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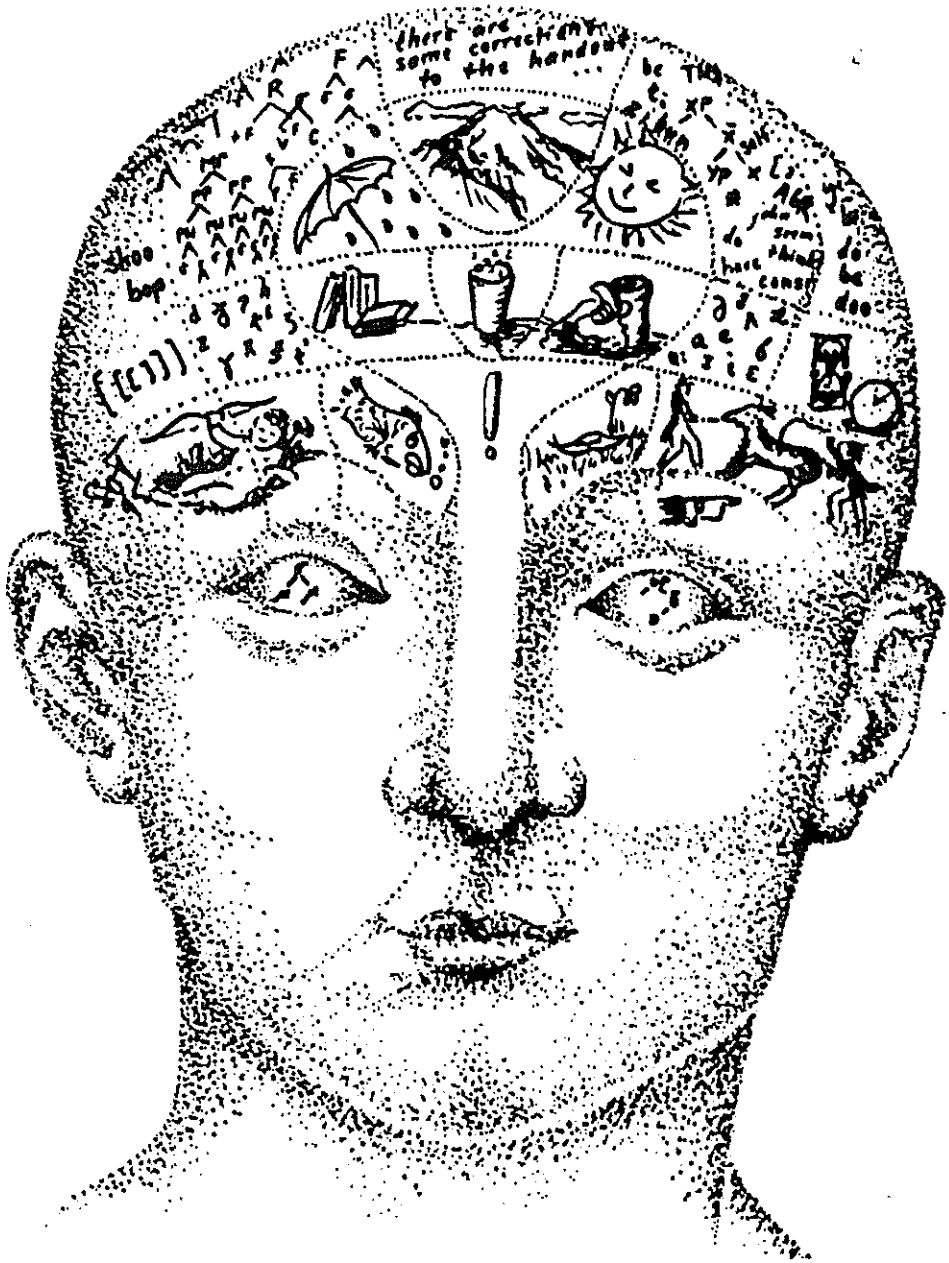

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An Account of *Wh*-Fronting in Aleut[1]

Kristin Denham

One of the most common descriptive difference across languages with respect to the behavior of *wh*-words is whether they remain in their canonical positions (in situ) at S-structure or not. It's been claimed that some languages have optional *wh*-movement. The first step in investigating such languages is to determine if the *wh*-movement is really *wh*-movement or if it is movement for some other purpose, such as topicalization or clefting. Cheng (1991) claims that *wh*-movement is only that movement to Spec of CP which serves to type a clause as interrogative. Chomsky's (1993, 1994) Minimalist Program only allows movement motivated by the presence of a strong feature. Thus, there should be no instances of optional movement within a language. Either C carries a strong feature, in which case there is overt movement, or a weak feature, resulting in covert (LF) movement.[2]

Though Aleut has been described as an in-situ language, I have found two instances of fronting, which are problematic for any theory which assumes no optionality of movement. I determine that the "*wh*-movement" in Aleut is not optional, but occurs for two reasons: topicalization and to avoid violation of a C^0-I^0 agreement requirement. Section one is a review of the data. Section two introduces the *yes-no*-question particle *ii* and reviews its distribution, which proves relevant for explaining the distribution of *wh*-words in *yes-no*-questions. Section three discusses the verbs *think* and *wonder* in English and applies analyses of Rizzi (1991) and Cheng (1991) to this data. Section four introduces the problematic Aleut data and shows how Cheng's and Rizzi's analyses cannot fully explain the data. An extension of head-to-head agreement is proposed to explain these facts.

[1] I offer sincere thanks to Michael Lestenkof for his time and for sharing his insights on his language. I thank Stefanida Lestenkof for her time and help as well. Special thanks to Heles Contreras, Sharon Hargus, Fritz Newmeyer, and Siri Tuttle for very helpful comments and suggestions, and also to Tomoko Sekiguchi, Kyoko Sato, and the other members of Linguistics 509 for comments on a presentation on an earlier version of this paper. I am, of course, solely responsible for all errors and shortcomings.

[2] I leave the implementation of the mechanics of the Minimalist Program to Aleut for future work.

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1 An In-Situ Language

Bergsland and Dirks (1981) claim that *wh*-words in Aleut occur only where their non-*wh*-counterparts do. They give examples like the ones in the next section.

1.1 Simple Questions

Aleut word order is SOV. *Wh*-words in matrix questions are typically in situ, i.e., they do not overtly front to a sentence-initial position (as they do in English). Below, is a non-*wh*-sentence illustrating the canonical SOV word order. All examples, unless otherwise noted, are from my own sessions with native speakers of Aleut.

(1) Piitraŝ Ivaanaŝ ilaĝulix.
Peter John help
'Peter is helping John.'

The order of elements in sentences with *wh*-words is the same as in those without. Thus, we have the following surface structures in sentences with the *wh*-words *kiin* 'who', *alqutax* 'what', and *qan* 'which', all of which maintain the SOV order.

• subject *wh*-word:

(2) Kiin Piitraŝ ilaĝulix?
who Peter help
'Who is helping Peter?'

(3) Qan ayagadaŝ Michaŝ aquliʁtalix
which girl Michael like
'Which girl likes Michael?'

• object *wh*-word:

(4) Piitraƛ kiin ilaĝulix?
Peter who help
'Who is Peter helping?'

(5) Michaƛ alqutaƛ qalix
Michael what eat
'What is Michael eating?'

(6) Ayagadaƛ alqutaƛ istalix
girl what say
'What did the girl say?'

(7) Michaƛ qan ayagadaƛ aquliƛtalix
Michael which girl like
'Which girl does Michael like?'

However, it is possible to front object *wh*-words if the relative case is used. The consultant sometimes produced examples like the following in which the object *wh*-word precedes the subject and the relative case occurs on the subject and verb.

(8) a. Kiin Piitra-**m** aquliƛtanaa
who Peter-REL like
'Who does Peter like?'

b. Piitraƛ kiin aquliƛtalix
Peter who like
'Who does Peter like?

Though Bergsland & Dirks' generalization that there is no movement/fronting of *wh*-words seems generally true, there are such exceptions. I will return to a discussion of these examples and the relative case in section four.

1.2 Embedded Questions

In declarative sentences with two clauses, the SOV order is maintained in both the matrix and embedded clauses.[3]

[3] When there is no independent nominal subject, the subject information is carried in the verb.

continued on next page

[S O V]
[S O V]
(9) Ivaanaƛ [Mariiyaƛ yaablukaƛ aquliƛtalix] anuxtaasakuƛ
John [Mary apples like] think
'John thinks Mary likes apples.'

The order in constructions when *wh*-words are present in the embedded clause is the same as without *wh*-words:

(10) Piitraƛ [kiin Mariiyaƛ aquliƛtalix] aqataatulix
Peter [who Mary like] know
'Peter knows who likes Mary'

(11) Piitraƛ [Mariiyaƛ kiin aquliƛtalix] aqataatulix
Peter [Mary who like] know
'Peter knows who Mary likes.'

We may conclude, then, that Aleut *wh*-words can always be in situ.

2 The *Yes/No*-Question Particle *ii*

2.1 Simple Yes/No-Questions

A question particle *ii* occurs in *yes/no*-questions. It always immediately follows the verb, which occurs sentence-finally, as shown in the following examples.[4]

(12) Awaltxin **ii**
work-you Q
'Are you working?'

[Ivaanaƛ txin aquliƛtalix] anuxtasku-qing
John you like think-I
'I think John likes you'

The object can also be incorporated into the verb, yielding a sentence like the following.

[Ivaanaƛ aquliƛta-txin] anuxtasku-qing
[John like-you] think-I
'I think John likes you.'

[4] It should be noted that *ii* may be replaced by intonation.

(13) Mariiyax̂ hilalix **ii**
Mary read Q
'Is Mary reading?'

Question particles are common in in-situ languages. Cheng (1991) claims, in fact, that all languages which do not have overt syntactic movement of *wh*-words also form *yes/no*-questions by means of some morphologically overt element (a particle, special inflection, or agreement). The particle *ii* appears to be such a particle. Any language which has a *yes/no*-particle, she claims, will also have a *wh*-particle, be it overt or non-overt. Cheng says these particles serve to type a clause as interrogative. Only languages without such particles type a sentence by moved *wh*-words.

Cheng claims that the languages with overt *wh*-particles (Japanese, Korean, and Hopi, among others) are languages that have ambiguous *wh*-words, that is, the *wh*-word can be interpreted as interrogative, existential, or universal. In Japanese, the interrogative reading of a *wh*-word is determined by the particle *-ka*:

(14) Dare-ga ki-masu-**ka**
who-N come-Q
'Who's coming?' (from Cheng 1991, (20a))

In languages which allow a non-overt particle, the *wh*-words are never ambiguous; they are always interpreted as interrogative (Hindi, Bahasa Indonesia, and Turkish, among others). The *wh*-words in Aleut always have an interrogative interpretation, and thus no overt *wh*-particle is necessary to disambiguate the *wh*-words. The assumption, however, is that a covert *wh*-particle is in Spec, CP to type the clause (and presumably mark the scope as well):

(15) $[_{CP}\ Q_i\ [_{IP}$ Piitrax̂ kiin$_i$ $[_{VP}$ ilaĝulix$]]]$
Peter who like
'Who does Peter like?'

Cheng also claims that no language will doubly-type a sentence. Though her discussion focuses on languages excluding both overt *wh*-movement and a *wh*-particle, the avoidance of double-typing is relevant also to typing with a *yes/no*-particle and a *wh*-particle. For example, (17) is ruled out below perhaps because a non-overt *wh*-typing particle is already present in sentence (16), making *ii* in (17) redundant.

(16) Kiin Piitrax̂ ilaĝulix?
who Peter help
'Who is helping Peter?'

(17) *Kiin Piitrax̂ ilaĝulix ii?

2.2 *Complex (or Only Adjacent?)* Yes/No-*Questions*

In complex *yes/no*-questions, the question particle *ii* occurs immediately following the matrix verb, which may occur either sentence-finally or sentence-initially.

(18) [Ivaanax̂ Mariiyax̂ aqulix̂talix] anuxtasxatxin **ii**?
[John Mary like] think-you Q
'Do you think John likes Mary?'

(19) = Anuxtasatxin **ii** [Ivaanax̂ Mariiyax̂ aqulix̂talix]?

(20) [Ivaanax̂ qax̂ qalaĝnax] aqaltaltxin **ii**?
[John fish eat] know-you Q
'Do you know (that) John is eating fish?'

(21) = Aqataltxin **ii** [Ivaanax̂ qax̂ qalaĝnax]?

The order of elements in (19) and (21)--with a sentence-initial verb--is possible, I believe, because there are two independent clauses. This is supported by the fact that the speaker paused after the *ii* when saying sentences of this type. Also, consider the fact that *ii* may not co-occur with a *wh*-word in a simple question, as shown above in (17). However, *ii* may occur when the

matrix subject and verb occur sentence-initially and there is a *wh*-word present in the lower clause as shown below:

(22) Mariiyax̂ aqatakan **ii [kiin** qax̂ aqulix̂talix?]
Mary know Q [who fish like]
'Does Mary know who likes fish?'

(23) Mariiyax̂ aqatakan **ii [kiin qan bukax̂** aqulix̂talix?]
Mary know Q [who which book like]
'Does Mary know who likes which book?'

A more literal translation of (22) is that which the consultant gives: "Does Mary know so? Who likes fish?" Because there are, in fact, two questions being asked, both *ii* and the *wh*-words may occur. One is typed by the *yes/no*-particle *ii*, and one is typed by the *wh*-particle. This analysis also allows us to maintain the basic SOV word order. The order in sentences such as (19), (21), (22), and (23) is S(O)V SOV.

When the subject of the matrix sentence is a full NP, the matrix verb always occurs sentence-finally:

(24) Piitrax̂ [Ivaanax̂ Mariiyax̂ aqulix̂talix] anuxtasalix ii
Peter John Mary like think Q
'Does Peter think John likes Mary?'

3 *Wonder* and *Think*

Before looking at more data from Aleut, let us first review the behavior and analysis of *wonder* and *think* in English. Consider the familiar data below.

(25) He wonders what you bought.
(26) What does he think you bought?

Descriptively, we can say that *wonder* takes an interrogative complement while *think* takes a non interrogative complement. Also, it has been noted that the surface order in each of the sentences above reflects the scope interpretations of the *wh*-words at LF. And though Chinese, for example, has no overt *wh*-movement, the same scope facts obtain. Therefore, many now assume (following Huang (1982)) that in sentences like those below, the *wh*-words move at LF to the same positions where the English *wh*-words are at S-structure:[5]

(27) Ta xiang-zhidao ni maile shenme
he wonder you bought what
'He wonders what you bought.'

(28) Ta renwei ni maile shenme
he think you bought what
'What does he think you bought?'

(from Aoun & Li 1993, (6a-6b))

To explain the *wonder* and *think* facts in English, Rizzi (1991) proposes the *Wh* Criterion.

3.1 Rizzi's Wh-Criterion

The *Wh*-Criterion is a general well-formedness condition on *wh* structures which is responsible for the S-structure and LF distribution of *wh*-elements. Rizzi assumes that in English, the Spec of Comp of an interrogative clause must be filled by a *wh*-word at S-structure. This explains why there is no sentence, for example, with an S-structure like the following:[6]

(29) *I wonder [[you saw who]]

[5] But see Aoun and Li (1993) for a proposal that the Chinese *wh*-words do not raise at LF, but are coindexed with a question morpheme which determines scope. The current discussion does not rest on selecting one or the other of these analyses. For expository purposes only, I will refer to there being LF *wh*-movement.

[6] This ignores echo-questions such as "You saw <u>who</u>?" where emphasis on the *wh* word permits the word to stay in situ. I will not deal with such constructions here.

Rizzi also assumes, "following standard practice," that the complementizer of a question is marked with the feature [+wh]. Then, the *Wh*-Criterion, given below, must be satisfied.

(30) The *Wh*-Criterion
A. A *Wh*-Operator must be in a Spec-head configuration with an $X^0_{[+wh]}$
B. An $X^0_{[+wh]}$ must be in a Spec-head configuration with a *Wh*-operator.

This expresses the fact that "at the appropriate level of representation," interrogative operators must be in the Spec of those CPs which are interpreted as questions and that CPs interpreted as questions must have interrogative operators as specifiers. In English, Rizzi asserts that the *Wh*-Criterion must be satisfied at S-structure. Though he doesn't talk specifically how this might explain the different surface positions of *think* and *wonder*, presumably the verb would specify whether the complementizer was marked [+wh] or [-wh]. Then whether or not a *wh*-word appears in that Spec depends on whether the Comp is specified [+wh].

3.2 Cheng's Clausal Typing

Cheng (1991) has a different way of capturing the facts about S-structure and LF distribution of *wh*-operators. Her Clausal Typing Hypothesis provides a motivation for syntactic *wh*-movement. As noted above, she claims that all languages with overt *yes/no*-particles will also have *wh*-particles (overt or non-overt). These *wh*-particles serve to type *wh*-questions as interrogative. The *wh*-particle in questions is base-generated in Spec of CP. For languages without such a particle, the *wh*-word itself moves to Spec of CP to type the clause as interrogative. Cheng's Clausal Typing Hypothesis is given below.

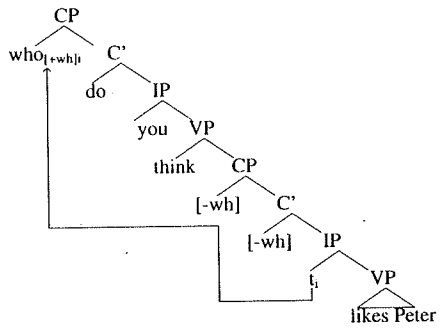
(31)
Clausal Typing Hypothesis: Every clause needs to be typed. In the case of typing a *wh*-question, either a *wh*-particle in C^0 is used or else fronting of a *wh*-word to Spec of C^0 is used, thereby typing a clause through C^0 by Spec-head agreement.

Her proposal can explain why there is *wh*-movement in a language like English and why there is no *wh*-movement in languages like Chinese or Japanese.

3.3 An Illustration: English

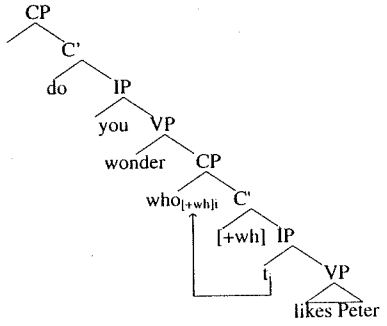
Cheng does not illustrate how the Clausal Typing Hypothesis might explain the surface order in sentences with *wonder* and *think*, which themselves subcategorize for an interrogative and non-interrogative CP respectively. Clausal typing alone will not suffice here since the *wh* words have different surface positions, as shown above in (25) and (26), and it must be determined whether the matrix or embedded clause is interrogative. We also need Rizzi's *Wh* Criterion. Let's look at an illustration of how this works in English. *Think* subcategorizes for a [-wh] CP, so this [-wh] feature shows up in C of the lower clause. Movement of the [+wh] *who* to the lower Spec does not satisfy the *Wh*-Criterion, so the *wh*-word continues on to the higher Spec, where it types the whole sentence as an interrogative.

(32)



Now consider a verb like *wonder*. *Wonder* selects a [+wh] CP, so *who*, which is inherently [+wh], may occupy that Spec since this satisifes the *Wh*-Criterion. However, its *motivation* for moving to Spec is to type the clause as interrogative.

(33)



In a language like Japanese, Chinese, or Aleut, clausal typing also happens at S-structure, but the *wh*-words stay in situ and *wh*-question particles in C do the typing. It is not until LF that the *wh*-words move to hold the correct positions for scope interpretation.[7] Thus, a *wh*-word in English moves to type a clause. Whether it stops in the lower clause or continues to the higher clause is determined by the *Wh*-Criterion.

4 Aleut Sentences with *Know* and *Think*

The Aleut sentences paralleling the English and Chinese ones in the previous section provide a challenge for the theory.[8] Although it was shown in section one that *wh*-words in Aleut usually remain in situ, those examples were only single clauses. The following apparent counterexamples occur in complex sentences. A subject *wh*-word such as *kiin*, 'who', must front to precede the matrix verb when it is *anuxta-*, 'think', but not when it is *aqata-*, 'know':

(34) Kiin anuxtasxatxin Piitraŝ aquliĉtalix
who think-you Peter like
'Who do you think likes Peter?'

(35) *Kiin aqataltxin Piitraŝ aquliĉtalix
who know-you Peter like
'Who do you know likes Peter?'

Following Cheng (1991), I assume that clausal typing in Aleut happens by means of a non-overt *wh*-particle since Aleut has a *yes/no*-particle *ii* and has been argued to be an in-situ-dominant language. Thus, there is no motivation for *kiin* to move out of its in-situ position to the front of

[7] Again, perhaps they don't move, but are coindexed with a question morpheme in the higher position. See Aoun and Li (1993).

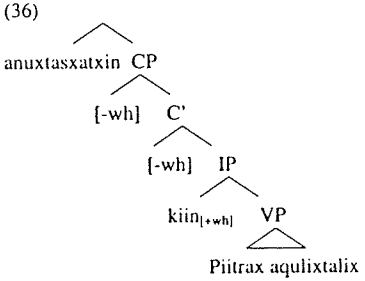
[8] The matrix verbs which may take embedded *yes/no*-questions across languages are a finite group. The verbs *know* and *wonder* are some of the most common. There is no Aleut verb with a meaning comparable to *wonder*. Thus, all of the example sentences have *know* as the matrix verb, with *think* as the counterpart which does not select for an interrogative. In future work, this group will be expanded to include verbs such as *ask* and *tell*.

the sentence. How then can the order in (34) be explained and why must the *wh*-word front with one verb and not the other?

4.1 Proposal: C^0-I^0 Agreement Includes [± wh]

There must be agreement between C^0 and I^0 in Aleut. Consider the structure below. The verb *anuxta-*, 'think', subcategorizes for a [-wh] CP, producing the following partial D-structure for sentence (34):

(36)



Because the feature of *kiin* does not match the dominating C's feature, *kiin* is not allowed to stay in place, but moves to the next higher CP, yielding the correct surface structure. Recall, however, that it has no motivation to move since, as an in-situ language, the clause is typed as interrogative by a non-overt *wh*-particle in the higher C. Thus, there appears to be head-to-head agreement between I and C.[9] We see similar agreement between I and C with respect to Tense.[10] For example, Chomsky (1981) notes that *that* subcategorizes for a [+Tense] verb and *for* for a [-Tense] verb, as indicated in the following example:

(37) a. The students prefer [S' for [S Bill INFL=[-TNS] to visit Paris]
b. The students prefer [S' that [S Bill INFL=[+TNS] visit Paris]

Though it has not been stated explicitly in the literature, it must be assumed that the complementizers themselves carry a [± TNS] feature when they are in C^0. Then, head-to-head agreement between C and I assures that *for* only takes a [-TNS] verb and *that* only takes a [+TNS] verb.[11] Similarly, I assume *kiin*'s [+wh] feature must agree with the feature in C. If it doesn't, the *wh*-word moves out of that clause and goes to the next highest CP. A *wh*-particle is in this higher C, so the *Wh*-Criterion is satisfied.[12]

To determine if this is the correct formulation, we should examine what happens with object *wh*-words. That is, if object *wh*-words are also fronted when the matrix verb is *anuxta-*, the restriction cannot stem from head-to-head agreement. Thus, we want to determine the surface order of elements in the sentence meaning, "Who do you think Peter likes?" in which the *wh*-word is the object in the embedded clause. Most often, the consultant gave the following sentence.

(38) Kiin anuxtasxatxin Piitram aqulix̂tanaa
who think-you Peter-REL like
'Who do you think Peter likes?'

[9] Presumably, such agreement is not required in other in-situ languages since we do not see the same fronting contrasts in those languages.

[10] Thanks to Heles Contreras for pointing out the similarity here to the independently-attested C^0-I^0 agreement which affects Tense.

[11] It seems odd that the complementizers themselves carry the TENSE features. Perhaps we should reexamine the tense facts and determine a better formulation for such agreement.

[12] The trace of the moved *wh*-word must not retain the [+wh] feature.

However, in this example, though the object *wh*-word occurs sentence-intially, the subject and verb are marked with the relative case. Generally, the relative case is used when the object is moved from its canonical position. When this happens, the subject gets the relative case marker *-m* and the verbal ending changes as well.[13] Thus, it is possible for an object to precede a subject, but when this occurs, the relative case must be used. Compare (34) from above, where the subject is in sentence-initial position, to (38), where the object is sentence-initial.

(34) Kiin anuxtaskatxin Piitraƛ aqulix̂talix
who think-you Peter like
'Who do you think likes Peter?'

(38) Kiin anuxtaskatxin Piitra**m** aqulix̂tan**aa**
who think-you Peter-REL like-s.REL
'Who do you think Peter likes?

Leer (1987) says that one use of the relative case in Aleut is in topicalized NPs, as in the example from Bergsland (1969) below (taken from Leer (1987)):

(39)a. tayaguƛ qaƛ qaluƛ
man fish eat
'the man is eating a fish'

b. qaƛ tayagu**m** qakuu
fish man-REL eat
'the fish, a man is eating it'

And as noted above in section one, I found that both orders are also possible with *wh*-words in simple sentences as well.

(40)a. Kiin Piitra**m** aqulix̂tan**aa**
who Peter like
'Who does Peter like?'

b. Piitraƛ kiin aqulix̂talix
Peter who like
'Who does Peter like?'

Thus, it appears that there is a preference for a *wh*-word to occur sentence-initially, especially in an embedded clause. Because the corresponding non-fronted order is also possible, it is clear that movement of the *wh*-words is not required. The *wh*-words tend to occur sentence initially since they are topicalized information. Though the judgments for the speakers are subtle, the meanings of the topicalized questions do appear to differ slightly--to be more contrastive or emphatic--from the non-fronted questions.

However, it is difficult to determine if the object *wh*-word in (38) above is fronted because of topicalization or for some other reason. Because non-topicalized orders are also possible, if (38) is an instance of topicalization, we should be able to get the non-topicalized version of it as well. This would indicate that head-to-head agreement includes a feature [±wh] in Aleut and, therefore, only subject *wh*-words should be affected. However, this is also difficult to determine because in complex questions with a *wh*-word, there is a tendency to create two independent clauses, as discussed above in section 2.2. Thus, the speakers produced three versions of the sentence meaning, "Who do you think Peter likes?": one is that given in (38), repeated here as (41). The other two, I believe, involve two independent clauses.

[13] The singular is marked by the suffix *-(k)uu* or *-(q)aa* on the verb. The inventory of the relative marker on the predicate is the following according to Bergsland and Dirks (1981):

	singular	**dual**	**plural**
present	-kuu	-kukix	-kungis
past	-qaa	-qakix	-qangis

This inventory varies somewhat from my consultant's data. For him, the vowel in the singular appears to vary according to the vowels of the root, so, for example, both of the following verbs are singular, present tense, with relative case: *aqulix̂tan**aa*** 'like', *kidu**kuu***, 'help'.

(41) Kiin anuxtaskatxin Piitram aqulix̂tanaa
who think-you Peter-REL like-s.REL
'Who do you think Peter likes?

(42) Anuxtasxatxin ii, Piitrax̂ kiin aqulix̂talix
think-you Q Peter who like
'Who do you think Peter likes?'

(43) Piitrax̂ kiin aqulix̂talix, anuxtasxatxin ii
Peter who like think-you Q
'Who do you think Peter likes?'

The complex sentence identical to (38)/(41), but with all elements in their canonical positions did not seem ungrammatical when posed to the speakers, though it was not the preferred version:

(44) Anuxtasxatxin Piitrax̂ kiin aqulix̂talix
think-you Peter who like
'Who do you think Peter likes?'

However, the generalization that only the subject *wh*-word of a *yes/no*-question with the matrix verb *anuxta-* must occur in sentence-initial position seems to hold true. This occurs because the features of the items in CP and IP do not match, forcing the *wh*-word to move to the closest CP that results in satisfaction of the *Wh*-Criterion. Additional evidence that (38) is an instance of topicalization is that non-*wh*-elements may also be fronted to topicalize, as noted above.

(45)a. Ivaanax̂ lakaayax̂ aqulix̂talix
John boy like
'John likes the boy.'

b. Lakaayax̂ Ivaanam aqulix̂tanaa
boy John-REL like
'It is the *boy* that John likes.'[14]

[14] I would like to see if you get the same order in a complex sentence with *anuxta-* and a topicalized non-*wh*-word as in a sentence with a *wh*-word. For example, is the following sentence possible?

Lakaayax̂ anuxtasxatxin Ivaanam aqulix̂tanaa
boy think-you John like
'Do you think it is the *boy* that John likes?'

continued on next page

Returning to the data with the subject *wh*-word, recall that (34), with matrix verb *aqata-*, 'know', is prohibited.

(35) *Kiin aqataltxin Piitrax̂ aqulix̂tálix
who know-you Peter like
*'Who do you know likes Peter?'

But when *kiin* is the object and there is relative case marking on the subject and verb, the sentence is allowed:

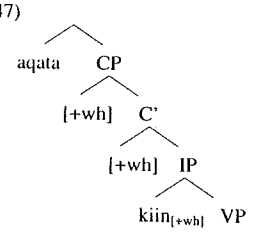
(46) Kiin aqataltxin Piitram aqulix̂tanaa
who know-you Peter-REL like
'Who do you know Peter likes?'

Thus, it is not the case that the *wh*-word is always fronted. This suggests that *kiin* in (46) is fronted for topicalization and not because of some sort of requirement on the position of *wh*-words specified by the verb or by features.

A tree representation for a sentence with *aqata-* as the matrix verb and *kiin* as the object is given below.

This may not be possible since *it* would probably be necessary and it always seems to occur sentence finally, following the verb, or preceding the embedded/second question, as shown in section two.

(47)



C-I agreement is satisfied--the features of the *wh*-word in IP match those in CP. Thus, there is no reason for the *wh*-word to appear in a sentence-initial position as in (35) and, consequently, such a sentence is ill-formed since it would violate the *Wh*-Criterion.[15] Example (46), however, is a feature-external movement operation. The motivation for movement is Topicalization, which is apparently a much freer movement operation, allowing *any* object to appear sentence-initially for emphasis.

5 Conclusion

In this paper, I have given an account of the apparent optional fronting of *wh*-words in Aleut. Such fronting only occurs with the matrix verb *anuxta-* 'think', which subcategorizes for a [-wh] CP. I have argued that because *kiin*, 'who', is inherently [+wh] it is not permitted to stay in the position adjacent to CP since C-I agreement is violated. Support for this is illustrated by the fact that object *wh*-words in a sentence with matrix verb *anuxta-* need not move. It was also suggested that other instances of fronting are simply topicalizations.

Is Aleut a counterexample to Cheng's claim that in-situ languages do not have overt *wh* movement? Not if we hold to her strong claim that "*wh*-movement" is only that movement which occurs at S-structure in order to type a clause as interrogative. There is forced S-structure movement of *wh*-words in Aleut, but the motivation for this movement is not clausal typing, but clause agreement. However, in her analysis of optional fronting languages (Egyptian Arabic, Bahasa Indonesian, and Palauan), she argues that "fronted" *wh*-arguments are base generated as the subjects of cleft constructions. Aleut, then, does differ in having forced overt movement motivated by something other than clausal typing.

[15] Though I do not have verbatim sentences from the consultants, it is possible for *aqata-* to also take declarative ([-wh]) complements as in "Peter knows whether it is sunny." If this is so (as one might expect since *know* in other languages selects for either ± interrogative), then *aqata-* will subcategorize for a [± wh] CP. This, however, does not change the analysis proposed above. If the complement is either [+wh] or [-wh] and the CP is marked for both, the *Wh*-Criterion will be satisfied and there will be no motivation for movement. It is only in the case of a mismatch of features, as with *anuxta-* that the element must move.

References

Aoun, Joseph and Yen-hui Audrey Li (1993) *Wh*-Elements in Situ: Syntax or LF? *Linguistic Inquiry* 24: 199-238.

Bergsland, Knut and Moses Dirks (1981) *Atkan Aleut School Grammar*. National Bilingual Materials Development Center, University of Alaska, Fairbanks.

Bergsland, Knut (1994) *Aleut Dictionary: Unangam Tunudgusii*, Alaska Native Language Center, University of Alaska, Fairbanks.

Cheng, Lisa Lai Shen (1991) On the Typology of *Wh*-Questions, Doctoral dissertation, MIT.

Huang, C.-T. James (1982) Logical Relations in Chinese and the Theory of Grammar, Doctoral dissertation, MIT.

