOTES

1 For comparison, consider attempting to pair the technical changes of the last decade (computer chips, etc.) with the migration/movement of a particular group of people.

2 Although a discussion of the ego- and/or ethnocentrism implicit in the denigration of ancient religions to the status of "cults" and/or "mythology" (i.e. fairy tales) is beyond the scope of this paper, these problems may be recognized as deriving from the same form of theoretical (and/or ideological) bias that led to the "Northern homeland" hypotheses examined earlier.

APPENDIX

Some of the linguistic differences between the East (or Risch's South) and West (Risch's North) dialects are summarized below (from Baldi, 1983: 68-70) [for further discussion of the Ancient Greek dialects, see Bubenik, 1983; Grant, 1987; Nagy, 1970; Williams, 1983]:

[A] Ancient Greek dialects
East/South Greek Dialects

1.   Attic-Ionic: "ē" vs West/North "ā" $< {}^*$ā, cf. mētēr, Doric mātēr - "mother"

2.   Attic dialect: or "koinē"- became dominant (as a result of ascendency of Athens)

3.   Ionic

4.   Aeolic: Lesbos, Thessaly, Boetia

5.   Arcado-Cyprian: "in" for Attic-Ionic "en"

West/North Greek
Characterized by:

●   "ē" not "ē" (as above)

●   retention of intervocalic t (not s, cf. Cretan portí, protí)

●   articles toí, taí not hoi, hai

Dialects:

1.   Northwest Greek: Delphian, Locrian, Elean

2.   Doric: Laconian, Heraclean, Megarian Corinthian, Argolic, Rhodian, Coan, Theran, Cyre-
        naean, Cretan, Sicilian Doric

[B] **Classical Greek**

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Consonants:         p       t       k
                    b       d       b
                    ph      th      kh
                    m       n
                            s
                            l
                            r
Vowels:             i               u
                    e               o
                            a
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Ablaut: qualitative
        e.g. pémai "fly": pot-é"flight": e-pt-ómen "flew"
             dérk-o-mai "see": dé-dork-a "saw": édrak-on "saw"
        quantitative
        e.g. patēr "father" (nom. sg): patéres (nom. pl.): patrós (gen.sg.)
             kúōn "dog" (nom. sg.): kunós (gen. sg.)
Breathings: smooth (')
            rough  (·) <IE *s: Lat. sex. Gk. héks "six"
Morphology: Cases: nominative, genitive, dative, accusative, vocative
            Genders: masculine, feminine, neuter
            Numbers: singular, plural, dual
            Noun declensions: ā-declension [oikí-ā "house"]
                              o-declension [lóg-os  "word"]
                              consonantal declension [phúlak-s "watchman"]
            Verb: voices (active, passive, middle)
                  moods (indicative, subjunctive, optative, imperative)
                  tense (present, imperfect, future, aorist, perfect,
                         pluperfect, future perfect)
Basic Word Order: SVO
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LARYNGOGRAPHIC ANALYSIS OF PHONATION IN KOREAN CONSONANT-VOWEL SEQUENCES

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1. LARYNGOGRAPHIC ANALYSIS

1.1. Manner of Articulation in Korean

Perceptual tests of Korean CV syllable sequences (Esling, 1988) indicate that information carried by vowel quality alone can be sufficient to identify whether the manner of articulation of a preceding consonant is 'lenis', 'aspirated' or 'fortis'. This finding suggests that it is important to reinvestigate the type of laryngeal activity that occurs during the vowels following lenis (medium-aspirated), (full) aspirated and fortis (so-called 'tense') consonants, in order to determine how characteristics of phonation type provide a cue to their identification. The method of investigation involves an experimental phonetic procedure developed at University College, London, in the early 1970s to isolate the direct larynx waveform (Lx) by means of an electrical impedance laryngograph. Laryngographic analysis has the advantage of separating the larynx (source) signal from the effects of supralaryngeal vocal tract modification, and provides information about the state of vocal fold vibration even when the glottis is closed (Fourcin, 1974). Research on Korean stop consonants indicates that the fortis series 'has a considerable degree of glottal stricture' (Ladefoged, 1973, p. 81), and exhibits 'laryngealized' or 'glottalized' laryngographic characteristics (creaky voice) immediately following voice onset (Abberton, 1972). In Abberton's laryngographic study (1972, p. 75), the lenis series, although purportedly followed by breathy vowels (Kim, 1965), occasionally demonstrates 'breathy voice onset', but no more consistently than the aspirated series. The present study introduces a new approach to analyzing the characteristics of the larynx waveform, to reexamine these relationships and to reassess these earlier findings.

1.2. Data Acquisition

A sample of Korean words was recorded, illustrating CV-initial syllables of the three manners of consonantal articulation in minimal triplets and pairs. Items are the same as those recorded in the Phonetic Database (PDB) of languages of the world in the Department of Linguistics (Esling, 1987). In this case, recordings were made of both the acoustic signal (with a Sennheiser microphone) and the output of an electrical impedance laryngograph by means of superficial electrodes placed on either side of the throat at the level of the thyroid cartilage. Both signals were captured digitally through a Sony Pulse Code Modulator to a Beta cassette recorder. Data include one example each of vowels /i/, /u/, /a/ following each type of initial p-, t-, k-, tʃ-, and one example of a minimal triplet for each of the vowels /o/, /ə/ and /æ/ Minimal pairs for each of five vowels following the two types of Korean s- are also included. For comparison of the Korean data with the laryngographic characteristics of phonetically modelled phonation types, six contrasting phonation types were recorded by the author using the same equipment and procedure, and a balanced phonetic text. Laryngographic analysis of these phonetic models constitutes a repetition, using the

revised microcomputerized analysis algorithm, of an earlier experiment to define and categorize phonation types laryngographically and laryngoscopically (Esling, 1984).

The laryngograph signal of each Korean item, and of each model phonation type, was transferred from Beta format to MS-DOS format using the *Computerized Speech Lab (CSL)* with a TMS320C25 digital-signal-processing board. Five seconds of each model phonation type were also transferred to disk files following this procedure. The resulting Lx signals present some differences from the types of waveforms obtained previously (Esling, 1984), due to differences in the type of amplification equipment used and the specifications of the laryngograph. Unmodified signals, viewed using *CSL* as if Lx were an acoustic signal, demonstrate considerable DC float and a non-level baseline, as in the top screen of Fig. 1. To quantify and compare these Lx waveforms, a pre-processing treatment was devised and an algorithm developed to allow automatic processing of the Lx signal.

1.3. Algorithm Development

Lx waveform analysis is carried out in the *Micro Speech Lab 320* environment, operating on an IBM-AT workalike, using a modified version of the speech/sound waveform analysis program *EDIT320* to accommodate unmodified Lx waveforms, account for DC float, and eliminate the effect of the nonlevel baseline in calculating a ratio of waveform rise time to fall time. Input files captured with the electrical impedance laryngograph (or 'raw' Lx) are loaded the same way as speech files, marked for detailed analysis, and viewed on a scale where the cursor moves one pixel at a time. The algorithm operates with two cursors, the first of which is used to mark the point corresponding to onset of closure of the vocal folds, the beginning of the rapid rise indicating decreasing impedance across the larynx. The second cursor is then moved to the next onset of closure, at the beginning of the subsequent Lx period. When the second point is marked, a third mark is automatically calculated and inserted at the highest value between the two, or peak of Lx, and a fourth mark is calculated and drawn where the line joining the two periods intersects the fall of the Lx trace. The ratio of rise time (from base to peak) to fall time (from peak to baseline intersection) is then calculated and displayed. In cases where marks are placed at locations which do not accurately reflect the observed rise or fall of a period, any mark can be repositioned using the cursor, and a new ratio obtained. Generally, repositioning is only required to reset the intersection of the fall, or to adjust marks where short-term plus-minus fluctuations of the signal interfere with automatic identification of the correct period peak. An output 'ratio' file can then be created for iterative storage of the ratios of an utterance and for subsequent statistical processing.

Tests of the contrastive model phonation type data using this initial procedure, however, show little of the expected differentiation of phonation types according to Lx rise-time-to-fall-time ratios based on the evidence in Esling (1984). A revised method of preprocessing Lx waveform data using an additional *CSL* analysis function appears to solve this problem. Raw Lx files are converted to *CSL* format and loaded for preprocessing, with normalization applied at each step. This procedure then entails flipping the data if amplification characteristics during recording had caused the signal to invert. Then, in order to flatten the baseline of the Lx signal and to enhance the changes in velocity of the signal, preemphasis is applied to the original Lx ($d_i = y_i - y_{i-1}$). The resulting differenced waveform, shown in the bottom screen of Fig. 1, is a reflection of the greatest change in rising velocity (analogous to vocal fold closure) and of the greatest change in falling velocity (roughly analogous to opening). The ratioing algorithm can be applied to the preemphasized Lx signal as before, by placing the marker cursors at successive negative peaks.

The resulting ratio is an expression of rise time (from the point of greatest velocity of increasing impedance to the point of greatest velocity of decreasing impedance) to fall time (from the point of greatest velocity of increasing impedance to the point of greatest velocity of decreasing impedance). Values thus obtained, instead of being between 0 and 1.0, are likely to exceed 1.0 and to range up to 4.0 or 5.0 or more, depending on the location of the Lx period in the syllable. Nevertheless, this procedure yields a reasonable distribution of measurements, judging by the results for the model phonation types.

2. RESULTS OF LX ANALYSIS

The distribution of the differenced Lx-waveform ratios for the set of model phonation types confirms the relationship between phonation types established in Esling (1984) (see Fig. 2). Pitch range, average ratio and ratio range data for each phonation type are based on calculations for all Lx periods in the first five seconds of a balanced phonetic text, in French in this case (Harmegnies & Landercy, 1986) for the sake of comparison with the results obtained previously for English (Esling, 1984). Between 200 and 500 pitch periods have been analyzed for each type. *Breathy voice, whispery voice, modal voice* and *harsh/ventricular voice* fall within the same pitch range, between about 110-150 Hz, but are distinguished hierarchically by decreasing Lx ratios. The three classic 'registers' are distinguished on the basis of both Lx ratio and frequency. *Creaky voice*, generally below 110 Hz, has low Lx ratios in the same range as *harsh/ventricular voice*. Mean and median Lx ratios for *modal voice*, in the mid-frequency range by definition, lie above the limits of the range of *creaky voice*, and below the limits of the range of *falsetto* at the 65% level of confidence. *Falsetto* has both a high frequency and high Lx-ratio range. Mean and median values and ranges at 65% and 95% confidence levels are presented in Table 1. These observations provide a benchmark for the interpretation of Lx data from Korean.

Findings for the Korean vowel data are grouped first according to vowels following *p-, t-, k-,* or *tʃ-*, and then according to vowels following *s-*. Initially, results are presented for all of the vowels in the environment of each manner of consonantal articulation, and then for each vocalic environment individually.

While vowels following fortis consonants are consistently lower in Lx ratio in stop and affricate environments, results for vowels following lenis and aspirated consonants are virtually identical. Thus, vowels in fortis stop, affricate and /s+/ environments are distinct from their lenis and aspirated counterparts in both mean and median Lx ratio, but vowels in lenis and aspirated stop, affricate and /s/ environments are undifferentiated in mean and median Lx ratio when all vowels are considered together. These global results are presented in Table 2.

Considering each individual vocalic environment separately gives a very different perspective on the behaviour of phonation in the contrasting consonantal environments. A vowel-by-vowel analysis of the data confirms that Lx ratios of vowels following aspirated consonants have higher ratios than vowels following lenis consonants, which in turn have higher ratios than vowels following fortis consonants (see Fig. 3). There is, however, a cross-over in the case of the /a/ vowel, where the lenis environment shows the highest ratios. It should be noted that in the present comparison only the /u/, /i/ and /a/ vowel categories contain four triplets of vowel tokens of n=175, 190 and 240 periods, respectively. Other categories contain fewer sample tokens and Lx periods for comparison. Considering only /u/, /i/ and /a/ as significant, the vowel cross-over phenomenon

persists as a salient characteristic of the present data. Thus, only the open vowel /ɑ/ following *p-*, *t-*, *k-*, *tʃ-* demonstrates the predicted higher Lx ratio in the lenis environment. Other vowels demonstrate a higher Lx ratio in the environment of the aspirated consonant series.

Similarly, results for **s-** suggest initially that the fortis sibilant is accompanied by lower Lx ratios during vocalic phonation for all vowels. Some vowels appear to contrast more sharply than others, but more data are required to establish significance. Absolute Lx ratios vary a great deal from vowel to vowel. Whether Korean /s/ demonstrates more aspirated or more lenis characteristics, based on the criterion of a following vowel, cannot be determined from these data because of the possibility that different vowels may exert a variable influence on the perception of /s/ as more aspirated or more lenis. Caution is advised in interpreting these preliminary data, since each vocalic environment for **s-** in Fig. 3 represents only one minimal pair of n = 36 Lx periods on average, except for /ɨ/ with two pairs.

3. DISCUSSION AND CONCLUSIONS

The pattern of Lx ratios for the Korean vowel data confirms that the three manners of consonantal articulation are indeed distinct, as predicted, according to the phonatory quality of the following vowel. A major qualification of this conclusion is that the Lx characteristics associated with manner of consonantal articulation vary depending on the identity of the particular vowel. Comparing Lx ratios obtained for Korean vowels with the ratios of modelled phonation types, these findings suggest that lenis initial consonants may be identified on the basis of *breathiness* (as distinct from *creakiness* or *harshness* in the case of fortis consonants) only in the open vowel /ɑ/ The hypothesis that a higher ratio, consistent with *breathy voice,* will characterize the vowels associated with lenis consonants is therefore not supported in the case of /o/, /u/, /i/, /æ/ or /ə/. Since the phonatory quality of the vowel has been said to characterize the lenis series, without reference to the articulatory identity of the vowel, the most plausible explanation that can be offered in the light of these data is that lenis syllables most often have a *whispery creaky* or *harsh whispery* phonatory quality rather than a *breathy* quality. The conclusion is inescapable that, for most vowels, greater *breathiness* in the phonatory quality of the vowels, as a function of Lx ratio, is a property of aspirated and not of lenis syllables. The assertion that fortis stops are accompanied by a vowel of 'laryngealized' quality (Ladefoged, 1973, p. 76) is supported by the evidence presented here of low Lx ratios for that series, although it cannot be determined by Lx ratio whether the vowel is *creaky* or *harsh/(ventricular)* or both.