Leer, Jeff (1987) Aleut Anaphora, Masters thesis, University of Chicago.

Rizzi, Luigi (1991) Residual Verb Second and the *Wh*-Criterion. Manuscript, Université de Genève.

German Word Stress in a Restricted Metrical Theory*

Michael Gamon

Abstract:
This paper offers an analysis of German word stress based on the metrical theory of Hayes (1995). It is shown that this restricted framework allows to formulate an analysis which is powerful enough to make a number of fairly intricate predictions about German word stress and the interaction of stress and affixation. Two stress rules and a set of extrametricality rules operating in a bistratal lexicon form the core of the analysis in this paper.

1. Overview

Section 2 introduces the basic generalizations about German word stress. In section 3 the analysis is developed on the background of a bistratal lexicon in German. Section 4 deals with stress-conditioned allomorphy in German and shows how these facts can be handled under the analysis proposed here. The persistence of German stress, i.e. their "everywhere" character within one lexical stratum is considered in section 5. In section 6 secondary stress is briefly investigated. Section 7 contains some discussion of an apparent problem for the analysis argued for here. Hall's (1992) analysis of German word stress is the focus of section 8, where it is compared to the proposal in this paper. In section 9, finally, I draw some conclusions and try to couch the claims of this paper in the discussion of central issues in lexical phonology.

2. German Word Stress

Starting with Wurzel (1970) it has become clear that predictability of German word stress is not confined to the native vocabulary which (with some exceptions) exhibits word-initial stress. Wurzel argues that nonnative words, too, exhibit a regular, though intricate pattern of stress. He adduces two pieces of evidence against a treatment of nonnative word stress as irregular or borrowed from the donor languages. The first argument is that a nonsense word with a typical nonnative segmental make-up is invariably stressed in the same way by native speakers. Secondly, the stress pattern of a word in a donor language is often changed in the borrowing into German; the Icelandic word "berserkur", for example, stressed word-initially in Icelandic, receives stress on the penult when borrowed into German as "Berserker."

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Consider now the following native and nonnative examples with their respective word-stress assignment to illustrate some basic generalizations about German word stress:

(1)

native words:	nonnative words:
a.) Héring [hé:rɪŋ] (herring)	d.) horrénd [hɔrɛnt] (horrendous)
b.) Ámboß [ámbɔs] (anvil)	e.) Senát [zená:t] (senate)
c.) Héirat [háyrat] (marriage)	f.) Energíe [ɛnɛrgí:] (energy)
	g.) Koróna [koró:na] (corona)
	h.) Anarchismus [anarçísmus] (anarchism)
	i.) Analéptikon [analéptɪkɔn] (analepticon)
	j.) Kámera [kámera] (camera)
	k.) Cleopatra [kleó:patra] (Cleopatra)

In the native words stress falls on the first syllable, while in the nonnative words the last heavy syllable is stressed.
Hall (1990) summarizes the pattern in nonnative words as follows:
- the last syllable is stressed if heavy (1d,e,f)
- if the last syllable is light, the penult is stressed if heavy (1g,h)
- if both penult and ultima are light, the antepenult is stressed, independent of whether it is heavy or not (1j,k)

Note that stress can not fall any further from the right edge of the word than the antepenult, even if the syllable preceding the antepenult contains a long vowel:

(2) Drosóphila [dro:sófɪla] (drosophila)

The question as to what counts as a heavy syllable has to be answered differently for syllables in word-final and in word-internal position: word-finally rhymes of the form VV and VCC make syllables count as heavy: compare (1d,e,f) where the final heavy syllable receives stress versus (1g-k) where the final syllable counts as light, not attracting stress. Word-internally syllables containing long vowels or diphthongs and closed syllables count as heavy as in (1g-k).
To summarize the generalizations made in the section above: In native words stress falls on the first syllable of the stem. In nonnative words stress falls on the last heavy syllable, and on the antepenult if both penult and ultima are not heavy. Word-internally,

closed syllables or syllables with long vowels or diphthongs count as heavy, and word-finally syllables with rhymes of the form VV or VCC.

This summary of the generalizations governing word stress in German is simplified, however. There are a number of exceptions for each of the generalizations presented above. As Jessen (1994) points out, the most problematic generalization concerns words with a long tense final vowel. While words like Energíe [ɛnərgí:] (energy) in (1d) above attract stress on the final tense vowel[1], there are many exceptions to this pattern. Some of the examples from Jessen (1994) and Benware (1980) include Eskimo [ésklmo] (eskimo) with stress on the antepenult, and Albino [albíno] (albino) with stress on the penult.

In other words: while a large part of the word stress facts in German are rule-governed, stress in other examples has to be treated as lexically listed. The decision as to which analysis of the data is preferable and which part of the data has to be treated as lexical exceptions will have to depend on which account makes the most interesting predictions, combined with the smallest rule-apparatus. In section 8 I will try to defend the analysis to be presented in this paper against Hall's (1992) analysis which draws the line between lexical exceptions and regular phenomena differently.

3. A Cyclic Analysis of German Word Stress

A number of rule systems for German word stress have been proposed in the literature (Wurzel (1970, 1980), Benware (1980), Féry (1986), Hall (1991), for an extensive survey see Jessen (1994)). While most authors make a distinction between a quantity-insensitive rule for native words and quantity-sensitive rules for nonnative words, Giegerich (1985) proposes a single quantity-sensitive stress rule. The native stress pattern in his model has to be derived from the status of most native words as compounds which allows the leftmost element to be stressed before compounding. This rather stipulative treatment drew heavy criticism from Hayes (1986), who suggests that German (native) word stress is phonemic, and that a quantity-sensitive German stress rule exists which specifies a "default stress pattern." Hall (1992) takes a similar stance, arguing for a single, quantity-sensitive stress rule in German, with the stress on native words being phonemic.

In this paper I propose an analysis couched in Hayes' (1995) theoretical framework, making use of two different rules for metrical structure-building for native and nonnative elements respectively.

In 3.1 I briefly introduce Hayes' (1995) theory. After discussing the issue of vowel quantity and tenseness in German as presented in Hall (1992) in 3.2, I propose a system of three stress rules in a two-level lexicon in German. This proposal is augmented by two extrametricality rule in section 3.4. I finally show some sample derivations to illustrate the mechanics of the proposed analysis.

3.1 Hayes' (1995) Metrical Stress Theory

In this section I will introduce some features of the metrical stress theory of Hayes (1995) which are of importance for the analysis proposed in this paper.

Hayes (1995) proposes a highly restricted metrical theory, building on a small set of basic metrical feet. This set includes the moraic trochee, the syllabic trochee and the iamb, as illustrated in (3) below, where X is a metrical grid marker and feet are enclosed in parentheses:

(3)

moraic trochee:		syllabic trochee:	iamb:	
(X .)	(X)	(X .)	(. X)	(X)
∪ ∪	–	σ σ	∪ σ	–

The moraic trochee as a quantity-sensitive foot type organizes two light syllables or one heavy syllable into one foot. The syllabic trochee, being quantity-insensitive comprises two syllables in a left-dominant foot. The canonical iamb consists of a light syllable, followed by any syllable. A noncanonical iamb can be built over a single heavy syllable. Note that one important feature of this very restricted set of possible foot types is that no ternary feet exist.

Syllable weight is determined by the number of morae a syllable contains. The version of moraic theory adopted by Hayes (1995) is one where the onset in a syllable is adjoined to the initial mora in that syllable. Since nothing in the analysis to be developed here crucially hinges on whether a moraic theory or a theory of syllabic constituency is adopted, I will follow this track.

Cross-linguistic variation in what syllable internal structure counts as heavy versus light is captured by extrametricality rules that can exclude a phonological constituent (root node, mora, syllable) at the word-edge from being part of the metrically visible structure. "Degenerate feet", i.e. feet which consist of only one mora or only one syllable in quantity-sensitive and quantity-insensitive systems respectively are banned from the metrical repertoire of many languages. In other words, a ban on degenerate feet can be active in the phonology of a particular language. This ban can take either a strong or a

weak form. If the ban is strong, degenerate feet are absolutely excluded, i.e. the language does not have words which don't allow for the construction of a nondegenerate foot. If the ban is weak, on the other hand, degenerate feet are licit in monomorphemic words where no canonical foot can be constructed.

Word-stress is determined by an "Endrule Right" or "Endrule Left" which places an extra gridmark on the leftmost or rightmost available position. Available position means that placement of a gridmark at that position does not violate the "Continuous Column Constraint" which bans noncontinuous columns of gridmarks. The Endrule is by definition unbounded in the sense that it scans the whole domain of its application.

Finally, languages can differ in whether they allow for iterative application of foot construction or not, and in whether the foot construction applies from right-to-left or from left-to-right.

3.2 Vowel Quantity and Tenseness in German

As Hall (1992) notes, it has been a long-standing discussion in German phonology whether vowel length or tenseness are part of the underlying representation in the German lexicon, or, in other words, which one of the two properties is derived from the other by rule. This question is of course significant for the application of stress rules since vowel length is crucial in determining whether a syllable is heavy or not: long vowels are dominated by two morae (or in syllable constituency theories by a branching nucleus).

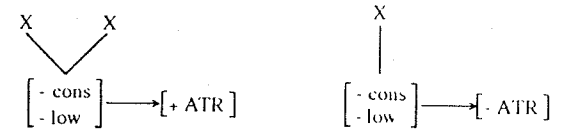
I will follow Hall (1992) in assuming that the underlying distinction is one of vowel length and that the feature [+ATR] is introduced by a tensing rule. Note that the feature [ATR] must be treated as a distinctive feature of German to make a distinction between the two phonemes [e:] and [ɛ:]. For the sake of completeness I will briefly summarize the arguments for this position as presented in Hall (1992) in this section.

First, there is evidence from phonotactic constraints. The rhyme of the German syllable is restricted to one consonant and either a long vowel or a diphthong. If the rhyme contains a short vowel, two consonants are licit. Coronal obstruents are the only consonants that can extend this pattern[2]. Since phonotactic constraints are constraints on underlying representations, vowel length must be present at that level.

Secondly, surface short tense vowels can be shown to be derived from long vowels. They are in complementary distribution with long tense vowels since they occur in open, unstressed syllables, while their long counterparts occur in open or closed stressed syllables. Phonotactically, short tense vowels behave like long vowels in that they can never be followed by [ŋ] and in that they count as long with respect to the restriction on rhyme-structure mentioned above.

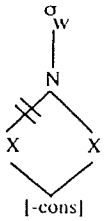
The rules proposed by Hall (1992) to fill in the feature [+/-ATR] on the basis of underlying vowel length are given in (4) below:

(4) *Default Tenseness Rules:*



The vowel shortening rule deriving surface short tense vowels is stated in Hall (1992) as in (5) below, where σ_w denotes an unstressed (weak) syllable:

(5) *Vowel Shortening:*

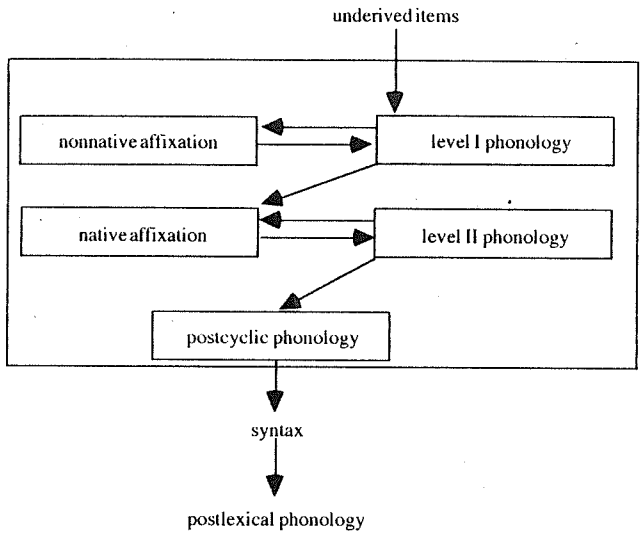


To summarize this section, I have briefly presented the arguments in Hall (1992) to the effect that German vowels are underlyingly specified as long or short, tenseness being derived from that lexical property.

3.3 German Stress Rules in a Two-Level Lexicon

In what follows I will explore an approach based on cyclic interaction of two stress rules in German. I assume, following Giegerich (1985) and Hall (1990) that the German lexicon is organized on two levels, as illustrated in (6) below:

(6)



Giegerich (1985) assumes that the stress rules operate between level I and level II, allowing for the correct prediction that level II affixes can be sensitive to stress, and that they never attract stress, while level I affixes can attract stress - if they have the appropriate syllable structure. This generalization will be captured by the analysis to be developed here, although stress rules will operate on both levels.
Assume now that the following stress rules operate on the two levels of the German lexicon:

level I: (ERL) End-Rule Left, restricted to native words
level II: (SR) Stress Rule: create moraic trochees from right to left, non-iterating
(ERL) End-Rule Left

The application of these cyclic rules is restricted by the Strict Cycle Condition as stated below:

Strict Cycle Condition applied to ERL and SR: Stress rules cannot destroy existing metrical structure. They can only reapply in a domain if new material becomes visible to stress assignment at that point of the derivation.

Note that it seems idiosyncratic to have the End-Rule Left apply at an earlier level than the foot-creating Stress Rule. In Hayes' (1995) theory, however, End Rules have two distinct functions: they either operate on existing metrical structure or they create unbounded feet on material that has not yet been assigned any metrical structure. In the analysis proposed in this paper, both these functions are employed. The creation of unbounded feet is confined to native words at a point in the derivation at level I where no metrical structure has been constructed yet, and the word-level application of End-Rule-Left takes place on later cycles. This mode of application of the End-Rule-Left falls out from the rule-organization proposed above without any stipulation.

3.4 Quantity-Sensitive Extrametricality

The rules above have to be augmented by an account of extrametricality in German, in light of the facts presented in section 2. Recall that word-final syllables count as heavy under different criteria than word-internal syllables. Those differences are summarized in (7) with reference to the relevant rhyme-structure:

(7)

word-internal rhymes		word-final rhymes:	
heavy	light	heavy	light
VV, VC(C)	V	VV, VCC	VC, V

At first blush it seems that a simple rule of consonant-extrametricality can account for these differences: if word-final consonants are considered extrametrical, a word final rhyme VC will be reduced to V for the purpose of syllable weight. That allows the formulation of a uniform criterion for syllable weight in German: syllables with a branching rhyme or a branching nucleus count as heavy, syllables with no branching in rhyme or nucleus as light. In terms of moraic theory, this statement could be formulated as follows: the rule "weight by position" which builds an extra mora on a syllable final consonant applies word-internally, but not word finally.
Note, however, that this solution does not work if the generalizations about word stress in German are taken into account in a restricted metrical theory such as the one adopted here: recall that in a word with a light ultima and a light penult the stress falls invariably on the antepenult. Since feet can only be binary in Hayes' theory, this pattern has to

result from construction of a binary foot at the right edge of the word. For this to work, however, the ultima must be invisible to foot construction, i.e. the ultima must be extrametrical. To summarize: For the seeming "ternary" foot effect it has to be assumed that a light ultima is extrametrical, but for a uniform assessment of syllable weight in German consonant extrametricality seems to be the right tool. An extrametricality rule as in (8) yields the right compromise (extrametricality is indicated by < >):

(8) Extrametricality (all levels):

$$\sigma \dashrightarrow \langle\sigma\rangle \quad \text{at the right edge}$$
$$(C_0)\ V\ (C)$$

Stated in words, this rule has the effect that a syllable at the right edge of a word is extrametrical if its rhyme consists either of a single vowel or of a vowel followed by one consonant[3]. Syllables with long vowels, diphthongs, or two or more consonants in their rhyme are not affected.

Although (8) yields the right results, it is a very peculiar "quantity-sensitive extrametricality rule", and the disjunction contained in it is suspicious. Although I will not be able to eliminate the disjunction, some improvement can be made: (8) can be regarded as the result of the application of two different extrametricality rules: consonant extrametricality and quantity-sensitive syllable-extrametricality (in that order):

(9) *Quantity-sensitive extrametricality: (EM)*

(a) consonant-extrametricality:

<C> at the right edge

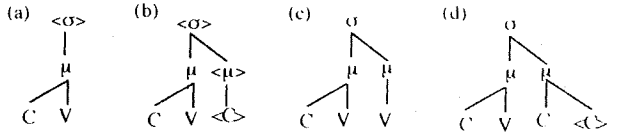
(b) quantity-sensitive syllable extrametricality:

<σ> at the right edge

μ

To illustrate the operation of (9) consider the examples below: word-final syllables of the form CV (a), CVC (b), CVV (c), and CVCC (d):

(10)



In (10a) rule (9a) is inapplicable, and (9b) applies. In (10b) the final consonant is extrametrical. As a consequence, the syllable consists only of one "visible" mora, which subjects it to extrametricality rule (9b). In (10c) neither of the rules applies, and in (10d) consonant-extrametricality has no consequences for the syllable because the final mora contains another element, so that the syllable counts as heavy for the purpose of stress assignment.

Note that the rules (9a) and (9b) do not violate the general constraint that extrametricality must not "chain", i.e. that it is not allowed to operate iteratively: the extrametrical constituent defined by (9b) dominates that defined by (9a). Therefore (9b) does not operate at a domain-edge that is created by (9a).

Note, finally, that, as Hayes (1995) suggests, extrametricality rules are blocked from application in a context where they would render a domain completely extrametrical. In other words, extrametricality cannot make a word unstressable. Hayes (1995) refers to this restriction as Exhaustivity.

In summary, I have argued here that an ordered pair of extrametricality rules as in (9) makes the right distinctions between heavy and light syllables for the purpose of stress assignment. The net result of the two rules is that final syllables are extrametrical if they are of the form CV or CVC, while syllables with long vowels or more than one consonant in the coda are not extrametrical and therefore visible for the construction of metrical structure.

3.5 Sample Derivations

I will illustrate the operation of the stress rules proposed in section 3.3 and 3.4 with some examples in this section.

Consider first the derivation of a native word with initial stress such as "Heirat" (marriage):

(11) hayra:t

level I:

EM (a) hay ra: ‹t›

ERL
X
hay ra: ‹t›

level II:

SR
X (X)
hay ra: ‹t›

ERL
X
X (X)
hay ra: ‹t›

At level I the extrametricality rule (9a) applies, rendering the final consonant extrametrical. Endrule Left (EL) applies, placing a gridmark on the leftmost available position. Note that this gridmark does not represent a metrical foot (it is not enclosed in parentheses in the representation above). At level II the Stress Rule (SR) applies, creating a moraic trochee at the right edge of the word. ERL reapplies, again placing a gridmark on the leftmost available position, resulting in main stress on the first syllable. Consider nonnative words next:

(12)	hɔrɛnd (horrendous)	ko:ro:na (corona)	analɛptIkɔn (analepticon)
level I:			
EM (a)	hɔ rɛn‹d›	----------	a na lɛp tI kɔ ‹n›
EM (b)	----------	ko: ro: ‹na›	a na lɛp tI ‹kɔ ‹n››
ERL	----------	----------	----------

level II:

SR:
(X) (X) (X .)
hɔ rɛn‹d› ko: ro: ‹na› a na lɛp tI ‹kɔ ‹n››

ERL:
X X X
(X) (X) (X .)
hɔ rɛn‹d› ko: ro: ‹na› a na lɛp tI ‹kɔ ‹n››

Notice that ERL at level I is restricted to native words, hence does not operate on the nonnative words in the sample derivations above. The EM rules make the last syllable of /ko:ro:‹na›/ and /analɛptI‹kɔ ‹n››/ extrametrical and therefore invisible for the Stress Rule at level II. In /hɔ rɛn‹d›/ only the last consonant is extrametrical, and the last syllable is still closed for the purpose of the Stress Rule. At level II the Stress Rule forms moraic trochees from the right edge. Finally, Endrule Left applies at level II, placing an extra gridmark on the leftmost available position, which is now defined by the leftmost gridmark. As a result, /hɔrɛnd/ receives main stress on the last syllable, /ko:ro:na/ on the penult, and /analɛptIkɔn/ on the antepenult.

4. Allomorphy of the Suffixes *-keit* and *-igkeit* in German: Support for the Cyclic Analysis of German Word Stress

Here I will show, following Giegerich (1985), that the distribution of the German suffixes *-keit* and *-igkeit* is governed by stress properties of the morphologically simple or complex items they attach to[4]. The case of morphologically complex hosts will be of particular interest, since in these cases it can be demonstrated that the distribution of the allomorphs is sensitive to metrical structure assigned by cyclic application of the Stress Rule. Section 4.1 contains the generalizations about the distribution of the two allomorphs, and an explanation in terms of the rule system proposed in section 3. In section 4.2 a class of seeming counterexamples is examined. Section 4.3 points out a remaining problem.

4.1 *-keit* and *-igkeit* as Stress-Sensitive Suffixes

The level II suffixes -igkeit (/Igkayt/) and -keit (/kayt/) in German attach to adjectives, deriving nominals:

(13)	hél (light)	----->	hél-Igkayt (lightness)
	gənáu (precise)	----->	gənáu-Igkayt (precision)
	áytəl (vain)	----->	áytəl-kayt (vanity)
	tápfər (brave)	----->	tápfər-kayt (bravery)

They are in complementary distribution:

(14)	hél	----->	*hélkayt
	gənáu	----->	*gənáukayt
	aytəl	----->	*áytəlIgkayt
	tápfər	----->	*tápfərIgkayt

I will argue - adopting Giegerich's (1985) proposal - that stress-sensitivity of these suffixes is the key to their distribution. I will then show that cyclic application of the stress rules proposed in section 3.2 provides the metrical structure the allomorphy condition refers to[5].

Giegerich (1985) claims that the distribution of -igkeit and -keit is governed by an allomorphy condition which refers to the metrical structure of the elements the suffixes attach to. Given the data in (13) and (14), which all involve underived adjectives, a simple generalization seems to be possible: -igkeit attaches to items with a stressed final syllable, -keit attaches to elements with an unstressed final syllable. Giegerich points out that the situation is more complex, however, as becomes clear when derived adjectives are taken into account:

(15)	léb-hàft (lively)	----->	leb-haft- Igkayt (liveliness)
			*leb-haft-kayt
	fróynd-IIç (friendly)	----->	fróynd-IIç-kayt (friendliness)
		----->	*fróynd-IIç-Igkayt

In (15) the adjectival suffixes -haft (/haft/) and -lich (/IIç/) don't bear word stress, but some secondary stress is present in the suffix -haft. In (15) -igkeit attaches to the adjective ending in secondarily stressed -haft, -keit to the one ending in unstressed -lich. Their distribution is still complementary in (15).

Following Giegerich (1985), I will argue here that this pattern can be captured under the simple assumption that -igkeit attaches to items ending in stressed syllables, and -keit to items ending in unstressed ones. The data in (15) fit nicely into the picture once the cyclic stress system proposed in section 3 is adopted. A consequence of the cyclic rule application of SR and ERL is that the suffix -haft bears a gridmark at the point of the derivation where -keit/-igkeit attaches, while the suffix -lich does not. To see how this works consider the cyclic application of SR and ERL to the adjectives in (16) below. For the sake of simplicity the output of the two ordered extrametricality rules (9a) and (9b) is collapsed into one line.

(16)

	leːb	hɛl	aytəl	fróynd
level I:				
EM:	leː ‹b›	hɛ ‹l›[6]	ay ‹tə‹l››	fróyn ‹d›
ERL:	X leː ‹b›	X hɛ ‹l›	X ay ‹tə‹l››	X fróyn ‹d›
level II:				
	X leːb haft	X hɛ ‹l›	X ay ‹tə‹l››	X fróynd IIç
EM:	X leːb haf ‹t›	----------	----------	X fróynd I ‹I‹ç››
SR	X (X) leːb haf ‹t›	----------	----------	----------

The suffix -haft, consisting of a heavy syllable, attracts stress on level II, while the suffix -lich, consisting of a light syllable, does not. Subsequent affixation of -keit/-igkeit at level II is sensitive to this metrical structure, i.e. -igkeit attaches to the bases ending in a stressed syllable, and -keit to those ending in an unstressed one. As a result, the adjectives in the first two columns serve as hosts for -igkeit, whereas the adjectives in the left-hand two columns serve as hosts for -keit. The simple generalization that -igkeit

attaches to an item ending in a stressed syllable and -keit attaches to an item ending in an unstressed syllable holds throughout.
Note that none of the level II suffixes will end up bearing word stress at the surface, due to reapplication of ERL:

level II (2nd cycle)

ERL:

X X (X) le:b haft lgkayt	X X hɛl lgkayt
X X ay tal kayt	X X frɔynd llç kayt

The derivation is not yet complete at this point. Reapplication of SR leads to foot construction on the super-heavy keit ([kayt]) followed by another ERL application. The result is, however, the same as above: the first syllable will surface bearing the main stress.
In this section I have demonstrated that the system of cyclic stress rules introduced in section 3 allows for a simple and straightforward account of the allomorphy of -keit/-igkeit. The latter are sensitive to metrical structure assigned at the level of the derivation where they attach, although the syllables that are stressed at that point of the derivation might not always surface as bearing main stress on the surface. The generalization that -keit attaches to bases ending in an unstressed syllable, and -igkeit to those ending in stressed syllables can be maintained in full generality.

4.2 A Class of Apparent Counterexamples

In this section I will introduce some apparent counterexamples to the claim about the distribution of -keit/-igkeit made above. I will show, however, that these examples are not real counterexamples, but rather involve a separate adjectival suffix -ig.
Consider the following nouns in German:

(17)

runtsəlɪgkayt	ɪrzɪnɪgkayt	brandflɛkɪgkayt
(wrinkledness)	(madness)	(full of burns)

At first glance these nouns seem to contradict the statement made in the previous section. It seems to be the case here that -igkeit is attached to bases that end in a light syllable and should therefore not bear stress on their ultima when affixation takes place. One important factor distinguishes these cases from the ones considered in the previous section, though: while the word-final sequence [Igkayt] is one morpheme in the examples of the previous section, the nouns in (17) clearly are derived from adjectives ending in -ig. Compare (18a) and (18b) below:

(18)

(a)	runtsəl$_N$	--> runtsəlIg$_A$	--> runtsəlIgkayt$_N$
	(wrinkle)	(wrinkled)	(wrinkledness)
	ɪrsɪn$_N$	--> ɪrsɪnIg$_A$	--> ɪrsɪnIgkayt$_N$
	(madness)	(mad)	(madness)
	brandflɛk$_N$	--> brandflɛkIg	--> brandflɛkIgkayt
	(burn)	(full of burns)	(fullness of burns)
(b)	le:bhaft$_A$	--> le:bhaftIgkayt$_N$	(*le:bhaftIg$_A$)
	(lively)	(liveliness)	
	hɛl$_A$	--> hɛlIgkayt$_N$	(*hɛlIg$_A$)
	(bright)	(brightness)	

In (18a) a noun undergoes suffixation with the adjectival suffix -Ig, and subsequent suffixation with the nominal suffix -kayt. In (18b), on the other hand, the adjectives undergo suffixation with the nominal suffix -Igkayt. Note that in (18b) adjectival forms ending in -Ig do not exist.

Given that -ig is an independent adjectival suffix in German, the nouns in (17) are in fact derived from a base ending in the light syllable -ig to which the suffix -keit attaches, as predicted.

4.3 Remaining Problems

Consider an overview of the distribution of -keit and -igkeit as presented in Fleischer (1971):

(19)

Adjective:	suffixation with -keit possible (example)	suffixation with -igkeit possible (example)
monomorphemic, monosyllabic: hell (bright)	no	yes Helligkeit (brightness)
monomorphemic, polysyllabic, ending in a stressed syllable: genau (precise)	no	yes Genauigkeit (precision)
monomorphemic, polysyllabic, ending in an unstressed syllable: tapfer (brave)	yes Tapferkeit (bravery)	no
derived adjectives, ending in:		
-haft [haft] lebhaft (lively)	no	yes Lebhaftigkeit (liveliness)
-ig [Ig] billig (cheap)	yes Billigkeit (cheapness)	no
-isch [Iʃ] schnippisch (saucy)	yes Schnippischkeit (sauciness)	no
-lich [lIç] lieblich (lovely)	yes Lieblichkeit (loveliness)	no
-los [lo:s] machtlos (powerless)	no	yes Machtlosigkeit (powerlessness)
-mäßig [mɛ:sIg] mittelmassig (mediocre)	yes Mittelmassigkeit (mediocrity)	no
-sam [sa:m] ehrsam (respectable)	yes Ehrsamkeit (respectability)	no
-bar [ba:r] essbar (edible)	yes Essbarkeit (edibility)	no

The analysis proposed above was based on the generalization that -igkeit attaches to stems ending in a stressed syllable while -keit attaches to those ending in unstressed syllables. While this generalization holds for monosyllabic adjectives, polysyllabic underived adjectives, and adjectives derived by most of the suffixes in the list above, two cases remain problematic: the last two suffixes [sa m] and [ba r]. Containing a long vowel, they should attract stress and therefore trigger affixation of -igkeit. Contrary to this prediction, -keit is the nominalizing suffix occurring with these two adjectival suffixes. I have to leave this problem unsolved[7].

5. The Persistence of German Stress

In this section I will argue that German stress is persistent in the sense of Hayes (1995). Given this assumption, a number of important generalizations about the stressability of German prefixes and suffixes follow naturally.

It has been observed in the literature (e.g. Benware (1980)) that native suffixes don't bear primary stress while nonnative ones are able to do so, given they have the right syllabic configuration. In the system discussed in section 3, this generalization follows for nonnative suffixes: they attach at level I, before the quantity-sensitive Stress Rule applies. For native suffixes attached to native stems it also follows: the former will never be able to attract stress because the native stem they attach to will have undergone ERL at level I before they attach.

For nonnative stems with a native suffix, however, the situation is different: the nonnative stem will reach level II without metrical structure. If the model of lexical phonology as depicted in section 3.2 is strictly adhered to, the item enters the first morphological substratum at level II before the phonological rules of that level apply to it. In other words, only after the native suffix attaches does the Stress Rule apply. Consider the derivation of "konzert-los" (concertless) in (20):

(20)

	kɔntsert
level I:	--------
level II:	
	kɔntsert lo s
EM:	kɔntsert lo ‹s›
	(X)
SR:	kɔntsert lo ‹s›

ERL: X / (X) / kɔntsert lo: ‹s›

correct stress pattern: kɔntsért lò:s

"Konzertlos" will end up with stress on the native suffix, contrary to fact and contrary to the generalization that native suffixes never attract stress in German. To resolve this problem, the nonnative stem will have to bear stress before the native suffixes attaches, so that ERL at level II will place the word stress on the foot created on the nonnative stem. Hayes' (1995) discusses a presumably parametrized property of metrical systems which can deal with the problem encountered here. He suggests that in some languages rules of metrical structure can resemble syllable structure algorithms in that they apply throughout the derivation as an "everywhere" rule. Assuming now that German metrical structure is persistent will resolve the problem with nonnative stems entering level II without stress: At level II the Stress Rule functions persistently, i.e. as soon as the nonnative stem enters level II, metrical structure will be constructed. This happens even before the native suffix attaches, hence the nonnative stem will bear a moraic trochee before native affixation, as in the derivation (21) below:

(21) kɔntsert
level I: ----------
level II:
kɔntsert
EM: kɔntser‹t›
(X)
SR: kɔntsér ‹t›
X / (X)
ERL: kɔntsér ‹t›
affixation: kɔntsert lo:s

reapplication of EM, SR, ERL:

X / X / (X) (X)
kɔntsert lo:s

With this assumption, all the relevant generalizations about German suffixes can be derived: native suffixes will never bear primary stress, whether attached to nonnative or native stems because the stem they attach to will always bear a gridmark, either due to ERL at level I, or due to persistent application of SR at level II. Nonnative suffixes will be able to attract stress if of the right syllable configuration. Finally, native prefixes are expected to differ from native suffixes in that they might attract word stress if inherently stressed since ERL will then place an additional gridmark on them. This prediction is borne out, German prefixes fall into two classes: stressed (and syntactically separable) prefixes, and unstressed (and syntactically unseparable) prefixes[8].

In summary, the metrical rule system proposed here can predict important generalizations about the stressability of native and nonnative suffixes and prefixes once it is assumed that the metrical rules of German are persistent in the sense of Hayes (1995).

6. Secondary Stress

In this section I will briefly discuss secondary stress in German. The main goal is to demonstrate that secondary stress assignment to the left of word stress has properties that distinguish it from word-stress assignment and should therefore be handled by a separate rule. Secondary stress to the right of word stress, on the other hand, is predictable by the rule system developed in this paper.

Consider secondary stress to the left of word stress first. The two properties that sets secondary stress in this environment apart from stress assigned by the Stress Rule are its quantity-insensitivity and its optionality. Secondary stress in multisyllabic nonnative words can fall on various syllables. The word "Enzyklopadie" (encyclopedia), for example, can have two different secondary stress patterns as in (22) below, where the main word stress is denoted by the symbol X:

(22) a.) X
ɛntsyklòpɛdi:

b.) X
ɛntsyklopɛdi:

Secondary stress in both examples falls on the first syllable, although this syllable is light. It may also fall on the heavy antepenult, but that is optional, as in (22a) versus (22b).

A comparison with a four-syllable word shows that the first syllable bears secondary stress again, but this time only one secondary stress can be present, presumably because secondary stress on the antepenult or the penult would lead to a stress clash with either the stressed ultima or the secondarily stressed initial syllable. The German word for economy can serve as an example:

```
(23)  a.)        X
          œ̀:konomi:
      b.)         X
          * œ̀:kònomi:
      c.)         X
          * œ̀:konòmi:
```

(23b) and (23c) are examples of illicit stress assignment, with a stress clash either between secondary stress on the first two syllables as in (23b) or between secondary stress and primary stress as in (23c).

A trisyllabic word, finally, receives secondary stress on its first syllable, as in the previous examples ("parodie" = parody):

```
(24)       X
      pàrodi:
```

Finally, in all the three examples discussed here it is possible to omit secondary stress completely:

```
(25)             X
      ɛntsyklopɛdi:
             X
      œ:konomi:
           X
      pàrodi:
```

These observations indicate that the rule for secondary stress placement to the left of primary stress is both quantity-insensitive and optional. I will not attempt a formalization here but the relevant generalization seems to be that the first syllable in a word can receive secondary stress regardless of its weight if no stress clash results. The material between the secondary and the primary stress can then be subject to an alternating, quantity-insensitive stress pattern.

Turning to secondary stress to the right of primary stress, note that the Stress Rule can produce a secondary grid mark on a heavy syllable to the right of word stress in native words. This situation can arise both in polysyllabic native roots and due to suffixation. Without going into detail, the prediction that native suffixes and heavy syllables in native roots can bear secondary stress is borne out. One piece of evidence for this has already been adduced in section 4: the allomorphy rule for *-keit/-igkeit* suffixation is sensitive to secondary stress on a preceding suffix.

To summarize, I have shown that secondary stress to the left of primary stress has to be accounted for by a separate rule that is both quantity-insensitive and optional. Secondary stress to the right of primary stress arises due to application of the Stress Rule and Endrule Left. It is (mandatorily) present as can be seen in stress-sensitive suffixation processes such as the <u>-keit/-igkeit</u> alternation of section 4.

7. *-ei/-erei* suffixation

The allomorphy rule for the deverbal suffix *-ei/-erei* has been analyzed by Hall (1992) as being stress-sensitive. The basis for this claim are the data below, where the allomorphy pattern can readily be explained if it is assumed that *-erei* attaches to stems ending in a stressed syllable while *-ei* attaches elsewhere (Hall (1992, p. 38)):

(26)	a.)	sing- (sing)	=>	Sing -erei
	b.)	lauf- (run)	=>	Lauf -erei
	c.)	spion-ier- (spy)	=>	Spion-ier -erei
(27)	a.)	segəl- (sail)	=>	Segəl -ei
	b.)	trödəl- (dawdle)	=>	Trödəl -ei
	c.)	plaudər- (chat)	=>	Plaudər -ei

The monosyllabic stems in (26 a-b) are stressed, and therefore *-erei* attaches. (26 c) triggers affixation of *-erei*, because the nonnative suffix *-ier* bears word stress.

In (27), after application of a schwa-epenthesis rule which inserts schwa before the word-final liquid, the final syllable will not receive stress, and consequently *-ei* attaches to the verbal stem.

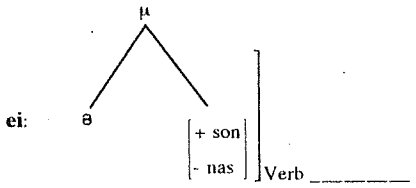
If this analysis is correct, it poses a serious problem to the system of stress rules proposed here. The suffix under consideration is a nonnative suffix, attracting word stress due to the final diphthong /ai/. As a nonnative affix it is attached at level I, and

therefore it should be unable to be sensitive to quantity-sensitive stress such as in (26 c). Stress on *-ier* is not assigned until level II.

In general, the analysis proposed here makes the following prediction: a suffix which is able to attract stress cannot be sensitive to stress assigned at level II. In order to attract stress, a suffix must be present at the moment the word enters level II. In order to be sensitive to stress assigned on level II it has to be attached after the Stress Rule applied within level II.

I suggest that the suffix under consideration is indeed a level I affix, as expected since it is nonnative and attracts word stress. The seemingly stress-sensitive allomorphy rule can be reformulated without reference to stress, without losing in generality[9]. The generalization can be captured once it is realized that *-ei* only attaches to verbal stems ending in *əl* or *ər*. The allomorphy rule can then be simply restated as in (28):

(28)



erei: elsewhere

(28) does not refer to any stress properties of the stem, and therefore avoids the problem mentioned. The suffix *-eil-erei* in this analysis is a normal nonnative level I suffix. As such, it attracts stress due to its diphthong, and it is insensitive to stress assigned at level II.

It is important to keep in mind that this reformulation of the allomorphy rule for *-ereil-ei* is possible because the allomorph *-ei* is very restricted in its distribution. A similar reformulation of the *-keitl-igkeit* allomorphy rule is impossible since the distribution of these two allomorphs is far from being predictable from the last two segments of the stem, as the discussion in section 4 has demonstrated.

8. Hall (1992)

I will try to outline Hall's (1992) analysis of German stress in this section.

Hall's analysis of German word stress differs crucially from the one proposed in this paper. Hall rejects the partition between native and nonnative vocabulary for stress assignment. He proposes a single German Stress Rule in a monostratal lexicon (Hall 1992, p. 24):

> *German Stress Rule:*
> *The final syllable is stressed if it contains a coda. If the final syllable contains no coda, then the penult is stressed if it contains a coda. If neither the ultima nor the penult has a coda, then the antepenult is stressed.*

Word-initial stress in native words is treated as a phonemic property. Hall points out that many native words in fact don't have initial stress. Examples are Hornísse (hornet), Wachólder (juniper), Berlín (Berlin) etc.

The fact that most suffixes cannot bear word stress is attributed to the Elsewhere Condition in Hall's analysis: presence of stress on the stem preempts stress assignment to those suffixes which are not bracketed as independent (stem-like) elements. Stressable prefixes are treated as word-like, i.e. as elements that define their own cyclic domain and therefore can undergo stress-assignment independently.

It is not possible to go into the details of Hall's analysis in this paper. However, I would like to point out some arguments in favor of the analysis proposed here.

First, while a monostratal lexical model is certainly to be preferred over a multistratal one for reasons of simplicity, a price has to be paid in Hall's analysis: The generalization that native suffixes can attract word stress while nonnative suffixes cannot is only expressible in a monostratal lexicon by stipulating different bracketing for those two classes of suffixes: the latter have their own cyclic domain while the former don't. While this distinction is plausible with respect to prefixes (those that can attract stress are so-called separable prefixes, i.e. they can occur syntactically separated from their host), it remains stipulative with respect to suffixes, which can never occur as free morphemes[10].

Secondly, Hall is right in pointing out that there are many exceptions to the rule that native words bear initial stress. This does not force an analysis in terms of phonemic initial stress, however: It is equally possible to assume that the non-initial stress is phonemic and the initial stress rule-governed. It is also reasonable on historic grounds

Quantity-sensitive extrametricality: (EM) operating at both levels in the order specified
(a) consonant-extrametricality:

<C> at the right edge

(b) quantity-sensitive syllable extrametricality:

<σ> at the right edge

|

μ

This rule system is consistent with the restrictive metrical theory proposed in Hayes (1995). With the additional assumption that the Stress Rule is persistent at level II, this analysis can cover the basic distribution of word stress in German native and nonnative words. It also correctly predicts that nonnative affixes and native prefixes can attract word stress, while native suffixes cannot. The rule system accounts for the occurrence of secondary stress to the right of main stress, and it allows a simple explanation for the distribution of the suffix allomorphs -keit and -igkeit.

What remains to be discussed is in how far the analysis put forth here fits into the general framework of Lexical Phonology. While it would go far beyond the purpose of this paper to address this question in detail, some general remarks seem to be in order. First, note that the lexical phonology model adopted here is what has been called recently an "interactionist" model (Kaisse/Hargus (1993)). In an interactionist approach, morphology and phonology interact in an interleaved way, as in the theory of lexical phonology proposed in Kiparsky (1982, 1985). In an interactionist model it follows naturally that conditions for allomorphy can refer to previously established phonological properties such as stress. In a noninteractionist model as suggested for example in Odden (1993), where all morphology precedes all phonology, the phonological information cannot be accessible to the morphological component, unless it is already part of the lexical entry and not a result of the application of phonological rules. Odden in fact suggests reanalyzing some stress-related allomorphy in Dutch along these lines: he claims that what seems to be sensitivity to previously established phonological information is simply sensitivity to idiosyncratic and therefore lexically listed information. Note, however, that the data presented in connection with the -keit/-igkeit allomorphy are regularly derived by the Stress Rule, and cannot easily be dismissed as idiosyncratic cases. One way to reanalyze the data presented in this paper in a non-interactionist theory would be to have only one suffix -keit, with the -ig part being epenthetic in a stress clash environment. Two immediate problems with this approach to assume that some reflex of the word-initial stress in Germanic is still found in the lexicon.

Thirdly, while the distinction between a native and a nonnative vocabulary is without doubt theoretically unsatisfactory, it cannot be denied that splits like that do exist in several languages, although the reason for their existence and a principled explanation are not available yet (see Ito and Mester (1993)). One particularly surprising case that comes to mind is the peculiar behavior of Turkish topographic vocabulary versus non-topographic vocabulary in an analysis of Turkish stress as discussed in Kaisse (1993).

Fourthly, the -keit/-igkeit alternation discussed in section 4 of this paper can only be accounted for if suffixes consisting of a heavy syllable do bear stress at the point in the derivation where suffixation of -keit/-igkeit takes place. In Hall's analysis none of the suffixes that trigger affixation of -igkeit could bear a gridmark because they don't belong to the class of suffixes that can define their own cyclic domain, as has to be assumed because they cannot bear primary stress.

Finally, the analysis proposed here is couched in a highly restrictive general theory of metrical structure as proposed by Hayes (1995). In particular, it only makes use of maximally binary feet, which seems very desirable on the background of data from languages all over the world that Hayes adduces. As Hall (1992) remarks himself, his analysis involves more unrestricted, ternary feet.

9. Consequences/Conclusion

To summarize the main claim of this paper, German word stress can be analyzed in a two level lexicon with nonnative affixation taking place at level I and native affixation at level II making use of the rule system repeated below for convenience:

level I: (ERL) End-Rule Left, restricted to native words

level II: (SR) Stress Rule: create moraic trochees from right to left, non-iterating
(ERL) End-Rule Left

are that first, -ig is only inserted in one very specific stress clash case, and second that it is not clear at all how the stress rules would have to be formulated to produce a stress clash in the cases in question in the first place.

I therefore tentatively conclude that the analysis proposed here lends support to an interactionist theory of lexical phonology[11].

Another point of controversy in lexical phonology is what the number of strata in the lexicon is, and how they are characterized. Boij and Rubach (1987), for example, suggest that there is only one cyclic stratum in the lexicon, followed by a postcyclic set of lexical phonological rules and a postlexical set of rules. As mentioned above, this hypothesis is also adopted in Hall's (1992) analysis of German phonology. The analysis proposed here, however, makes crucial use of a bistratal lexicon, with two distinct sets of cyclic phonological rules, one set belonging to level I, the other to level II. While this assumption allows a fairly simple and consistent treatment of German word stress within the metrical theory of Hayes (1995), it is not impossible to conceive a monostratal alternative, where native words bear phonemic, word-initial stress. This alternative, as discussed in section 6, however, induces a shift of complexity from the lexical organization to suffix-specific stipulations of being "word-like" or not.

As an overall conclusion I hope to have demonstrated that the restrictive metrical theory of Hayes (1995) can be successfully applied to German word stress. While it does not solve all the puzzles of German stress, it allows for a straightforward treatment of word stress, stress-conditioned allomorphy, and the stressability/unstressability of native and nonnative affixes. In the framework of lexical phonology, the analysis put forth here lends support to interactionistic models, and to the claim that the lexicon is multistratal, with separate sets of cyclic phonological rules for each stratum.

Notes:

* I am grateful for comments that Sharon Hargus provided. Ellen Kaisse, James Lyle, and the participants at Ellen Kaisse's seminar on metrical theory in spring 1993 provided helpful suggestions and comments on an earlier version. Tracy Hall discussed a squib of an earlier version with me at the 1993 LSA Institute, and helped me improve on some problems of my anaysis. Errors are, of course, my own.

1 The final tense vowel here is underlyingly long (see section 3.2).

2 Hall (1993) leaves the question as to exceptions to this generalization open. He explicitly rejects a solution in terms of extrasyllabicity.

3 A similar proposal in a different framework for metrical theory has been made in Grewendorf/Hamm/Sternefeld (1989).

4 This claim is very different from Oberle's (1990)) statement that the distribution of these suffixes is not governed by phonological criteria. Oberle's descriptively oriented work does not take suprasegmental phonological structure into account at all.

5 Note that while I adopt Giegerich's treatment of the allomorphy phenomenon, the analysis proposed here is different in that it is based on Hayes' (1991) general metrical theory. Giegerich essentially derives the same results, but in a rather idiosyncratic analysis of German and English stress.

6 Note that the second extrametricality rule EM (b) is blocked from application in this monosyllabic stem due to Exhaustivity, cf. section 3.3.

7 Interestingly there is another property that distinguishes [sam] and [bar] from the "wellbehaved" suffix [los]: the former can in some dialects (though not in Standard High German) be pronounced as [sam] and [bar], i.e. as containing a short vowel. This is not possible with [lo s]

8 I do not have a solution to offer to the question why the possibility of inherent (lexical) stress is restricted to native prefixes, and does not seem to occur with suffixes.

9 Jessen (1994) arrives at a similar conclusion.

10 As Sharon Hargus has pointed out to me, the distinction between affixes that can also occur as free morphemes and affixes that cannot is not really one that should reflect in the determination of phonological domains at all. For a recent discussion of the factors entering the determination of domains for application of phonological rules see Inkelas (1993).

11 For similar arguments see Boij and Lieber (1993) and Hargus (1993)

References:

Benware, W. A. (1980): "Zum Fremdwortakzent im Deutschen". Zeitschrift für Dialektologie und Linguistik XLVII/3, 289-312.

Boij, G. and J. Rubach (1987): "Postcyclic versus Postlexical Rules in Lexical Phonology". Linguistic Inquiry 18/1, 1-44.

Boij, G. and R. Lieber (1993): "On the Simultaneity of Morphological and Prosodic Structure". In: E. Kaisse, and S. Hargus eds., Studies in Lexical Phonology (Phonetics and Phonology 4), 23-44.

Féry, C. (1986): "Metrische Phonologie und Wortakzent im Deutschen". Studium Linguistik 20, 16-43.

Fleischer, W. (1971): "Wortbildung der deutschen Gegenwartssprache". Niemeyer Verlag: Tübingen.

Giegerich, H.-J. (1985): Metrical Phonology and Phonological Structure - German and English. Cambridge University Press: Cambridge.

Grewendorf, G., Sternefeld, W. and Fritz Hamm (1989): Sprachliches Wissen. Suhrkamp: Frankfurt.

Hall, A. T. (1990): Syllable-Structure and Syllable-Related Processes in German. Diss. University of Washington.

_____ (1992): Syllable-Structure and Syllable-Related Processes in German. Niemeyer Verlag: Tübingen. [Revised version of Hall (1990)]

Hargus, S. (1993): "Modeling the Phonology - Morphology Interface". In: Kaisse, E. and S. Hargus eds. Studies in Lexical Phonology (Phonetics and Phonology 4), 45-74.

Hayes, B. (1985): "Review of Giegerich (1985)". Journal of Linguistics 229-235.

_____ (1995): Metrical Stress Theory. The University of Chicago Press: Chicago, London.

Inkelas, S. (1993): "Deriving Cyclicity". In: Kaisse, E. and S. Hargus eds., Studies in Lexical Phonology (Phonetics and Phonology 4), 75-110.

Itô, J. and A. Mester (1993): "Japanese Phonology: Constraint Domains and Structure Preservation". Manuscript, Linguistic Research Center, UCSC, Santa Cruz.

Jessen, M. (1994): "A Survey of German Word Stress". Ms., University of Stuttgart.

Kaisse, E. (1993): "On Moraic Trochees in Turkish". Presentation at the 1993 Linguistic Institute Workshop on Phonology at the Ohio State University.

Kaisse, E. and S. Hargus (1993): Introduction. In: Kaisse, E. and S. Hargus eds., Studies in Lexical Phonology (Phonetics and Phonology 4), 1-19.

Kiparsky, P. (1982): "From Cyclic Phonology to Lexical Phonology". In: H. v. d. H. and N. Smith eds., The Structure of Phonological Representations. Foris: Dordrecht, 131-175.

_____ (1985): "Some Consequences of Lexical Phonology". Phonology Yearbook 2, 85-138.

Oberle, B. E. (1990): Das System der Ableitungen auf -heit, -keit und -igkeit in der deutschen Gegenwartssprache. Carl Winter Universitatsverlag: Heidelberg.

Wurzel, W. U. (1980): "Der Deutsche Wortakzent: Fakten - Regeln - Prinzipien. Ein Beitrag zu einer natürlichen Akzenttheorie". Zeitschrift fur Germanistik 3, 299-318.

_____ (1970): "Der Fremdwortakzent im Deutschen". Linguistics 56, 87-108.

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TEMPORAL ARGUMENT STRUCTURE AND CLITIC CLIMBING IN ROMANCE*

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Kayne (1989) has claimed that two conditions are necessary in order for clitic climbing to take place: a strong I, and I-to-C-to-I movement. The latter is a property which may account for the strong correlation between subject control constructions and clitic climbing. However, as Kayne himself has pointed out, not all subject control verbs allow clitic climbing. Although he is unable to account for this fact, he suggests that those subject control verbs that do not allow clitic climbing do not fulfill the second condition. That is, that they do not allow I-to-C-to-I movement.

In the case of subject control verbs that do not allow clitic climbing, it is not immediately apparent what would prevent I-to-C-to-I movement at S-structure, where clitic climbing takes place. I will propose an account in terms of temporal argument structure, in which it will be argued that the unacceptability of clitic climbing with the verbs in question is due to a lack of L-marking of CP at LF. I will claim that the lack of L-marking of CP at LF is due to a lack of s-selection of temporal features on the part of the matrix V.

This paper is organized as follows: section 1 is a summary of Kayne's (1989) discussion on clitic climbing; section 2.1 presents the theoretical assumptions upon which my analysis is based; in section 2.2, I show how these assumptions can be used to account for another raising phenomenon in Romance: quantifier raising (QR) in French[1]; in section 3, I argue for a similar analysis as a third condition on clitic climbing in Romance. Section 4 presents a summary of the findings in this paper.

1 Kayne (1989): Two conditions on clitic climbing

Kayne (1989) provides an ECP-based account for the data in (1).

(1) a. *Jean **les** veut voir.
b. Gianni **li** vuole vedere.
*John wants to see **them**.*

In (1a), the object clitic pronoun associated with the subordinate verb cannot occur in construction with the matrix verb, while this is possible in (1b). According to Kayne, these facts are to be related to the null subject parameter. French, which disallows clitic climbing, also disallows null subjects, while the opposite is true of Italian, which allows both clitic climbing and null subjects.

Kayne dismisses an earlier account of this problem by Rizzi (1982), which was based on a restructuring rule. This account made use of the notion of adjacency which is now widely regarded as irrelevant. It also assumed a rule of INFL-lowering which is also now doubted. Like Rizzi, however, Kayne's analysis assigns great importance to the role of INFL (henceforth I).

According to Kayne, any adequate analysis of (1b) must also cover the example in (2).

(2) (*)[2] Jean a promis de **les** bien faire.
*John has promised to do **them** well.*

Since equivalents of this example are acceptable in some Romance languages, it shows that attachment to V is not a fundamental property of Romance clitics.

Because (2) is analogous to (1b), which is related to the null subject parameter, and because the null subject parameter is related to I, it is suggested that in languages where (2) is acceptable, the clitic is attached to I (i.e. CL+I Adv VP). In French, however, the order of the clitic pronoun and the adverb must be reversed in order to obtain an acceptable version of (2). In French, then, the clitic is attached to V. Romance languages thus have two options for clitics: attachment to I and attachment to V.

In Italian and French these two options converge when there is a tensed V, which adjoins to I. The question arises, however, as to why, when V and I remain separate, attachment to I is not possible in French. Kayne suggests that I in French is not strong enough by itself to L-mark VP, so that if the clitic moved to I, it would not be able to antecedent govern its trace. In Romance languages that license null subjects, however, I is strong enough to L-mark VP, even when V doesn't move to I.

Evidence for a strong I (i.e. one that is able to L-mark VP on its own) in Italian comes from the fact that infinitival V is able to move out of VP without passing through I. Consider the examples in (3).

(3) a. **Lui** parler serait une erreur.
*To speak to **him** would be an error.*

b. Parlar**gli** sarebbe un errore.
*To speak to **him** ...*

Post-infinitival clitics are possible in Romance only in null subject languages, so that the following is not possible in French:

(4) *Parler-**lui** serait une erreur.

Kayne offers two suggestions to account for the unacceptability of (4): first, the French weak I prevents the infinitive from leaving VP and second, clitics in Romance must always be adjoined to the left of a head. In (3b), then, the clitic is adjoined to the left of I, which is itself distinct from and following the moved infinitive, giving the structure shown in (5).

(5) V_{infin} [Cl+I [$_{VP}$ [$_{V}$ e] ...]] **sarebbe** ...

We have seen so far that in order for a clitic to move up from an infinitival complement to the matrix V (or matrix I), it must be able to leave VP. This will be possible in a null subject language like Italian, where infinitival I is sufficiently strong, but not in French. (1a) and (2) are therefore unacceptable for the same reason.

Certain causative constructions, like the one in (6), at first seem to provide counter-evidence to the claim that clitics can't climb in French.

(6) Jean **la** fait manger par/à Paul.
John makes Paul eat it.

According to Kayne, however, the ability of the clitic to occur in construction with the matrix verb in causative constructions is due to the fact that the causative verb takes a VP complement. The negative element **ne**, however, blocks clitic climbing in such constructions. This can be seen in (7).

(7) *Jean/Cela **l'**a fait **ne** pas manger à l'enfant.
Jean/that has made the child not eat it.

Kayne suggests that this is because **ne** is a head which, like C and I (except for the strong I in null subject languages like Italian), is unable to L-mark its complement. This would also be able to account for the ordering of **ne** with respect to object clitic pronouns in simple sentences like the one in (8).

(8) a. Jean **ne les** voit pas.
b. *Jean **les ne** voit pas.
Jean does not see them.

The clitic cannot move past **ne** because VP, not being L-marked, would be a barrier to antecedent government.

The blocking effect we have just seen is more widely visible with Italian **non**. This can be seen in the following examples:

(9) Gianni **non li** vuole vedere.
John does not want to see them.

(10) a. Gianni vuole **non** vederli.
b. *Gianni **li** vuole **non** vedere.

In (10b), the clitic cannot antecedent govern its trace because **non** is unable to L-mark VP, which acts as a barrier.

The next question which arises is whether the clitic in sentences like (9) moves directly to its S-structure position, or whether it does so stepwise. With this question in mind, consider the example in (11).

(11) *Gianni (non) **li** vuole che (Maria) veda.
John doesn't want Maria/she to see them.

In this example, the clitic cannot occur in construction with the matrix V. In constructions with infinitival Wh-islands, however, clitic climbing is (marginally) acceptable. This is shown in the following example:

(12) Non **ti** saprei che dire.
I wouldn't know what to say to you.

If clitics were able to move from their D-structure positions to their S-structure positions in one step, it would be difficult to differentiate these examples.

In order to account for (11) and (12), two assumptions are necessary: first, that clitics, unlike Wh-phrases, cannot move through the SPEC of CP, and second, that clitics are non-operators and, as such, cannot delete intermediate traces. In (11), **che** is a complementizer in C, whereas in (12) it is a Wh-element in the SPEC of CP. In (11), then, the only possibility for the clitic to move to the matrix clause would be direct I-to-I movement. If this were the case, however, the clitic would be unable to antecedent govern its trace in IP. This is because IP is not L-marked so that CP counts as a barrier by inheritance. In (12), where **che** is in the SPEC of CP, the clitic can move to the matrix I through C. The clitic will then govern its trace in C, since CP is L-marked by V, and the trace in C will govern the lower trace in I, assuming that IP cannot be an inherent barrier.

The behavior of clitics with respect to **se** provides support for the claim that the former move through C. This can be seen in the following examples:

(13) Non so **se** farli.
I don't know whether to do them.

(14) *Non **li** so **se** fare.

The unacceptability of (14) is not surprising if we take Italian **se**, like English **if**, to be a C rather than a Wh-phrase. In (14), then, the **se** in C blocks movement through that position just like **che** does in (11).

Although the preceding discussion strongly suggests that an empty C is necessary for long clitic climbing, it is not immediately clear what prevents a clitic from moving from its base position directly to C, rather than first passing through the lower I. This possibility can be excluded in the same way as direct I-to-I movement if we assume that IP is a potential barrier (other than just by inheritance). If IP were a barrier, and if the clitic moved directly to C, it would be prevented from governing its original trace. This assumption, however, is in direct contradiction to the earlier assumption that IP cannot be an inherent barrier. Assuming IP to be a potential barrier, then, might exclude not only direct movement to C, but also the I-to-C step proposed earlier.

In order to resolve this problem, Kayne suggests that after the clitic adjoins to I, yielding [$_I$ CL I], what moves on to C is not just the clitic but the whole newly formed I constituent that

includes the clitic. He further suggests that in moving to C, Italian I retains its ability to L-mark its sister constituent. Since Italian has a strong I, once in C position, the constituent [$_{I}$ CL I] can L-mark IP, thus voiding barrierhood. Recall that it is I, and not the clitic that has the L-marking ability, so that if the clitic adjoined directly to C, skipping I, there would be nothing in C capable of L-marking IP, thus violating the ECP.

Further support for the I-to-C-to-I proposal comes from constructions with double clitics, such as the one in (15).

(15) Gianni **ve li** vuole mostrare.
*John wants to show **them** to you.*

Both clitics can remain together on the embedded I, but it is impossible for one to move up to the matrix I without the other. This can be seen in the following examples:

(16) Gianni vuole mostrar**veli**.

(17) a. *Gianni **vi** vuole mostrarli.
b. *Gianni **li** vuole mostrarvi.

If the clitic in (1b) could move directly to the matrix I, it would be difficult to see why, in (15) or (16), one of the clitics could do the same while the other moved only as far as the lower I. (17), then, provides support for the claim that a clitic first moves to the embedded I, and that, if the clitic moves any further, it does so along with the entire I.

Kayne also mentions a correlation between clitic climbing and 'easy-to-please' constructions. Rizzi (1982) claims that his restructuring rule can be related to the Italian 'easy-to-please' construction in that when there are two embedded infinitives, the higher one has to be one which allows clitic climbing. For example, **cominciare** allows clitic climbing, while **promettere** does not. Compare the following examples:

(18) a. Questa canzone è facile da cominciare a cantare.
This song is easy to begin to sing.

b. *Questo lavoro è facile da promettere di finire per domani.
This work is easy to promise to finish by tomorrow.

This contrast also holds in French, as can be seen in the following:

(19) a. ?(Pour moi), ce livre serait impossible à commencer à lire aujourd'hui.
For me this book would be impossible to begin to read today.

b. *Ce genre de livre est facile à promettre de lire.
This kind of book is easy to promise to read.

It is somewhat surprising that the following is more acceptable than (19b), despite the fact that it contains a Wh-island:

(20) ?Ce genre d'article est difficile à savoir où classer.
This kind of article is hard to know where to-file.

This seems somewhat paradoxical since French doesn't allow clitic climbing with either (19a) or (20). In order to account for these facts, Kayne suggests that in both Italian and French, 'easy-to-please' constructions with two levels of embedding are only possible if the higher infinitive is of the type that allows a CP complement with an empty head bound from without. More specifically, he proposes that in (19a) and (20), "the lowest infinitival I has moved out of its S into the upper infinitival domain, i.e. that I-(to-C)-to-I/V has applied (perhaps in LF)" (251). In both Italian and French, then, I-to-C-to-I movement is involved in 'easy-to-please' constructions.

I-to-C-to-I movement is exactly what allows clitic climbing in Italian, hence the paradox. Recall, however, that this type of movement is not the only factor involved in clitic climbing. Also essential is an I strong enough to L-mark VP. This is a property present in Italian and absent in French. In order for long clitic climbing to occur, then, it is necessary both that I be strong enough to L-mark VP, and that I-to-C-to-I movement be permitted by the matrix V.

The interaction of clitic climbing and control may also provide support for an analysis according to which a clitic moves through an embedded infinitival I. Virtually all cases of clitic climbing are in cases of subject control, and virtually none are in cases of object control. What, then, is at the root of the apparent incompatibility of clitic climbing and object control? Kayne suggests that it may due to coindexation. In subject control constructions, the matrix and embedded subjects are coindexed, and the movement of the clitic from I (to C) to I results in a parallel coindexation of both I's (specifically, according to Kayne, of both AGR's). Similar coindexation of both I's in object control constructions would result in a situation in which both the matrix and embedded I matched in terms of coindexation while the matrix and embedded subjects did not. This coindexation analysis will only hold if the proposed I-(to-C)-to-I movement takes place.

While there seems to be a strong correlation between clitic climbing and control, not all verbs with subject control allow clitic climbing. Luján (1978) has suggested that verbs that take infinitival complements with "an independent tense" do not allow clitic climbing. Kayne suggests that this may be due to an abstract tense element in C which, like **se** and **che** blocks clitic climbing. He notes, however, that this may not be sufficient to account for all such constructions since, in Italian, 'want' allows clitic climbing while 'hate' and 'desire' do not. Kayne does not account for this fact, but suggests only that those matrix verbs that do allow clitic climbing also allow I-(to-C)-to-I movement, leaving a complement with and empty head position bound from without.

In the case of subject control verbs that do not allow clitic climbing, it is not immediately apparent what would prevent I-to-C-to-I movement at S-structure, where clitic climbing takes place. In section 3, I will propose an account in terms of temporal argument structure, in which it will be argued that the unacceptability of clitic climbing with the verbs in question is due to a lack of L-marking of CP at LF. I will claim that the lack of L-marking of CP at LF is due to a lack of s-selection of temporal features on the part of the matrix V. The critical contrast that I will deal with can be seen in the following examples:

(21) Mario lo vuole leggere.
Mario wants to read it.

(22) *Mario lo odia leggere.
Mario hates to read it.

It is important to note that in each of these examples, the matrix verb is of the subject control type. Moreover, both of these verbs s-select for the subjunctive, refuting Luján's (1978) claim that clitic climbing is blocked in constructions where the matrix verb s-selects for a complement which is indicative, and thus has the "blocking" feature [TENSE].

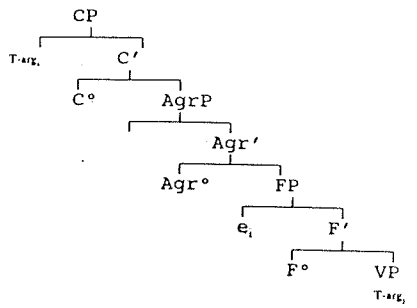
My claim will be, then, that there are three necessary conditions for clitic climbing: a strong I, I-to-C-to-I movement at S-structure, and the L-marking of CP at LF. This claim is saying, in effect, that even if all S-structure conditions on clitic climbing (an S-structure operation) are met, the derivation can crash at LF if CP is not L-marked at this level. Before turning to my analysis, however, I will outline the theoretical assumptions upon which it is based (2.1) and show how these assumptions can account for QR in French (2.2).