If the type of phonation observed varies with the quality of the particular vowel, a new interpretation of the role of laryngeal quality in the perception of the Korean consonant series would appear necessary. Lx ratios of the sort derived here are not known to differ according to supralaryngeal vowel quality, and have been assumed not to do so. If this assumption is incorrect, then that finding would be a significant result in its own right. If in fact supralaryngeal configurations can be demonstrated not to affect Lx, then the results obtained here remain of considerable interest, because of their implications for theories of perception of sequences such as Korean CV syllables. If the results presented above can be demonstrated in more extensive tests to be correct, the environment (the vowel in this case) following a phonemic contrast (initial consonants in this experiment) could play a more prominent role in the description and identification of that consonantal distinction. Some realizations of those consonantal phonemes may in fact retain only a few of the features that normally distinguish them, compared with other instances of the same pho-

neme. Such cases suggest environments that are likely candidates for language change -- the shifting of an item from one perceptual category to another. A related implication for Korean *s-* would be that /s/, as distinct from /s+/, may be perceived as more or less aspirated, or as more or less lenis, depending on the vowel which follows. Some phonemic distinctions might also be in the process of being lost where the inventory of factors that signal the identity of /s/ vs. /s+/ is reduced. Further testing is therefore necessary with additional subjects and for the full inventory of Korean vowels, to assess the behaviour of Lx in varying vocalic contexts.

3.1. Summary of Korean Manners of Articulation

The literature on Korean obstruents and the results of Esling (1984, 1988) and of the present study indicate that the three contrastive manners of articulation are distinguished primarily by onset characteristics but also by following-vowel phonatory characteristics. The aspirated stop demonstrates longest voice onset time (VOT), around 100 msec; the lenis stop is partially aspirated, around 40 msec VOT; and the fortis stop demonstrates shortest VOT, around 20 msec with virtually no aspiration noise present. These observations conform to the temporal changes in glottal width found by Kagaya (1974) for the three types of consonants. Aspirated and lenis stops generally begin with similar glottal width, followed by an increase in width for [h] for the former but reduced width during [h] of the latter. Fortis stops begin with narrower glottal opening and decrease rapidly to tight closure of the glottis prior to articulatory release and voicing. Electromyographic studies have shown, in addition, that the vocalis muscle is distinctly active in the fortis or 'forced' series immediately prior to the release of oral stop closure (Hirose et al., 1974; Fujimura, 1977). "It is noted also ... that the Korean aspirated ... stops show some momentary activity of the vocalis muscle immediately preceding voice onset" (Fujimura, 1977, p. 286).

It has been reported that the vowels associated with lenis stops sound *breathy* to Western ears (Kim, 1965, p. 349), and that the fortis stops are accompanied by a vowel of 'laryngealized' quality (Abberton, 1972; Ladefoged, 1973, p. 76). These observations have been confirmed in experimental studies by Hardcastle (1973) who argues for the recognition of a glottal 'tensity' feature, and by Iverson (1983, p. 198) who identifies the presence of 'murmur' in lenis consonants, and especially in /s/ which "correlates well with various reports of its amorphous 'breathy' quality (Kim-Renaud, 1974, p. 14, 16)." In examining the vowels themselves, vowels in the lenis environment are indeed distinct from vowels in the aspirated environment in most cases. It is the aspirated condition, however, which produces vowels with Lx characteristics of *breathiness* (or greater *whisperiness*) rather than the lenis condition. Only in the case of the open vowel /a/ are Lx ratios higher after lenis consonants (similar to the *breathy* model) than after aspirated consonants. Vowels following fortis consonants are clearly distinct from the other two conditions for all vowels; lower in Lx ratio, which would correspond with either increased *creakiness* or *harshness* of phonation. As vowels in the lenis environment, independent of their articulatory identity, are known to reveal the manner of articulation of a preceding consonant (Esling, 1988, p. 7), the most likely interpretation to be drawn at this stage in the research on Korean is that the phonatory cue present in post-lenis-consonant vowels such as /o/, /u/ or /i/ is not *breathy voice*, as it is in the case of /a/, but rather *whispery creaky voice* or *harsh whispery voice*.

Abberton's (1972) laryngographic study found that

breathy voice onset is not consistently present for any stop series but does occur sometimes following the medium and most aspirated stops; in contrast with the

least aspirated at the same place of articulation for which breathy voice does not occur (p. 75).

The present results are consistent with Abberton's findings in that *breathy* (or *whispery*) Lx features characterize the lenis and aspirated series but not the fortis series. It now appears that whether the lenis or aspirated series is more *breathy* is a function of the articulatory quality of the vowel involved. Dart (1987, p. 146) reports that 'Korean fortis stops [are] generally characterized aerodynamically by higher oral pressure and lower oral flow than their lenis counterparts,' and postulates that tenser vocal tract walls are responsible for this. The present study adds to this body of knowledge the finding that the 'tensity' of the fortis series has a distinct laryngeal component. Independently of the activity of the supralaryngeal vocal tract, the phonatory quality of post-fortis-consonant vowels is clearly distinct from the other two series and well within the expected range for *creaky voice* or *harsh(/ventricular) voice*. As the vowels of this series are consistently higher in pitch than in the other two series (the lenis environment having the lowest pitch), *harshness* would seem to be a more likely candidate for describing fortis CV sequences. Details of Lx-waveform shape beyond the computed Lx ratio have not been analyzed further here, although the 'double-peak' phenomenon reported in Esling (1984) could be a useful way of describing differences in phonation that are associated with degrees of *harshness* as distinct from *creakiness*.

3.2. Theoretical Implications

In second-language-acquisition theory, the argument has been advanced that CV sequences may be critical in the process of acquiring accent (Tarone, 1978). The more traditional view gives more importance to the acquisition of individual consonants or vowels as feature bundles minimally distinct from other members of the inventory. This is a view implicit in phoneme theory but which, stated in this extreme way, leaves many questions unanswered in second-language-acquisition research. With respect to Korean, it seems clear that either the consonant or the vowel of the CV sequence can provide adequate information for correct identification. That is, although place of articulation cannot be perceived very reliably from vowel quality alone, manner of consonantal articulation can be perceived quite accurately by vowel quality alone, most distinctly for the fortis series, then for the lenis series, then (less reliably) for the aspirated series. Results from Esling (1988) further indicate that while aspiration and 'tensity' may be significant consonant indicators, information present in a vowel from a lenis context overrides these indicators in identifying a CV sequence. Together with the finding that phonatory cues differ for the aspirated and lenis series depending on the identity of the particular vowel, these results imply that the consonant of the sequence cannot be considered separately from its vowel, as a perceptual entity or, especially, in explaining acquisitional processes. On purely vocalic criteria (in this case the specification of Lx), several categories, including /æ/ and /ə/ following *p-, t-, k-, tʃ-* and three vowels following *s-*, present evidence that in some cases there may be no clear distinction whatsoever between lenis and aspirated consonant onsets.

These findings suggest that properties of isolated consonants may not be the critical elements in successful recognition (and perhaps production) of the syllable-long or word-long items that convey lexical meaning. Such a position reinforces second-language-acquisition studies (see Tarone, 1978) which identify the CV sequence as a minimum critical unit of choice by learners, and which focus on the importance of word identification rather than phoneme identification as the basis for building a phonological system in a second language. Such evidence suggests that it is unwise to concentrate on consonant details in second-language pronunciation teaching when it may be the

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vowel of the syllable that carries a large portion of the cues that learners rely on to distinguish meaning.

NOTES

In technological terms, this research represents a step in the development of automatic laryngographic analysis software for microcomputer facilities equipped to process acoustic signals. The analysis algorithm described here has been designed as an *EDIT320* program, to be used in conjunction with *Computerized Speech Lab* speech-analysis software developed by Speech Technology Research, Ltd., available as the *CSL 4300* laboratory research system from Kay Elemetrics Corporation.

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Fig. 1. *CSL* display of Lx signal: partial text with *breathy voice*.
Top screen (A): original Lx waveform.
Bottom screen (B): normalized, preemphasized signal.
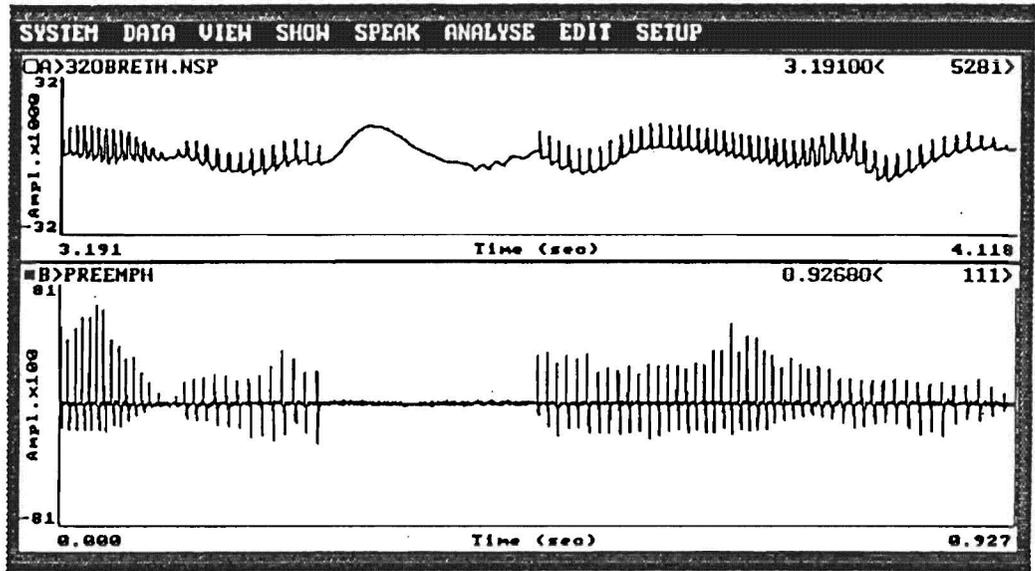
Fig. 2. Lx ratio ranges and frequency ranges of six model phonation
types at 65% confidence. Ranges intersect at the mean Lx ratio
and midpoint of the estimated frequency range.
Median Lx ratios are represented by an open square.