2 Temporal argument structure a QR in French

2.1. Theoretical assumptions

In the analysis proposed in section 3, I assume a theory of temporal interpretation put forth by Zagona (1990a, 1990b and 1990c). This theory assumes a [+/-Finite] Phrase (FP), as shown in (23), whose head, F°, selects temporal arguments. F° subcategorizes for its internal argument, VP, which represents the event time and which is assigned the feature [+/-Past]. The external argument of F° represents the evaluation time and moves to the SPEC of CP in order to be licensed.

(23)



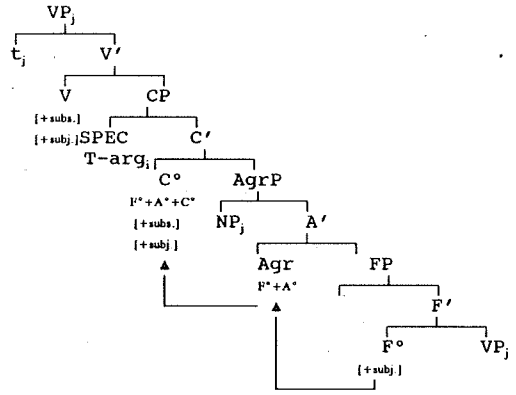
Following Zagona (1990a), I will assume that temporal arguments are subject to principles of the Binding Theory. A present moment interpretation is possible when F° assigns the feature [-Past], on the basis of the feature complex [+anaphoric], [-pronominal], to the event-VP. In order for a present moment interpretation to hold, then, the event-VP must be bound in its minimal governing category. A future interpretation is possible when F° assigns the feature [-Past], on the basis of the feature complex [-anaphoric], [-pronominal], to the event-VP. In order for a future interpretation to hold, the event-VP must be locally A-bar bound by a modal or a modally construed constituent. A past interpretation is possible when F° assigns the feature [+Past], on the basis of the feature complex [-anaphoric], [-pronominal], to the event-VP. In order for a past interpretation to hold, the event must be free. A generic interpretation is possible when F° assigns the feature [-Past], on the basis of the feature complex [-anaphoric], [+pronominal], to the event-VP. In order for a generic reading to hold, then, the event must be free in its minimal governing category (Zagona 1990a:3).

Also relevant to my analysis are four types of co-indexing (cf. Arteaga 1990:216): 1) referential indexing, according to which indices are assigned to coreferential arguments, and which is relevant for binding purposes; 2) predication indexing, according to which a subject NP assigns an index to its VP[3]; 3) feature-sharing between a head and its projections (in this discussion, between V° and VP, and between C° and CP); and 4) feature-sharing between an X^{max} and the X° that θ-marks it (here, V° and CP). A crucial assumption in this paper, and one not made explicit in previous analyses within this framework, is that in order for an event-VP to be bound, it must share all indexing with its governor[4].

Much of the analysis proposed here was inspired by Arteaga's (1990) analysis of the Disjoint Reference Requirement (DRR) in subjunctive clauses in Romance. Arteaga argues that "verbs whose complements show DRR effects, namely verbs of volition and influence" (213), semantic select (s-select) for the subjunctive, as well as for the temporal feature [+subsequence] ([+subs.]). Arteaga assumes, following Grimshaw (1979, 1981), and Pesetsky

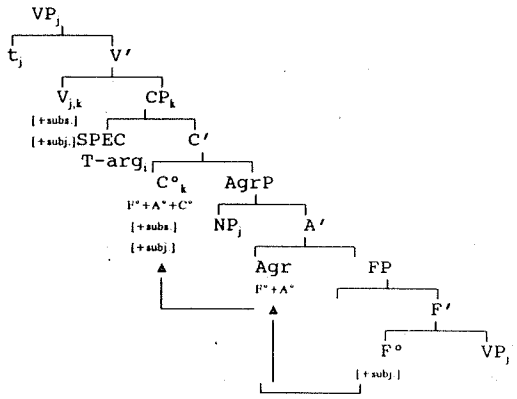
(1982), that features which are s-selected for by the verb appear on the head of C°, and that in order for this s-selection to be satisfied, F° must front to C° (cf. 216). Arteaga takes the structure of verbs s-selecting for [+subjunctive] ([+subj.]), as well as for the temporal feature [+subs.], where the matrix and subordinate subjects are coreferential and after predication indexing, to be as in (24) (cf. 217)[5].

(24)



V° and VP are then coindexed through feature-sharing between a head and its projection, followed by the coindexation of V° and CP through feature-sharing between an X^{max} and the X° that θ-marks it. CP and C° are then coindexed through feature-sharing between a head and its projection. This results in the representation in (25) (cf. 219).

(25)



Recall that in order for a subsequent (i.e. future with respect to the matrix VP) interpretation to hold, the subordinate event-VP must be locally A-bar bound. According to Arteaga, "after movement of F° to Agr° to C° and SPEC Head agreement [...] CP is truly L-marked with respect to temporal features, as the matrix V° agrees with C° with respect to the temporal feature [+subsequence]", and "it is the amalgamation of V° and T-arg that act as the temporal governor for the lower event, thereby extending the Temporal Governing Category for the lower event (VP) to the matrix VP" (220). In (25), then, the lower event (VP) is A-bound by the matrix V°.

Arteaga claims, then, that "the Disjoint Reference Requirement in volitional complements is actually a manifestation of an improper temporal chain. This improper temporal chain is only formed when the matrix V° A-binds the lower event of verbs s-selecting for [+subsequence] and [+subjunctive], which in turn only occurs when the VPs are assigned the same index by coreferential NPs through predication" (221-222).

2.2. The effects of Temporal Argument Structure on QR in French

In this section, I will show how the theory of Temporal Argument Structure outlined in the previous section can account for the surface structure positions of **tout** and **tous** in the paradigm in (26), where the symbol ^ stands for a possible position for these quantifiers and * stands for an impossible position.

(26) a. Elle va ^ pouvoir ^ les suivre ^ (**tous**).
*She's going to be able to follow them **all**.*
b. Il a ^ failli ^ rater ^ (**tout**).
*He almost missed out on **everything**.*
c. Elle a * certifié ^ les connaître ^ (**tous**).
*She certified knowing them **all**.*

d. Elle va * avouer ^ mépriser ^ (**tout**).
*She's going to confess to scorning **everything**.*

In particular, I will account for the fact that the quantifiers **tout** and **tous**, associated with the subordinate object, can occur in construction with the matrix VP in (26a) and (26b), while this is not possible in (26c) and (26d).

I will argue that the possibility of movement to the matrix clause in (26a) and (26b) is due to the transparency of CP at LF (where quantifier movement takes place). The transparency of CP is, in turn, due to temporal feature selection on the part of the matrix verb. In (26c) and (26d), however, no temporal feature is selected by the matrix verb, so that CP is not transparent with respect to quantifier movement.

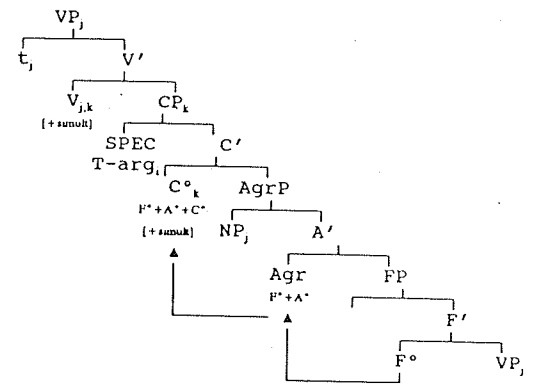
2.2.1. The temporal feature [+simultaneity]

I propose that there is a temporal feature [+simultaneity] ([+simult.]) which is s-selected for by verbs like those in (26a) and (26b). Motivation for such a feature comes from the fact that in sentences like (26a) and (26b), the same time adverbial may occur in the matrix and subordinate clause without resulting in ill-formedness. This can be seen in (27).

(27) a. **A trois heures**, elle va tous pouvoir les suivre **à trois heures**.
*At three o'clock, she's going to be able to follow them all **at three o'clock**.*
b. **A trois heures**, il a tout failli rater **à trois heures**.
*At three o'clock, he almost missed out on everything **at three o'clock**.*

I take the structure of verbs s-selecting for [+simult.], after all indexing, to be as shown in (28).

(28)



Recall that in order for a simultaneous interpretation to hold, the subordinate event time must be bound in its governing category. Comparing (28) to (25), and following the assumptions of Arteaga (1990), the conclusion can be drawn that in (28), as in (25), the lower event (VP) is A-bound by the matrix V°. In (28), however, where a simultaneous interpretation is called for, this is the desired result.

What is crucial for this discussion is that since, at LF, the matrix V° agrees with C° with respect to the temporal feature [+simult.], CP is L-marked and is thus not a barrier to quantifier movement. This is why, in (26a) and (26b), where the matrix V s-selects for a complement with the feature [+simult.], the quantifier associated with the subordinate object may occur in construction with the matrix VP. Let us now turn to the sentences in (26c) and (26d).

2.2.2. Precedent interpretation and the lack of s-selection

In (26c) and (26d), the subordinate event must be interpreted as precedent with respect to the matrix V. To see that this is indeed the case, consider the sentences in (29), where coreferential time adverbials in the matrix and subordinate clauses result in ill-formedness.

(29) a. ***A trois heures**, il a certifié tous les connaître **à trois heures**.
At three o'clock, he certified knowing them all at three o'clock.
b. ***A trois heures**, elle va avouer tout mépriser **à trois heures**.
At three o'clock, she's going to confess to scorning everything at three o'clock.

It is a revealing fact that the only time adverbial that can be used in the subordinate clauses of these sentences is one with a durative connotation (i.e. using the adverb **depuis**, *'since'*). The use of this adverb requires a time previous to the event time of the matrix verb. This can be seen in (30).

(30) a. **A trois heures**, il a certifié tous les connaître **depuis *trois heures/une heure.**
*At three o'clock, he certified knowing them all since *three o'clock/one o'clock.*
b. **A trois heures**, elle va avouer tout mépriser **depuis *trois heures/une heure.**
*At three o'clock, she's going to confess to scorning everything since *three o'clock/one o'clock.*

In order for an adverb with a punctual connotation (i.e. **à**, *'at'*) to be used in the subordinate clause, the subordinate verb must be in the past infinitive as in (31)[6]. In this case, the time adverbial must again refer to a time previous to the event time of the matrix verb.

(31) a. **A trois heures**, il a certifié tous les avoir connu ***à trois heures/à une heure.**
*At three o'clock, he certified having met them all at *three o'clock/at one o'clock.*
b. **A trois heures**, elle va avouer tout avoir méprisé ***à trois heures/à une heure.**
*At three o'clock, she's going to confess to having scorned everything at *three o'clock/one o'clock.*

According to Zagona (personal communication), it may be that a precedent interpretation is the unmarked case and that it does not involve the s-selection of a temporal feature by the matrix verb. No s-selection of a temporal feature means no agreement with respect to temporal features between the matrix V° and C°, and thus no L-marking of CP at LF. If CP is not L-marked at LF, it acts as a barrier to quantifier movement. This is why, then, in (26c) and (26d), the quantifier associated with the subordinate object may not occur in construction with the matrix VP.

Recall that, in order for a precedent interpretation to hold, the subordinate event must be free. Since in this case there is no s-selection of features, there is no movement of F° to C°, and so no agreement between the matrix and subordinate verbs with respect to the index *k*. This prevents the matrix V from being a potential governor for the subordinate V. The subordinate V is, then, free.

2.2.3. The temporal feature [+subsequence]

The analysis proposed thus far poses a problem for sentences like (32), from Rochette (1988:301), where the matrix V s-selects for a complement with the temporal feature [+subsequence] ([+subs.]).

(32) Jean a **tous** voulu les lire.
Jean wanted to read them all.

In order to avoid unnecessary repetition, this problem will be treated in our discussion of clitic climbing below.

3 A third condition on clitic climbing

Let us now see how an analysis in terms of temporal argument structure can be applied to the examples in (21) and (22), repeated here as (33) and (34) for convenience.

(33) Mario **lo** vuole leggere.
Mario wants to read it.

(34) *Mario **lo** odia leggere.
Mario hates to read it.

The example in (33) is, again, exactly the type of sentence dealt with by Arteaga, so we can take its structure, after all indexing to be as shown in (25). Again, after F° to Agr° to C° movement and SPEC Head agreement, CP is L-marked with respect to temporal features. This is precisely what allows clitic climbing. The problem remains, however, as to how a subsequent interpretation can be obtained since in (25) the VP is A-bound rather than A-bar bound.

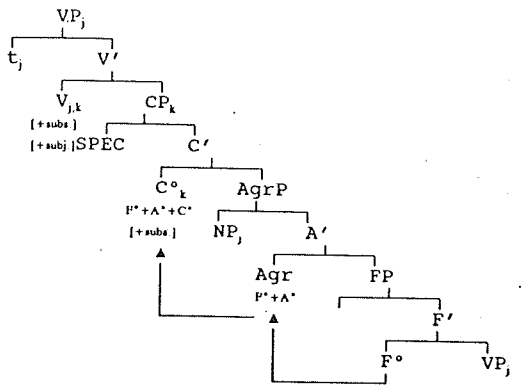
In order to see that sentences like the one in (33) do indeed require that a subsequent interpretation hold, consider the sentence in (35), where coreferential time adverbials in the matrix and subordinate clauses result in ill-formedness, while a time adverbial in the subordinate clause whose reference is subsequent to the one in the matrix clause does not.

(35) **Alle tre**, Mario l'ha voluto leggere **alle *tre/quattro.**
*At three o'clock, Mario wanted to read it at *three o'clock/four o'clock.*

Recall that in order for a subsequent interpretation to hold, the subordinate event must be A-bar bound, usually by the external temporal argument in the SPEC of CP. However, as we have seen in (25), the subordinate event of a verb s-selecting for the feature [+subs.], where the matrix and subordinate subjects are coreferential, is A-bound by the matrix V°. Since the lower event is not A-bar bound, a subsequent interpretation cannot hold.

In order to resolve this problem, I will assume that in structures where a verb s-selects for both the feature [+subj.] and the temporal feature [+subs.], and where the matrix and subordinate subjects are coreferential, the co-indexation resulting from predication in turn results in the absorption of all features on F°, as well as the external temporal argument. This situation is analogous to passive constructions where the verb morphology is affected, the external theta role is absorbed and the structural case of the verb is absorbed. This process, and all indexing, will give us the representation in (36).

(36)



In (36), as in (25), the movement of F° to Agr° to C° results in the L-marking of CP since the matrix V° and C° agree with respect to the temporal feature [+subs.]. This will account for the fact that in sentences like (33), where the matrix verb s-selects for the temporal feature [+subs.], a clitic associated with the subordinate V can occur in construction with the matrix VP. At the same time, however, let us assume that the residual [+subj.] feature on the matrix V° prevents it from A-binding the lower event. Let us further assume that, since there is no external argument in the SPEC of CP, the subordinate VP can raise to this A-bar position, where it can receive a subsequent interpretation. This will give the same result as if the subordinate VP was the complement of the matrix V.

In (34), although the matrix verb **odiare** s-selects for the feature [+subj.], it does not s-select for a temporal feature. That this is the case can be seen by the fact that the embedded V must always have a generic temporal interpretation, just as the verb in "John sings" must. The lack of s-selection of a temporal feature means that CP cannot be L-marked at LF, and so any derivation including the movement of an element across CP will crash at this level.

Recall that, in order for a generic temporal interpretation to hold, the event VP must be free in its governing category. With **odiare**, since there is no s-selection of temporal features to coincide with the feature [+subj.], there is no absorption of the features on F°, nor of the external temporal argument. Again, F° must move to C° in order for the selection of the feature [+subj.] to be satisfied. Since there is also no modally construed operator in the SPEC of CP to A-bar bind the embedded VP, the lower event is free in its minimal governing category. Note that the matrix V is a potential governor for the subordinate VP since they share all indexing.

It should be noted that this analysis cannot account for the apparently exceptional behavior of **desiderare** *'to want, wish'*, as can be seen in the examples in (38), from Burzio (1986:221).

(38) a. **Lo** voglio leggere.
I want to read it.
b. ***Lo** desidero leggere.
I wish to read it.

There is no obvious reason to assume that **desiderare** is any different than **volere** in terms of the s-selection of temporal features. Furthermore, **desiderare** also s-selects for the feature [+subj.]. Burzio, following Rizzi, assumes that **volere** is "semantically weak", while **desiderare** is not. While it is not immediately clear how the presence versus absence of semantic features can block the s-selection of temporal features, we can not offer any alternative solution at this time. This situation is no more problematic for the analysis offered here than it is for Rizzi and Burzio's analyses in terms of restructuring.

As we have already seen in section 2.2.1 above, this analysis can also account for those cases of clitic climbing where the verb s-selects for the temporal feature [+simult.]. This is the case for the verb **cominciare**, as can be seen in (39).

(39) Mario l'ha cominciato a leggere.
Mario has started reading it.

Since the subordinate event time is bound in its governing category, a simultaneous interpretation may hold. Also, since the matrix V° agrees with C° with respect to the temporal feature [+simult.] at LF, CP is L-marked and is thus not a barrier to clitic climbing at this level.

The analysis presented here also has the advantage of being able to account for the unacceptability of clitic climbing with a certain class of verbs not mentioned by Kayne (1989). The verbs of this class can be roughly defined as "reporting" or "asserting" verbs. The following example from Spanish is provided by Luján (1978), but also holds for Italian:

(40) ***La** admitimos conocer.
We admitted knowing her.

In this example (as with most verbs of this class), the subordinate event must be interpreted as precedent with respect to the matrix V. It has already been suggested, in section 2.2.2, that a precedent interpretation may be the unmarked case, and that it does not involve the s-selection of a temporal feature by the matrix verb. No s-selection of a temporal feature means no agreement with respect to temporal features between the matrix V° and C°, and thus no L-marking of CP at LF. If CP is not L-marked at LF, it acts as a barrier to clitic climbing. This is why, in (40), the clitic pronoun associated with the subordinate verb may not occur in construction with the matrix VP.

4 Summary

Kayne (1989) proposes two conditions on clitic climbing. The first, related to the null subject parameter, is that the language in question must have a strong I. Italian and Spanish have this property, while French does not. The second condition on clitic climbing is that I-to-C-to-I movement must be permitted. Kayne showed that this type of movement is likely involved in 'easy-to-please' constructions, and that it is permitted in both French and Italian. Kayne also linked clitic climbing to subject control constructions, but was unable to account for those subject control constructions where clitic climbing is not allowed. In order to resolve this problem, I have proposed a third condition on clitic climbing which holds at LF. According to this condition, CP must be L-marked at LF in order for any derivation including movement across this node to be successful. The L-marking of CP at LF occurs when there is agreement with respect to temporal features between the matrix V° and the embedded C°. I have also provided independent motivation for this analysis by showing that it can account for QR in French.

References

Arteaga, Deborah L. 1990. *The Disjoint Reference Requirement in Subjunctive Clauses: Diachronic Evidence from Romance*. Unpublished Ph.D. dissertation, University of Washington.

Burzio, Luigi. 1986. *Italian Syntax. A Government-Binding Approach*. Dordrecht: D. Reidel Publishing.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, Mass.: MIT Press.

-----. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.

-----. 1986. *Barriers*. Cambridge, Mass., MIT Press.

Gess, Randall S. 1992. The effects of temporal structure on quantifier movement in French, ms., University of Washington.

-----. 1994. Three requirements for clitic climbing, ms., University of Washington.

Grimshaw, Jane. 1979. Complement selection and the lexicon. *Linguistic Inquiry* 10, 279-426.

-----. 1981. Form, function, and the Language Acquisition Device. *The Logical Problem of Language Acquisition*, ed. by C.L. Baker and J. McCarthy, 165-182. Cambridge, Mass.: MIT Press.

Kayne, Richard S. 1975. *French Syntax: The Transformational Cycle*. Cambridge, Mass.: MIT Press.

-----. 1984. *Connectedness and Binary Branching*. Dordrecht: Foris.

-----. 1989. Null subjects and clitic climbing. *The Null Subject Parameter*, ed. by O. Jaeggli and K. Safir, 239-261. Dordrecht: Kluwer Academic Publishers.

Luján, M. 1978. Clitic promotion and mood in Spanish verbal complements. *Montreal Working Papers in Linguistics* 10, 103-190, also in *Linguistics* 18 (1980) 381-484.

May, Robert. 1985. *Logical Form: Its Structure and Derivation*. Cambridge, Mass.: MIT Press.

Pesetsky, David. 1982. *Paths and Categories*. Unpublished Ph.D. dissertation, MIT.

Pollock, Jean-Yves. 1978. Trace theory and French syntax. *Recent Transformational Studies in European Languages*, ed. by S. Jay Keyser, 56-112.

-----. 1989. Verb movement, Universal Grammar, and the structure of IP. *Linguistic Inquiry* 20, 365-424.

Quicoli, A. Carlos. 1976. Conditions on quantifier movement in French. *Linguistic Inquiry* 7, 583-607.

Raposo, E. 1987. Case Theory and Infl-to-Comp: The Inflected Infinitive in European Portuguese. *Linguistic Inquiry* 18, 85-109.

Rizzi, L. 1982. *Issues in Italian Syntax*. Dordrecht: Foris.

Rochette, Anne. 1988. *Semantics and Syntactic Aspects of Romance Sentential Complementation*. Unpublished Ph.D. dissertation, MIT.

Sportiche, Dominique. 1988. A theory of floating quantifiers and its corollaries for constituent structure. *Linguistic Inquiry* 19, 425-449.

Zagona, Karen. 1982. *Government and Proper Government of Verbal Projections*. Unpublished Ph.D. dissertation, University of Washington.

-----. 1988. *Verb Phrase Syntax: A Parametric Study of Spanish and English. Studies in Natural Language and Linguistic Theory*. Dreidel: Dordrecht.

-----. 1990a. Times as Temporal-Argument Structure, ms., University of Washington.

-----. 1990b. On the non-isomorphism of morphological tense and temporal interpretation. *Proceedings of the XVIIth Linguistic Symposium on Romance Languages*, ed. by C. Kirschner and J. DeCesaris, 479-494. Amsterdam: John Benjamins.

-----. 1992. Tense-binding and the construal of present tense. *Theoretical Analyses in Romance Linguistics*, ed. by C. Laeufer and T. Morgan. Amsterdam: John Benjamins.

Notes

* This paper investigates the phenomenon of clitic climbing in Romance from within the Barriers framework outlined in Chomsky (1986). I wish to thank Karen Zagona and Julia Herschensohn for the valuable comments they made on earlier versions of this paper.

1. Note that QR is an LF operation so that the requirement of a strong I does not hold.

2. The asterisk in parentheses indicates a varying degree of acceptability across Romance languages.

3. I am assuming, following Zagona (1982, 1988), Sportiche (1988), Pollock (1989), Arteaga (1990), among others, that the subject is an external argument of VP which originates in the SPEC of VP.

4. Further study is needed to illuminate the relationship between indexing and temporal interpretation.

5. Unlike Arteaga (1990), I assume that the feature [+subj.], like the feature [+subs.] appears under the matrix V°. The significance of this feature will be seen in the following pages.

6. Note the concomitant change in meaning in (31a).

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A Refinement of Checking Theory and a Model-Structure of Korean Functional Categories

Though Chomsky (1992) presents several applications and prospects its extension, the Checking Theory needs to be more refined and formalized to properly work in the grammar. I will examine how the strength of features is designated and claim that it is better to separate AGRs from AGRo, in a sense that doing so allows the [SPEC, TP] and no T-raising to AGRs in English. This implies that the strength of ϕ_N-features of AGRs may be different from that of AGRo, unlike Chomsky's argument that they have the same properties universally, hence the strength of ϕ-features of AGRs and AGRo are the same. With this argument I have formalized the feature-checking process as the Identity Principle. A model-structure of Korean functional categories is presented and functional features are explored, being attested of their appropriateness within the Identity Principle.

1. The Checking Theory of Minimalist Program

Chomsky's (1992) Minimalist Program (MP) abandons the D- and S-structures. The principles and theories which were applying at the D-S or S-S must be covered somehow at some other level of representation. Among them, the Affect-α comes to apply in PF or LF, and the fundamental concept of Affect-α changed from 'derivational' to 'checking'.[1] For instance, the verb *were* is derived in the syntax through movement in the derivational theory. First it is inserted as an abstract verb *BE* from the lexicon. In the syntax it moves to the tense morpheme *-ed* and becomes another abstract verb {BE-ed}. When it arrives at AGRs it gets the whole set of morphological features which is realized as the actual form *were* after PF rules applied.

Whereas, in the Checking Theory of MP the word *were* itself is inserted directly from the lexicon with relevant morphological features. The reason why it moves through functional categories up to AGRs is just to get its features checked off by satisfying the Principle of Full Interpretation (FI) given in (1) below. That is, the word *were* is no more abstract than it accompanies the features [+PL, -3rd, +PAST] when it is selected from the lexicon, and it can be a direct object of the SPELL-OUT (SO). In this way, the reason of Move-α is simplified and the process is more formalized. To speak more precisely in terms of MP, a functional category, as a checker playing a 'mediating role', has V- and NP-features which motivate verb- and NP-movement respectively, leading check-off of features through head-adjunction or SPEC-Head agreement. To satisfy the FI, the Checking Theory requires strong features to be checked off before SO, since they are visible at PF and hence are not legitimate objects of PF. If a strong feature remains at PF, it cannot receive an interpretation, hence the derivation crashes, violating the FI. Whereas, weak features do not make problem at PF since they are invisible. Weak features which are not checked off before SO due to Procrastinate (2) are checked off at LF by the FI again.

(1) Full Interpretation

Every symbol must receive an external interpretation by language-independent rules. (Chomsky 1992: 45)

(2) Procrastinate

LF movement is cheaper than overt movement. (Chomsky 1992: 42)

In the following section, I will explore the possibility overlooked in Chomsky's Checking Theory, especially discussing Chomsky's argument that Tense has a strong NP-features and does not have a specifier-position in English. In Section 3, I will discuss the necessity of refinement of feature-checking process and propose the Identity Principle as a formal mechanism of the Feature-checking Theory.

[1] It must be noted that the term 'derivational' is different from the one used in Chomsky (1994). My usage is strictly restricted to the sense that a word (morpheme) is selected as fully inflected form. Its feature-checking process is still derivational.

2. The T-to-AGRs Raising Argument

Chomsky's (1992) argument that Tense has a strong NP-feature and does not have a specifier-position is related to several phenomena. First, it is for the explanation that there is only one argument-position allowed before verbs in English. According to his argument, in the structure (3c) T adjoins to AGRs since its NP-feature, i.e. [+NOM], is strong and it must be checked off before SO. The amalgamated form [$_{AGRs}$ T AGRs] lifts up the subject *a man* to the [SPEC, AGRsP] and the strong NP-feature of T and the same feature of *a man* are checked off through SPEC-Head agreement, deriving (a). If there were a [SPEC, TP] in the structure (3c), *a man* should not raise to the [SPEC, AGRsP], since T could get its strong feature checked at the [SPEC, TP]. However, Chomsky worries that the presence of [SPEC, TP] allows such an ungrammatical sentence as (3b). That is, there would be two argument positions in (3b) before SO and nothing could prevent *there*-insertion before SO.

(3) a. A man is here.
b. * There a man is here.
c. [$_{AGRsP}$ AGRs [$_{TP}$ T [$_{VP}$ [$_{VP}$ is a man] here]]]

−PL	−PAST	−PL	+NOM
+3rd	+NOM	+3rd	−PL
−PL		−PAST	+3rd
+3rd			

Second, the T-raising argument is needed for the explanation of how French adverbs can appear between verbs and objects unlike English. If there were a [SPEC, TP], we could not explain how subjects in French can raise to the [SPEC, AGRsP] in front of verbs which adjoin to AGRs due to the strong V-feature of AGRs before SO. That is, in (4c), in order to derive the grammatical sentence (4a), nothing could lift *Jean* to the [SPEC, AGRsP] from the [SPEC, TP] where *Jean* would have raised due to the strong NP-feature of T. In Chomsky's structure, *Jean* can raise to the [SPEC, AGRsP] over *perdit* since there is no [SPEC, TP] in which *Jean* could be held.

(4) a. Jean perdit souvent la tete
b. John lost often his mind
'John often lost his mind.'
c. [$_{AGRsP}$ [$_{AGRs}$ [AGRs perdit$_i$] [$_{TP}$ Jean [$_{T}$ T] souvent [$_{VP}$ t$_i$ la tete]

Another motivation of Chomsky's T-to-AGRs raising argument is to simplify the case-checking process. That is, as Accusative Case is checked off at the [SPEC, AGRoP] by the amalgamated form [$_{AGRo}$ V AGRo] through SPEC-Head agreement, he wants to get Nominative Case checked off at the [SPEC, AGRsP] by [$_{AGRs}$ T AGRs] in the same fashion. This process makes it possible to maintain the assumption that AGRs and AGRo have exactly the same properties. If we say, in order to explain EPP phenomenon of English, that $\phi_{N\text{-feature}}$s of AGRs are strong, then objects also raise over verbs due to the strong ϕ_N-features of AGRo, not reaching PF. The only way to explain EPP, maintaining the same-property assumption of AGR, is the T-raising.

However, the T-raising argument involves several questionable points. Even though we cannot say that the raising of T to AGRs is against the Greed Principle,[2] the process of raising is somewhat vague. First, how does T expect that it can get it's strong feature checked off in the position of AGRs despite that there is no checkee for it yet in the checking domain of [$_{AGRs}$ T AGRs] when T has raised? Second, if strong features just motivate the raising of substantives before SO, and the feature-checking takes place when a pair of features meet at an appropriate syntactic position, how/why are the ϕ_N-features of AGRs not checked off when the feature [+NOM] of subject is checked at the [SPEC, AGRsP]?[3] Third, in order to get the V-features of verbs checked at the position adjoined to I at LF by the V-features of T, we have to stipulate that the trace of T still has V-

[2] The Principle of Greed (Chomsky 1992 47)
Move-α applies to an element α only if morphological properties of α itself are not otherwise satisfied

[3] Jung comments (p.c.) that weak-features are checked-off at LF due to the principle of procrastinate, even though they are already at PF in the position where they can be checked off. If this is really so, the current definition of procrastinate must be changed which is defined in terms of LF movement only. But I overlook this possibility.

features after T has raised to AGRs.[4] Fourth, if T does not have a specifier-position unlike other functional categories, it will violate the Uniformity Principle.

If we can allow [SPEC, TP] and do not incur such questions as above, it will comply to the Uniformity Condition and simplify the grammar system. This is possible, if we change the feature system as follows. The only change in this system is that AGRs is separated from AGRo and the NP-features of AGRs are strong instead of the NP-features of T.

(5)

		Present		**Revised**	
		English	**French**	**English**	**French**
AGRs	V-features	weak	**strong**	weak	**strong**
	NP-features	weak	weak	**strong**	**strong**
AGRo	V-features	weak	strong	weak	weak
	NP-features	weak	weak	weak	weak
T	V-features	weak	weak	weak	weak
	NP-features	**strong**	**strong**	weak	weak

The distinction of AGRs from AGRo is supported by the object-shift language like Modern Irish.[5] According to Carnie (1993), the basic word order of Irish is VSO. This order is achieved by verb-raising to AGRs as in French, subject-raising to the [SPEC, TP], and objects-raising to the [SPEC, AGRoP] Even though the reason is not clear in Carnie's, if the object-shift is motivated by the strong ϕ-features of AGRo, then the ϕ-features of AGRs must be also strong according to Chomsky's argument that AGRs and AGRo have the same properties However, if the ϕ-features of AGRs are strong, we cannot explain how subjects can stay at the [SPEC, TP].[6] The opposite way does not work either If both ϕ-features of AGRs and AGRo are weak, the raising of objects to AGRo cannot be explained. One way to account for this is to assume that in Irish the ϕ_N-features of AGRo are strong, while those of AGRs are weak

The sentences in (6) represent the constructions of simple raising-verb, *there*-insertion, ECM, *there*-insertion with ECM, passive formation with ECM, raising-verb, and *there*-insertion involving raising-verb, respectively. These constructions for the explanation of which Chomsky needs the T-raising Hypothesis are explained with the revised feature system and the Identity Principle which I will present in the following section

(6) a. A man is here.
b. There is a man here.
c. He believes there to be a man here.
d. He believes them to be here.
e. There is believed to be a man here.
f. A man is believed to be here.
g. A man seems to be here.
h. There seems to be a man here.

[4] Bobaljik (1993: 72 (fn23)) raises a similar question. He points out that after a subject raises overtly to the [SPEC, AGRsP] and T raises to the head of AGRsP to check the subject, an object cannot be licensed in the [SPEC, AGRoP] since there is no checker for the object left.

[5] Another supporting evidence for the argument that AGRs differs from AGRo is presented in Section 5. Collins and Thrainsson (1993: 133) implies the differentiation too: "We will simply assume that the N-features of AGRo are optionally strong." They argue this in order to explain the optional overt raising of object in the following examples (their (2a, b)).

(i) a. Jón las bækurnar ekki
John read the books not
'John did not read the books.'

b. Jón las ekki bækurnar
John read not the books
'John did not read the books.'

Even though they avoid the discussion about the movement of T to AGRs (133: fn2), it seems that they assume subject-raising to the [SPEC, TP] which is forced by the strong N-feature of T. If the N-feature of AGRo is optionally strong as they argue, then that of AGRs must be also optionally strong in order to comply to Chomsky's argument that AGRs and AGRo are the same. If this is really so, we are forced to say that in Icelandic subjects raise optionally raise to the [SPEC, AGRs] according to the strength of the N-feature of AGRo.

[6] Designation of strength to the NP-feature of T, to the feature [+ACC] of AGRo, and to the ϕ_V-feature of AGRs also accounts for the VSO word-order in Irish. However, in this paper I explore that the separation of AGRs from AGRo works better than the T-raising argument in the sense that the former does not make the questions I have raised in Section 2

3. Identity Principle

3.1. Functional Node Projection and Functional Categories

For the purpose of the present study, I need to separate functional nodes from functional morphemes. This will be an extension of Chomsky's assumption that, "like verbs, nouns are drawn from the lexicon with all of their morphological features" (1994: 40).[7]

Before the Minimalist Program, a functional category means a functional morpheme. A functional node (0-level) is just a place to which a functional category is selected. Functional morphemes but not functional nodes have all the relevant morphological features in the lexicon and they project in the syntactic node with their features when they are selected.

In the Minimalist Program a functional category means a bundle of grammatical features without morpheme. Therefore we can call functional nodes functional categories in the syntax, while functional morphemes are just called as functional morphemes. In most cases, functional morphemes are drawn with substantives but in some cases like *not* in English they stand alone in the lexicon with all relevant features including syntactic ones.

To sum up, in the present study the term 'functional category' stands for functional nodes which exist in the lexicon as a set of grammatical features. Whereas the term 'functional morpheme' stands for linguistic elements which exist in the lexicon, conglomerated to substantives or alone, with a set of grammatical features (ordinary ones), which are the same as those of the corresponding functional nodes except their inverse feature value. I will continue to use the term 'functional category' for both functional nodes and morphemes unless it incurs a confusion.

[7] In this paper, I use the terms morphological features, grammatical features, and functional features without distinction. There are roughly three kinds of functional features, syntactic features or categorial features expressed with [±N, ±V], morphological features such as [±Nom, ±Pl, ±Past], and grammatical features such as [±FOC, ±TOP]. I think precise distinction of the last two is hard since in some languages topicalization is expressed with special morphemes while in others it is expressed with syntactic movement. Since the distinction is not crucial in this paper I will continue to use them without distinction.

3.2. Feature Notation: Inverse features

In the preceding section I mentioned V- and NP-features of functional categories which motivate verb- and NP-movements, respectively. For example, verb-features of AGRs are ϕ-features for verbs (ϕ_V-features of AGRs) which adjoin to AGRs and its NP-features are ϕ-features for NPs (ϕ_N-features of AGRs) which substitute specifier-positions of AGRsP. These features come along with projections of AGRs node from the lexicon and in the syntax they function to motivate movements. They are supposed to be checked off at a position of SPEC-Head agreement or a head-adjunction when they meet a verb or an NP which has the same features.

Let us consider the sentence (7a) which has the structure (b). The feature [+NOM] of T is strong and must be checked off before SO. According to Chomsky, before SO T adjoins to AGRs, forming $[_{AGRs}$ T AGRs], and forces *Mary* to substitute the position of [SPEC, AGRsP] in order to discharge each other's same feature, that is [+NOM]. Since all the other features are weak, they must be wait until LF where they are checked off through SPEC-Head agreement or head-adjunction.

(7) a. Mary loves John.

b. [AGRs T [Mary loves John]]

AGRs	T	Mary	loves	John
$-PL_V$	+NOM	+NOM	$-PL_V$	+ACC
$+3rd_V$	−PAST	$-PL_N$	$+3rd_V$	
$-PL_N$		$+3rd_N$	−PAST	
$+3rd_N$			+ACC	

To formalize the process of feature-checking, I introduce inverse features which are supposed to be a property of functional categories. That is, while the ordinary value [±F] is designated to the morphological features of substantives or functional morphemes, to those of functional categories (nodes) is the inverse value [±F¯] designated. The introducing of inverse feature has at least two advantages. First, functional categories and substantives can be defined distinctively in a more schematic fashion. That is, functional categories are

checkers which have only inverse features, while subtantives are checkees which have ordinary features. Second, the feature-checking process can be more visualized (concrete). If the concept of 'morphemes being licensed through feature-checking' is interpreted as 'getting their identities,' it is nicely expressed at the point where inverse features meet ordinary counterparts. With this feature notation, the feature-checking process is formalized as the Principle of Identity, as stated in (8).[8]

(8) Principle of Identity

Every functional morpheme M is identified iff,
(a) $M[\pm F] \bullet [\pm F^{-}]=M$
(b) The function $\bullet$ = SPEC-Head agreement or Head-adjunction

In addition, I will use underlines to indicate strong features. By the way, to point out one more vagueness of the feature system, which I did not say in Section 2, Chomsky does not clarify what is responsible for the nominative Case of subject. If the verb *loves* is selected as fully inflected form including tense and the functional category T plays just a 'mediating role', as Chomsky himself says, it is the verb that is responsible for Nominative Case of subject. To express this concept, I will add the feature [+NOM] to verbs, and its inverse $[+NOM^{-}]_V$ to Tense. As a result, the functional category T have two $[+NOM^{-}]$ features; one is for verbs and the other for subjects. The same is true to the case of Accusative Case, which is already expressed in Chomsky's system. This suggestion makes the feature system of functional categories more symmetric. That is, AGRs, AGRo, and T have two sets of features which are checked off through SPEC-Head agreement. Consequently we can generalize the feature-system as follows, the functional categories leading SPEC-Head agreements have two sets of features, one for NPs and the other for verbs.

With this feature-notation, the above sample (7b) can be expressed as in (9), with the node of AGRo added.

(9) [AGRs: $-PL_V^{-}$, $+3rd_V^{-}$, $-PL_N^{-}$, $+3rd_N^{-}$ | T: $+NOM_V^{-}$, $-PAST_V^{-}$, $\underline{+NOM_N^{-}}$ | AGRo: $+ACC_V$, $+ACC_N$ | Mary: $+NOM_N$, $-PL_N$, $+3rd_N$ | loves: $-PL_V$, $+3rd_V$, $-PAST_V$, $+NOM_V$, $+ACC_V$ | John: $+ACC_N$]

The underlined features, which are strong, must be checked off before SO. T which has the strong NP-feature moves up, before SO, to the position adjoined to AGRs where the inverse feature $[\underline{+NOM}]_N$ and ordinary $[+NOM]_N$ of *Mary* meet (8) through SPEC-Head agreement. The other features are weak, hence checked off at LF through the Identity Principle again.

This feature-checking process involves all the question I raised in Section 2. In Section 4, I will show the argument that AGRs may not be the same as AGRo does not raise such questions. With this, the specifier-position of T and non-T-rasing can be allowed, complying to the Uniformity Principle. I will call this whole process Non-T-Raising argument.

3.3. Strong and Weak Features

Grammatical features must be checked off at an appropriate level of representation (more precisely before or after SO), satisfying the FI. Since the strong feature is not a legitimate object of PF, it must be checked off before SO, while the weak feature is checked off at LF. Strength of features is figured out in such a way that the grammar system can "reach PF as fast as possible, minimizing

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[8] I obtained the basic idea of this formation from Brame's lecture on Algebraic Linguistics (Fall, 1993). He uses the inverse symbol "$^{-1}$" for missing categories. For example, the definite article *the* is expressed as such a syntactic word as <the, DN^{-1}>, which reads '*the* is the category D looking for N.' When <the, DN^{-1}> combines with another syntactic word <man, N> which has the category N, they become <the man, D>. The combining process is expressed as "the Rule of Cancellation", as stated below.

Cancellation $\langle x, \varphi\psi^{-1}\rangle \circ \langle y, \psi\rangle = \langle xy, \varphi\rangle$

In the Principle of Identity, I adopt his idea that the inverse category is cancellated when it meets an ordinal counterpart. Mine, however, differs significantly from his in several points. First, the inverse symbol is used for features but not syntactic categories. Second, his cancellation process takes place in the linear structure of sentence, while mine works in configurational structures. Third, the inverse symbol means 'missing categories' in his rule, while it means 'checker' of already-existing morphemes in mine.

overt syntax" (Chomsky 1994: 42). That is, if PF can be reached without any overt movement, the grammar does not need to have any strong features. However, no overt movement does not reach PF, the grammar must designate a certain strong feature to some functional category in a way that allows the least overt movements. In this sense, in order to make the grammar correctly judge the grammaticality of sentences, the strength of features must be determined through the comparison of actual structures with the ones which will be produced by the theory of the grammar.

Let us consider the sentence in (10a) which has the structure in (11a). The subject *Bill* apparently does not need to move overtly over the VP before SO since even if all the elements are spelled out without any overt movement, it looks reached PF already. However, if we consider (10b), a negative counterpart of (10a), which has the structure (11b), we can recognize that the same is not true. The subject *Bill* must be spelled-out after it has moved over the negation morpheme *not* out of the VP. If it is spelled out without overt movement, the spelled-out sequence of elements will differ the actual PF, as shown in (10c). In order to produce the correct PF, we need a device to motivate the overt subject-NP movement. This consideration leads us to designate a certain strong feature to some functional category over the NEGP. The same consideration is invoked for the auxiliary verb *does*. It is also moved somehow over *not* before SO. No more overt movement is needed except these two, since the form derived by the two movements reached the correct PF already. The other movements for feature-checking wait until LF, satisfying the Procrastinate Principle.

(10) a. Bill loves Mary.
b. Bill does not love Mary.
c. * not does Bill love Mary.

(11) a. $[_{AGRsP}\ [_{AGRoP}\ [_{VP}$ Bill $[_{V'}$ loves Mary]]]]]
b. $[_{AGRsP}\ [_{NEGP}$ not $[_{AGRoP}\ [_{VP}$ does$[_{VP}$ Bill $[_{V'}$ loves Mary]]]]]]

Another well-known example is the fact that an adverb comes between verb and object in French, which is not allowed in English. In order to obtain a universality of X-bar structure, it is strongly recommended that the structure before SO is the same in both French and English. What makes the PF of French differ from English is the strong V-feature of AGRs in French. In English which has a weak V-feature of AGRs, verbs cannot move out of VP before SO, while in French verbs must move up to AGRs before SO due to the strong feature. This kind of method or similar one will be used to determine feature strength in the following sections.

At this moment, we need to more refine the feature system in order to make it work properly. In the structure (9), the strength of feature is indicated only on checkers (functional categories), but not on checkees (functional morphemes).[9] However, sometimes the strength need to be indicated on checkees too. Chomsky (1992) implies this necessity, trying to account for the different behavior of auxiliaries from regular verbs. That is, English auxiliaries, like French ordinary verbs, always appear over the negation morpheme *not* at PF, but ordinary verbs stay in-situ. In the following paragraph, he explains the reason of this different behavior between them;

> "... such elements (auxiliaries), lacking semantically-relevant features, are not visible to LF rules. If they have not raised overtly, they will not be able to raise by LF rules and the derivation will crash." (p. 42-4)

This different behavior must be reflected in the feature system. If we designate the strength on the features of checkers, we cannot account for why English auxiliaries show overt movements like ordinary verbs of French. In other words, in order to account for the phenomenon that English auxiliaries always appear above *not*, if we say that the ϕ_V-features of AGRs in English are strong as those in French, it contradicts to the opposite argument that we need for the explanation of English ordinary verbs in-situ. To solve this problem, I suggest

[9] See Section 2.1 for the discussion about the dissociation of functional nodes (categories) and functional morphemes.

that the strength of features can be designated on checkees (functional morphemes) too. Given this suggestion, I claim that English auxiliaries have strong ϕ-features, and must be checked off at the position of AGRs before SO.[10] I believe that this claim has a conceptual propriety. Conceptually, auxiliary verbs are closer to functional categories than to substantives. If this opinion is not incorrect, auxiliaries can have strong features, as we have so far assumed that only features of functional categories are strong.

4. Attestation of the Non-T-Raising Hypothesis

Before I start attesting my revised feature system, I repeat it here for reader's convenience: AGRs is separated from AGRo, the NP-features of AGRs is strong in English, the specifier-position of TP is allowed and T does not raise to AGRs. This new feature system works within the Identity Principle.

Let us examine how the sentences in (12) are generated. In the structure (12c), the ϕ-features of AGRs and verb are strong and they must be checked off before SO. The subject *a man* raises to the [SPEC, AGRsP] and the verb to the AGRs, respectively. They satisfy the Identity Principle and are licensed, deriving (12a). Before they reach their destinations, *is* and *a man* stop by T and the [SPEC, TP], respectively, where their weak features are checked off by satisfying the Identity Principle. Otherwise they will violate the Economy Principle of Shortest Link. It is a kind of free-riding feature-checking. If *there* is inserted into the [SPEC, AGRsP] by a different numeration, *a man* does not need to raise since there is no more strong features for it. Whereas, *is* still has to raise in order to get its strong features checked off. Here I assume that *there*-insertion nullifies or weakens strength of the morphological features. (The letters V and N subscribed at the right side of features stand for Verbs and Nouns, respectively. For example, the feature [+NOM$_V$] is read as 'Nominative feature for verbs.')

(12) a. A man is here.
b. There is a man here.
c. [$_{AGRsP}$ AGRs [$_{TP}$ T [$_{VP}$ [$_{VP}$ is a man] here]]]]

$\underline{-PL_V}$	$+NOM_V$	$\underline{-PL_V}$	$+NOM_N$
$\underline{+3rd_V}$	$-PAST_V$	$\underline{+3rd_V}$	$-PL_N$
$\underline{-PL_N}$	$+NOM_N$	$-PAST_V$	$+3rd_N$
$\underline{+3rd_N}$		$+NOM_V$	

Let us examine the sentences in (13), which are some cases of ECM-construction. In the structure (13d), *them* goes up to the [SPEC, AGRsP]$_{EMB}$ before SO due to the strong null ϕ_N-feature of the embedded AGRs. *You* raises to the [SPEC, AGRsP] through the [SPEC, TP] due to the strong ϕ_N-features of the matrix AGRs, deriving the sentence (13a).[11] At LF, *them* continues to go up to the [SPEC, AGRoP]$_{MAX}$ to get its [+ACC, +PL, +3rd] checked off. If *they* is selected instead of *them*, its feature [+NOM] cannot be checked off even at LF, since in the sentence the [SPEC, AGRsP]$_{MAX}$ is the unique position where [+NOM] can be checked off, but it is occupied by *You* already, hence (13b) rules out. If *there* is inserted into [SPEC, AGRsP]$_{EMB}$ by a different numeration, *two men* cannot raise to that position before SO, since *there* nullifies the strength of [ϕo]$_N$, hence (13c) is derived. Here I assume that the function of expletive there is to nullify the strength of AGRs features. At LF, *two men* raises to the [SPEC, AGRoP]$_{MAX}$ to get its [+ACC, –PL, +3rd]$_N$ checked off.

(13) a. You believe them to be there.
b. * You believe they to be there.
c. You believe there to be two men there.

[10] I do not know how auxiliaries can skip the intermediate negation morpheme not which is a relativized head-barrier for the movement of auxiliaries. One temporary solution to this problem is to assume that not is inserted after the auxiliaries raise to AGRs due to the strong ϕ-features of AGRs. I also do not know what consequences this assumption will bring. I will leave this question open, since it is not directly related to the present purpose.

[11] I assume that the AGRs and T of infinitive verbs have null-ϕ-features [ϕo] and null-Case feature, respectively. This is an extension of Chomsky's assumption that T has null-strong Case feature. Another assumption I need is that infinitive verbs do not have any morphological features.

d.

$[_{AGRsP}$ AGRs $[_{TP}$ T $[_{AGRoP}$ AGRo $[_{VP}[_{V'}$ You believe $[_{AGRsP}$ AGRs$[_{TP}$ to $[_{VP}$ be (two men) them there]]]]]

$-PL_V^-$	$+NOM_V^-$	$+ACC_V^-$	$-PL_N$	$-PL_V$	$\underline{\phi o_N}^-$	$+ACC_N$
$+2nd_V^-$	$-PAST_V^-$	$+ACC_N^-$	$+2nd_N$	$+2nd_V$		$+PL_N$
$\underline{-PL_N}^-$	$+NOM_N^-$	$+PL_V^-$	$+NOM_N$	$-PAST_V$		$+3rd_N$
$\underline{+2nd_N}^-$		$+3rd_V^-$		$+ACC_V$		
		$+PL_N^-$		$+NOM_V$		
		$+3rd_N^-$		$+PL_V$		
				$+3rd_V$		

Continue to examine passive sentences of ECM-verbs. In the structure (14d), *they* raises to the [SPEC, AGRsP]$_{EMB}$ due to the strong $[\underline{\phi o_N}^-]$ before SO. However, it cannot stay there due to the strong $[\underline{+PL}^-, \underline{+3rd}^-]_N$ of the matrix AGRs, unlike *them* in (13d). It continues to raise to the [SPEC, AGRsP]$_{MAX}$, to check off the strong features, deriving (a). If *them* is selected instead of *they*, the feature [+ACC] of *them* cannot be checked off since there is no functional category which can check it off in the structure (14d), hence (b) is ruled out. If *a man* is selected instead of *they*, and *there* is inserted into the [SPEC, AGRsP]$_{EMB}$ by a different numeration, *a man* does not need to raise the [SPEC, AGRsP]$_{EMB}$, since *there* nullifies the strength of $[\underline{\phi o_N}^-]$, and *there* continues to raise to due to the strong $[\underline{+PL}^-, \underline{+3rd}^-]_N$ of the matrix AGRs before SO, deriving (14c).[12]

(14) a. They are believed to be there.
b. * Them are believed to be there.
c. There are believed to be a man there.
d.

$[_{AGRsP}$ AGRs $[_{TP}$ T $[_{VP}$ are believed $[_{AGRsP}$ AGRs $[_{TP}$ to $[_{VP}[_{V'}$ be they] there]]]]]]

$+PL_V^-$	$+NOM_V^-$	$\underline{+PL_V}$	$\underline{\phi o_N}^-$	$+NOM_N$
$+3rd_V^-$	$-PAST_V^-$	$\underline{+3rd_V}$		$+PL_N$
$\underline{+PL_N}^-$	$+NOM_N^-$	$-PAST_V$		$+3rd_N$
$\underline{+3rd_N}^-$		$+NOM_V$		

[12] Y-G Jung (p c) pointed out that if *there* is inserted directly into the [SPEC, AGRs]$_{MAX}$, *a man* must raise to the [SPEC, AGRs]$_{EMB}$, deriving the following ungrammatical sentence Not to generate this ungrammatical sentence, I just stipulate that *there* is inserted in the [SPEC, AGRs]$_{EMB}$ first I do not know how to solve this problem right now
(i) * There are believed a man to be there

Finally let us examine how the revised feature system applies to the raising-verb constructions. In the following structure (15d), *three men* raises to the [SPEC, AGRsP]$_{EMB}$ before SO, due to the strong $[\underline{\phi o}\ ]_N$ of the embedded AGRs However, *three men* cannot stay there since the strong features $[\underline{+PL}\ , \underline{+3rd}\ ]_N$ of the matrix AGRs which force it to raise to the [SPEC, AGRsP]$_{MAX}$ before SO, deriving (15a). If *there* is inserted to the [SPEC, AGRsP]$_{EMB}$ by a different numeration, it nullifies the strength of $[\underline{\phi o}^-]_N$ of the embedded AGRs and *three men* does not need to raise. *There* continues to raise the [SPEC, AGRsP]$_{MAX}$ again before SO, nullifying the strength of $[\underline{+PL}^-, \underline{+3rd}^-]_N$, hence the sentence (15c) is derived. Here I assume that the expletive *there* can nullify the strength of ϕ-features of AGRs several times.[13] *Three men* cannot raise to the [SPEC, AGRsP]$_{MAX}$, keeping *there* in the [SPEC, AGRsP]$_{EMB}$, since it will violate the Economy Principle of Shortest Link, hence the sentence (15b) is ruled out

(15) a. Three men seem to be here
b. * Three men seem there to be here
c. There seem to be three men here
d.

$[_{AGRsP}$ AGRs $[_{TP}$ T $[_{VP}$ seem $[_{AGRsP}$ AGRs $[_{TP}$ to $[_{VP}[_{V'}$ be three men] here]]]]]]

$+PL_V^-$	$-PAST_V^-$	$+PL_V$	$\underline{\phi o_N}^-$	$+NOM_N$
$+3rd_V^-$	$+NOM_V^-$	$+3rd_V$		$+PL_N$
$\underline{+PL_N}^-$	$+NOM_N^-$	$-PAST_V$		$+3rd_N$
$\underline{+3rd_N}^-$		$+NOM_V$		

So far, I have examined how the revised feature system applies to the sentences with which Chomsky attests his T-raising argument, and showed that it works well without raising questions which Chomsky's system has.

[13] This assumption is not so different from Chomsky's that after the strong null-Case feature of the infinitive Tense lifts NP up to [SPEC, AGRsP]$_{EMB}$ the strong Case-feature of the matrix I lifts it up to the [SPEC, AGRsP]$_{MAX}$

5. Functional Categories of Korean

5.1. A Model-Structure of Functional Categories

5.1.1. Sentence Final Endings in Korean

In this section, I will discuss how types of sentences are determined in Korean and English. I will try to show, within the Checking Theory (Principle of Identity), that the sentence final endings of Korean and *wh*-words are checked off by the property of COMP, like *wh*-words and auxiliary-verbs of English questions, and that these morphemes have weak features, hence are checked off at LF, unlike in English. It will be argued that the property of COMP is a set of grammatical features, and the different property of COMP is determined by the COMP-feature selecting parameter.

Korean has sentence final endings, unlike English, as we see in (16). The endings *-ta, -nya, -ca,* and *-la,* express declarative, interrogative, propositional, and imperative meanings respectively. That is, we can say that the types of sentences are determined by the sentence final endings in Korean.[14]

(16) a. Jihi-ka o-n-Ta.
Jihi-NM come-Pres-Dec
'Jihi is coming.'

b. ney-ka mence ssoa-La!
you-NM before fire-Imp
'You, fire first!'

c. kati nol-Ca.
together play-Prop
'Let's play together.'

d. Jihi-ka cip-ey ka-Nya?
Jihi-NM home-to go-Int
'Is Jihi going home?'

[14] Abbreviations used in this study are as follows,
NM: Nominative Marker AM: Accusative Marker Imp: Imperative ending
Dec: Declarative ending Int: Interrogative ending Prop: Propositional ending
HM: Honorific Marker Op: Operator Pres: Present Tense
PM: Plural Marker TM: Topicalization Marker
For the sake of space largely irrelevant morphemes are sometimes just glossed with capital letters

In English, the type of sentences is syntactically expressed without any special morpheme. For example, English direct questions are formed by movement of the auxiliary verb *Do* or *Be* to the COMP position. From the Standard Theory it has been argued that the question formation is motivated by the interrogative feature [+Q] ([$\pm$Q] for English in the new feature system).[15] If the head COMP has the feature [$\pm$Q], it triggers overt movements of auxiliary verbs to the position adjoined to COMP. The question which I address at this point is whether this process of question formation is a language-particular rule or not. If we induce some generalization of question formation between two different languages, it will be a small contribution to building up the UG. One idea which leads us to do that comes from Bresnan (1979) and Huang (1982). Bresnan argues that COMP determines the type of sentences. If a sentence has a *wh*-word, COMP must have the feature [+WH] to license it, and COMP must have the feature [+Q], in order to license question sentences. Can this procedure apply to the SOV languages such as Korean or Japanese? If we adopt Huang's claim that in SOV languages *wh*-words move to the position of COMP at LF to take a scope, we can unify two different processes of question formation in Korean and English in the feature-checking system of the Minimalist Program. That is, if we designate the feature [+Q] to COMP in Korean and the question morpheme *-nya* , which also has the feature [+Q], must move to the position adjoined to COMP at LF like *wh*-words, the question formation gets a parallel paradigm with *wh*-movement in both languages.

This idea is supported by Kim's (1991) observation which leads him to propose the IPI condition, and even complements his weakness. He observes that in Korean *wh*-words always appear with an interrogative morpheme *-nya* , and expresses this phenomenon as IPI well-formedness condition as stated in (17).

[15] Note that Nishigauchi (1990) uses the feature [+Q] to indicate "Quantificational" instead of "Question."

(17) An interrogative polarity item (IPI) must be governed by an interrogative marker (Q-morpheme) at LF. (Kim 1991: 208)

Kim assumes that the interrogative morpheme along with other sentence final endings is the head of IP, and argues that *wh*-words are quantifiers (IPIs) which are supposed to move to IP-adjoined position at LF where, satisfying the IPI condition, they are governed by the interrogative-morpheme *-nya* which moves to COMP from I-position. This condition implies that in Korean, as in English, the movement of interrogative-morpheme exists even though in a restricted situation.

Kim's weakness, as Jung (1992) points out, is that he does not clarify how the interrogative morpheme moves to COMP from I. The reason of its movement is just to govern the IPI (*wh*-word). In terms of the Minimalist Program, it violates the Principle of Greed. To complement his weakness, Jung argues that the sentence final endings are SPECs of CP and the COMP which selects the interrogative morpheme *-nya* has the feature [+Q] in the outer KASE Grid which motivates the *wh*-movement in Korean. That is, she agrees with Kim on the argument that in Korean the *wh*-movement is triggered by the feature [+Q] which the interrogative morpheme *-nya* has.

I agree with Jung and Kim on the opinion that the interrogative morpheme *-nya* is related to the position of COMP. However, my analysis of the interrogative morpheme is fundamentally different from theirs in the sense that the morpheme *-nya* is not base-generated in C- or I-position and furthermore the feature [+Q] of *-nya* is never for licensing *wh*-words, but for the question formation itself.[16] To say briefly in terms of the Identity Principle presented in Section 3.2, the interrogative morpheme *-nya*, as a checkee which has the feature [+Q], is inserted into V-position as a form conglomerated with a verb. The morpheme is identified and licensed in the position adjoined to C, at LF since it is weak, by the checker COMP which is supposed to also have the inverse feature [+Q¯]. The same is true to the case of *wh*-movement which occurs at LF due to the weak feature [+WH] of COMP.

My claim that the *wh*-movement is not related with the feature [+Q] is supported by the following observation. In Korean, matrix verbs subcategorize for their subordinated sentences and are sensitive to types of embedded sentences, as illustrated in (18). To say in detail, declarative sentences ended with the morpheme *-ta* are selected by report-type verbs-(a), imperative sentences ended with *-la* by imperative verbs-(b), propositional sentences ended with *-ca* by suggestive verbs-(c); and interrogative sentences ended with *-nya* by question verbs-(d).

(18)

a. Minho-ka Jihi-ka o-n-Ta-ko pokoha /*myengha/*ceanha *mwul-ess-ta.
Minho-NM Jihi-NM come-Pres-Dec-KO report order suggest ask-Past-Dec
'Minho reported that Jihi was coming'

[16] To speak precisely, Jung (1992) argues that Korean sentence final endings such as *-ta*, *-la*, *-ca*, and *-nya* are based gererated in the [SPEC, CP] by the KASE Grid of COMP. For example, the COMP which selects the interrogative morpheme *-nya* has the KASE grid <+Q < o- {F3}>, and the feature [+Q] in the outer slot, which is supposed to be discharged to the [SPEC, CP] selects *-nya*. But I do not agree with her on this argument since her theory has a serious theory-internal problem and makes the grammar complex in the following sense. First, to explain that SFEs appear at the very end of sentences, she needs to stipulate that the [SPEC, CP] right-branches in Korean. Second, if the [SPEC, CP] right-branches, the scope-interpretation of *wh*-words which adjoin to the [SPEC, CP] at LF cannot be syntactically expressed. That is, the right-branched [SPEC, CP] always takes the narrowest (even though it is in the highest syntactic position) syntactic position in the head-final languages like Korean, and the position adjoined to that position will be also the narrowest. We can stipulate that the highest is the widest. But this does not work for the following scrambled sentences. As I discuss in Section 5.2, in (a) and (b) the scrambled objects take the wider scope than any other elements in the sentences. This means that there must be an argument position preceding the subjects (as the S-structure shows) and higher than the verbs in terms of Jung's argument. However, there is no such a position in her system.

(i) a. Minswu-lul Jihi-ka ttayli-ess-ta
Minswu-AM Jihi-NM hit-Past-Dec
'Minswu, Jihi hit'

b. Minswu-lul Jihi-ka ttayli-ko Yenghi-ka tallay-ess-ta
Minswu-AM Jihi-NM hit-and Yenghi-NM soothe-Past-Dec
'As for Minswu, Jihi hit and Yenghi soothed him'

c. For x, x Minswu, Jihi hit x and Yenghi soothed x

In short, the linear order as well as the hierarchical order must be considered for the interpretation of scope relation.

Also, it is not clear whether *wh-* words are licensed by the feature [+Q] or the morpheme *-nya*. If it is licensed by the first one, *wh-* words can appear alone without *-nya*, on the contrary to her claim. If they are licesed by the latter, it must have been said in her theory.

b. ku cangkyo-ka Jihi-eykey o-La-ko *pokoha /myengha/*ceanha/*mwul-ess-ta.
the officer-NM Jihi-to come-Imp-KO report order suggest ask-Past-Dec
'The officer ordered Jihi to come.'

c. Minho-ka Jihi-eykey ka-Ca-ko *pokoha /*myengha /ceanha /*mwul -ess-ta.
Minho-NM Jihi-to go-Prop-KO report order suggest ask-Past-Dec
'Minho suggested Jihi to go together.'

d. Minho-ka Jihi-ka ka-Nya-ko *pokoha /*myengha /*ceanha /mwul-ess-ta.
Minho-NM Jihi-NM come-Inf-KO report order suggest ask-Past-Dec
'Minho asked Jihi if she went'

As illustrated in (19), even if we add a *wh*-word *ence* 'when' to the above sentences, not only the sentence (19d) which has an interrogative morpheme *-nya* , but also the other sentences which have other sentence final endings (19a, b, and c) are grammatical, on the contrary to the prediction by the IPI condition. In other words, the interrogative morpheme *-nya* is responsible only for the type of matrix verb.

(19) a. Minho-ka Jihi-ka ence o-n-Ta-ko pokoha-ess-ta.
Minho-NM Jihi-NM when come-Pres-Dec-KO report-Past-Dec
'Minho reported when Jihi was coming'

b. ku cangkyo-ka Jihi-eykey ence o-La-ko myengha-ess-ta.
the officer-NM Jihi-to when come-Imp-KO order-Past-Dec
'The officer ordered Jihi when to come.'

c. Minho-ka Jihi-eykey ence ka-Ca-ko ceanha-ess-ta.
Minho-NM Jihi-to when go-Prop-KO suggest-Past-Dec
'Minho suggested Jihi when to go together.'

d. Minho-ka Jihi-ka ence ka-Nya-ko mwul-ess-ta.
Minho-NM Jihi-NM when come-Int-KO ask-Past-Dec
'Minho asked when Jihi would leave.'

As a matter of fact, if the feature [+Q] is not related to the job of licensing *wh*-words, the interrogative morpheme *-nya* does not need to move to C-position at LF. It is apparently not bad for it to move to C-position before SO, since both of them converge to the correct PF in Korean that is a head-final language in which head-movement from AGRo or T to COMP does not induce a different word order. However, the Principle of Procrastinate urges them to wait until LF.