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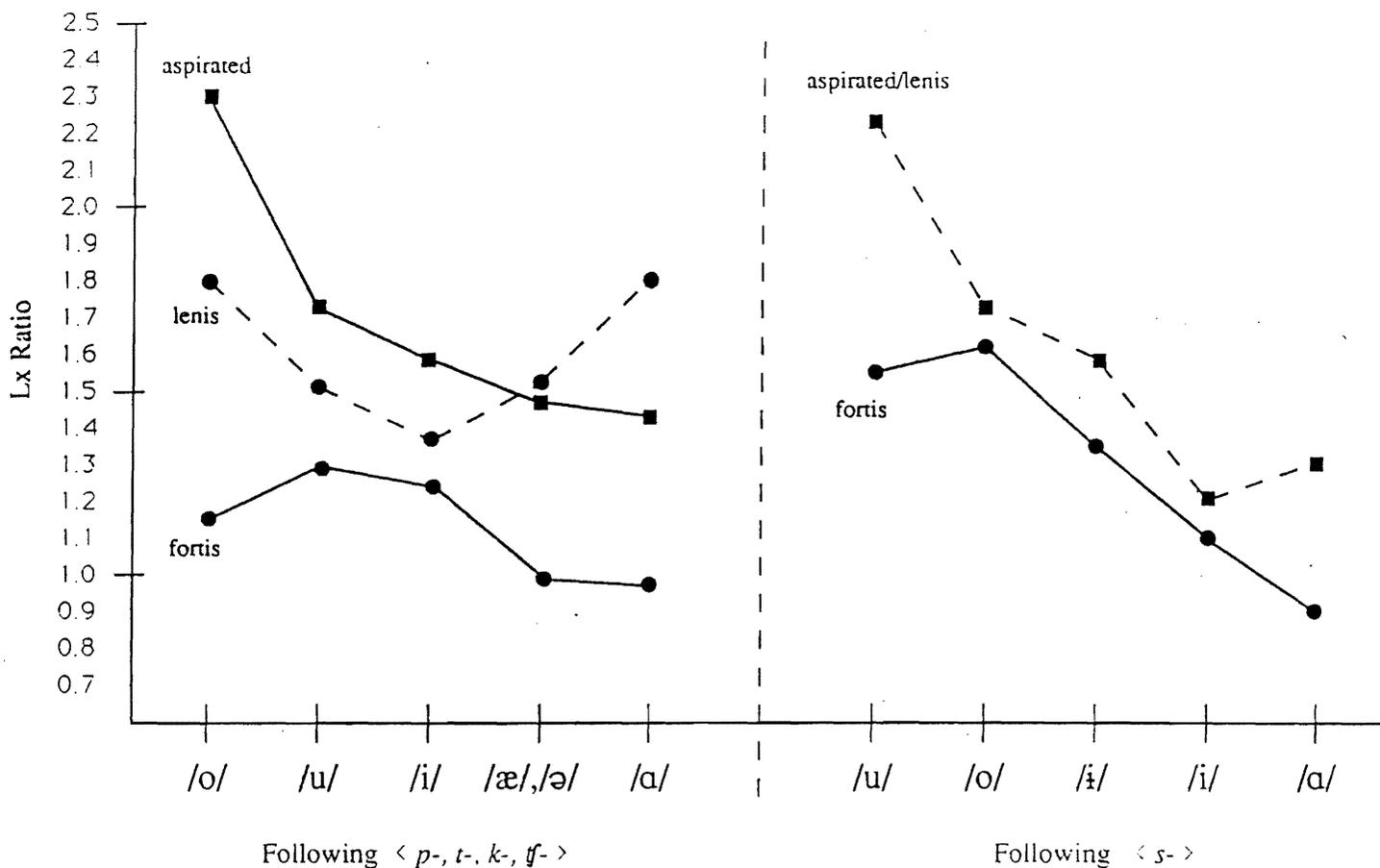
Fig. 3. Mean Lx ratios, differenced waveforms, by vowel category.
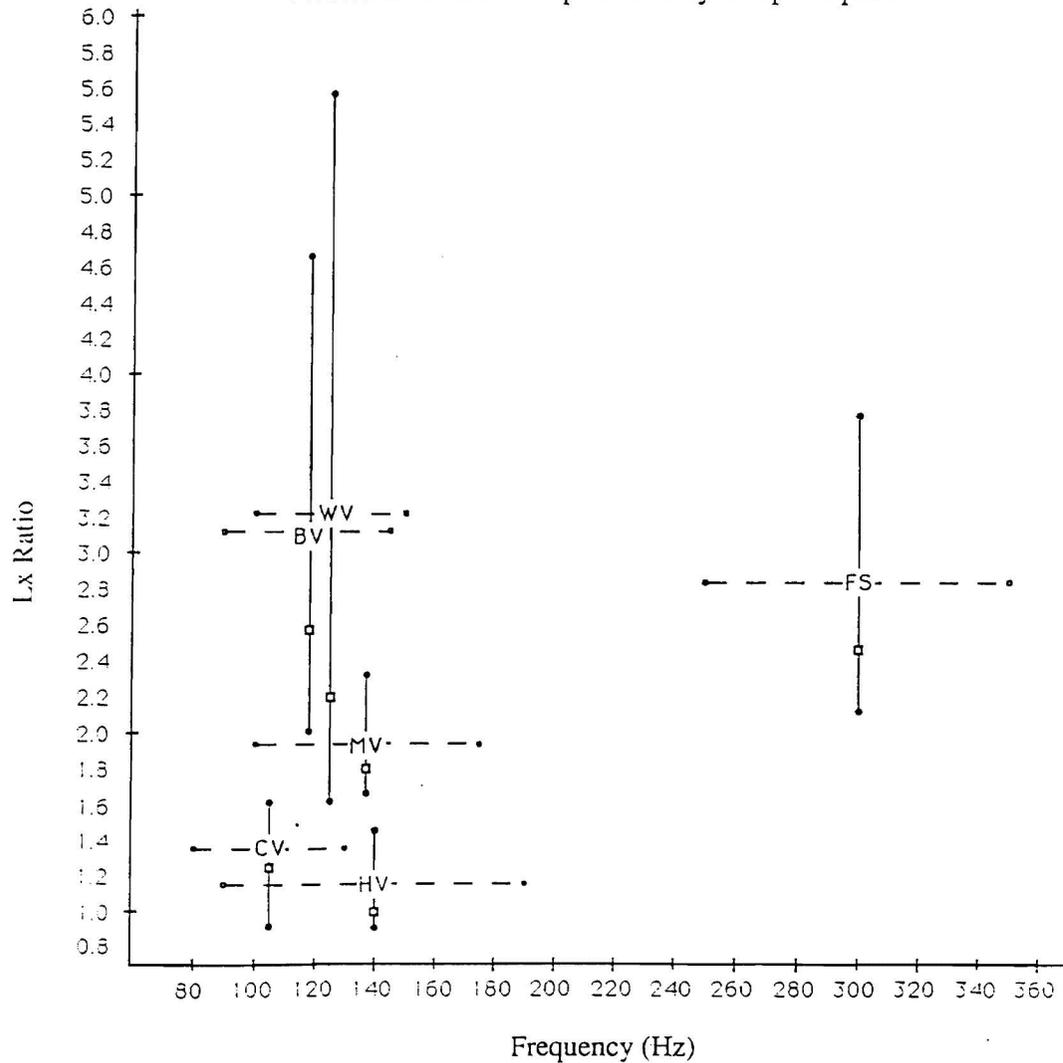
Fig. 3. Mean Lx ratios, differenced waveforms, by vowel category.

Table 1. Mean and median Lx ratios and ranges for six model phonation types at 95% (bold) and 65% confidence levels.

Phonation Type		Minimum	Median	Mean	Maximum
Breathy Voice	95%	1.50	3.03	3.41	9.15
	65%	2.04	2.57	3.17	4.66
Whispery Voice	95%	1.34	3.00	3.59	10.05
	65%	1.62	2.19	3.23	5.57
Falsetto	95%	1.69	2.78	2.96	6.25
	65%	2.16	2.47	2.84	3.75
Modal Voice	95%	1.35	1.91	2.03	4.16
	65%	1.67	1.80	1.93	2.32
Creaky Voice	95%	0.21	1.34	1.33	2.82
	65%	0.91	1.25	1.35	1.61
Harsh/Ventricular Voice	95%	0.77	1.13	1.20	2.87
	65%	0.90	1.00	1.15	1.46

Table 2. Mean and median Lx ratios for all vowels following Korean fortis, lenis and aspirated consonants.

Consonantal Environment	Tokens	n Periods	Mean Lx	Median Lx
Fortis /p⁺, t⁺, k⁺, ʧ⁺/	15	343	1.16	1.08
Fortis /s⁺/	6	131	1.31	1.24
Lenis /p⁻, t⁻, k⁻, ʧ⁻/	16	259	1.61	1.53
Lenis/Aspirated /s/	6	91	1.60	1.49
Aspirated /pʰ, tʰ, kʰ, ʧʰ/	17	266	1.60	1.51

REDUPLICATION IN SANSKRIT: AN ANALYSIS OF THE INTENSIVE

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1. INTRODUCTION

Sanskrit is a language with a rich grammatical tradition which goes back beyond the grammar of Pāṇini (4th century B.C.). A morphologically and phonologically complex language, it is still of theoretical interest today. Indeed, in recent years both McCarthy and Prince (1986) and, in passing, Marantz (1982) have looked at certain aspects of Sanskrit reduplication to demonstrate certain tenants of their theoretical models. However, these analyses have ignored certain problematic features of Sanskrit which complicate any attempt for a simple, neat analysis. Steriade (1988) attempts to grapple with these problems and in the process comes up with her own "full copy" reduplication model to account for the complex syllable transfer phenomena found in what most generative linguists would refer to as instances of partial reduplication.

In Sanskrit, reduplication is involved mainly in the formation of verbal stems expressing tense and aspect. It is found in five places:

root	full grade	zero grade	root gloss
(1) to form the present stem of one class of verbs (the 3rd. conjugation)			
hu:	juhoti	juhvati	'sacrifice'
da:	dada:ti	dadat i	'give'
(2) the perfect			
budh	bu-bodh-a	bu-bodh-ur	'awake'
piš	pi-piš-e	pi-piš-re	'adorn'
(3) the aorist			
druv	adudruvat		'run'
jan	aji:janat		'beget'
(4) the desiderative			
stu	tuṣṭu:ṣa-		'praise'
gam	jiga:miṣa-		'go'
(5) the intensive			
ved/vid	ve-vet-ti	ve-vid-ati	'know'
bodh/budh		bo-budh-ya-te	'awaken'

Generally speaking, reduplication involves the prefixing of a monosyllabic reduplicative prefix to the root. In the first four types listed above, this prefix is a light syllable with a CV-form, or, in

the terms of Prosodic Morphology, a core syllable, σ_C (as noted by McCarthy and Prince, 1986). The intensive, however, differs from the others in that it involves the prefixation of a heavy syllable. Although most of the processes involved are relevant to all five verbal formations, the generation of this heavy syllable entails a number of considerations not found in the other four. This paper will look at the intensive from two different theoretical perspectives: the first, an extended Marantzian model; the second, Prosodic Morphology (McCarthy and Prince, 1986; 1990). In doing so, it will examine a number of points which will be of considerable theoretical interest within the paradigm of each model and to phonological theory in general.

2. ABLAUT IN SANSKRIT

Before examining the formation of the intensive, it is important to discuss certain general phonological features of Sanskrit, in particular the very productive process of ablaut in the stem vowel. The following example shows the three ablaut grades of the root vowel in √*vid* 'know'.

(6) √*vid* *veda* *vaidya*

Ablaut can be seen as a case of vowel weakening or strengthening, depending on one's stand-point. The Indian grammarians saw it as a case of strengthening. They took the weak form or zero grade - *vid*- as being the base form and from that derived the full or normal grade *(guṇa)* - *veda* - and the strong or extended grade *(vṛddhi)* - *vaidya*. However, western philologists and linguists have viewed the *guṇa* or full grade form as being basic in many cases where it was not for the Indian grammarians. Assuming the traditional Indian analysis, the alternations involved in ablaut are as follows:

zero grade	normal grade	strong/extended grade
i	e [ai]	ai [a:i]
u	o [au]	au [a:u]
a	a	a: [aa]
r̥	ar	a:r
l̥	al	a:l

Traditionally Sanskrit is seen as having 5 short vowels - *a, i, u, r̥, l̥* - of which the first four have long counterparts. In addition, there are the long vowels *e, o*, and the diphthongs *ai, au*. Phonologically, *e* and *o* are seen as being surface representations of underlying *ai* and *au* , while *ai* and *au* are the surface forms of underlying *a:i* and *a:u*, respectively. There is evidence in the language for such a distinction, particularly the behaviour of these vowels in sandhi when followed by a vowel, where *e > ay, o > av, ai > a:y, au > a:u*. Thus, Sanskrit can be seen as having an underlying 3 vowel system, [± length], and with additional syllabification of *r* and *l* . This assumption was basic to the analyses of McCarthy and Prince (1986) and Steriade (1988). It will also be assumed in the analyses of the intensive presented here.

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3. THE INTENSIVE

The intensive is found mostly in the older Sanskrit language - i.e. Vedic Sanskrit - and much less in the later, classical language.[1] It intensifies the verb or lends it a frequentive aspect. Formally, it involves the prefixation of a heavy, monosyllabic reduplicative prefix to the root. Roots in Sanskrit are almost always monosyllabic. They may have or not have a consonant onset and/or coda, and may have both initial and final clusters. The initial clusters are of increasing sonority with the exception of sibilant + obstruent clusters. Final clusters, on the other hand, are of decreasing sonority. The reduplicative prefix takes the form of

$$\text{C V V} \qquad \text{or} \qquad \text{C V C}$$
$$\quad | \qquad\qquad\qquad\qquad |$$
$$\quad [a] \qquad\qquad\qquad [+\text{son}]$$
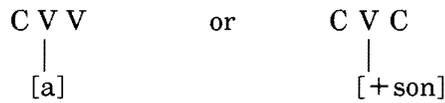
where the coda consonant can only be a sonorant: i.e.(r,l, nasals). The onset is obligatory. These features can be seen in the data given in (7)-(13) below:[2]

	root	full grade	zero grade	
(7)	ved/vid	(vai-vaid-ti)	ve-vid-vah	
		ve-vet-ti	ve-vid-i:-ti	'know'
	bodh/budh		(bau-budh-ya-te)	
			bo-budh-ya-te	'awaken'
(8)	ves/vis	ve-veṣ-	ve-viṣ-	
	pat	pa:pat-	pan-i-pat-	'fall'
(9)	mard/mr̩d	mar-mard-	mar-mr̩d-	'crush'
	kr̩ṣ	car-ka:rṣ-	carkr̩ṣ-	'plow'
	pan		pan-i-pn-at	'admire'
	gam	jaN-gam-	gan-i-gam-	'go'
	cal	cal-cal-i:-ti		'move'
(10)	kri:d		ce-kri:d-	'play'
	krand	kani-krand-	kani-krad-	'roar'
(11)	stan	tan-stan-		'thunder'
	skand	kan-skand-		'leap'
(12)	svap/sup	sa:-svap-	so-sup-	'sleep'
	grah/gr̩h	ja:-grah-	jar-i-gr̩h-	'seize'
(13)	yaj/ij	ya:-yaj-		'offer'
	vac/uc	va:-vac-		'speak'

As can be seen from these examples, when the prefixed syllable has no coda (i.e. is an open syllable) the vowel in the prefix must be long (i.e. full/ extended grade) as in *ve-vid*, *bo-budh-*, *pa:pat-*.

The Indian grammarians would simply say that the root vowel or syllabic sonorant takes its guṇa, or in the case of *a*, its *vṛddhi* form. When followed by a [+son] consonant the vowel is short *a* as in *mar-mard-*, *cal-cal-*, *jaNgam-*

Any attempt to analyse these data in a modern generative framework is complicated by changes in the root due to reduplication and other phonological processes which make it difficult to arrive at the underlying root vowel. Steriade (1988) chooses the full grade as the underlying form. She bases this on the general observation (supported by Thumb, 1957; MacDonnel, 1928) that the strength of the root vowel in most cases of reduplication is a function of accent. When the accent is on the root, the root vowel is found in the full grade. When the accent is not on the root, then the root vowel is in the weak or zero grade, as in *vevidmâh*. In effect, this means that the root is strong in the singular in all three persons of the active, but is weak in all other forms of the active and all forms of the middle, where the accent falls on the conjugational suffixes. This conjugational pattern holds in the intensive, even though the accent is often on the prefix (MacDonell, 1968; Burrow, 1973).[3] Thus, following this tendency, Steriade derives the zero grade forms from a syncope rule applying in inherently unstressed environments. As can be noted in *ve-vid-i:-ti* in (7), the root is sometimes followed by an epenthetic i: which also results in the root vowel being in the zero grade (in all probability due to a resulting shift in stress).