At this point, a question to be answered is how the other types of sentences can be generalized in this fashion. Given Bresnan's claim that types of COMP determine types of sentences, we can suppose that COMPs have other features which determine whether a sentence is propositional, imperative, etc. If this is really so, a question arises: How can we know when the features are identified (checked off)? It is hard to answer to this question since overt movements of verbs, as in the case of question formation, do not make different word orders. Therefore, it is reasonable to say that the other features of COMP are checked off along with [+WH] and [+Q], that is, at LF in Korean. This complies to the Principle of Procrastinate. The case of English is more complicated. Unlike the question formation, English does not show any specific overt movement for the formation of declaritive sentences only. If there is a cross-linguistic parallelism in the determination of sentence types between English and Korean, it will be favorable to say that verbs somehow raise to C-position at LF in English declaritive sentences. If this is really so, it will be the case that English verbs have some null morpheme corresponding to Korean *-ta* for English declaritive sentences. However, I do not have any other independent evidence supporting the null morpheme of verbs of English declaritive sentences. I will just leave this question open.

To sum up the discussion so far, the sentence final endings of Korean are identified by COMP. The features of COMP corresponding to the types of sentences, namely [+Q], [+D], [+IMP], and [+PROP] are all weak, and hence identified at LF, like the feature [+WH]. The difference between the two languages, English and Korean, with regard to the types of sentences, is accounted for by the differentiation of strength of functional categories. That is, the features of the former are strong, while those of the latter are weak. In the following subsection, I will discuss the contents of COMP in both languages, Korean and English.

5.1.2. Properties of COMP and Parametric Variation

In the preceding section, I claim that the types of sentences are determined by the sentence final endings in Korean and they are identified in the position adjoined to COMP at LF, since the morphological features of COMP which identify the sentence final endings are weak. This amounts to saying that the functional category COMP always projects even without *wh*-word or embedded sentence. This also means that the lexicon has various C's which cover various types of sentences. In this section I will discuss the classification of C.

Let us consider the properties of Korean COMP . To cover the simple sentences discussed so far, we need at least four inverse features for COMP , namely [+Q$^-$], [+D$^-$], [+IMP$^-$] and [+PROP$^-$] for direct questions, declaratives, imperatives, and propositionals, respectively. In addition, for *wh*-questions like (20) we need a COMP which has the set of inverse features [+WH$^-$, +Q$^-$].

(20) Jihi-ka ence ka-ess-nya?
Jihi-NM when go-Past-Int
'When did Jihi go?'

For the sentences in (18) which have the complementizer *-ko*, we need a COMP which can identify *-ko* besides the sentence final endings. Temporarily I assume that *-ko* has the feature [+C] which stands for 'connector'. In order to identify this morpheme, COMP needs the inverse feature [+C$^-$] and this combines one of the inverse features [+Q$^-$], [+D$^-$], [+IMP$^-$] or [+PROP$^-$]. For the sentences in (19), we need C's which have [+WH$^-$] in addition to one of the feature combinations for the sentences in (18). That is, all the inverse features which COMP can have are [+D$^-$], [+IMP$^-$], [+PROP$^-$], [+Q$^-$], [+C$^-$], and [+WH$^-$]. To summarize the whole combinations of the features of C, it will be as follows;

(21) Classification of the Category COMP of Korean

Sentences	Features	
(16a, b, c, d)	[+T$^-$],	[+D$^-$], [+IMP$^-$], [+PROP$^-$], [+Q$^-$], respectively
(18a, b, c, d)	[+T$^-$, +C$^-$],	[+D$^-$, +C$^-$] [+IMP$^-$, +C$^-$], [+PROP$^-$, +C$^-$], [+Q$^-$, +C$^-$], respectively
(19a, b, c, d)	[+WH$^-$, +T$^-$, +C$^-$],	[+WH$^-$, +D$^-$, +C$^-$], [+WH$^-$, +IMP$^-$, +C$^-$] [+WH$^-$, +PROP$^-$, +C$^-$], [+WH$^-$, +Q$^-$, +C$^-$], respectively
(20)	[+WH$^-$, +T$^-$]	

This feature system looks very complicated. However, any two of the four features [+D$^-$], [+IMP$^-$], [+PROP$^-$], and [+Q$^-$] which determine the types of sentences never take place at the same time. I will use [+T$^-$] as a representative feature for them. Therefore, actually COMP has three kinds of grammatical features; (i) the features for sentence final endings, [+T], (ii) the feature for *wh*-words or operators, [+WH], and (iii) the feature for complementizers, [+C]. Logically, the number of combinations which the three kinds of features can make are 7; (a) [+T$^-$], (b) [+WH$^-$], (c) [+C$^-$], (d) [+WH$^-$, +T$^-$], (e) [+T$^-$, +C$^-$], (f) [+WH$^-$, +C$^-$], and (g) [+WH$^-$, +T$^-$, +C$^-$]. Three of them, i.e. (a), (e), and (g) are fully attested in the above data, and (d) is partially attested. If the other combinations, i.e. (b), (c), and (f), can be attested, that will be a strong evidence supporting this feature system.

The combination (f) is found in relative clauses of Korean like (22). It is largely attested that Korean relative clauses have a null-operator O, as illustrated in (13).[17] As in English, the operator moves from the complement position of the verb *salangha-* 'love' to the specifier-position of CP. In the present feature-checking system, it is required for COMP and O to have features satisfying the Identity Principle. I suggest that the null operator O has the weak feature [+WH] and COMP has [+WH$^-$]. In addition, if we assume the strong feature [+C] for the

[17] See D-W Yang (1989)

complementizer *-n*, and its inverse [+C$^-$] for C, we get a COMP of the combination (f). On the other hand, the combinations (b) and (c) are not found in Korean.

(22) [nay-ka salangha]$_{IP}$ -n] C' Ø]$_{CP}$ Jihi
I-NM love C Op Jihi
'Jihi who I loved.'

Next, let us consider types of English COMP . Does only the interrogative morpheme undergo overt movement? Imperative and propositional sentences also show overt syntactic changes from declarative sentences. That is, infinitive verbs are used for them. We can assume that they are an evidence of the existence of null-morphemes (only bundle of features) that motivate the overt syntactic changes. The next question is: Where is the position of *does* ? If we assume that it is base-generated in VP-adjunction position, the assumption is the same to the other null-morphemes. Under these assumptions, we can say that English COMP has all the four features which determine the types of sentences, as illustrated in (14), and the features of functional morphemes corresponding to the functional categories are strong, like [+WH] of *wh*-words.

Combination of Features of C

(23) a. Mary loves John [+T$^-$]
b. Does Mary love John?
c. Let's go.
d. Get out of here!

(24) a. He reported (that) Mary loves John [+T$^-$, +C$^-$]
b. He asked if Mary loves John
c. He suggested (that) we should go right away.
d. He ordered (that) we should go right away.

(25) a. He reported who Mary loves. [+WH$^-$, +C$^-$]
b. He asked who Mary loves.
c. He suggested us when to go.
d. He ordered me when to go.

(26) a. He knows the girl (that) Mary loves [+WH , +C]
b. He knows the girl (who) Mary loves

(27) Who do you love? [+WH , +Q]

In English, the features [+WH$^-$] and [+T$^-$] do not take place at the same time, as in Korean. In other words, English does not have the combination (g), as illustrated in (24). The other combinations are attested in English too, as illustrated in (23, 26, and 27). This phenomenon can be expressed by a parametric variation between languages. I will call it Complex COMP Parameter. This is a kind of on-off parameter; in English it is off, while in Korean it is on. On the other hand, the combinations (b) and (c) are not found in English either. From this, we can say that [+WH$^-$] always accompanies [+C] or [+Q]. This amounts to saying that a specifier-position is allowed only when a head exists in that category, therefore it is a natural result that there is no combination (b) in natural languages. Another thing to say from this is that there is no such a COMP that plays the role of connector only.

To sum up the discussion in this section, the number of features of COMP is cross-linguistically three; [+WH$^-$], [+C], and [+T]. The types of COMP are determined according to combinations of these three features. The cross-linguistic variation of the types of COMP is explained as a parametric variation. The unattested type of COMP in Korean is also unattested in English, and this seems to be a universally innate property of COMP.

5.1.3. A Model-Structure of Functional Categories of Korean

Given the generally accepted VP-internal-subject Hypothesis, Korean superficially seems not to have any strong grammatical features, since in most cases PF without overt-movement corresponds to the real utterance sequence of linguistic elements. However, this is not true to all the sentences of Korean. In this section, I will discuss the hierarchical order of functional categories of Korean, and strength of morphological features. First, let me discuss how the

basic hierarchical order of functional categories can be determined in Korean. Following Chomsky's interpretation of Baker's Mirror Principle, as quoted in the following paragraph, the order of functional morphemes attached to substantives is captured by the hierarchical order of the functional categories.

> "There are various ways to make a Checking Theory precise, and to capture generalizations that hold across morphology and syntax. Suppose, for example, that Baker's mirror principle is strictly accurate. Then we may take a lexical element, say the verb V, to be a sequence V = (α, $INFL_1$,...,$INFL_n$), where α is the morphological complex [R-$INFL_1$-...-$INFL_n$], R a root and $INFL_i$ an inflectional feature. The PF rules only "see" α. When V is adjoined to a functional category F (say, AGRo), the feature $INFL_1$ is removed from V if it matches F; etc. If any $INFL_i$ remains at LF, the derivation crashes at LF. The PF form α always satisfies the mirror principle in a derivation that converges at LF. (Chomsky 1992: 38-39)

According to this we can suppose the structure (28d) for the sentence (28a).[18] If there is nothing else to consider, the hierarchical order of the functional categories is the same as that of English except that heads right-branch by the head-final parameter. Hence the order is CP-AGRsP-TP-AGRoP-VP. However, unlike English, Korean has honorific expressions, as shown in (28b). The honorific markers appear whenever the subject is a person socially superior to the speaker. A pair of honorific markers are used; *-nim* for subjects and *-si-* for verbs. From this fact many Korean linguists argue that the subject and verb are in the relation of SPEC-Head agreement.

(28) a. Jihi-ka Minswu-lul ttayli-ess-ta.
Jihi-NM Minswu-AM hit-Past-Dec
'Jihi hit Minswu.'

b. Sensayng-nim-i aktong-lul honnay-si-ess-ta.
Teacher-HM_N-NM bad kid-AM scold-HM_V-Past-Dec
'The teacher scolded the bad student.'

[18] Here, I assume that specifier-positions invariably left-branch and heads right-branch by the head-final parameter

c. Sensayng-nim-tul-i aktong-lul honnay-si-ess-ta
PM

d. [$_{CP}$ [$_{AGRsP}$ [$_{TP}$ [$_{AGRoP}$ [$_{VP}$ Jihi Minswu-lul ttayli-ess-ta] AGRo] T] AGRs] C]

e. [$_{CP}$[$_{TP}$[$_{AGRsP}$[$_{AGRoP}$[$_{VP}$ Sensayng-nim-i aktong-lul honnay-si-ess-ta]AGRo] AGRs]T] C]

To say in terms of MP, Korean has an AGRsP in which the two morphemes are licensed; the former is in the specifier-position of AGRs, while the latter is in the position adjoined to AGRs. Given this assumption, the question to be answered is: Where is the exact position of AGRsP? From the fact that the verbal honorific morpheme appears between verb-root and tense morpheme, we can take the position between AGRoP and TP as a candidate position for AGRsP, hence the structure (28d) changes into (28e) for the sentence in (28b). Fortunately, this structure is supported by another agreement phenomenon in Korean. Even though it has been rarely argued, I believe that Korean has a number agreement like in English. As a matter of fact, verbs have no morpheme representing number agreement with subjects, as illustrated in (28c). However, if subjects have a morpheme for number, it must be checked off in an appropriate syntactic position in terms of the checking-theory of MP. I believe that the number morpheme *-tul* of subjects is checked in the [SPEC, AGRsP] as a part of ϕ_N-features of AGRs, as in other languages.[19] Given this assumption, what I want to discuss is the position

[19] Sato pointed out to me (p.c.) that it is hard to say that in Korean subjects number-agree with the verbs since Korean do not have any overt morpheme for number agreement. However, in Korean we have some verbs which require plural subjects as illustrated below. The only difference between the sentences in (a) and the ones in (b) is that the subjects of the former have the plural marker *-tul* but those of the latter do not. In these cases we are urged to say that verbs have number feature [+Pl]. If so, this number feauture is checked off in the head position of AGRs.

(i) a. notongca-tul-i him-lul hapchi-ess-ta
laborer-PM-NM force-AM gather-Past-Dec
'Laborers join efforts.'

b. ?* notongca-ka him-lul hapchi-ess-ta

(ii) a. sensayng-tul-i mwungchi-ess-ta
teacher-PM-NM unite-Past-Dec
'Teachers united.'

of the number morpheme *-tul*. As we can see in (28c), it appears before the Nominative Case-marker *-i*. As universally accepted, the Case-feature of subjects is checked off in the [SPEC, TP], I will assume that the same is true to Korean.[20] If the discussion is in the right track, the position of AGRsP must be below TP according to the Mirror Principle. Consequently, the hierarchical order of functional categories discuss so far is confirmed as in (28e), that is, CP-TP-AGRs-AGRo.[21]

5.2. Features of Functional Categories

With this model-structure of functional categories, in this section I will explore what features Korean functional categories have, and discuss the strength of features. First let us discuss strength of morphological features. It seems that, for the explanation of only the above examples, we do not need any strong features which motivate overt movements, since in the structure (28e) the string of elements converges to the PF (28b) without overt movement. However, as soon as we consider negative sentences as in (29a), we can recognize that this is not true to all the sentences. If there is no overt movement at all in the structure (29c), the spelled-out PF will be as in (29b), which is different from the grammatical PF.[22] This means that, to derive the correct PF, the verb *ttayli-ess-ta* 'hit' must raise at least over NEGP. The first candidate position for the verb movement is AGRs. If the verb's staying in this position does not lead the derivation to crashing, this will be the most appropriate landing-site of the verb before SO. The other positions above AGRs, that is, T and C, could be its landing-sites. However, these positions are abandoned by the Shortest Movement of Economy Principle, unless the verb's staying in AGRs leads a crash of derivation. This series of thoughts urges us to designate the strength to the V-features of AGRs.

(29) a. Jihi-ka Minswu-lul ani ttayli-ess-ta
Jihi-NM Minswu-AM not hit-Past-Ind
'Jihi did not hit Minswu.'

b. * Jihi-ka Minswu-lul ttayli-ess-ta ani

c. [$_{CP}$ [$_{TP}$ [$_{AGRsP}$ [$_{NEGP}$ [$_{AGRoP}$ [$_{VP}$ Jihi-ka Minswu-lul ttayli-ess-ta] AGRo] ani] AGRs] T] C]

Let us examine features that AGRs of Korean may have. From the fact that NPs have plural forms, AGRs at least has the number-feature for them, namely $[\pm PL^{-}]_N$. Even though Korean verbs do not inflect for number agreement, I assume that singular verbs share the same morphological form with plural ones but their features are different from each other. That is, singular verbs have the feature [-Pl], while plural ones have [+Pl]. If so, AGRs has the feature $[\pm PL^{-}]_V$ for the number of verbs. In addition, as we discussed in the preceding section, Korean honorific morphemes of subjects and verbs show the SPEC-Head agreement in the minimal domain of AGRs. For this agreement, I designate $[\pm H^{-}]_N$ and $[\pm H^{-}]_V$ to AGRs for subjects and verbs, respectively. As for the features of AGRs, this much, $[\pm PL_N^{-}, \pm PL_V^{-}, \pm H_N^{-}, \pm H_V^{-}]$, is enough for the explanation of the data discussed so far.

Interestingly, Korean has another kind of Honorification which seems to be also licensed through SPEC-Head agreement. I will call this Object Honorification. This expression is not always possible. However, when the object is a person superior to the subject, one must use proper verbs with the honorific morpheme *-nim-* attached to the object, if they are in the lexicon, unless he wants

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b. ?* sensayng-i mwungchi-ess-ta.

(iii) a. haksayng-tul-i molli-ess-ta
student-PM-i crowd-Past-Dec
'Students crowded.'

b. ?* haksayng-i molli-ess-ta.

See Yoon (1990) for another evidence for Number-agreement in Korean.

[20] There are some strong evidences for the argument that Nominative Case is assigned by AGRs. See fn. 25.

[21] For the discussion of CP, see Section 5.2.

[22] I assume that NEGP is positioned immediately above AGRoP. As a matter of fact, there is no supporting evidence for which position is correct one for Korean negative morpheme *ani*. However, if it is accepted that the neg-morpheme is not base-generated VP-internally, the position immediately above AGRoP is most appropriate one in the sense of Universality.

to be shown rude to other persons. For instance, each pair of the sentences in (30), (31), and (32) basically have the same meaning. However, the sentences in (a) are not normal expressions to well-educated persons, while the ones in (b) are good. The reason is that the appropriate verbs to the objects are used in the former sentences, but not in the latter ones. To say in terms of linguistics, in (b) sentences the objects spec-head-agree with the respective verb, but in (a) sentences they do not. From this observation, I strongly believe Korean to have the category AGRo, and designate the feature [±H^{-}] to AGRo too.

(30) a. * nay-ka sensayng-nim-lul teylikoka-ess-ta.
I-NM teacher-HM$_N$-AM take along with-Past-Dec
b. nay-ka sensayng-nim-lul mosi-ess-ta.
attend
'I took the teacher along with me.'

(31) a. * Jihi-ka ku chayk-lul sensayng-nim-lul cu-ess-ta.
Jihi-NM the book-AM teacher-HM$_N$-AC give-Past-Dec
b. Jihi-ka ku chayk-lul sensayng-nim-lul tuli-ess-ta.
'Jihi gave the book to the teacher.'

(32) a. * Jihi-ka sensayng-nim-lul manna-ess-ta.
Jihi-NM teacher-HM$_N$-AC meet-Past-Dec
b. Jihi-ka sensayng-nim-lul poyp-ess-ta.
beshown-Past-Dec
'Jihi met the teacher.'

It is noteworthy that sometimes subjects and objects are not honorified at the same time in Korean, as illustrated in (33). Even if the speaker is inferior to the subject, the speaker does not use honorific marker to refer to the subject if the hearer (the object in (33)) is a person superior to the subject. This is another evidence for the argument that AGRs must be differentiated from AGRo. That is, in this case AGRs has the feature [−H^{-}], while AGRo has [+H^{-}].[23]

[23] In soliloquy, both subject and object can be honorified at the same time, as illustrated below

(i) a sensayng-**nim**-i ku chayk-lul kyocangsensayng-**nim**-lul tuli-si-ess-ta
teacher-HM-NM the book-AM principal-HM-AC- give-HM-Past-Dec
'The teacher gave the book to the principal.'

(33) a. * ape-nim-i ku chayk-lul halapenim-lul tuli-ess-eyo.
father-HM$_N$-NM the book-AM grandfather-AM give-Past-Dec

b. apeci-ka ku chayk-lul halapenim-lul tuli-ess-eyo

Let us next consider the category T. If we accept the argument that Nominative Case is checked at TP in Korean too (Jung (1992)), we need Case-features [+NOM$_V^{-}$, +NOM$_N^{-}$] for T besides [±PAST^{-}]. As for AGRo, it seems not to need any more feature than [+ACC$_V^{-}$, +ACC$_N^{-}$], and [±H$_N^{-}$, ±H$_V^{-}$] for the data discussed so far.

To sum up the features and apply them to the sentence (34a), it will be (b) Note that only the feature [−PL^{-}]$_V$ is strong, as we discussed in the preceding section.[24] Due to this strong feature, the verb *thailu-si-ess-ta* 'admonished' overtly raises to the position adjoined to AGRs, deriving (a).

(34) a. Sensayng-nim-i aktong-lul ani thailu-si-ess-ta.
Teacher-HM$_N$-NM bad kid-AM not admonish-HM$_V$-Past-Dec
'The teacher did not admonish the bad student.'
b.

[[[[[Sensayng-nim-i	aktong-lul	thailu-si-ess-ta]	AGRo]	ani]	AGRs]	T]	C]
−PL$_N$	+ACC$_N$	−PL$_V$	+ACC$_V^{-}$		−PL$_V^{-}$	−PAST$_V^{-}$	+D
+NOM$_N$		−PAST$_V$	+ACC$_N^{-}$		−PL$_N^{-}$	+NOM$_V^{-}$	
+H$_N$		+NOM$_V$			+H$_V^{-}$	+NOM$_N$	
		+ACC$_V$			+H$_N^{-}$		
		+H$_V$					
		+D$_V$					

What I want to discuss next is whether these features are enough for the explanation of the following sentences that have a different morpheme from the ones we have seen so far, or a different word-order. In the sentence (35a), the object comes first unlike the ordinary sentences. This is a so-called scrambled sentence in which the object is focused. The scrambling must be answered within

However, their checking positions are different from each other, the subject in the [SPEC, AGRs] while the object in the [SPEC, AGRo]

[24] For the discussion of the feature [+D], see Section 5.2

the feature system, since every movement must be motivated by some feature. For this, I just assume that the feature that motivates the scrambling is [±FOC], which is strong. What we have to discuss is the position or the functional category which has this feature. The first candidate place is the [SPEC, AGRo]. But this position cannot be a destination of the overt movement of focused element. Focused elements always have a wide scope in Korean, as we can see in (35b), which has (35c) as its semantic interpretation. Therefore, focused elements must be in the higher position than non-focused ones at LF too. The same is true to focused subjects. The word order of the sentence in which the subject is focused is apparently the same as that of the ordinary sentence, as shown in (36a). However, it is definite that, in the coordinated sentence like (36c), the subject has a wider scope than the objects, as shown in the semantic interpretation (36d). From this observation, I believe that the focused NP, whether it is subject or object, must be in a higher position that the non-focused one. For this reason, the [SPEC, AGRo] cannot be the destination of focused objects, since this position is lower than AGRsP or TP in which subjects raise at LF. For the same reason, the [SPEC, AGRs] cannot be the position for the focused objects either. The next candidates are the [SPEC, CP] and the [SPEC, TP]. The former is exempted from our consideration since it is a non-argument position.[25] The last one is the [SPEC, TP]. This position is also problematic, since it will be occupied by a subject at LF. However, I just leave this problem open, and assume that T has the strong feature [±FOC].[26]

(35) a. Minswu-lul Jihi-ka ttayli-ess-ta.
Minswu-AM Jihi-NM hit-Past-Dec
'Minswu, Jihi hit.'

b. Minswu-lul Jihi-ka ttayli-ko Yenghi-ka tallay-ess-ta
Minswu-AM Jihi-NM hit-and Yenghi-NM soothe-Past-Dec
'As for Minswu, Jihi hit and Yenghi soothed him.'

c. For x, x Minswu, Jihi hit x and Yenghi soothed x.

(36) a. Jihi-ka lamyen-lul mek-ess-ta
Jihi-NM curly noodle-AM eat-Past-Dec
'Jihi ate lamyen.' or 'As for Jihi, she ate lamyen.'

b. Jihi-ka lamyen-lul mek-ko ippal-lul sswusi-ess-ta
Jihi-NM curly noodle-AM eat-and teeth-AM pick-Past-Dec
'Jihi ate lamyen and picked her teeth.'

c. For x, x Jihi, x ate lamyen and x picked x's teeth.

Now, let us consider the morpheme *-nun*, which is traditionally called 'Topicalization Marker.' As in the case of focusing, I just assume that this morpheme is checked by [+TOP]. This feature seems to be weak, since the elements that have this morpheme do not raise overtly, as shown in (37a). The question to be answered is what functional category has this feature. If, at LF, the object, which is topicalized, does not have a wider scope than the subject, which is not topicalized, the functional category which has the feature [+TOP] must be the one in the lower position than T to which the subject raises at LF. It is true that focused objects do not take a wide scope even at LF, as we can see in the coordinated sentences (37b, c). The reason why (37b) is ungrammatical is that *lamyen* cannot have a wide scope, as in (36c). Whereas, (37c) in which the two topicalized objects are just compared is grammatical. From this observation, we can think two candidates, AGRs and AGRo. The former seems not to be a good

[25] Following Saito (1992), I assme that clause internal scrambling can (must in case of object or subject movement, I think) be A-movement. However, it seems that the distinction of agrment position from non-argument is not necessary in MP, since the movement is solely motivated by features.

[26] Yang (1993) argues that Korean has MP (Modal Phrase) which is responsible for focalization, topicalization, and determination of sentence types. I do not agree with him on this opinion, since CP does do this job well. See Section 5.2.

This problem seems to be solved if Nominative Case is checkecd off in the checking domain of AGRs in Korean. There seems a strong supporting evidence for this argument. As illustrated below, in Korean subjects can have Case in infinitive clauses and honorific agreement (and number agreement also) appears in infinitive clauses.

(i) sensayng-nim-i kecimal-lul ha-si-ki-ka ship-ta
teacher-HM-NM lie-AM tell-HM-KI-NM easy-Dec
'It is easy for teachers to tell a lie.'

(ii) na-nun kunyu-ka ka-ki-lul pala-ess-ta
I-Top she-NM go-KI-AM hope-Past-Dec
'I wanted her to go.'

position for the topicalized object since it is the position which subjects pass through at LF. Therefore, I will designate the feature [+TOP$^-$] to AGRo for topicalized objects.

(37) a. Jihi-ka lamyen-nun cohaha-n-ta.
Jihi-NM curly noodle-TM like-Pres-Dec
'Jihi likes lamyen, (but nothing else).'

b. * Jihi-ka lamyen-nun cohaha-ko Minswu-ka silheha-n-ta.
Jihi-NM curly noodle-Top like-and Minswu-NM dislike-Pres-Dec
'As for lamyen, Jihi likes it, but Minswu does not.' (intended reading)

c. Jihi-ka lamyen-nun cohaha-ko wutong-nun silheha-n-ta.
Jihi-NM curly noodle-Top like-and Chinese noodle-NM dislike-Pres-Dec
'Jihi likes lamyen, but does not like wutong.'

If AGRo has the feature [+TOP$^-$], is its specifier-position available for topicalized subjects too? Since that position will be occupied by objects at LF, it is not available for subjects. If so, the last possible candidate is AGRs and I designate the feature [+TOP$^-$] to AGRs too. That is, when a topicalized object is selected, an AGRo which has the feature [+TOP$^-$] projects, while a topicalized subject is selected, the AGRs which has the same feature.

Let us examine how well the two features, [$\pm$FOC$^-$] and [+TOP$^-$], work in the following examples in which both focalization and topicalization occur at the same time. First consider the case of subjects. The sentence (38a) is ambiguous. The first reading has only topicalized subject, urging the interpretation (38b). In the second reading, the subject is both topicalized and focused, having the interpretation (38c).

(38) a. Jihi-nun lamyen-lul cohaha-n-ta.
Jihi-Top curly noodle-AM like-Pres-Dec

b. 'Jihi likes lamyen, but nobody does.'
c. 'As for Jihi, she, but nobody, likes lamyen.'

This ambiguity is captured by the following two different feature designations. In the structure (39a), *Jihi* raises to the [SPEC, AGRs] at LF, and get topicalized, reading (38b). On the other hand, in the structure (39b), it raises to the [SPEC, TP] before SO, reading (38c). It is also topicalized in the [SPEC, AGRs] before it reaches TP.

(39) a. [[[[Jihi-nun lamyen-lul cohaha-n-ta] AGRo] AGRs] T] C]
$-PL_N$ $+ACC_N$ $-PL_V$ $+ACC_V$ $-H_V^-$ $-PAST_V$ $+D^-$
$+NOM_N$ $-PAST_V$ $+ACC_N^-$ $-H_N^-$ $+NOM_V$
$+TOP_N$ $+NOM_V$ $\underline{-PL_V}^-$ $+NOM_N$
$-H_N$ $+ACC_V$ $-PL_N^-$
$-H_V$ $+TOP_N^-$
$+D_V$

b. [[[[[Jihi-nun lamyen-lul cohaha-n-ta] AGRo] AGRs] T] C]
$-PL_N$ $+ACC_N$ $-PL_V$ $+ACC_V^-$ $-H_V^-$ $-PAST_V^-$ $+D^-$
$+NOM_N$ $-PAST_V$ $+ACC_N^-$ $-H_N^-$ $+NOM_V$
$+TOP_N$ $+NOM_V$ $\underline{-PL_V}^-$ $+NOM_N^-$
$-H_N$ $+ACC_V$ $-PL_N^-$ $\underline{+FOC_N}$
$+FOC_N$ $-H_V$ $+TOP_N^-$
$+D_V$

Next, consider some case of objects. In the sentence (40a), the object *lamyen* 'curly noodle' is focused, and it is derived from the structure (c). Due to the strong feature [$\underline{\pm FOC_N}^-$] of Tense, the object raises to the [SPEC, TP] before SO, having the meaning of (40b). On the other hand, in the sentence (41a), the object *lamyen* is both focused and topicalized, and hence it has the meaning of (41b). This derivation of meaning is captured in the structure (41c) in which Tense has the strong feature [$\underline{\pm FOC_N}^-$] which forces the object to raise to the [SPEC, TP] before SO. By way of the [SPEC, AGRo], the feature [+TOP$_N$] of the object is checked off.

(40) a. lamyen-lul Jihi-ka cohaha-n-ta
curly noodle-AM Jihi-NM like-Pres-Dec
b. 'As for lamyen, Jihi likes it.'

c. [[[[[lamyen-lul Jihi-ka cohaha-n-ta] AGRo] AGRs] T] C]
$-PL_N$ $+NOM_N$ $-PL_V$ $+ACC_V^-$ $-H_V^-$ $-PAST_V^-$ $+D^-$
$+ACC_N$ $-H_N$ $-PAST_V$ $+ACC_N^-$ $-H_N^-$ $+NOM_V^-$
$+FOC_N$ $+NOM_V$ $\underline{-PL_V^-}$ $+NOM_N^-$
$+ACC_V$ $-PL_N^-$ $\underline{+FOC_N^-}$
$-H_V$
$+D_V$

(41) a. lamyen-nun Jihi-ka cohaha-n-ta.
curly noodle-Top Jihi-NM like-Pres-Dec
b. 'As for lamyen, Jihi likes it, but nothing else.'

c. [[[[[lamyen-nun Jihi-ka cohaha-n-ta] AGRo] AGRs] T] C]
$-PL_N$ $+NOM_N$ $-PL_V$ $+ACC_V^-$ $-H_V^-$ $-PAST_V^-$ $+D^-$
$+ACC_N$ $-H_N$ $-PAST_V$ $+ACC_N^-$ $-H_N^-$ $+NOM_V^-$
$+TOP_N$ $+NOM_V$ $+TOP_N^-$ $\underline{-PL_V^-}$ $+NOM_N^-$
$+FOC_N$ $+ACC_V$ $-PL_N^-$ $\underline{+FOC_N^-}$
$-H_V$
$+D_V$

To sum up the discussion of this section, the hierarchical structure of Korean functional categories is CP-TP-AGRs-AGRo. The sentence final endings are licensed in the position adjoined to COMP at LF. The existence of Honorific morphemes are supporting evidence for the presence of AGRsP and AGRoP in Korean. These morphemes are licensed by AGRs or AGRo through SPEC-Head agreement at LF. From the fact that NPs have a plural morpheme, it is argued that Korean also has number agreement. Focalization is licensed by Tense before SO, and Topicalization by AGR at LF.

6. Conclusion

In this paper, I have raised some questions about Chomsky's T-raising Hypothesis and argued that it is better to separate AGRs from AGRo. This allows the [SPEC, TP] and no-T-raising, complying to the Uniformity Principle. I have refined and formalized the Checking Theory of Minimalist Program with the proposal of the Identity Principle. Its gist is that functional categories have two sets of inverse features, one is for NPs and the other for verbs. Especially, functional categories may have some pairs of the same feature-set for the morphemes that are licensed through SPEC-Head agreement

Working with the Identity Principle and the revised feature system, I have presented a model of structure of Korean functional categories. The structure of functional categories forms CP-TP-AGRs-AGRo. By examining number agreement, honorific expressions, focalization, topicalization, and sentence final endings, I have proved the presence of each functional category, and explored the functional feature system of Korean.

References:

Bobaljik, J. (1993). On Ergativity and Ergative Unergatives. In Phillips, C. ed. *MIT Working Papers in Linguistics* 18: 45-88.

Bresnan, J. (1779). *Theory of Complementation in English Syntax*. Garland Publishing Inc.

Carnie, A. (1993). Nomimal Predicates and Absolutive Case Marking in Irish. In Phillips, C. ed. *MIT Working Papers in Linguistics* 18: 89-129.

Chomsky, N. (1982). *Lectures on Government and Binding: The Pisa Lectures*. Dordrecht: Foris Publications.

Chomsky, N. (1988). Some Notes on Economy of Derivation and Representations. in Freidin, R. ed. *Principles and Parameters in Comparative Grammar*: 406-454. Cambridge, Massachusetts: MIT Press.

Chomsky, N. (1992). Minimalist Program for Linguistic Theory. *MIT Occasional Papers in Linguistics* 1

Chomsky, N. (1994). Bare Phrase Structure. *MIT Occasional Papers in Linguistics* 5.

Collins, C. & H. Thrainsson (1993). Object Shift in Double Object Constructions. In Phillips, C. ed. *MIT Working Papers in Linguistics 18*: 131-174.

Fukui, N. (1986). *A Theory of Category Projection and Its Applications*. Doctoral Dissertation, MIT.

Grimshaw, J. (1991). Extended Projection. ms., Brandeis University.

Huang, C.-T. (1982). *Logical Relations in Chinese and the Theory of Grammar*. Doctoral Dissertation, MIT.

Jung, Y.-J. (1992). *A Restrictive Theory of Functional Categories and Their Parametric Variation*. Doctoral Dissertation, University of Washington.

Kim, S.-W. (1991). *Chain Scope and Quantification Structure*. Doctoral Dissertation, Brandies University.

Nishigauchi, T. (1990). *Quantification in the Theory of Grammar*. Dordrecht: Kluwer Academic.

Pollock, J. (1989). Verb Movement, Universal Grammar, and the Structure of IP. *LI* 20: 365-424.

Saito, M. (1992). Long Distance Scrambling in Japanese. *Journal of East Asian Linguistics* 1: 69-118.

Watanabe, A. (1993). *AGR-Based Case Theory and Its Interaction with the A-Bar System*. Doctoral Dissertation, MIT.

Yang, D.-W. (1989). *Jibay-Kyelsok Ilonyi Kicho*. [An Introduction to Government and Binding Theory]. Seoul: Shin A Sa.

Yang, D.-W. (1993). The Minimalist Theory and the Structure of Korean. presented to the 2nd Seoul International Conference on Generative Grammar.

Yoon, J.-Y. (1990). *Korean Syntax and Generalized X-Bar Theory*. Doctoral Dissertation, University of Texas at Austin.

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Deriving Split Ergativity: Case and Agreement in Georgian

James Lyle

0. Introduction

Georgian, the Caucasian language spoken in the republic of Georgia, has long been of interest to linguists because of its peculiar pattern of case and agreement marking. In particular, Georgian has three tense-aspect series that each have a distinct case/agreement pattern. Furthermore, the pattern for each series differs according to which of four possible classes the verb belongs to. In general the different case/agreement paradigms correspond to various types of ergativity we find in various languages around the world (see Dixon 1979 for a survey of types of ergativity). Thus for example, series I clauses in Georgian behave like typical nominative/accusative clauses, while series II is a "mixed" type, with ergative/absolutive case marking and nominative/accusative verbal agreement. Several accounts have been given in the generative literature to explain the complexities of this system, e.g. Harris (1981), Anderson (1984), Marantz (1984), Halle and Marantz (1993), King (1994). With the exception of Harris (1981) and King (1994), all of these have basically been given in morphological, rather than syntactic, terms. This is only natural if we think of (overt) case and agreement as reflecting operations conducted in a more-or-less independent morphological component of the grammar. However, recent work on ergativity (Murasugi 1992, Bobaljik 1993) in the framework of the minimalist program (Chomsky 1992) has motivated analyses of such case/agreement distinctions in syntactic terms. In the minimalist framework, case and agreement are taken to be manifestations of the spec-head relation. Thus, the case and agreement features which a particular clause shows are a result of the movement of NP to the specifier of an agreement phrase. The different paradigms of nominative/accusative systems and ergative/absolutive systems simply result from the application of different movement options.

In this paper I propose an account of Georgian case and agreement in syntactic terms, following the insights of the latter work in the minimalist program. The account relies on several modifications of the accounts in Murasugi (1992) and Bobaljik (1993) and thus has consequences for the more general theory of ergativity. The structure of the paper is as follows: in section 1 a sketch of the basic case and agreement facts in Georgian is given, with some indication of the problems they pose for grammatical theory. Section 2 outlines previous work on ergativity in the minimalist program, and shows how that work is inadequate to the task of accounting for the Georgian facts. In section 3 I outline a proposal that extends the analyses described in section 2, and in section 4 I show how the proposal accounts for the Georgian data. Section 5 briefly discusses some possible consequences that this proposal has for a more general account of ergativity.

1. Summary of Georgian Facts

Nominative/Accusative languages differ from Ergative/Absolutive languages in that the former treat transitive and intransitive subjects the same in terms of case and/or agreement, while the latter treat intransitive subjects and transitive objects the same. This can be schematized as in (1), where **A** represents the subject of a transitive, **S** the subject of an intransitive, and **O** a direct object:

(1) a. Nominative/Accusative: A, S --> Case/Agr 1
O --> Case/Agr 2

b. Ergative/ Absolutive: A --> Case/Agr 1
S, O --> Case/Agr 2

Ergativity or accusativity may be realized either by case forms on NPs, or by bound agreement markers or pronominal clitics on a verb or AUX stem. These case and agreement paradigms need not "agree", however; a distribution such as that schematized in (2) is also possible, within a single language[1]:

(2) Case: A --> Case 1
S, O --> Case 2

Agreement: A, S --> Agreement paradigm 1
O --> Agreement paradigm 2

Georgian has both overt case marking on NPs and a system of verbal affixes that show agreement with argument NPs, and so all three of the above schemata are possible in Georgian. In fact Georgian does show all three of these types. Thus series I clauses in Georgian correspond to system (1a), nominative/accusative, as shown in (3). Sentence (3a) shows a class 1 verb (class 1 corresponds roughly to transitives) in series I, and (3b) shows a class 2 (unaccusative) verb in series I:

(3) a. **k'ac-i** **(me)** **m-k'lav-s**
man-NOM me-ACC[2] 1sg-kill-3sg
"The man kills me"

b. **k'ac-i** **k'vdeb-a**
man-NOM die-3sg
"The man dies"

Note that the subject is marked in the same way in both types of clause--with the use of a suffix. The object in (3a) is marked with a prefix. Georgian has two[3] classes of agreement affixes. The **v-series**, of which the two verbal suffixes in (3) are members, generally mark subject agreement. The **m-series**, which includes the prefix **m-** from (3a), generally marks object agreement. The forms of the two series are shown in (4):

(4) **Georgian agreement markers**

	v-series	m-series
1sg	v-	m-
2sg	--	g-
3sg	-s, -a	--, h-, u-, e-, a-
1pl	v- -t	gv-
2pl	-t	g- -t
3pl	-en	--, h-, u-, e-, a-

Actually, Georgian verbs can show agreement with three core arguments on the verb stem--subject, direct object, and indirect object (indirect objects are usually marked with a variant of the m-series markers; see note 3). I will only deal with subject and direct object agreement in this paper, setting aside the issue of ditransitives for further research. Any account of Georgian agreement must eventually deal with these, for indirect object agreement is very productive in Georgian. One possible way to approach indirect objects is to assume that there are three functional projections corresponding to the three core arguments in ditransitives. See King (1994) for an approach along these lines. I will not pursue this further here.

The agreement markers in (4) can be seen again in the series II clauses in (5):

(5) a. **k'ac-ma** **(me)** **mo-m-k'l-a**
man-ERG me-NOM perf-1sg-kill-3sg
"The man killed me"

b. **k'ac-i** **mo-k'vd-a**
man-NOM perf-die-3sg
"The man died"

Note that with respect to agreement, (5) is just like (3), i.e. nominative/ accusative, with subjects marked by the **v**-series, and objects by the **m**-series. But the case marking in (5) is ergative/absolutive, with both transitive objects and intransitive subjects marked with the same case. Series II clauses in Georgian thus correspond to the 'mixed' schema in (2).

Yet a third paradigm can be seen in Georgian series III clauses (the so-called "inversion" construction), as shown in (6):

(6) a. **k'ac-s** **(me)** **mo-v-e-k'ali**
man-ACC me-NOM perf-1sg-3sg-kill
"The man had apparently killed me"

b. **k'ac-i** **mo-mk'vdar-a**
man-NOM perf-die-3sg
"The man apparently died"

Note here that transitive objects and intransitive subjects receive the same case, as in a typical erg/abs system. In addition, both the intransitive subject and the transitive object are marked on the verb by an agreement morpheme from the **v**-series (the 3sg suffix **-a** and the 1sg prefix **v-**, respectively), while the transitive subject is marked differently, with an affix from the **m**-series (the 3sg prefix **e-**). This means that the agreement system in this series is also erg/abs, and so series III clauses in Georgian show a case/agreement pattern corresponding to the schema in (1b).

Georgian has three structural cases, as can be seen in (3) through (6) above. The least-marked case (the case given in citation form) I will call 'nominative', though it could equally well be called 'absolutive' in that it is opposed to ergative case in series II. This case appears in all three series, marking various arguments depending on the series. 'Ergative' case appears only in series II, and always marks the subject of a transitive verb[4]. The third structural case can appear on both direct and indirect objects. In this respect, 'accusative' is indistinguishable from 'dative' in Georgian. While it is customary in the literature on Georgian to refer to this case as 'dative,' I will call it 'accusative' to avoid unnecessary confusion, since the discussion here revolves around the notions of ergativity and accusativity. Note that this case behaves accusatively in series I, marking transitive

objects (see (3)), but it behaves 'ergatively' in series III, marking transitive subjects (see (6)). This is the reason that series III is often called the 'inversion' construction, for the assignment of case to arguments in transitive clauses in series III is just the inverse of series I.

Word order is notoriously free in Georgian, with the orders SVO and SOV apparently tied for the status of least-marked order. The other four orders of S, V, and O are also possible however. In addition, overt arguments are not necessary in a typical clause, so that any finite verb form alone is interpreted as a complete sentence. Pronouns in argument position will only be overt for emphasis or contrast. These properties make Georgian a candidate for analysis as a non-configurational language in the sense of Jelinek (1984). Jelinek has argued that overt NP-arguments in non-configurational languages are IP-adjoined, and are coindexed with an empty pronominal in argument position. If that is the case, then the various word orders in Georgian may result from various choices of the order of the IP-adjoined nominals. It is also possible that the free word order in Georgian is the result of scrambling applying freely late in a derivation. Whichever of these options is the case, what is important here is that word order will be irrelevant to the discussion below.

In order to account for the peculiar behavior in (3)-(6), Harris (1981), working in the framework of relational grammar, proposes a series of syntactic rules which operate on the argument structure of the clause. For example, to account for the properties of the inversion clause (6a), she proposes the following two-part rule (which I have simplified somewhat):

(7) **Inversion** (Harris 1981):

a. Subject Demotion: demote a subject to object if tense/aspect=series III

b. Unaccusative: promote object to subject in the absence of a subject

This rule explains how the underlying subject of the clause has the surface morphological properties of an object, and vice versa. Semantic properties of arguments are determined before the application of (7), and morphological properties after. But there are serious objections to this kind of syntactic view of inversion, as pointed out by Anderson (1984). In particular, since (7) is a syntactic rule which changes the grammatical functions of arguments in a clause, we would expect some overt syntactic reflex of the application of this rule. But the only reflexes of the rule are *morphological*, that is, the demoted subject behaves like an object only with respect to morphological properties such as case and agreement. By every conceivable syntactic test, e.g. the ability to bind a reflexive, etc., the demoted subject still behaves like a subject. Anderson therefore eschews the notion that the grammatical functions of arguments change in any sense in inversion clauses, and proposes instead an account of inversion in purely morphological terms. Anderson's account relies on a set of independent rules which operate strictly on the morphological structure of individual lexical items. In a sense these rules simply recapitulate the results of (7), but have the advantage of being independent of the syntax, and so we do not predict that inversion will have any syntactic consequences, as Harris wrongly does. However, Anderson's account has the disadvantage of requiring a large number of language-specific and construction-specific morphological rules.

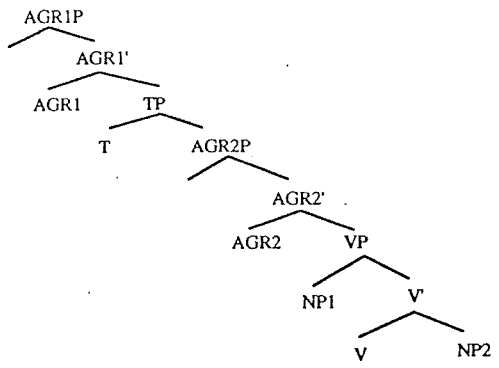
More recent work on agreement has given us new ways to look at these issues that do not suffer the disadvantages of either of the views discussed above. In particular, the notion that case and agreement are manifestations of the spec-head relation, which is a central assumption of the minimalist program (Chomsky 1992), allows us to give a syntactic account of facts like those in (3)-(6) without assuming that underlying grammatical functions are changed, and without a large number of ad hoc morphological rules. I turn to a discussion of such an account in the next section.

2. Deriving Ergativity in the Minimalist Framework

2.1 Central Assumptions

The structure of the clause in the minimalist framework is generally taken to be something like (8) (from Chomsky 1992):

(8) **The clause:**



In this structure, case and agreement features are 'checked' in the spec-head relation of the AGR(eement) phrases. The verb and tense each raise to adjoin to the head of an AGRP, and the NP arguments raise to the specifiers of AGRP to check their features against the features of the verb/agr and tense/agr complex. In this sense case and agreement have a syntactic component to their nature--each is a manifestation of a relation that results from syntactic movement. All the relevant case and agreement features must be checked in the course of a derivation; if any unchecked features survive to the final LF-representation, the derivation crashes. Features may be checked either at S-structure ('before SPELLOUT' in minimalist terms) or at LF.

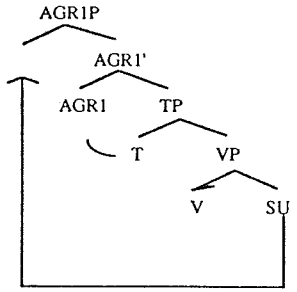
Movement is constrained in this framework by economy conditions (Chomsky 1991, 1992) which specify which moves are most economical. In particular, LF-movement is less costly than S-structure movement, and so all movement must wait until LF if possible. S-structure movement is forced by the presence of 'strong' features (Pollock 1989), which have the property that they must be checked at S-structure, a property which overrides other economy conditions. In general, then, NPs which must check [+strong] features move at S-structure, and NPs which check [-strong] features move at LF. General principles of economy determine that it is always NP1 (the subject) that raises to spec-AGR1 in (8), and NP2 (object) that raises to spec-AGR2. Thus the typical derivation has crossing movement paths.

Given this general set of assumptions, two quite different proposals have been made to account for the basic difference between the case and agreement patterns of nom/acc languages on the one hand, and erg/abs languages on the other. In the following subsections, I briefly outline these proposals, then show how they are each inadequate to account for the full range of facts in Georgian. The proposal I give in section 3 crucially relies on several of the assumptions of these accounts.

2.2 Bobaljik (1993)

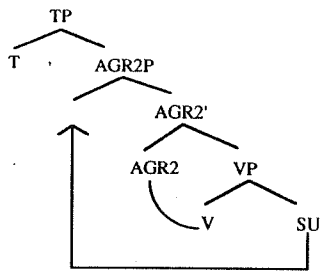
Bobaljik (1993) seeks to explain the difference between nom/acc and erg/abs languages by making use of the notion of an obligatory projection. In intransitive clauses, there is only one argument NP with features that need to be checked, and hence only one AGRP projection is necessary. Which of the two AGR projections is obligatory (i.e. is present in intransitive clauses) in a given language is determined parametrically. If AGR1 is specified as the obligatory projection, then the subject in intransitive clauses will raise to the same specifier position as the subject of transitive clauses, and hence have its case and agreement features checked in the same place, by the complex head [T AGR1]:

(9) Intransitive clause:



This corresponds to a nom/acc distribution, since both transitive and intransitive subjects are treated the same. On the other hand, if AGR2 is the obligatory projection, then the subject of intransitives will be assigned case and agreement by the head [V AGR2], like transitive objects:

(10) Intransitive clause:



If we assume that the case which is assigned in both transitive and intransitive clauses (the obligatory case) is always the unmarked case, i.e. nominative or absolutive, then the difference between erg/abs and nom/acc languages boils down to the setting of the *Obligatory Case Parameter* (OCP):

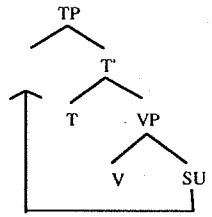
(11) **OCP** (Bobaljik 1993): Case X must be assigned, where
i) for nom/acc languages, X=NOMINATIVE, or
ii) for erg/abs languages, X=ABSOLUTIVE

In this account, nom/acc and erg/abs languages do not differ in transitive clauses--both show the same type of derivation. It is only in intransitive clauses that they differ: nom/acc languages have the derivation in (9), while erg/abs languages have the derivation in (10). Note that nominative is structurally equivalent to ergative, since both are assigned by [T AGR1], while accusative is structurally equivalent to absolutive, since both are assigned by [V AGR2].

2.3 Murasugi (1992)

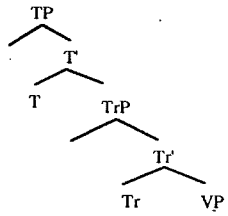
The account in Murasugi (1992) makes almost the opposite assumptions from Bobaljik. For Murasugi intransitive clauses are identical in both nom/acc and erg/abs languages. Furthermore, the two unmarked cases, nominative and absolutive, are structurally equivalent--both are assigned by [T]. Thus the intransitive clause has the form (12) for Murasugi:

(12) Intransitive clause:



Here the subject raises to spec-TP to check case and agreement features in both types of languages. The two types differ with respect to the behavior of transitive clauses. For Murasugi the transitive clause has the structure in (13):

(13)



The head [Tr] (for 'transitive') is the assigner of marked case, either ergative or accusative. Murasugi proposes a slightly different set of economy conditions with the result that, in addition to the crossing paths derivation assumed by Chomsky (1992), a nesting paths derivation is also allowed. Thus, either the subject or the object can move to spec-Tr in transitive clauses. When Tr is [+strong], it forces movement of the subject to spec-Tr, with the result that the subject receives marked case, i.e. ERGATIVE. The object then raises to spec-T and receives the unmarked case, ABSOLUTIVE. On the other hand, if T is [+strong], the subject is forced to move to spec-T and it receives unmarked case, i.e. NOMINATIVE. Thus Murasugi's ergative parameter is formulated as follows:

(13) **Ergative Parameter** (Murasugi 1992):
T is [+strong] --> nom/acc language
Tr is [+strong] --> erg/abs language

2.4 Some Problems

First of all, it is clear that neither the OCP nor Murasugi's ergative parameter can be a "parameter" in the sense which is usually ascribed to that term in the Principles and Parameters literature, for ergativity is very seldom an all-or-nothing affair in a given language. Many (probably most) ergative languages show at least some type of "mixed" ergativity (cf. the survey in Dixon 1979). NPs in Hindi, for example, show up with an ergative/absolutive case distribution in perfective clauses only, and a nominative/accusative distribution otherwise. Thus it must be the case for languages like Hindi that both settings of the parameter in (11) are available internal to one language. This has been argued by Jelinek (1993) to be the case for Lummi and by Carnie (1993) for Irish.

More importantly, however, neither of these proposals can account for the kind of mixed distribution shown in Georgian series II, where the case system does not agree with the agreement system. For both of these accounts unite case and agreement under a single projection, making it impossible for any NP argument to receive, for example, the same case in transitive and intransitive clauses but be marked by different agreement markers. My aim in the remainder of this paper is to make use of the notions proposed by Bobaljik and Murasugi to extend the minimalist account of ergativity in such a way as to cover the Georgian facts.

3. The Proposal

In (14) through (18) I summarize the assumptions that are crucial to the proposal given here. In developing this proposal, I will assume with Murasugi (1992) that the unmarked cases are equivalent, i.e. nominative and absolutive case are assigned by the same head, namely T, and that the marked cases are similarly equivalent, both assigned by V. I also will make use of the notions of crossing and nested paths, although I proceed from a somewhat different set of economy conditions. From Bobaljik (1993) I take the notion of an obligatory projection. By combining the assumptions of the two proposals this way, the theory is enriched in such a way as to derive a greater range of possible case/agreement combinations. Once having outlined my assumptions, I proceed in section 4 to show how they account for the Georgian facts.

First, some general assumptions about case assignment and agreement:

(14) **Case assignment:**

Structural Case is assigned in the spec-head relation by
i) T (unmarked case, i.e. Nom or Abs)
ii) V (marked case, i.e. Acc or Erg)

(15) **Agreement:**

The two core agreement relations (subject and direct object) are checked in the spec-head relation of AGRP by AGR1 or AGR2.

These are essentially the assumptions of Chomsky (1992). But these assumptions are supplemented by a more articulated theory of feature strength, outlined in (16):

(16) **Feature Strength:**

Only one of { T, V } and only one of { AGR1, AGR2 } is assigned [+strong]. The other is assigned [-strong].

We may think here in terms of the GPSG notion of "feature-valued features", so that it is not, for example, V itself that is +strong, but rather its case feature, e.g. [+ergative [+strong]]. The assumption in (16) differs from Murasugi in that I allow the strength of case and agreement features to vary independently. The values of both the case and agreement features will be relevant to the determination of NP-movement. Furthermore, feature strength determines which AGR projection is obligatory:

(17) **Obligatory Projection:**

[+strong] AGR is the obligatory projection in the sense of Bobaljik (1993) (i.e. it appears in intransitive clauses).

NP-movement must be restricted by a theory of economy. I suggest that NP-movement is essentially unbounded, and thus reject Chomsky's (1992) notion that head movement is necessary to open up equidistance domains for movement of NPs. Instead, I propose a variation on Miyagawa's (1993) effort to 'relativize' the economy conditions on NP-movement. NPs may move as far as they want, passing as many potential landing sites as they want, so long as no potential landing site contains a feature that could be checked by that NP *at the level of the derivation at which the movement takes place*. I express this condition as (18):

(18) **Relativized Economy Condition for NP-movement:**

Movement of NP may not cross a potential landing site which contains unchecked features of the same type (where "type" means [+/-strong]).

We may assume that (14) through (18) are given by UG. The child's job in acquiring the case/agreement system is to determine which heads have [+strong] and which [-strong]. For Georgian, I assume that the strong agreement features are always associated with the v-

series of agreement markers, for it is this set of markers that is in some sense obligatory, appearing in all the clauses in (3)-(6). The specifications of T, V, AGR1, and AGR2 should completely determine NP-movement, assuming strong feature-driven movement *a la* Pollock (1989) and Chomsky (1992). Crucially, it must be assumed that within a single language, various choices for the feature specifications can be realized. For example, for Hindi and Georgian, it must be that different tense/aspect properties can determine different specifications of feature strength. This seems a reasonable assumption, since many languages have an ergative split along tense/aspect lines. In the next section, I show in detail how the assumptions in (14) through (18) yield a system rich enough to account for the Georgian facts.

4. Accounting for Georgian

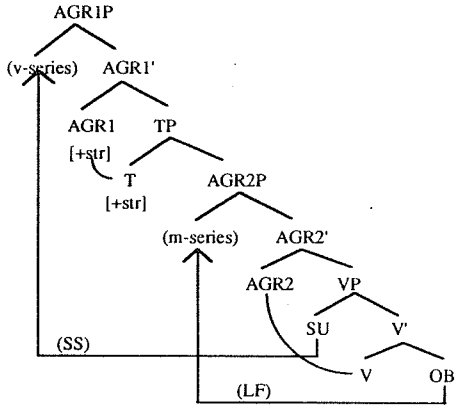
4.1 Georgian Series I

Georgian series I agreement behaves much like English and many of the more familiar languages upon which most current models are based. The derivations for this series therefore look exactly like the derivations proposed for English in Chomsky (1992). In the system proposed here, these derivations fall out from the following specifications of feature strength:

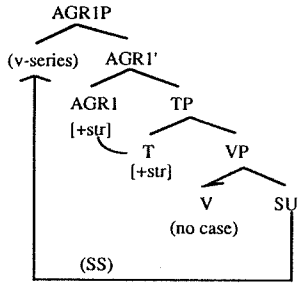
(19) **Georgian Series I features:**
[+strong] --> T, AGR1
[-strong] --> V, AGR2

The derivation for transitive clauses yielded by this set of feature specifications is given in (20), and the derivation for intransitive clauses is given in (21). Note that in intransitive clauses, the verb has no case features to check, and so is not involved in the derivation. In the transitive clause, the subject raises overtly to spec-AGR1 to check nominative case and v-series agreement. Condition (18) allows this movement, since no [+strong] unchecked features are present in spec-AGR2, a closer potential landing site. Note also that in both types of clauses, the subject checks its case and agreement in the same place, as desired:

(20) **Series I Transitive Clause:**



(21) **Series I Intransitive Clause:**



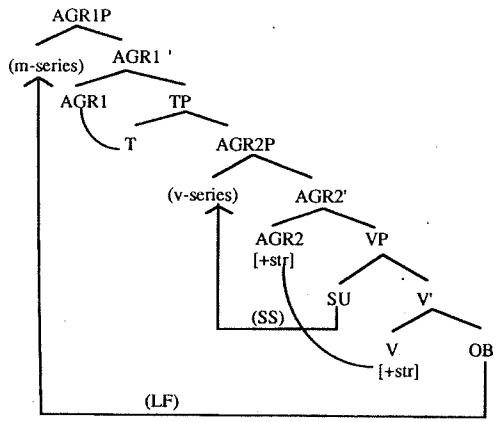
4.2. Georgian Series II

Series II clauses in Georgian have the following feature specifications:

(22) **Georgian Series II features:**
[+strong] --> V, AGR2
[-strong] --> T, AGR1

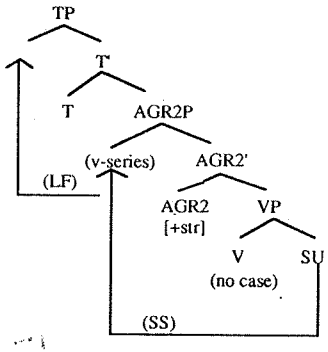
In series II transitive clauses (shown in (23)), the subject must raise at S-structure to spec-AGR2, to check the strong case and agreement features there. At LF, the object raises to spec-AGR1. This movement of the object past the potential landing site at spec-AGR2 does not violate the economy condition in (18), because at LF spec-AGR2 does not contain any unchecked features--all the relevant features were checked at S-structure.

(23) **Series II Transitive Clause:**



In intransitive clauses (shown in (24)), however, the verb has no case to assign and so there is no [+strong] case feature to motivate movement. The subject still must raise to spec-AGR2 to check the strong agreement features there, but it does not receive case until LF, when it raises to receive nominative from T in the spec-T position. Here I assume following Chomsky (1992) that the specifier of TP is not projected unless it is necessary to ensure the convergence of a derivation. In (24), the spec-T position is needed because the subject must check its case features.

(24) **Series II Intransitive Clause:**



Note that the subject receives v-series agreement in both (23) and (24), as desired, but receives different cases, i.e. ergative in (23) and nominative in (24), again as desired.

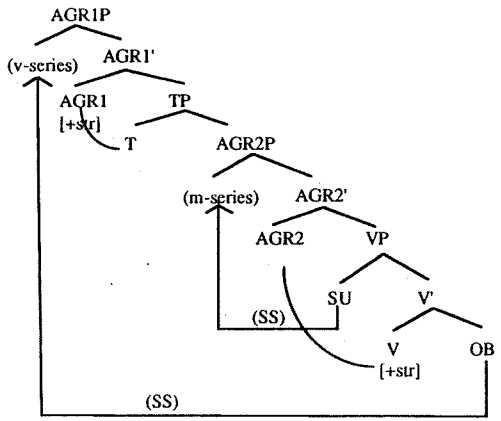
4.3. Georgian Series III

Series III clauses in Georgian have the following feature specifications:

(25) **Georgian Series III features:**
[+strong] --> V, AGR1
[-strong] --> T, AGR2

The desired derivation for transitive clauses is shown in (26):

(26) **Series III Transitive Clause:**

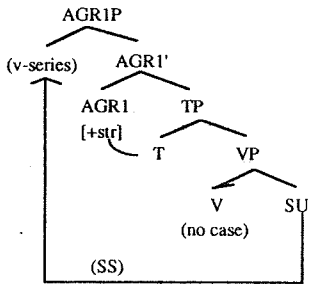


Here the verb raises to adjoin to AGR2 to check its case features, forcing movement of the subject to spec-AGR2. The object moves across the subject to spec-AGR1 to check the strong agreement features there. Both these moves must take place at S-structure. Note that this latter move does not violate the condition in (18), because so long as the subject moves first and checks the strong case features of V, the position AGR2 will contain no unchecked [+strong] features, and so S-structure movement of the object across this position is licensed.

There is a potential problem here, however. It is not enough for the move of OB across spec-AGR2 to be possible--we must ensure that that move is the *only* possibility. That is, it is also possible for SU to move to spec-AGR1 at S-structure, but we must rule this move out. I see two possible ways to do this, corresponding to two different views of the nature of economy conditions. First, notice that if SU moves to spec-AGR1P then there will be no landing site for OB at LF and its case and agreement features will go unchecked, and the derivation will crash. But if OB moves to spec-AGR1P at SS the derivation converges. If the movement of SU to spec-AGR1 is ruled out in this way, we must appeal to a global view of economy conditions, in which they are able to look ahead to see the possible consequences of a particular move, and rule that move out on the grounds that no converging derivation can ultimately be reached. This seems to be the view of economy adopted in Chomsky (1992). A second possibility is to take the view that economy conditions apply at each step of the derivation, and must always choose the 'least costly' operation, without regard to possible consequences. Under this view, we could say that checking features *in situ* is cheaper than movement. Thus, once SU is in the spec-AGR2 position, it is cheaper for it to check its agreement features there, even though the features of AGR2 are [-strong]. So movement of the subject is prevented at this stage of the derivation by the fact that it can check its features more cheaply. Under this view, we would be adopting some form of Chomsky's(1992) "Procrastinate" principle. Though the latter view of economy seems to me more attractive, the solution just proposed may have unwanted consequences. For the purposes of this paper, I will assume that one of these solutions can be maintained and remain agnostic on the question of the nature of the economy conditions.

In intransitive clauses in series III the verb again has no case features to assign, and so there is no [+strong] case to motivate movement. The subject raises to spec-AGR1 at S-structure to check v-series agreement, as desired, and T raises at LF to discharge nominative case:

(27) **Series III Intransitive Clause:**



5. Some Consequences

If the above analysis is correct, then we can give a general account of ergativity in its terms. We need not specify an ergative parameter such as those in (11) and (13). Instead, the case/agreement pattern of a particular language (or some construction of a particular language) will be completely determined by the feature specifications of T, V, AGR1 and AGR2. Thus, nom/acc languages like English, French, Japanese, etc., will have feature specifications like those of Georgian series I. Note that I am claiming that the strong/weak features of these four heads are only relevant to the determination of NP-movement--other

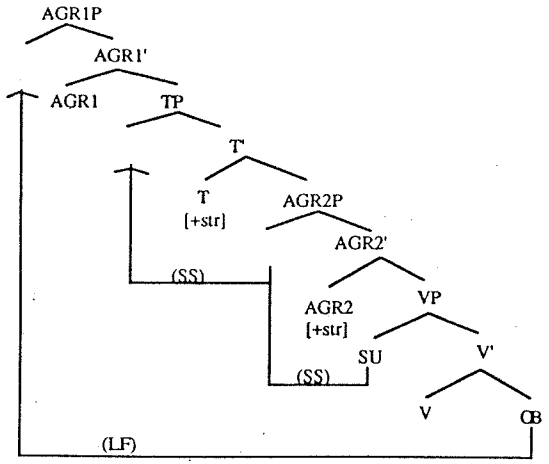
independent considerations may determine further possibilities for head-movement. Thus the analysis proposed here does not compromise the force of arguments about word-order differences among languages like that in Pollock (1989). This richer system can explain a wider range of case and agreement possibilities, and is still flexible enough to allow variations in word order among languages.