As stated, the reduplicative prefix has only [+son] consonant codas, which means that the root codas in (7) and (8) are not reduplicated; i.e. √*pat* > *pa:pat*. As for the syllabic consonants in (9), we must either speak of a change due to an epenthesis of *a* and subsequent desyllabification of the sonorant (*mṛd.* > *mard*) or of the deletion of a by syncope and the subsequent syllabification of the resonant (*mar* > *mṛd*). This does not, however, alter the form taken by the vowel of the prefix.

In the case of roots with complex onsets, the least sonorant member of the onset cluster reduplicates - e.g. in √*krand* it is the obstruent *k* which is reduplicated, not the sonorant *r* (kan-i-krand). Similarly the sibilant in *svap* in (11) is reduplicated rather than the glide *v* (*sa:svap*);[4] whereas in the sibilant + obstruent onset clusters in (11), it is the obstruent which is copied (*tan-stan*). In cases where the root has a complex coda, the first member of the cluster will be copied when it is [+son] - e.g. *kan-i-krand.*, *mar-mard*.

As seen in the case of *kan-i-krand*, a further peculiarity of the intensive is the epenthetic *i* which is sometimes inserte between the prefix and the root when prefix ends in a nasal or liquid.

There are also some cases, such as those in (12), where the alternating grade of the root vowel appears to affect the vowel of the prefix:

svap/sup	sa:-svap-	so-sup-	'sleep'
grah/gṛh	ja:-grah-	jar-i-gṛ-	'seize'

As mentioned above, all reduplicative prefixes must have an onset. The effect of this obligatory onset condition can be seen in the case of glide-initial/onsetless roots like *yaj/ij* in (13). Only the form of the root with the onset undergoes intensive formation - i.e. *ya:yaj* but not **i:yij*. Indeed, roots with vocalic onsets, such as √*ad* 'eat' do not form the intensive.

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4. A SEGMENTAL ANALYSIS

We will now look at the intensive from the perspective of several models of reduplication. First we will see how a strict phoneme-driven Marantzian analysis can account for the intensive data. The forms of the prefix that we have seen in (7) to (13) are essentially CVC and CaV (assuming that [a:] is [aa] and [e] and [o] are underlyingly [ai] and [au]). Since in all cases the vowel after the initial C in the CVC prefix is [a], we can can prespecify the vowel in both cases and form the templates CaC and CaV. Allowing for the association of the prespecified vowel [a] with a corresponding root vowel, we can then derive forms like *veved-* and *mar-mard* directly from the full grade of the root, as shown in the derivational representation below:

```
CVV  +  CVVC                        CVC +  CVCC
|||     ||||                        |||    ||||
vaid    vaid --> vai-vaid           mard   mard --> mar-mard
             --> veved
```

Forms where the root is in the zero grade (e.g. *vevid-*, *marmr̩d*) would then have to be derived from these forms by a further [a] deletion rule (vowel weakening) applying in unstressed environments. This rule is required in any case to account for root forms in cases where the root vowel *a* is lost due to syncope (e.g. √*pan* --> *pan-i-pn-*).

However, the CaC template will copy unwanted [-son] codas resulting in incorrect forms like **patpat* instead of the desired *pa:pat*. Here, the final C of the template will incorrectly link with the final C of the root, *t* as shown below:

```
        [a]
         |
        CVC  +  CVC
        |||     |||
        pat     pat --> *pat-pat
```

This could be avoided by putting feature prespecifications on the coda consonant; i.e. the template would be

```
        C  a  C.
              |
           [+son]
```

The most difficult problem for any analysis of the intensive is resolving the problem of association of consonants, both in the onset and in the coda. With prespecification of the final C of the CaC template as [+son], the finals no longer pose a problem for a phoneme-driven analysis. The resonants in *mar-mard, calcal, jangam* will be associated, while the obstruents in verbs like *pat (pa:pat)* and *svap (sa:svap)* will not.

However, as they are, the two templates are still not able to account for the data. The most intractable problem for a phoneme-driven Marantzian model is that of sibilant initial complex

onsets. In roots with sibilant + obstruent clusters the obstruent is copied as the onset of the prefix. However, when the sibilant is followed by a glide, semivowel, or liquid, the sibilant is copied. These two scenarios can be seen in (14) below.

```
(14)    stan               tan-stan-          'thunder'
        svap/sup           sa:-svap-          'sleep'
```

In the case of the roots with sibilant + obstruent clusters in (11), any CVC template will incorrectly associate the initial sibilant. This is demonstated in the following representation:

```
        [a][+son]
         |  |
        C V C    +    CCVC
        | | /
        stan          stan --> *san-stan
```
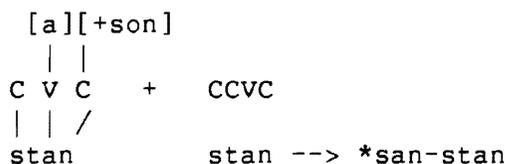
It is not possible to prespecify the initial C of the template to exclude the association of initial sibilants, since, as seen in *sa:svap* in (14), initial sibilants are associated when they are followed by a consonant of lesser sonority. This requires a phoneme driven model to include the foreign notion of extrametricality. Therefore, on this point alone, we must assume that a strict phoneme-driven analysis is inadequate to deal with the intensive.

Modifying the segmental model to allow for such a template driven process, we might posit a notation such as that below:

```
        C      V      C
        |      |      |
     [>son]    a   [+son]
```
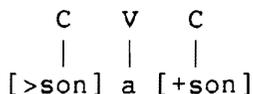
Here, the feature specification [>son] is seen as indicating that the template will seek out the least sonorant member of the onset. Note that for the [>son] element to be restricted merely to the onset without bringing in the notions of onset and rime into ourformalism, it would be necessary to stipulate, as does Kiparsky (1986; cited in Steriade, 1988) that the first V in the template will associate first, and only then, once the template is thus linked to the copy, the first C. Even though this allows us to avoid using notions of prosodic syllable structure in a theory where they are not at home, the template posited above is a substantial extension of the Marantzian model. However, it can still be seen in purely segmental terms: the template will seek out the least sonorant member of all consonants before the first vowel.

It is tempting when we view our two templates to draw the conclusion that, since the final consonant and vowels are both [+son], we can collapse the two templates into one:

```
        C      V      X
        |      |      |
     [>son]    a   [+son]
```
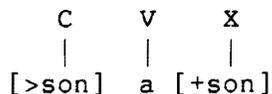
This would generate most of the desired forms in (7)-(13). Even forms exhibiting lengthening of *a* in the prefix, such as *pa:pat* and *sa:svap*, can be generated by a rule linking the [+son] X with the already associated [a], thereby lengthening it :

```
C V X-      CGV
| |/
svap-       svap   -->  sa:svap (after stray erasure)
```

Here, the first consonant is associated, then the prespecified V associates with *a*. As the final X [+son] finds no other segment with which it can associate, it too associates to the first sonorant segment on its left, resulting in the lengthening of the a, giving the correct form *sa:svap*. Alternatively, if we wished to avoid permitting two elements of the template to associate with one segment of the copy, we could posit an extra rule inserting [a] into the unlinked [+son] X slot.

However, this template would not work in the case of roots where the onset cluster has a [+son] second member and a vowel other than a. This is the case in the roots like *kri:d* in (10). Since the prespecified V [a] could not find a V with which it could associate, the X [+son] would associate with the first sonorant element, which in the case of *kri:d* would be the *r* in the onset. After the required insertion of the prespecified [a], this would yield the incorrect form *car-kri:d* instead of the desired form *ce-kri:d-*,[5] as shown below:

```
[a] [+son]
 | /
C V X       CRVVC
| /
| /
kriid-      kriid   ----->  *kar-kriid
                    ----->  *car-kri:d
```

Thus, it seems that it is necessary to posit two templates:

```
C  V  V       and       C  V  C
|  |                     |  |  |
[>son] [a]               [>son] [a] [+son]
```

These two templates will cover all the cases in (7)-(13), including the cases in (13), where the form of the prefix is dependent on the grade of the root vowel. In such cases, both alternatives can be generated by applying the CVV template for each grade of the root vowel. This is shown below:

```
         sa:svap                          sosup

     [>son][a]                        [>son][a]
        \  |                             \  |
        C V V      CGVC                  C V V      CVC
        |  \|                            |  |/
        s v a p⁻   svap -----> saasvap   s u p⁻     sup ------> sosup
```
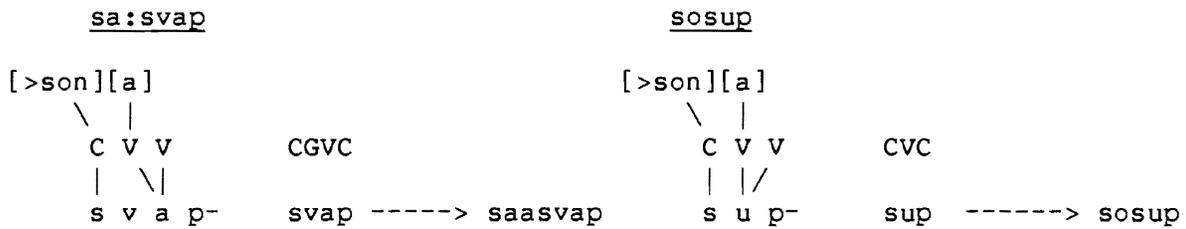
In the derivation of *sa:svap*, the final V cannot associate. Thus, to derive the long *a:* we must still posit an insertion rule whereby unlinked V slots of the template are filled with an epenthetic [a]. In addition, roots of this type would have to be marked in the lexicon as having only the CVV prefix. Otherwise, the modified C V C[+son] template might apply and to get the long vowel in the prefix, a less natural rule inserting [a] into the then unlinked C[+son] slot of the template would have to be posited.

It should be noted that when we posit such [a] insertion into empty V template slots or permit the association of unlinked Vs of the template with the already linked V, we will have to have some sort of ordering of the application of templates. The CVC template must apply first; otherwise, for roots with [+son] consonant codas the CVV template could apply first, resulting in the non-association of the desired [+son] consonants and the incorrect lengthening of the root vowel *a*. Thus, for the root √*krand* we would get **kaa-krand* instead of the correct *kar-(i)-krand*. This can be seen in the following derivational representation:

```
           [a]
            |
           C V V     +     CCVCC
           |  |/
           krand-          krand  --> *kaa-krand
```
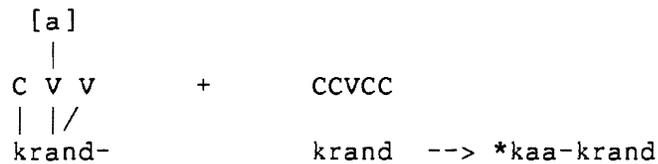
Here, the modified CVC template must apply to ensure that the nasal is associated and the correct form *kan-i-krand* derived. If the CVC template is applied first and cannot be satisfied (i.e. can find no [+son] consonant), then by default the CVV template will apply. This will result in the correct derivation of all the forms discussed in this paper.

Thus, a modified, template-driven, segmental model can account for the intensive data, but only with a radical innovation permitting the template to find the least sonorant of the initial clusters of the copy. This can only be accomplished when it is assumed that the V nucleus of the template is first linked to the V nucleus of the copy. The problems presented by differing lengths can also be solved by this model by either assuming the association of unlinked V slots with an already linked V (which here is always *a*) or by positing an epenthesis rule to insert [a] into the empty V slot, thus giving the long vowel.

5. A PROSODIC ANALYSIS

We will now analyse the same phenomena within the framework of Prosodic Morphology (McCarthy and Prince, 1986, 1990). As we will see the problems we have already encountered above also tax the mechanisms of this theory.

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Sanskrit has basically two types of syllables: 1) light, monomoraic syllables (σ_μ), which can be either V or (C)CV; 2) heavy, bimoraic syllables ($\sigma_{\mu\mu}$), which can be (C)CVV(C) or (C)CVC(C). Syllables with a long vowel and consonant coda could also be analysed as being superheavy syllables, but this is not germane to our discussion here. Since our reduplicated prefix is a heavy CVV or CVC syllable the obvious template would seem to be $\sigma_{\mu\mu}$.

5.1. The $\sigma_{\mu\mu}$ Template

If we posit $\sigma_{\mu\mu}$ as our template, we can derive the heavy, bimoraic syllables of the prefix by having the full grade of the root (the rime of which begins with either VV or V[+son, -syllabic]) as the underlying form; i.e. *vevid-* will be derived from *vaid*. The zero grade forms of the root would then be derived by a vowel weakening rule (syncope of *a*) applying to root vowels in unstressed environments. This can be seen in the following derivational representations for *veved-/ vevid*:

```
σμμ     +    σμμ                    σμμ     +    σμμ
| | |        | | |                  | | |        | | |
vaid-    vaid --> vai-vaid          vaid-    vaid --> vai-vaid
             --> veved-                           --> vai-vid (weakening)
                                                  --> vevid-
```

However, this means that for forms like *pa:pat-*, which have a long *a:* in the reduplicative prefix, but only a short *a* in the full grade of the root, we must posit an underlying long vowel for which there is no other motivation. Thus, to get the form *pa:pat*, the root must be *pa:t*, even though there is no independently motivated rule of vowel shortening in stressed syllables which could give the desired short vowel in the root. Otherwise, if the base were *pat*, the result of reduplication would be the incorrect form **pat-pat*, as shown below:

```
σμμ     +    σμμ
| | |        | | |
pat          pat   --> *patpat
```

One possible way to circumvent this problem would be to circumscribe all [-son] coda consonants as extrametrical, in which case the root could be with a short vowel (i.e. *pat*). The first mora of the template would associate with the short root vowel, while, due to the extrametricality of the coda obstruent, the second mora would have no melodic material with which it could associate. Thus, the unassociated mora of the template would associate with the already linked *a*, making it long. This is shown below:

```
σμμ     +    σμμ
| | /
pa(t)        pat   --> paa-pat
```

However, even with extrametricality of final consonants, the template will not be able to account for the differences in the vowel of the prefix in roots like *svap --> sa:svap/sosup*, where the form of the prefix varies according to the grade of the root vowel (the root vowel *u* of the latter being the

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product of syncope of *a* and subsequent vocalization of the glide *v*). The $\sigma_{\mu\mu}$ template will generate the long vowel in sa:svap (ignoring the problem of the initial cluster), but assuming the underlying base for the second form, *so-sup*, is *svap*, there is no way to generate the [o] in the prefix (*so-*). Since the only vowel in the melody is *a*, it will be associated and then lengthened, giving *aa (a:)*. Indeed, even if we allow roots like *svap/sup* to form the intensive on both the zero and strong grade bases, it will be impossible to derive *so-sup* from the zero grade: The [p] being extrametrical, both mora of the template would associate with the [u], giving the incorrect form **su:-sup-*.

$$\begin{array}{ccc} \sigma_{\mu\mu} & + & \sigma_{\mu\mu} \\ |\,|\!/ & & \\ \text{su(p)} & + & \text{sup} \longrightarrow \text{*su:sup} \end{array}$$

One possible way to overcome this difficulty is to posit a melodic overwriting rule (McCarthy and Prince, 1990). Since the first mora of the prefix is necessarily always associated with an [a], the rule would write this segment into the first mora of the template after association has occurred. It is thus possible to generate the different prefix vowels in *sa:svap/sosup*. Here, one would have to assume that this type of roots can form the intensive on both grades of the root. In the case of *sa:svap*, the template would associate the *a* of the copy of the full grade root to both mora, resulting in the long *a:* rime of the prefix. In the case of *sosup*, the base would be the zero grade of the root *sup*. Here, both mora of the template would associate the *u*. Then the first mora of the template would be overwritten with *a*, giving the desired *au (o)*. The derivations of these two forms are shown below.

$$\begin{array}{cccc} \sigma\ \mu\ \mu & + & \sigma_{\mu\mu} & \\ \text{s v a(p)} & \text{svap} & \\ \qquad\ \ \diagdown\text{a} & & \longrightarrow \text{saa-svap} \\ & & \longrightarrow \text{sa:svap} \end{array} \qquad \begin{array}{cccc} \sigma\ \mu\ \mu & + & \sigma_{\mu\mu} & \\ \text{s u p} & \text{sup} & \\ \qquad\ \ \text{a} & & \longrightarrow \text{sau-sup} \\ & & \longrightarrow \text{sosup} \end{array}$$

Indeed, one might be able to posit the zero grade as the base for the entirety of intensive formation and then employ the above-mentioned melodic overwriting rule to "write in" an [a] in the first mora of the template. This would also be dependent on the above-mentioned circumscription operation defining all [-son] root final elements as extrametrical. The derivation of *ve-vid* demonstrates the application of this template.

$$\begin{array}{ccc} \sigma_{\mu\mu} & + & \sigma_{\mu\mu} \\ \text{v i(d)} & + & \text{vid} \longrightarrow \text{vai-vid} \\ \ \ \diagdown\text{a} & & \end{array}$$

However, even with this analysis, one would have to derive forms like *sa:svap* from the full grade of the root. Furthermore, the vowel deletion rule first posited to derive the weak grade of the root in unaccented environments is required for cases where the root vowel [a] is deleted in unaccented

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environments (e.g. *pan-i-pn-at*). Thus., it would seem that the full grade should be taken as the base.

In any case, with melodic overwriting, the bimoraic syllable template seems to be able to deal with the intricacies of vowel qualities in the rime of both the root and the prefix. With the extrametricality of final obstruents, it is also capable of accounting for the reduplication of only [+son] consonants. It fails, however, on one critical point - the correct association of onset clusters.

According to McCarthy and Prince (1986) only a core syllable template is able to skip consonants in initial clusters when it associates with material from the melody. Thus, if the template were simply a bimoraic syllable, the entire CC onset cluster would have to be copied. This means that the notion of extrametricality must be invoked to ensure that the sibilants in the sibilant+obstruent clusters found in (11) (e.g. *stan*) are not copied. This can be achieved by excluding the sibilant from the domain of operation by means of partial prosodic circumscription (McCarthy and Prince, 1990). First, factoring from the left, a positive circumscription operation would locate the first obstruent of the onset, which would be the edge defining the base of the intensive operation. This will define the initial *s* in roots like *stan* as being extrametrical. This will isolate the base *tan*, which allows the association of the desired initial consonant of the prefix (*tan-stan*). This can be seen from the following representation:

$$\overset{\sigma_{\mu\mu}}{\underset{\text{(s)tan}}{\mid\mid\mid}} \quad + \quad \overset{\sigma_{\mu\mu}}{\underset{\text{stan}}{}} \quad \text{--> tanstan}$$

Should the application of positive circumscription not find the desired [-son, -cont] element in the onset, then the default is the normal operation and association of the template, which would correctly associate the sibilant in sibilant+sonorant clusters, as in *sa:svap*.

However, no form of prosodic circumscription would resolve the difficulties presented by the [+son] second members the complex onsets in (10) and (12) (e.g. *krand, svap*). According to the tenets of Prosodic Morphology, only peripheral segments can be extrametrical (McCarthy and Prince, 1990). Thus, since there is no recourse to extrametricality to exclude the second member of onset clusters, the $\sigma_{\mu\mu}$ template would necessarily associate both consonants of this type of onset cluster. This would make possible the derivation of incorrect forms like the following:

$$\overset{\sigma_{\mu\mu}}{\underset{\text{kran(d)}}{/\mid\mid\mid}} \quad + \quad \overset{\sigma_{\mu\mu}}{\underset{\text{krand}}{}} \quad \text{----> *kran-i-krand}$$

One is therefore forced to conclude that a $\sigma_{\mu\mu}$ template cannot account for the Sanskrit intensive.

5.2. The σ_C Template

One way around the intractable problem of the initial clusters might be to posit a σ_C template operating on a zero grade base of the root. Here, it is no longer critical that the coda obstruents be extrametrical. Since the core syllable in Sanskrit is (C)V, coda obstruents will never be associated.

Furthermore, a σ_C template associates the first consonant and then is able to skip over subsequent onset consonants to associate the rime vowel. This is once again complicated by the problem of sibilant+obstruent clusters, but this can be resolved by the partial circumscription mechanism discussed earlier which enables only initial sibilants followed by obstruents to be defined as being extrametrical (and not those followed by a [+son] consonant, as in *svap --> sa:svap*). The greater problem is deriving the correct vowel in the prefix, as we will see below.

Intensive formation with a σ_C template for the reduplicative prefix will involve reduplication of the zero grade base of the root with subsequent insertion of an epenthetic [a] after the first C of the prefix as an intensive marker. An epenthetic [a] will also be inserted before the first vowel in accented roots. This can be seen in the derivation of *veved- (vai-vaid)*:

```
σC      +    σμμ
/|
vid-         vid  --> vivid
                  --> vaivid (Int. [a] epenthesis) (unaccented root)
                  --> vaivaid (accented root - [a] epenthesis)
```

As the σ_C template will associate with only the first vowel of the root, it is necessary to assume that the intensive always has as its base the zero grade of the root. Otherwise, for roots having *e (ai)* or *o (au)* as their full grade, the *a* of the underlying diphthong will be associated and not the desired *i* or *u*. This can be seen below:

```
σC      +    σμμ
/|
vaid-        vaid  --> *va-vaid
                   --> *vaa-vaid ([a] epenthesis)
```

However, this analysis will not work for roots with a short [a] vowel followed by a [+son] consonant like *gam, cal, krand*. In these cases, the σ_C template, requiring a CV melody, will be unable to associate the desired [+son] root coda consonant. This can be seen in the derivation of √krand below:

```
σC      +    σμμ
/\
krand-       krand --> *ka-krand
                   --> *kaa-krand ([a] epenthesis)
```

One possible way out of this dilemma is to assume that underlyingly these coda sonorant consonants, including the nasals, are actually syllabic sonorants. These would be reduplicated and then following the application of [a] epenthesis would desyllabify.[6] Historically, it may be correct that the nasals and some of the liquids were originally syllabic, but synchronically there are no syllabic nasals in Sanskrit and verbs like *cal* 'move' and *car* 'move' do not behave as if they have an underlying syllabic sonorant as their nucleus. Moreover, both *cal* and *gam* have the same form in both the accented and unaccented forms of the root. Thus, this analysis is untenable.

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The only recourse left is to assume that there are two templates, One of these would be the σ_C template, which would have as its domain of operation the zero grade of the root with subsequent [a] insertion as discussed above. The second would be a $\sigma_{\mu\mu}$ template for roots with a coda containing a liquid or nasal. However, if we are forced to accept $\sigma_{\mu\mu}$ as one of our templates, we would once again be faced with the insoluble problem of association presented by the obstruent/sibilant + resonant onset clusters exemplified by *kan-i-krand*. Thus, it must be concluded that, without some changes or additional constraints, Prosodic Morphology does not at present have the mechanisms to deal with the Sanskrit intensive.

6. SUMMARY AND DISCUSSION

Intensive formation in Sanskrit is a complicated process which cannot easily be described by either segmental or prosodic templatic theory. Of the perspectives we have approached this from, it is clear that a strict phoneme-driven (Marantzian) analysis will not account for the intensive data. Although it is capable of generating the correct rimes of the prefix, it fails to associate the correct member of the initial sibilant + obstruent consonant clusters. Indeed, due to the problem of the initial clusters, for a segmental theory of reduplication to describe intensive formation, it must be modified to allow for template-driven association. Therefore, the greater part of the discussion of the intensive data revolved around two different template-driven analyses - one segmental, the other prosodic. These two analyses will now be reviewed and contrasted.

Both analyses required two different templates to account for the complexities of association in both the rime and the onset of the prefix. In the modified segmental analysis, the CaV template was required to derive the prefix vowels, while the second CaC template was required for the reduplication of [+son] coda consonants (e.g. *tan-stan*). In the prosodic analysis, one template (σ_C) was required to ensure correct association of initial clusters, the other ($\sigma_{\mu\mu}$) was once again necessary to associate [+son] coda consonants.

Both analyses were able to resolve the complexities of proper association in the rime of the prefix. In the segmental analysis, this was done by the prespecification of the first V of both templates, as well as the final C of the CVC template. The vowel length and quality could be derived by either an epenthesis rule for unassociated V slots, or, in another solution, double association of two V slots with one vowel of the copy. The σ_C prosodic template was able to accomplish the same thing by the positing of a subsequent [a] epenthesis rule.

The non-association of [-son] final consonants posed no real problem to either theory. In the segmental analysis, [-son] consonants were excluded from reduplication by prespecifying the final C of the template as [+son]. In the prosodic analysis, this could be resolved through the use of the σ_C template or/and by defining [-son] coda consonants as extrametrical.

The greatest challenge posed to both theories was that of correct association of the least sonorant element in the case of roots with initial consonant clusters. In a segmental analysis, obstruent + resonant clusters posed no problem since the segmental template would naturally associate the first member of the cluster, which would be the less sonorant. The greater problem was that of sibilant-initial clusters. This could only be resolved through a radical innovation within the segmental theory which would allow for associating the first C of the template with the least sonorant consonant before the first V. Prosodic Morphology, however, was able to resolve the problem of

sibilant-initial clusters through the mechanism of partial circumscription, but not that of the obstruent+resonant clusters. In order to generate the [+son] coda of the prefix of some roots, the $\sigma_{\mu\mu}$ template must be retained. However, within the present framework of Prosodic Morphology, the $\sigma_{\mu\mu}$ template cannot simply associate the obstruent member of the onset cluster and then skip over the [+son] member. Therefore, the theory fails to account for the reduplication of forms like *kan-i-krand*. The $\sigma_{\mu\mu}$ template is required to associate the nasal coda of the prefix, but by definition must incorrectly associate the entire *kr* onset. Thus, the $\sigma_{\mu\mu}$ template would in some cases have to be permitted to have a fairly ad hoc special constraint restricting its onset to a single melody segment. This means that for Prosodic Morphology to adequately describe Sanskrit intensive formation, there must be a redefinition of the properties of one of its major prosodic categories, the syllable, in terms that would necessarily be segmental. Alternatively, there must be an extraordinary, language-specific constraint barring the copying of more than one consonant by the $\sigma_{\mu\mu}$ template.

7. CONCLUSION

Neither a template-driven segmental analysis, nor a purely prosodic analysis can account for intensive formation without some innovation or extension of the theories that underlie them. In the case of the segmental analysis, a multivalant sonority scale must be built into the template. In the same fashion, in a prosodic analysis, either the $\sigma_{\mu\mu}$ bimoraic syllable template must be redefined to restrict association to only one melodic onset element, or there must be an ad hoc constraint on the copying of non-initial [+son] onset consonants. If such special mechanisms or conditions are allowed, then both analyses will be able to adequately describe the complexities of the intensive. Then, the argument must necessarily revolve around which theory most contradicts its basic tenets in making these innovations or accommodations. This will be the subject of further research.

NOTES

1 A few remarks on the Sanskrit language would be in order here. Sanskrit has a long recorded grammatical history and the language has been frozen in time for over 2000 years with very little change. In this time the grammarians and scribes have had ample time to "regularize" the language. Therefore, the grammarians give forms which, though seemingly theoretically possible, do not appear in extant texts. Thus the best source for data is from the Vedas, which have been well preserved. This is particularly important in the case of the intensive, which is no longer productive in the classical language.

2 The majority of the forms in (8)-(13) have been been taken from Steriade (1988). Although Steriade notes the difference between forms attested to in the texts and those found only in the grammatical literature, she chooses to include the latter. For the reasons given above, however, they have been excluded from this analysis.

3 Indeed, Burrow (1973) notes that in most verbs, in the case of the three singular persons the accent is on the reduplicative prefixes, and sometimes in the dual and plural as well, although here the accent also can fall on the suffixes. Moreover, he points out that generally speaking, accent in the Vedas is not completely stable.

4 In Sanskrit, the v is generally regarded as a semivowel (i.e. w).

5 A dissimilation rule applies here whereby the first velar stop of two adjacent, velar-stop-initial syllables palatizes; e.g. caka:ra (perfect of $\sqrt{k\underset{\smile}{r}}$ 'do').

6 Steriade (1988) assumes this for roots having nasal codas.

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PROSODIC ANALYSIS OF INTENSIFICATION IN JAPANESE

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1. INTRODUCTION

The purpose of this paper is to define a phonological process of "intensification" in Japanese. The process has never been discussed comprehensively in the literature. It involves insertion of a consonant before a consonant, and arguments for the moraic consonants or gemination in Japanese have sometimes touched upon the phenomenon; however, those data sets presented have been far from complete. Besides, possibly due to the insufficiency of the data, one important issue has been ignored; the specification of the insertion site. This paper will show that several different types of intensification are identifiable depending on the type of the circumsription of the operation domain. The Japanese intensification process will prove to be sensitive to two circumscription principles: prosodic and morphological.

2. A SKETCH OF THE PROSODIC STRUCTURE OF JAPANESE

2.1. Syllable Structure

Japanese is known to have a relatively simple syllable structure. The majority of the syllables have the form /(C)V/. Onset is optional, and is limited to one at maximum. A heavy syllable is certainly possible, and a syllable of the shape /CVV/ is not uncommon. A long vowel, /CVV/ where both of the V's share one melodic element, is phonemically contrastive with a short vowel. Closed syllables are rather limited both in distribution and in phonological shape. Nasal is the only consonant that can take the syllable-final position freely. Glides, liquids, and voiced obstruents are usually not allowed to close a syllable.[1] The other consonants, voiceless obstruents, can occur syllable-finally, but it must constitute a geminate or a homorganic cluster with the following consonant. A superheavy syllable /CVVC/ is subject to the same restriction, and is more limited in distribution. Syllabification in Japanese is not always straightforward. As onset is not obligatory, a word consisting of more than one morpheme[2] sometimes shows a sequence of vowels. The most complex case will be a sequence of one identical vowel,[3] like *sooon* ('noise') from *soo* ('noisy') + *on* ('sound'), and *hoooo* ('phoenix') from *hoo* ('male phoenix') + *oo* ('female phoenix'). The syllable structure of those words, particularly the question as to whether the syllabification should be sensitive to the morpheme boundary or not, is unclear to me.

2.2. Moraic Structure

Japanese is sometimes characterized as a mora-counting language (Kuroda 1965), or a mora-count syllable language (McCawley 1968). Vance (1987) provides three pieces of justification for asserting the existence of moras in Japanese. First, the default location of accent can be specified in terms of mora; i.e. it falls on the third mora from the end. This claim has been attested with nonsensical melody sequences and loan words like *pájama* ('pajamas') and *pairótto* ('pilot'). Second, rhythmic organization seems to involve moras as timing units. That is, the coda C/V is recognized

as an independent unit, just like a light syllable /CV/. In fact, each moraic unit corresponds to one character in the Japanese Kana writing system. Third, mora is the metrical unit in all kinds of Japanese versified poetry; consisting usually of combinations of five and seven moras. Heavy syllables are always counted as two units.

Lately, Katada (1990), McCarthy and Prince (1986, 1990), Poser (1990), Suzuki (1990), Tateishi (1989) have given ample evidence for the minimal unit template consisting of two moras (foot?). The bimoraic template is observable in such diverse areas as hypocoristics, truncation (abbreviated) words, reduplicative adverbs, secret words, among others. It seems beyond doubt that the bimoraic unit plays a crucial role in the Japanese phonology (and morphology). This, in turn, gives a very strong support for moraic structure in the language.

2.3. Moraic Consonant

In the last section, I mentioned that a closed syllable is limited both in distribution and in phonological shape. Restrictions on a closed syllable will amount to those on a moraic consonant in Japanese. This section will give a rough picture of the phonological and distributional properties of moraic consonants.

In Japanese, a vowel is always moraic. A consonant is usually non-moraic; the exceptions are a moraic nasal and a voiceless obstruent which constitutes the first half of a geminate. Note that the second half of the geminate is not moraic, being in the onset position. Naturally, there is no word that starts with either a moraic nasal or a moraic obstruent. A non-word-final moraic nasal has also been treated as part of a homorganic cluster, because it usually assimilates with the following segment (Itô 1989). Thus, [m̩] before labials, [n̩] before dentals/alveolars, and [ŋ̩] before velars. Otherwise, a moraic nasal is pronounced relatively close to ŋ, but the point of articulation is observed to be as far back as possible, with the oral closure unreleased (Vance 1987). (Represented here as n̩ for the sake of convenience.) The pronunciation of a moraic obstruent is close to that of a glottal stop. Kindaichi (1967) says that what is essential for it is sustaining an oral closure or constriction, the particular place of articulation being dependent on the following segment. Like the moraic nasal, it also lacks the release of an oral closure.

Historically speaking, Old Japanese did not use to have any moraic consonants, and the syllable structure was more regularly /(C)V/. The emergence of a moraic consonant has been attributed to the massive loan words from Chinese and a heterogeneous group of phonological changes known collectively as *onbin* that started around the ninth century (Vance 1987).

Synchronically, Kuroda (1965) describes four major morphological environments for a moraic consonant. First, verb-inflection, i.e. between the verb stem and the inflectional suffix; e.g. *mat.ta* ('waited'). Second, a certain type of adverb, to be discussed later. Third, the original morpheme boundary of Chinese compound words (registered as a simple word in Japanese); e.g. *sek.kin* from *čip+kʌn* ('approach'). Fourth, certain loan words: e.g. *hot.to dog.gu* (< *hot dog*), *pot.to* (< *pot*), etc. In a study of gemination in Japanese, Aoki (1981) lists some other environments where a moraic consonant (=geminate) can occur. It includes three types of denominal adjectives. An interesting point is that the adverbs that fall into Kuroda's second category and the adjectives which correspond to one of the three types listed by Aoki can be identified by a common denominator. That is, they all convey "intensified" meaning, like "very hot" as opposed to "hot". In what follows I will provide more data showing that the intensified words are not limited to those two classes, and will attempt

to define the process in a more comprehensive way.

3. INTENSIFIED ADVERBS AND ADJECTIVES

3.1. Data and Previous Studies

The data below exemplify the type of adverbs termed "intensified adverbs" by Kuroda (1965), Aoki (1981), and Vance (1987) (henceforth, Type I Intensification). They are composed of an (onomatopoetic) morpheme, which is very rich in inventory in Japanese, followed by the suffix /-ri/. A geminate is found after the first vowel of the base:[4]

(1) /gak.ku-ri/ /ga.ku-ri/ 'disappointedly'
    /pit.ta-ri/ /pi.ta-ri/ 'right (to the point)
    /šom.bo-ri/ /šo.bo-ri/ 'dejectedly'
    /gun.n^{y}a-ri/ /gu.n^{y}a-ri/ 'limply'

Given these data, Kuroda (1965) suggested that their form be represented as $C_1V_1C_0C_2V_2$–ri, C_0 being a moraic consonant to be assimilated with C_2. McCawley (1968) says that this is a case of the infixation of a moraic consonant and /-ri/ suffixation. Reviewing previous analyses, Aoki (1981) claims that the crucial process involved in the derivation of these adverbs is gemination. They seem to suggest that intensified adverbs constitute an independent morphological class on its own; no significance is attached to the C_0 (Kuroda) or the gemination (Aoki) itself outside this particular form of adverbs. Nevertheless, they all agree that the intensification of adverbs of this type is derivational.

A word is in order about this claim. Intensified adverbs are "arguably" derivational; they do not necessarily possess the non-intensified counterparts, though some actually do. The examples in (1) have the non-intensified form, while those in (2) below do not:[5]

(2) /yuk.ku-ri/ */yu.ku-ri/ 'slowly'
    /šik.ka-ri/ */ši.ka-ri/ 'courageously'

Nevertheless, a piece of evidence for the derivational view comes from the reduplicative adverbs and other related morphemes. Japanese is very rich in onomatopoetic-reduplicative adverbs. Often the base form of the intensified adverb is found in the base of the reduplicative adverb with almost the same meaning.[6] Besides, there are verbs and adjectives that seem to have supplied the base for the intensified adverbs:

(3) */kir.ra-ri/ /ki.ra-ri/ /kira.kira/
    /sap.pa-ri/ */sa.p(h)a-ri/ /saba.saba/
    /koŋ.ga-ri/ */ko.ga-ri/ /koge-ru/ (v.) 'burn'
    /yan.wa-ri/ */ya.wa-ri/ /yawaraka-i/ (adj.) 'soft'

Although there are still some adverbs whose non-intensified base never surfaces now, e.g. /yuk.ku-ri/, /šik.ka-ri/, etc., diachronic study shows that most of them used to have a possible non-intensified base: /yuku-ri/, /šika-to/ it is not unreasonable to assume that the intensified adverbs are in fact derived; the intensification process inserts the moraic consonant into the base at some level.

As mentioned above, the moraic consonant insertion as an intensification process is not limited to this particular type of adverbs. It is much more prevalent than has been suggested in the literature. (4) below exemplifies such adjectives, verbs, and adverbs which do not end in /-ri/ (henceforth, Type II Intensification). In (5) are both nouns and adjectives (henceforth, Type III Intensification).

(4) a. /toŋ.garu/   /to.garu/   'be pointed'
       /oṇ.naži/   /o.naži/   'same'
       /yop.podo/   /yo.hodo/   'very'
   b. /čis.sai/ (> /čič.čai/)   /čii.sai/   'small'
   c. /sug.goi/   /su.goi/   'terrible, great'

(5) a. /ɸukis.saraši/   /ɸuki.saraši/   'drafty'
       /akep.panaši/   /ake.hanaši/   'left open'
   b. /aoč.čiroi/   /ao.žiroi/   'pale'
       /karak.kaze/   /kara.kaze/   'gale'
       /kisecup.pazure/   /kisecu.hazure/   'unseasonable'
   c. /maruk.kiri/   /maru.kiri/   'completely'
       /aburak.koi/   /abura.koi/   'greasy'

The examples in (4-b,c) are exceptional. In (4-b), a vowel is lost; (4-c) shows voiced moraic obstruents. The latter seems to be an innovative variation observable in a colloquial speech. An alternative /suṇ.goi/ is also observable, particularly among the older generation.

There is another type of intensified adjectives worth considering. It is the type illustrated by Aoki (1981) as a case of gemination (henceforth, Type IV Intensification). See the following examples.

(6) a. /mak.kura/   'pitch dark'   /kura-(i)/   'dark'
       /maš.širo   'pure white'   /širo/   'white'
       /mas.saki/   'very first'   /saki/   'first'
       /map.piruma/   'broad daylight'   /hiruma/   'daylight'
       /map.padaka/   'stark naked'   /hadaka/   'naked'
   b. /mak.ka/   'deep red'   /aka/   'red'
       /mas.sao/   'deep blue'   /ao/   'blue'
   c. /ma.ue/   'right above'   /ue/   'above'
       /ma.šita/   'right below'   /šita/   'below'

Here, nouns (adjectives?) get /ma/ prefixed, and the moraic consonant occurs between /ma/ and the base. (6-b) shows some irregularity that has resulted from the lack of an onset element in the base. (6-c) exemplifies the data that have failed to get the moraic consonant inserted.

Given these data, an intriguing question is the location of the moraic consonant insertion. The examples in (4) seem to pattern with the /-ri/ adverbs, but those in (5) clearly deviate from them. The data in (6) also appear to conform to the pattern. None of the previous studies has suggested anything about the insertion site, except that the formula of Kuroda (1965) necessarily puts the moraic consonant after the first CV: $C_1V_1C_0C_2V_2$-ri. Obviously, however, it has nothing to say about the other types of intensified words illustrated above. Even in more recent studies this

problem has been neglected. Itô and Mester (1986) simply comment in a footnote that "Intensive Infixation can be viewed autosegmentally as insertion of a skeletal slot, followed by gemination (spreading) of the adjacent consonantal melody," giving the examples /karak.kaze/ and /toŋ.garu/. This view, "insertion of a skeletal slot", is untenable in the view of Prosodic Theory, as will be argued in the next section. A more adequate analysis, I believe, will be found in a prosodic analysis. The discussion below will show that a morphological unit and a prosodic unit intersect in an interesting way, giving a possible solution to yet another (seemingly distinct) type of intensification process.

4. PROPOSAL

4.1. Mora Attachment

Following recent developments in Prosodic Theory, I will assume that a segmental slot should not play more than a representational role (McCarthy and Prince (1986, 1990), Hayes (1989), Itô (1989) among others). The insertion of a moraic consonant should then be restated. Let me first consider, as a point of departure, the suggestion made by Itô and Mester (1986), and its inadequacies in the light of the prosodic analysis based on the "moraic hypothesis" by Hyman (1985) and Hayes (1989).

As mentioned in the previous section, Itô and Mester (1986) suggest that a segmental C is inserted, followed by spreading of a melody element. I agree with the view that the process involves spreading rather than copying of the melody. However, the insertion of a segment C does not make a correct prediction about the prosodic structure of an intensified word. The assumption behind the suggestion seems to be that the moraic value of the consonant, or the moraic consonant that characterizes the intensified words, is purely derivational. By "derivational" I mean that the mora is assigned to the segment by virtue of its being in coda position. The problem is the "underestimation" of the moraic value; it can be added or deleted.

In recent studies on Compensatory Lengthening, for instance, more importance is attached to the moraic value. Hayes (1989) describes Lengthening (long vowel, gemination) as essentially a result of the strategy to preserve the number of moras through derivation. Itô (1989) argues that Epenthesis results from interrelated requirements of prosody. She also explores the possibility of adopting a moraic theory and presents positive consequences. The point relevant here is that Epenthesis can also be interpreted as a manipulation process to conform to the well-formedness condition of a syllable structure in a given language while maintaining the weight (i.e. the number of the moras) involved in the morpheme (word). A rough principle seems to emerge: preserve the number of moras during derivation unless some rule "adds" or "deletes" mora(s).

This principle may seem too strong, especially given the Weight by Position Rule (Hayes 1989), which assigns a moraic value to any segment by virtue of being in the coda position. However, if this rule applies in Japanese at all, it must apply at the base level of derivation. One of the relevant data that come to my mind is verb morphology in Japanese, where some consonant-final verb stems trigger either gemination or vowel epenthesis to satisfy the requirements of the syllable structure in Japanese. Compare the following examples where a consonant-final verb stem is followed by a past tense morpheme /ta/. The moraic value after the vowel /a/ in the stem seems to be assigned by the Weight by Position rule, and the value must be preserved by a principle of mora (weight) preservation. Otherwise, the replacement by a geminate consonant and the /i/-epenthesis would find no explanation:[7]

(7) a.   /kaw/ + /ta/ → /kat.ta/   'bought'
    b.   /kat/ + /ta/ → /kat.ta/   'won'
    c.   /kas/ + /ta/ → /kasi.ta/   'lent'
    d.   /kam/ + /ta/ → /kaṇ.da/   'bit'
    e.   /kak/ + /ta/ → /kai.ta/   'wrote'

Thus, I will claim that the phonological process of intensification in Japanese is not the insertion of a consonant (or segment C) but the insertion of a mora. The unlinked mora invokes the spreading of the melody element over to it.

4.2. Prosodic Circumscription: Type I and II

The proposal that intensification is essentially a mora insertion is not unreasonable; however, it raises another question: Why is a consonant but not a vowel spread to fill up the mora. Given the syllable structure of Japanese, a vowel is always available in this position. Besides, recall that a CVV syllable is far more common and less restricted than a CVC one. Why should the inserted mora be associated with the consonantal element rather than the adjacent vocalic element?

This is an intriguing question especially in view of the fact that Japanese has yet another type of intensive adjective/adverb formation which is featured by the lengthening of a vowel (henceforth, Type V Intensification). This process has never been discussed in the literature to my knowledge,[8] but it is definitely an established phonological process, and the data is abundant in all kinds of (non-academic) publications as well as in mass media like T.V. and radio. The examples below show that even some of the output of the intensification process mentioned above can undergo this process:

(8) a.   /cuyooi/   /cuyoi/   'strong'
         /yowaai/   /yowai/   'weak'
         /maruui/   /marui/   'round'
    b.   /šizukaana/   /šizukana/   'quiet'
    c.   /pukaari/   /pukari/   'floating'
    d.   /mam.maruui/   /(mam)marui/ 'perfectly round'
         /čis.saai/   /čis.sai/   'small'
    e.   /sootto/   /sotto/   'quietly'
         /ɸuwaatto/   /ɸuwatto/   'softly'

I will come back to this type later; for the moment it is sufficient to remark that consonant gemination is not the only logical possibility to satisfy the prosodic requirement.

One part of the explanation to this problem relies on the idea of "Prosodic Domain Circumscription" discussed and formulated in McCarthy and Prince (1990), repeated in (9):

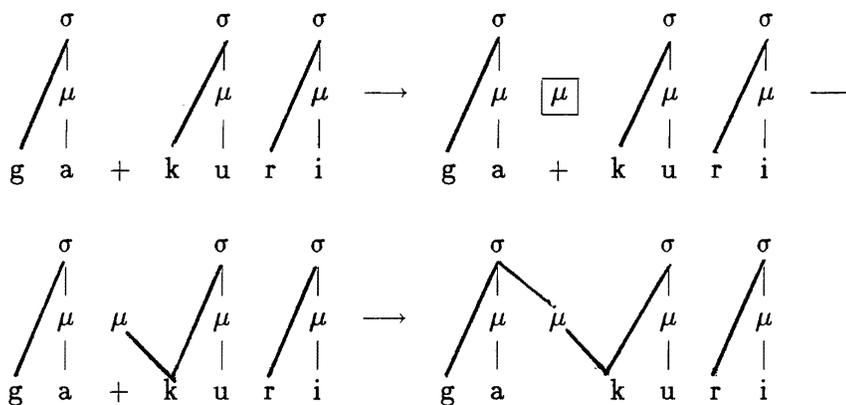(9) Prosodic Circumscription of Domains:

> The domain to which morphological operations apply may be circumscribed by prosodic criteria as well as by the more familiar morphological ones. In particular, the minimal word within a domain may be selected as the locus of morphological transformation in lieu of the whole domain. (pp. 199-210)

My proposal is that the intensification of Type I and II (cf. (1), (2), (4) above) is an operation applying under extrametricality, formulated as follows (cf. McCarthy and Prince 1990):
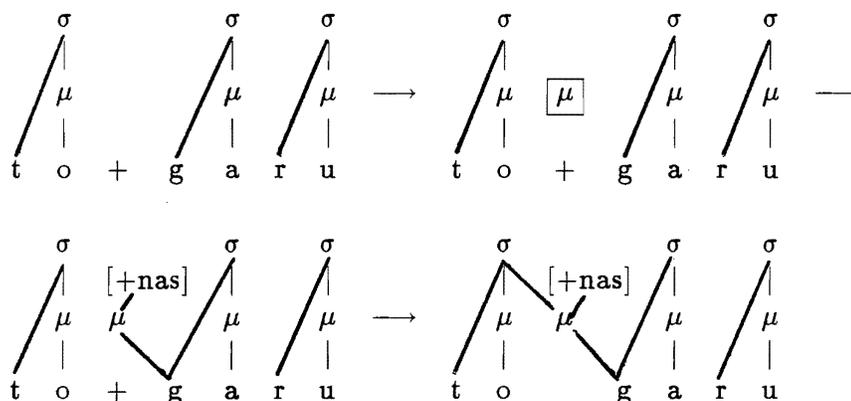
(10)   O/Φ(B) = B:Φ ∗ O(B/Φ)

where B stands for a base, O for an operation. B:Φ picks out the initial mora as extrametrical, with the residue, represented as B/Φ, undergoing the operation: prefixation of a mora. It is followed by the spreading of an available melody element. As the first moraic unit is excluded from the operation domain, the vowel is no longer available, rendering the association to the consonantal element obligatory. Note also that this process cannot be the suffixation of a mora to the first moraic unit, given the extrametricality argument in McCarthy and Prince (1990); that is, a phonological process cannot operate on the extrametrical elements. Thus, spreading of a vowel is automatically blocked. The derivation proceeds as follows:

(11)   /gakuri/ → /gak.kuri/ (Type I)

$$
\begin{array}{l}
\sigma\ [\mu\ g\,a] + \sigma[\mu\ k\ u]\ \sigma[\mu\ r\ i] \longrightarrow \sigma[\mu\ g\,a]\ \boxed{\mu} + \sigma[\mu\ k\ u]\ \sigma[\mu\ r\ i] \longrightarrow \\[4pt]
\sigma[\mu\ g\,a]\ \mu\!\!\!\vee\!\!\!k + \sigma[\mu\ u]\ \sigma[\mu\ r\ i] \longrightarrow \sigma[\mu\ g\,a\ \mu\ k]\!\!\vee\ \sigma[\mu\ u]\ \sigma[\mu\ r\ i]
\end{array}
$$

The last step above is reprosodization. The moraic consonant /k/ is associated to the first syllable because it must be a coda element. The extrametrical unit (the first moraic unit) is reprosodized to constitute a syllable sharing /k/ with the adjacent syllable. This whole process is required presumably by the principle of "Prosodic Licencing" in the sense of Itô (1986).

(12)   /togaru/ → /toŋ.garu/ (Type II)

$$
\begin{array}{l}
\sigma[\mu\ t\,o] + \sigma[\mu\ g\,a]\ \sigma[\mu\ r\ u] \longrightarrow \sigma[\mu\ t\,o]\ \boxed{\mu} + \sigma[\mu\ g\,a]\ \sigma[\mu\ r\ u] \longrightarrow \\[4pt]
\sigma[\mu\ t\,o]\ \mu^{[+\text{nas}]}\!\!\vee g + \sigma[\mu\ a]\ \sigma[\mu\ r\ u] \longrightarrow \sigma[\mu\ t\,o\ \mu^{[+\text{nas}]}]\!\!\vee g\ \sigma[\mu\ a]\ \sigma[\mu\ r\ u]
\end{array}
$$

Following Itô (1986, 1989), [+nas] feature is introduced and attached to the inserted mora in the derivation of (12). Recall that the gemination of a voiced obstruent is usually not allowed. The [+nas] feature is inserted to make up for the violation.

The point is that the actual domain of operation is not the whole word but the residue left when the first moraic unit is substracted. The motivation for defining the first moraic unit of those examples, I claim, is found in the accent system of Japanese.

The Japanese accent system is characterized by pitch, "the perceptual correlate of fundamental frequency (Vance 1987)". There is general agreement that the accent pattern of isolated Japanese words can be represented by specifying which moras carry high pitch and which moras carry low pitch (Vance 1987). For instance, see the following examples, where H represents a high pitch mora, L a low pitch mora:[9]

(13)	a.	za'razara	HLLL	'rough (surface)'		
	b.	tate'mono	LHLL	'building'		
	c.	širabe'ru	LHHL	'to investigate'		
	d.	takara'	LHH	'treasure'	cf. takara-ga (nominative)	LHHL
	e.	sakana	LHH	'fish'	cf. sakana-ga	LHHH

The last H syllable (usually coincides with mora) is considered the "accented syllable" and marked by a following " ' " in (13-a-d).[10] Note that (13-d) has the accent fall on the last syllable, while (13-e) has no accent. The distinction appears when a case marker is attached to each of them. Only in the (13-d) type does the case marker receive a lower pitch than the last syllable of the noun. It is worth noting that in Standard Japanese the initial short syllable (which has one moraic value) is always low in pitch unless it is the accented syllable itself, as illustrated in (13). This fact suggests strongly that the first mora is extrametrical by default, to be overridden only in the accent pattern of (13-a). Interestingly, there are no examples in the data of Type I and Type II where the base (when it is available) has the accented initial mora.[11] Thus it does not seem totally unreasonable to assume that the first moraic unit in question is indeed extrametrical.

The phonological irregularities found in some of the examples, repeated in (14), are accounted for by the segmental rules independently motivated in other domains of Japanese phonology. The major examples of the alternation are given in (15):

(14)	a.	/yap.pa-ri/	/ya.ha-ri/	'still, nonetheless'
	b.	/toŋ.garu/	/to.garu/	'be pointed' (v./adj.)
	c.	/šom.bo-ri/	/šo.bo-ri/	'dejectedly'
	d.	/boṇ.ya-ri/	/bo.ya-ri/	'absentminded'
		/yaṇ.wa-ri/	/yawaraka-i/	'soft'
	e.	*/hir.ra-ri/	/hi.ra-ri/	'quickly'

(15)	a.	/h/	→	/p/
	b.	/g/	→	/ŋ/
	c.	/b/	→	/m/
	d.	/y/, /w/	→	/N/

As for (14-a), there is agreement among Japanese linguists that /h/ is underlyingly /p/. This

"change" is historically proven, and is also widely assumed in a synchronic study as well. The correspondence is found in many different morphological classes among /h/, /p/, and /b/. As noted earlier in this paper, voiced obstruents, glides, and liquids do not allow gemination.[12] This possibly has forced the insertion of a moraic nasal before a voiced obstruent and a glide, which surface variably as ṇ, ŋ, and m̥ through assimilation. Liquids, on the other hand, seem to block the process altogether rather than inserting a moraic nasal; hence (14-e).

4.3. Morphological Circumscription: Type III

Now let me turn to the examples of Type III, repeated here in (16).

(16) a.	/ɸukis.saraši/	/ɸuki.saraši/	LHHHH	'drafty'
	/akep.panaši/	/ake.hanaši/	LHHHH	'left open'
b.	/aoč.čiroi/	/ao.žiroi/	LHHHL	'pale'
	/karak.kaze/	/kara.kaze/	LHHL?	'gale'
	/kisecup.pazure/	/kisecu.hazure/	LHHHLL	'unseasonable'
c.	/maruk.kiri/	/maru.kiri/	LHHL	'completely'
	/aburak.koi/	/abura.koi/	LHHHL	'greasy'

It is readily seen that the same type of mora attachement as proposed in the previous section features this intensification process, while the insertion site is clearly not the same. The prosodic circumscription fails to predict the correct shape of the intensified words of this class. Note that all the examples in (16) have the low pitched first mora in their base as well as in the derived (intensified) form. That is, they are exactly the same as those of Type I and II in terms of extrametricality. The prosodic circumscription proposed in the previous section would wrongly predict the intensified forms as in (17):

(17)	*/ɸuk.kisaraši/	/ɸuki.saraši/	LHHHH	'drafty'
	*/ak.kehanaši/	/ake.hanaši/	LHHHH	'left open'
	*/kis.secuhazure/	/kisecu.hazure/	LHHHLL	'unseasonable'

It is not very likely that the operation domain of these examples constitutes a prosodic minimal (bimoraic foot) word, either. Hence, some other type of domain circumscription seems to be at work in this case.

Morphological circumsription of the operation domain is what I claim to be operative in Type III Intensification. Note that the examples that fall into this class are either compound words or words consisting of a base plus a morphological affix, while those of Type I and II are all "atomic" words. The following list shows how they are composed:

(18) a.	/ɸuki+saraši/	'blow' + 'exposed'	'drafty'
	/ake+hanaši/	'open' + 'let free'	'left open'
b.	/ao+žiroi/	'blue' + 'white'	'pale'
	/kara+kaze/	'dry' + 'wind'	'gale'
	/kisecu+hazure/	'season' + 'displaced'	'unseasonable'
c.	/maru+kiri/	'round' + 'just'	'completely'
	/abura+koi/	'oil' + '-ish'	'greasy'

The mora is inserted at the boundary of the two component "words". To be more precise, the domain of the mora attachement (prefixation) is circumscribed to the second component word, the first part being eliminated from the operation domain. Clearly, this is not a case of mora suffixation, because then a long vowel would result: /karakaze/ → /karak.kaze/, */karaa.kaze/. The derivation is essentially the same as (11) and (12) (Type I-II) except with respect to the domain of operation. The same phonological restrictions and rules mentioned in relation to Type I and II will account for the irregularities observed here (e.g. /h/ → /p/, etc.).

4.4. /Ma/ Attachment?: Type IV

Now let me consider Type IV Intensification, briefly touched upon by Aoki (1981). The data is repeated in (19).

(19) a.
/mak.kura/	'pitch dark'	/kura-(i)/	'dark'
/maš.širo	'pure white'	/širo/	'white'
/mas.saki/	'very first'	/saki/	'first'
/map.piruma/	'broad daylight'	/hiruma/	'daylight'
/map.padaka/	'stark naked'	/hadaka/	'naked'

b.
/mak.ka/	'deep red'	/aka/	'red'
/mas.sao/	'deep blue'	/ao/	'blue'

c.
/ma.ue/	'right above'	/ue/	'above'
/ma.šita/	'right below'	/šita/	'below'

He assumes that /ma/ is an intensive adjective prefix. The "gemination" process takes place after the prefixation of /ma/. There are two possible ways to explain the phenomena along the line of the present argument. First, the prefixed /ma/ could be considered as the extrametrical unit. Whatever the accent pattern of the stem adjective is, the attachment of /ma/ changes it in such a way that the initial /ma/ gets low pitch and the following mora high pitch.[13] Differently put, the first moraic unit of the stem adjective which mostly gets low pitch in isolation gets high pitch when /ma/ is attached. This accent change is not always clear because not many of the examples of Type IV have the non-geminated counterparts, but in all cases where the non-geminated form is available, the accent change is observable. After the gemination they all conform to the pattern:[14]

(20)
/ma.širo-(i)/	LHHL	/širo-(i)/	LHL
/ma.hiruma/	LHLL	/hiruma/	LHH
/ma.hadaka/	LHLL	/hadaka/	LHH
/ma.šita/	LHH	/šita/	LH

In other words, along this line of explanation, the prefixation of /ma/ supplies input to the intensification process of Type I and II, that is, intensification under prosodic circumscription.

That is a possible explanation, but the account of Type III Intensification will provide an equally plausible explanation. /Ma/ is not likely to be just a functional or grammatical affix, considering the Chinese character assigned to it,[15] which has the meaning "true". Though it rarely stands on its own, it is not unreasonable to assume that the examples of Type IV are in fact "compound" words, like /mak.kura/ 'pitch dark' ← 'truly dark'. Given that, the intensification pattern will automatically follow from the principle of the morphological circumscription of the operation domain suggested for the cases of Type III; the mora is prefixed to the stem-part of the

base, and the first consonant of the stem gets spread over to the unlnked mora. At this moment, I have no further evidence to justify one analysis over the over, though intuitively I would opt for the second explanation.

Aside from the operation domain, the derivation is analogous to (11) and (12).

4.5. Lengthening of a Vowel: Type V

With respect to moraic weight, lengthening of a vowel and consonant gemination are considered as essentially the same type of phenomenon (Hayes 1989). Simply put, both of them featured the spreading of a melody element over a mora in coda position. The difference resides in the selection of the type of the element to be spread: consonant (from the adjacent onset leftwards) or vowel (from the adjacent nucleus rightwards). Starting from this assumption, this section will explore the possibility of extending the analyses for Type I-IV Intensification discussed so far to Type V Intensification featuring lengthening of a vowel.

First see the examples given above, repeated here in (21):

(21) a. /cuyooi/   /cuyoi/   LHL   'strong'
        /yowaai/   /yowai/   LHL   'weak'
        /maruui/   /marui/   LHH   'round'
     b. /šizukaana/ /šizukana/ HLLL   'quiet'
     c. /pukaari/   /pukari/   LHL/LHH 'floating'
        /soroori/   /sorori/   LHL/LHH 'slowly'
     d. /mam.maruui/ /(mam)marui/ LHHHL   'perfectly round'
   e. /sootto/   /sotto/   LHH   'quietly'

The domain of operation seems to be the word minus the last moraic unit. It cannot be the other way round; that is, the domain cannot be the last moraic unit. If the last moraic unit were the domain, then the last vowel /i/ would be lengthened in (21-a and d), a moraic nasal would be inserted in (21-b), and the process would be blocked in (21-c) (cf. (14-e), where a liquid blocks the process.) To put it another way, the difference between Type I-IV (=gemination) and Type V (=vowel lengthening) does not have to (and perhaps should not) refer to a rather fundamental distinction between a vowel and a consonant. Rather, I claim that the difference in question results from the difference in the attachment site of a mora: before the base or after the base.

Now the question is: What is the principle behind the circumscription of the operation domain in this case? Prosodic, morphological, or what? There seems to be no case where the final mora is accented with the exception of (21-c), where an accented final mora is only one of the possibilities. Though there are several cases where the final mora receives high pitch, they are in fact unaccented words. The general accent pattern of adjectives ending in /i/ (=*i*-adjectives) (21-a) is either unaccented or penultimate (mora) accent. (See McCawley (1968), Vance (1987).) Adjectives ending in /na/ (=*na*-adjectives or denominal adjectives) (21-b) show all varieties of accent pattern, though the inflective suffix /na/ never gets accented. However, this alone would not make a good argument for the extrametricality of the last moraic unit. As mentioned above in introducing the concept of mora and the default accent pattern in Japanese, low pitch moras must be counted from the end to an accented syllable. Default accent does not apply in this case, simply because these examples have a morphologically (lexically) conditioned accent pattern on their own. Default

accent thus does not provide a test for extrametricality in this case. It does show, however, that "low-pitchness" after an accented syllable or "unaccentedness" does not say anything about the extrametricality in itself. Therefore, in the absence of more dependable evidence, and given the variety of accent patterns of /na/-adjectives, I will conclude that Prosodic Circumscription is not a plausible solution.

I will claim that the circumscription in Type V is morphological. It gives a simple picture of the intensification process of this type. That is, a mora is attached to a morphological base, or a stem. Considering that /i/ and /na/ are grammatical (inflectional) suffixes, it seems (intuitively) natural that the mora is attached to the stem excluding the suffix. This situation can be contrasted with the compounding and morphological suffixation illustrated in Type III and IV Intensification, where the second morpheme provides the domain of mora insertion and a consonantal melody element is spread over the mora. The data in (21-c) and in (21-d) will be explained in the same way; /ri/ and /tto/ are both adverbializing suffixes and hence excluded from the domain of operation. The derivation is illustrated below:

(22) /ɸurui/ → /ɸuruui/ (Type V)
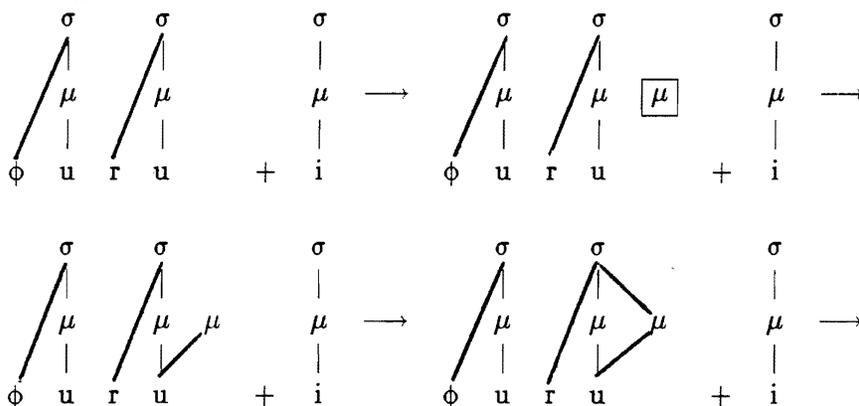
5. CONCLUSION

In this paper I have illustrated five types of intensified words, identifying mora-insertion as the common denominator. The five types are further classified into three according to the type of operation domain circumscription and the location of mora-insertion. Types I-II include non-compound words and invoke a prosodic circumscription. A mora is attached to the residue. In Types III-IV, on the other hand, there is either a compond word or a stem word with a morphological suffix. The words in these classes undergo a morphological circumscription rather than a prosodic one, and the domain is limited to the second part of the word. Type V includes both non-compound and compound words. It is subject to a morphological circumscription, presumably on a different level from Type III-IV, in the sense of lexical phonology; it parses the adjective/adverb stem off its inflectional suffix. The stem being the domain, the attached mora gets a vocalic element rather than a consonantal one spread over it. Given the classification based on the word-formation type, the surface differences like the mora attachment location and gemination vs. vowel lengthening are automatic consequences. I believe that the argument presented in this paper provides a simple, less stipulative answer to the question as to why a mora is attached to a certain site and not to the others, and why the additional mora is realized as a moraic consonant in some cases and as a lengthened vowel in others.

NOTES

1. I am assuming that there is no /(C)VG/-syllable on the surface structure in Japanese. The sequences /aw/, /ay/, etc. are to be analyzed as /au/, /ai/.

2. However, the vowels within one morpheme seems to be limited to two.

3. A morpheme carries some meaning of its own, and roughly corresponds to one Chinese character. A "simple" (non-compound) word can consist of more than one morpheme. It is somewhat analogous to those English words composed of Greek/Latin morphemes like re-turn, pro-ject etc.

4. The left-hand column represents the intensified words which are assumed to be derived from the base (non-intensified) words given in the right-hand column. The glosses given in the examples translate the base words unless specified otherwise. The meaning of the intensified words will be obtained by adding "very" to each of the given gloss.

5. The last example is different from others in that the base is not onomatopoetic. There are also some adverbs ending in /-ri/ that fail to undergo the intensified adverb formation like *hir.ra-ri/hi.ra-ri ('fluttering') and *por.ro-ri/po.ro-ri ('drop'). It is presumably due to a phonological constraint that blocks moraic liquids. They all have non-intensified meanings.

6. Reduplicative forms have often been used to justify the argument here. However, it could be a circular argument. The reduplicative adverbs in question seem to impose a bimoraic template ($/C_1V_1C_2V_2$-$C_1V_1C_2V_2/$) anyway, and never allow a moraic consonant to intervene between V_1 and C_2 because it would end up with three moras. Therefore, it is possible to argue that the moraic consonant is "dropped" to conform to the template; i.e. the opposite direction of argument.

7. The verb root in (7-a) may not be taken as a counterexample to the statement in footnote 1 above. Note that the glide after a vowel surfaces as a moraic consonant, i.e. voiceless obstruent. The glide is preserved only when the verb root is followed by a vowel. In that case, however, the glide is an onset segment.

8. This is presumably because it is somewhat more colloquial than the other types illustrated above.

9. Accentuation is according to Nihon Hoosoo Kyookai (ed.), *Nihongo Hatsuton Akusento Jiten* [Japanese Pronunciation and Accentuation Dictionary].

10. Note that the accented unit is defined in terms of a syllable rather than of a mora. This distinction is crucial. In Japanese, when a long syllable is accented, the first mora is H and the second mora is L. Recall that the default accent falls on the third mora from the word-final boundary. However, if the third mora from the end is the second mora of a heavy syllable, the accent shifts leftward to the first mora of the syllable (i.e. the fourth mora from the end). This is why McCawley called Japanese a "mora-counting syllable language" (McCawley (1968), Vance (1987), Tabata (1989)).

11. Three points require comments. First, I mean by "base" of Type I an adverb ending in /-ri/ without gemination. That is, the "base" should not be confused with the "quasi-base" like the related reduplicative adverbs and related verbs/adjectives mentioned above in defense of the

derivational view of Type I intensive adverbs. In particular, the reduplicative adverbs almost invariably get the first syllable accented; however, this is irrelevant to the accent pattern of the base. Second, as can be seen from the pattern of reduplicative adverbs, most of the recent prosodic template analyses show hardly any sensitivity to the accent pattern or the extrametricality. Usually the minimal base (arguably a bimoraic foot) is selected without any regard to the extrametricality argued for here (i.e. including the first mora). This problem can be got around, however, if one posits different levels of rule application. Thirdly, there is one exception to the extrametricality argument. That is, the intensified version of /i.cumo/ ('always') shows up as /ic.cumo/, but the accent pattern of the former is HLL, i.e., the first moraic unit is the accented syllable. This could be explained by "analogy", but I have no more plausible explanation to this exception.

12. Note the innovative variation in (4-c) above, which violates this constraint.

13. Here "stem" refers to the adjective form without /ma/, and "base" the form with /ma/ but without gemination.

14. The attachment of /ma/ has an overall effect on the accent pattern of a word; note the lowering of pitch in (20-b and c). The mechanism of the pitch change is beyond the scope of this paper.

15. A general tendency of Japanese is that grammatical, inflectional affixes are represented exclusively by syllabary (moraic) alphabets, while other units like nouns, adjective-stems, verb-stems, etc. have particular Chinese characters to represent their "concept".

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