The reader may have noticed that I have exploited only three of the four possible feature specifications in explaining Georgian agreement. The fourth possibility is shown in (28):

(28) [+strong] --> T, AGR2
[-strong] --> V, AGR1

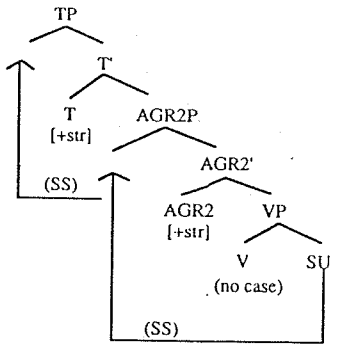
What type of derivation does this set of specifications correspond to? The answer to this question depends crucially on the status of spec-TP. One possible derivation might be that in (29), with a subject movement to spec-TP at S-structure:

(29)



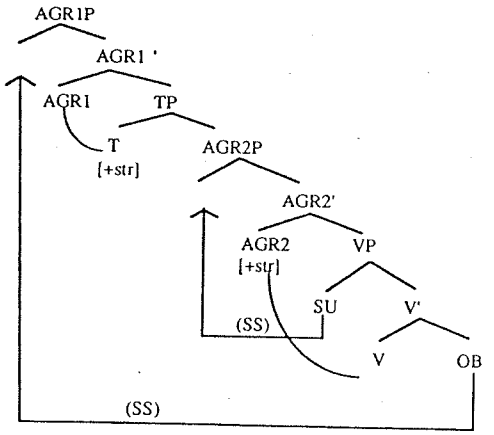
Here we must assume that the object receives case through raising of V all the way to AGR1. The intransitive clause corresponding to (29) is (30):

(30)



Note that the subject receives exactly the same case and agreement in both kinds of clauses, (29) and (30). If this is a possible set of derivations, it corresponds to the case/agreement pattern of Georgian series I (and English, etc.), i.e. nominative/accusative. Another possible derivation does not allow generation of a spec-TP:

(31)



Here the subject raises to check agreement in spec-AGR2 and the object to check case in AGR1. V raises at LF to assign case to the subject. The intransitive clause corresponding

to this derivation would again be (30). In comparing (31) and (30) note that the subject checks its agreement features in the same place, AGR2, but receives different cases in the two types of clause. This is identical to the mixed type of ergativity we see in Georgian series II, with nom/acc agreement and erg/abs case. Thus, depending on the possibility of the generation of a specifier of TP, the feature specifications in (28) simply yield another possible derivation for one of the types already discussed. Crucially, no set of feature specifications corresponds to a system in which case shows a nom/acc pattern, but agreement shows an erg/abs pattern. This type of mixed system is unattested in the world's languages (see note 1) and it has been claimed to be impossible (see Dixon 1979, Mallinson and Blake 1981). It is therefore an advantage of the theory proposed here that such hypothetical languages correspond to a type of derivation that is impossible within the bounds of the theory. This is a desirable result if we wish to extend the proposal into a general account of ergativity.

6. Conclusion

In this paper it has been argued that the tense/aspect of a particular Georgian clause selects one of the feature specifications (19), (22), or (25), and that given that specification, the course of NP-movement (and thus the case and agreement paradigm) is completely determined. This account of case and agreement can be taken as a general theory of ergativity, in that possible types of ergative and accusative languages and mixed systems fall out from the feature specifications.

Notes

1. In fact there is also another possible type of distribution which is the 'opposite' of (2), as shown in (i):

(i)

Case:	A, S --> Case 1
	O --> Case 2
Agreement:	A --> Agreement paradigm 1
	S, O --> Agreement paradigm 2

This would correspond to a system with nom/acc case but erg/abs agreement. Such a system is unattested among natural languages (see Dixon 1979). Although pragmatic explanations have been given for this lacuna, a theory which predicts the absence of such a system on general grounds is desirable. I return to this point below.

2. First and second person pronouns are not overtly marked for case (except genitive). In general, all pronouns in A-positions are optional, so that a finite verb form in Georgian always expresses a complete thought:

(i) **m-k'lav-s**
1sg-kill-3sg
"He kills me"

3. It is usually claimed that there are actually more than two classes of agreement affixes. In addition to the v- and m-series, there are also the h-, u-, e-, and a-series. The latter four, however, are morphologically conditioned alternants of the same series. They are in most cases identical to the m-series with the addition of a "pre-radical vowel" (see Aronson 1990:169ff.). Their function is to mark indiriect object agreement in Series I and II and subject agreement in Series III. Hence they are always used to mark arguments in accusative case. In this they differ from the m-series only in that the m-series can show agreement with arguments in absolutive in Series II. As I have set aside entirely the issue of indirect object agreement for now as beyond the scope of this paper, I will for the purpose of the argument here collapse the latter five series under the label m-series. This move is not unwarranted, given two sets of facts: (i) the similarities in form and function among the m-, h-, u-, e-, and a-series markers, and (ii) the fact that they never co-occur. Of course, a proper account of indirect object agreement in terms of the analysis here is not unproblematic, but setting it aside as an expository convenience does not affect the conclusions drawn in this paper.

4. Ergative case also marks the subject of some intransitives, specifically the class 3 or 'medial' verbs. These verbs are the active intransitives or 'unergatives' which assign an agent role to their subject. I will not deal with these in this paper, but assume following Harris (1981) that an account of their case marking pattern can be given with the assumption that they are underlyingly transitive. An abstract object then absorbs the absolutive case in series II, leaving the subject to be assigned ergative. See Laka (1993) for a similar account of unergatives in Basque.

References

Anderson, S. (1984) On representations in morphology: Case, agreement, and inversion in Georgian. NLLT 2.

Aronson, H.I. (1990) Georgian: A Reading Grammar. Columbus, OH: Slavica.

Bobaljik, J. (1993) On ergativity and ergative unergatives. MITWPL 19.

Carnie, A. (1993) Nominal predicates and absolutive case marking in Irish. MITWPL 19.

Chomsky, N. (1991) Some notes on economy of derivation and representation. In R. Friedin, ed. Principles and Parameters in Comparative Grammar. Cambridge: MIT Press.

Chomsky, N. (1992) A minimalist program for linguistic theory. MITOPL 1.

Dixon, R.M.W. (1979) Ergativity. Language 55(1).

Halle, M. and Marantz, A. (1993) Distributed morphology and the pieces of inflection. In K. Hale and S. J. Keyser, eds. The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger. Cambridge: MIT Press.

Harris, A. (1981) Georgian Syntax: A Study in Relational Grammar. Cambridge: Cambridge University Press.

Jelinek, E. (1984) Empty categories, case, and configurationality. NLLT 2.

Jelinek, E. (1993) Ergative 'splits' and argument type. MITWPL 18.

King, T. H. (1993) SpecAGR and case: Evidence from Georgian. In H. Harley and C. Phillips, eds. The Morphology-Syntax Connection: MITWPL 22.

Laka, I. (1993) Unergatives that assign ergative, unaccusatives that assign accusative. MITWPL 18.

Mallinson, G. and B.J. Blake. (1981) Language Typology. Amsterdam: North-Holland.

Marantz, A. (1984) On the Nature of Grammatical Relations. Cambridge: MIT Press.

Miyagawa, S. (1993) Case-checking and minimal link condition. MITWPL 19.

Murasugi, K. (1992) Crossing and Nested Paths: NP Movement in Accusative and Ergative Languages. MIT diss.

Pollock, J.-Y. (1989) Verb movement, universal grammar, and the structure of IP. LI 20.

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On The Suspension of *that-t* Effect*

Hideo Makihara

1. Introduction

Most research in Generative Grammar has been done with the goal of reducing language-specific and construction-specific rules. More recent work has focused on radical reduction, leaving only universal principles and language specific parameter settings. However, Culicover (1993) suggests this may not always be possible. Considering data like the following, Culicover says that a standard ECP account cannot give an empirically more adequate explanation than the *that-t* filter of Chomsky and Lasnik (1977, p. 561):

(1) a. Robin met the man {OP$_i$ that/who$_i$} Leslie said that *(for all intents and purposes) t_i was the mayor of the city.
b. This is the tree OP$_i$ that I said that *(just yesterday) t_i had resisted my shovel.
c. I asked what$_i$ Leslie said that *(in her opinion) t_i had made Robin give a book to Lee.

(from Culicover (1993))

There have been many analyses which have tried to capture the *that-t* effect and some principled accounts have been proposed (Chomsky (1986), Rizzi (1990), among others). However, there has been no principled explanation for the suspension of the *that-t* effect as shown in the sentences above (as far as I know), even though the phenomenon was pointed out as early as 1977 by Bresnan.

In this paper, I propose that the suspension of the *that-t* effect may be accounted for by the ECP. The rest of this section provides data illustrating (the suspension of) the *that-t* effect. In section 2, I present evidence that sentential phrasal adverbs are different from non-phrasal adverbs like *probably* in terms of their distribution. In section 3, with the assumption that phrasal sentential adverbs are base-generated in Spec of a maximal phrase between CP and IP, I reexamine (the suspension of) *that-t* effect in terms of the ECP. The last section is a conclusion drawn from the present analysis.

* This paper is an extension of a term paper for Linguistics 561 and 562 instructed by Professor Heles Contreras in the quarters of Fall 1993 and Winter 1994. This paper is also a part of my Master's thesis. I greatly appreciate Prof. Contreras' help on an earlier version of the paper. I thank Michael Gamon and Sonia Maruenda for their review in the class. Thanks to my advisor Professor Fritz Newmeyer for his comments, which helped me to organize the presentation of the paper. Kristin Denham not only corrected my English for every version of this paper, but also, gave me many helpful comments. Also, I thank Professor Tatsuya Suzuki for his comments. And finally, thanks to many friends who helped me with the judgement for examples. Of course, I am responsible for any kind of errors.

1.1 (The Suspension of) the *that-t* Effect

Examples of the *that-t* effect are given below:

(2) a. Who$_i$ do you suspect [t_i is a spy]
b. *Who$_i$ do you suspect [that t_i is a spy]

(3) a. Who$_i$ do you believe [(that) Peter likes t_i]
b. How$_i$ do you believe [(that) Peter fixed it t_i]

The generalization is that the extraction of a subject is impossible when there is an overt complementizer. Example (2) shows that the presence of the overt complementizer *that* blocks extraction of the subject. However, extraction of an object or an adjunct is independent of the presence of an overt complementizer, which is shown by example (3).[1] Culicover (1991, 1993) and Bresnan (1977) point out that the *that -t* effect is suspended if there is a sentential adverbial between *that* and IP. The sentences given in (1) are repeated here:

(1) a. Robin met the man {OP$_i$ that/who$_i$} Leslie said that *(for all intents and purposes) t_i was the mayor of the city.
b. This is the tree OP$_i$ that I said that *(just yesterday) t_i had resisted my shovel.

[1] Rizzi (1991) argues that an empty element in C is an agreeing form and that the overt complementizer *that* in English is inert for agreement. Therefore, the subject trace is licensed only when no overt complementizer is present as shown in (2a) repeated below as (i):

(i) Who$_i$ do you suspect [CP t_i' [C e][IP t_i is a spy]]

The empty head C agrees with the intermediate trace in Spec and gets the same index as the subject trace. Hence the subject trace is licensed by the empty head C by transitivity.

The case of the object extraction as in (3) repeated below as (iii) can be explained in terms of referential indices, where referential indices is assigned as in (ii):

(ii) REFERENTIAL INDICES
A referential index must be assigned by a referential q-role.

(Rizzi (1990), p. 86)

(ii) a. Who$_{ik}$ do you believe [(that) Peter likes t_{ik}]
b. How$_i$ do you believe [(that) Peter fixed it t_i]

The assignment of a referential q-role occurs when the case that the assignee of the q-role has a referent in the discourse. Rizzi assumes that the licensing of a trace is done by either the Binding Condition or Antecedent-Government. In (iia), *who* is assigned a referential index *k* because it is assigned a referential q-role by the verb *like*. Hence, the license of the trace is satisfied with the Binding Condition (see footnote 21 for the definition). Note that the Binding Condition is fulfilled if the antecedent c-commands the trace and they have the same referential index. On the other hand, in (iib) *how* does not have the referential indices because, it is not an argument. Therefore, it must satisfy the Antecedent-Government requirement. Having no potential A'-governor between *how* and the trace in (iib), the derivation is legitimate. Notice that there is no need for an intermediate trace as long as the place of a potential governor (i.e. Spec of CP in the embedded sentence) is empty under Rizzi's account.

c. I asked what$_i$ Leslie said that *(in her opinion) *ti* had made Robin give a book to Lee.

(from Culicover (1993))

The suspension of *that-t* effect can be seen also in interrogatives:

(4) a. Which doctor$_i$ did you tell me that during the operation t_i had had a heart attack?
b. Who$_i$ did you say that in all probability t_i will regret his words?

Notice that the *that-t* effect is also suspended with negative sentential adverbs where Subject-Auxiliary Inversion (henceforth, SAI) is applied as shown in example (5):

(5) Leslie is the man who I said that under no circumstances would run for president.

Comparing the cases above with the Topicalization construction (section 2.2), which is superficially similar, I will propose a condition that constrains a certain relationship in operator-variable chains. In the next section, I show that prepositional sentential adverbs are different from sentential adverbs which do not have prepositions. Throughout the paper, I use the term *(sentential) phrasal adverbs* to refer to adverbs which are prepositional phrases functioning as adverbs such as *under no circumstance, in all probability* ... etc. and the term *non-phrasal adverbs* to refer to adverbs such as *probably, evidently* ...etc.

2. What Are Sentential Adverbs?

The suspension of the *that-t* effect appears to depend on two crucial differences among various adverbs: (A) whether they are sentential (i. e. modify sentences), (B) whether they are phrasal or non-phrasal. In 2.1.1, I present the difference between sentential adverbs and VP adverbs. In section 2.1.2, I illustrate that only phrasal adverbs can suspend the *that-t* effect. Then I proceed to the discussion of the position of sentential phrasal adverbs in 2.2.

2.1 Phrasal vs. Non-phrasal adverbs

In this section, I illustrate the distribution of sentential adverbs and VP adverbs and their structural difference, and I argue that sentential adverbs can suspend the *that-t* effect (2.1.1). Second, I suggest that in order to suspend the *that-t* effect, it is not sufficient for adverbs to be sentential, they must be phrasal as well (2.1.2).

2.1.1 The type of adverb and the suspension of the *that-t* effect

2.1.1.1. Sentential adverbs and VP adverbs

The main question to be discussed in this section is the difference between sentential and VP adverbs. Then I show that among various kinds of adverbs, only the sentential adverbs suspend the *that-t* effect.

Adverbs modify various elements (a verb, an adjective and a sentence itself) in a sentence. Sentential adverbs are defined as adverbs which modify sentences and VP adverbs as the ones which modify verbs. The following sentences contain a sentential adverb and a VP adverb respectively:

(6) a. *Probably* the tickets for the R.E.M. concert have already been sold out.
b. Leeland dropped his cup of coffee *clumsily*.

It is easy to see which elements in the sentence each adverb above modifies. The two interpretation of example (6) are paraphrased below;

(7) a. It is probable that the tickets for the R.E.M. concert have already been sold out.
b. The manner in which Leyland dropped his cup of coffee was clumsy.

The sentential adverb *probably* modifies the whole sentence as in (7a), which says that the whole event described by the embedded sentence in it is *probable*. On the other hand, the VP adverb *clumsily* modifies the verb as in (7b), which says the manner of dropping his cup is *clumsy*. Therefore, the descriptive generalization drawn from the sentences above is:[2]

(8) a. A sentential adverb α is one which is paraphrased as *it is α-adjective that* ....
b. A VP adverb β is one which is paraphrased as *the manner in which....is β-adjective*.
c. α/β–adjective is an adjective form of the adverb α/β

Although the generalization above captures the difference between sentential adverbs and VP adverbs, the behavior of adverbs is not so simple because the distribution

[2]The generalization does not hold for all adverbs. However, a detailed analysis of adverbs is beyond the scope of the present analysis. Also (8) is sufficient for the discussion here. See Jackendoff (1972) for a critical analysis of a transformational account of adverbs.

of them partially overlaps. In addition, some adverbs function as both sentential and VP adverbs depending on where they occur.

Putting aside the interaction of their distribution and their function, one of the characteristics of adverbs is that they usually can occur freely in various places in a sentence, such as in sentence-initial and sentence-final position and between a subject and a verb:

(9) a. *Quickly* John finished his homework.
b. John *quickly* finished his homework.
c. John finished his homework *quickly*.

Notice that the adverb *quickly* can be either a sentential or a VP adverb.[3] Therefore, it is not always true that any adverb can occur in any place. The distribution is restricted depending on the function of an adverb. Sentential adverbs cannot occur at the end of sentences as in (10):

(10) a. *Evidently/Probably* Horatio had lost his mind.
b. Horatio has *evidently/probably* lost his mind.
c. *Horatio has lost his mind *evidently/probably*.[4]:

(Jackendoff (1972), p. 50)

These adverbs modify the whole sentence and can be paraphrased as *it is evident/probable that Horatio has lost his mind*. There are some adverbs which seem to be able to occur in any position. However they have different readings depending on their position in a sentence.

(11) a. John *cleverly/clumsily* dropped his cup of coffee.
b. *Cleverly/Clumsily* (,) John dropped his cup of coffee.
c. John dropped his cup of coffee *cleverly/clumsily*.

(Jackendoff (1972) p. 49)

(11a) is ambiguous, having two readings (12a, b), which means that they can be either sentential or VP adverbs. On the other hand, (11b) has the meaning of (12a), which is sentential, and (11c) has the meaning of(12b) which is a VP adverb:

(12) a. It was clever/clumsy of John to drop his cup of coffee.
b. The manner in which John dropped his cup of coffee was clever/clumsy.

In the case where the adverb has the reading of (12a), it modifies the whole sentence (i. e., the whole event). In the other cases, (11c) and (11a) with the other reading, the adverb modifies the VP only (i. e., the action).[5] In other words, it is impossible to have the sentential adverb reading in (11c). Thus, the distribution is constrained by the type of adverb. To summarize, sentential adverbs modify a whole sentence and can occur in sentence initial position and after the subject.[6] [7]

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[3] The meaning change in (9) is very subtle, but it becomes clear in the following sentences, where the first two have the sentential adverb readings and the latter the VP adverb readings:
(i) a. *Quickly* John will be arrested by the police.
b. John *quickly* will be arrested by the police.
c. John will be *quickly* arrested by the police.
d. John will be arrested *quickly* by the police.

(from Travis (1988), p. 292)

[4] (10c) is acceptable if there is a pause before the adverbs:
ii) Horatio has lost his mind, *evidently/probably*.

(Jackendoff (1972), p. 50)

[5] Jackendoff (1972, p. 49) says that there is no difference in meaning in (9), but Travis (1988) argues that there is a subtle difference in the same way as we find in (11). I think that the observation of Travis (1988) is correct. Then, the generalization is that there is no adverb which can occur in any place in a sentence without changing the meaning of a sentence. Fritz Newmeyer (personal communication) pointed out to me that the generalization was too strong, providing the sentences below:
(i) John surely must have been working.
(ii) John must surely have been working.
(iii) John must have surely been working.
(iv) John must have been surely working.
For some speaker, the sentences above have the same meaning. However, the judgement varies among speakers. Some say that (iv) has only the manner reading, not sentential adverb reading. I leave the question open, whether or not the generalization holds in all cases.

[6] Superficially, the adverbs in (11) seems to occupy the same position. However, sentential adverbs and VP adverbs differ in terms of their distribution:
i) a. The tornado probably/completely ruined George.
b. George probably/*completely was ruined by the tornado.
c. George is being *probably/completely ruined by the tornado.

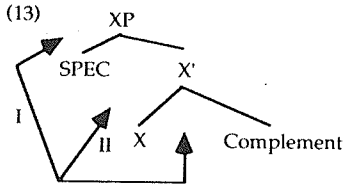
(Travis (1988), p. 291, citing Jackendoff (1972), p. 75-76)

One might argue that this generalization does not hold in a case like (10b) where the sentential adverb appears after the auxiliary. Jackendoff (1972) points out that sentential and VP adverbs may appear after the first auxiliary when there is only one auxiliary, but not when there are two auxiliaries as in (ic). I did not include the examples where sentential adverbs appear after the first auxiliary, but the examples in this section are enough to show that sentential adverbs and VP adverbs differ from each other.

[7] Hence, the generalization (8) is revised as follows:
(8') a. An adverb α is *α sentential adverb* ,iff
(i) a sentence which contains the adverb α is paraphrased as *it is α-adjective that* ..., and
(ii) it can occur in sentence initial position and after the subject without changing the meaning of the sentence.
b. A adverb β is *a VP adverb*, iff

In order to capture the fact that adverbs have relatively free distribution but that it is constrained by the types of adverbs themselves as we have seen in (10) and (11), Keyser (1968) proposes a transportability convention.[8] VP adverbs and sentential adverbs, which have the feature [+transportable] can be generated anywhere as long as they are dominated by VP and S (=IP) respectively. Travis (1988) reanalyzes the transportability convention of Keyser (1968) in terms of feature percolation. Adverbs can adjoin to any place in the tree as long as they are in the domain of feature percolation, which is shown schematically below. Thus there are three potential positions represented by arrows (i.e. I, II, and III), where adverbs can adjoin:

(13)



(from Travis (1988) with some modification)

Sentential adverbs are licensed by the feature of INFL, so they can appear in sentence initial position (i.e. arrow I) and after a subject (i.e. arrow II).

What about sentential phrasal adverbs? If they can be analyzed the same way as non-phrasal adverbs, they should have the same distribution. However the following examples show that they are different.

(14) a. In my opinion(,) Bill has ruined his chance of inheritance.
In all probability(,)

b. Bill *in my opinion has ruined his chance of inheritance.
*in all probability.

(15) a. I said that just yesterday the tree resisted my shovel.

b. I said that the tree (*just yesterday) resisted my shovel.

(i) a sentence which contains the adverb β is paraphrased as *the manner in which....is β-adjective.*, and
(ii) it can occur at the end of the sentence and after the subject without changing the meaning of the sentence.

c. α/β-adjective is an adjective form of the adverb α/β.

[8] The Transportability convention is stated as "permit[ing] a particular constituent to occupy any position in a derived tree so long as the sister relationship with all other nodes in the tree are maintained" (Keyser (1968), p. 368).

(16) a. Leslie said that for all intents and purposes Robin was the mayor of the city.

b. Leslie said that Robin (*for all intents and purposes) was the mayor of the city.

In all cases above, the sentences with adverbs following the subjects are not acceptable without a pause. If the sentential adverbs were the same as true adverbs, the sentences above should be acceptable without a pause. Notice that pauses are optional in the cases of initial phrasal adverbs. It depends on where you put the emphasis in a sentence. However, (14b), (15b) and (16b), there must be a relatively long pause.[9]

In this section, I have shown the difference between sentential and VP adverbs. I have also argued that the distribution of phrasal adverbs is different from that of non-phrasal adverbs. Travis (1988) predicts that non-phrasal adverbs may be adjoined to any place in a maximal projection. Since her analysis also predicts that phrasal adverbs can occur any place in a maximal projection, sentences such as (14)-(16), in which phrasal adverbs may not adjoin to certain places in a maximal phrase, are not predictable. It was shown that a pause is necessary to make sentences such as (14)-(16) acceptable. Thus, such phrasal adverbs are not licensed by feature percolation (or the transportability convention of Keyser (1968)).

2.1.1.2 Sentential adverbs and the suspension of *that-t* effect

It appears that only sentential adverbs can suspend the *that-t* effect. (In the next section, I will argue that among sentential adverbs, only phrasal adverbs suspend the effect.) Sentential adverbs are those that may occur in sentence-initial position.[10] Examples (17) to (19) show that adverbs occurring in other positions do not suspend the *that-t* effect.[11] The adverbs in the examples in (17) modify the verb:

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[9] The same kind of the difference between phrasal adverbs and non-phrasal adverbs also can be seen in VP adverbs:

(i) a. Bill dropped the bananas quickly/in a quick manner
b. Bill quickly/*in a quick manner dropped the bananas.

Although with the phrasal adverbs the sentences are somewhat awkward, phrasal adverbs cannot appear in the same place as *quickly* without a pause. We can see the difference between phrasal and non-phrasal adverb in VP adverbs, too.

[10] It is possible that sentential adverbs can occur at the end of a sentence, but there must be a relatively long pause before the sentential adverb as we have seen in (10c).

[11] One might argue that the position of the sentential adverb is not clear, because there are two potential positions for them, namely, sentence-initial position and after a subject as we have seen in 2.1.1. However, the cases of negative sentential adverbs suggest that the position of the adverbs be immediately after the complementizer. Negative polarity item in the adverbs triggers the inversion:

(i) I said that under no circumstance would Leslie run for any public office.
(ii) I said that only on very few occasions had Leslie given a damn about the budget
(from Culicover (1993) with modification)

(17) a. *Who$_i$ did she say that t_i just escaped death?
b. *The army OP$_i$ that we know that t_i completely destroyed the village.

Examples (18) and (19) show that the adverbs *just* and *completely* cannot occur in front of the subject because they are VP adverbs:[12]

(18) a. *Just he escaped death.
b. He just escaped death.

(19) a. *Completely the army destroyed the village.
b. The army completely destroyed the village.

(from Hasegawa (1993))

On the other hand, (20) shows that adverbs like *during the operation* and *in all probability* are sentential since they can occur in sentence initial position:

(20) a. During the operation the doctor had had a heart attack.
b. In all probability John will regret his words.

The above sentence show that the suspension of *that-t* effects is obtained only in the cases of sentential adverbs. Thus the structure of the cases above should be the one where the initial trace is located after the sentential adverb as in (21a) but not in (21b).

(21) a. .... that Sadv *t* ....
b. ... that *t* Sadv ...

I have argued that sentential adverbs and VP adverbs are different in terms of their distribution and only the latter suspend the *that-t* effect. However, among sentential adverbs, only the phrasal adverbs suspend the effect, which is the topic of the next section.

[12] Fritz Newmeyer (p.c.) pointed out that VP adverbs can occur if they are complex:
(i) More completely than ever in the past the army destroyed the village.
(ii) More thoroughly than ever he cleaned the kitchen.
Kristin Denham (p.c.) gave me the second example.

2.1.2 Phrasal adverbs and the suspension of *that-t* effect

The *that-t* effect is suspended only by phrasal adverbs as shown in the following examples. The judgements below are relative and based on the comparison of phrasal with non-phrasal adverbs.

(22) Who do you say that *probably / in all probability will regret his word?

(23) Robin met the man who Leslie said that for all intents and purposes / *effectively was the mayor of the city.

(24) I asked what Leslie said that in the end / ?finally had made Robin give a book to Lee.

In conclusion, we see phrasal adverbs are different from non-phrasal adverbs with respect to the suspension of the *that-t* effect.

2.2 The Position of Sentential Adverbs

As we have seen in the last section, phrasal adverbs and non-phrasal adverbs have different distributions. I propose that phrasal adverbs are base-generated in the specifier of a maximal projection and that they are licensed by a Tense feature.[13] The assumption that some feature licenses adverbs is independently motivated by Rivero (1992), who argues that adverbs that are outside of VP are licensed by Tense/Aspect as an instance of Spec-Head agreement in Modern Greek.[14] I assume that the licensing is done by verb movement at LF. In order to check its Tense feature, a verb moves up to INFL. If there is

[13] I am not sure at this point what adverbs are classified as having which feature. To explore the exact classification of adverbs is beyond the scope of the present analysis, so I leave the question open here. However, the examples below suggest that there is a relation between some adverbs and tense:
(i) My brother is believed to be in Uruguay right now.
*My brother is believed to have been in Uruguay right now.
ii) Fred is believed to have arrived at 2:00 yesterday.
*Fred is believed to arrive at 2:00 yesterday.
(from McCawley (1988) p. 216)

[14] The criterion for defining VP external adverbs is whether they are incorporated into a verb or not. See Rivero (1992) section 2 for a detailed discussion.

a Focus-P (Focus phrase) which dominates IP, then the verb moves up to the head position of the phrase.[15]

In conclusion, I propose the following partial structure for the sentences in (1). ((1a) is repeated below for convenience.)[16]

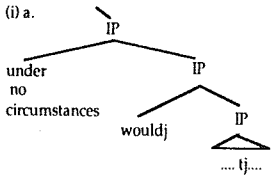
(1) a. Robin met the man {OP$_i$ that/who$_i$} Leslie said that *(for all intents and purposes) t_i was the mayor of the city.

[15] Stefanie Dipper and Roland Meyer (p.c.) told me that Rizzi used the name Focus-P to account for the suspension of the *that-t* effect in his class lecture. Unfortunately, what he taught in the class is not available to me at the moment.

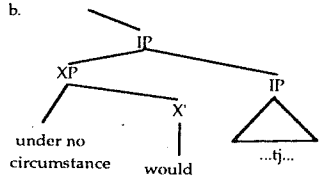
[16] Phrasal adverbs should be analyzed as having their own maximal projections. If they do not, then presumably they are adjoined to IP. Consider the fact that negative adverbs trigger SAI. Example (6) is repeated below. Assuming that the phrasal adverbs are adjoined to IP, we have the structures in (i). In (i a), the inverted auxiliary is also adjoined to IP. In (i b), the inverted auxiliary moves to the head position of the phrasal adverbs:

(6) Leslie is the man who I said that under no circumstances would run for president.

(i) a.

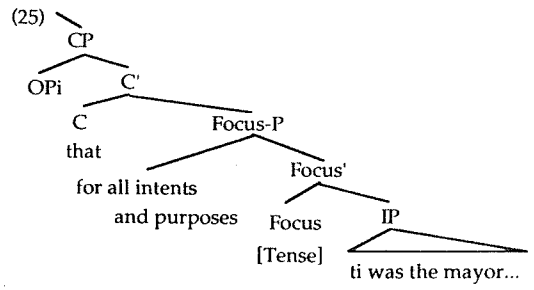


b.



According to the structures above, the inverted auxiliary is either adjoined to IP or moved into the head position of XP. Both possibilities have theoretical problems. First, it is implausible that a head can adjoin to a maximal projection as in (ia). It violates the Structure Preserving Principle. Secondly, it is implausible that a head can move to a head position of a maximal projection which is in the specifier position of another phrase. The movement of the head I (i.e. *would*) to the head X is not allowed, because there is no c-command relation between *would* and its trace t_j. Hence, no bound relation is established. Therefore, example (6) cannot be derived. Thus I will not adopt the structures in (i a, b). The problems can be resolved however, if we assume that phrasal adverbs have their own maximal projections (=Focus-P).

(25)



The Focus-P is projected between CP and IP and the phrasal adverb is generated in the specifier of Focus-P. In the case of negative phrasal adverbs like *under no circumstance*, the negative polarity item triggers SAI and the inverted auxiliary moves into the head Focus.[17]

In this section, I have argued that the sentences in (1) have a structure like (25) with a Focus-P (focus phrase) between CP and IP, and that sentential adverbs are projected as maximal projections and licensed by their heads, which have Tense features, by Spec-Head agreement.

It should be noted that sentential adverbs do not form Topic islands, which suggests that the sentential adverbial construction is distinct from Topicalization.

The following example shows the typical Topic island effects.

(26) *What$_i$ do you think that for Ben's car Mary will pay t_i ?

(27) a. *What$_j$ does John think that Bill$_i$, Mary gave t_j to t_i?

b. *This is the man who$_i$ that book$_j$, Mary gave t_j to t_i?

(from Rochemont (1989))

Given that the sentential adverb construction differs from the Topicalization construction, there are two possible explanations. One is that sentential adverbs are moved to their

[17] The structure in (25) can be extended to the other types of adverbs as discussed in Larson (1985). Bare-NP adverbs are shown as follows:

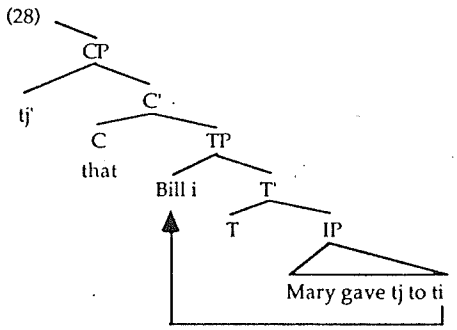
(i) a. I saw John [$_{NP}$ that day]
[$_{NP}$ someplace you'd never guess]
b. John was headed [$_{NP}$ that way].
c. Max pronounced my name [$_{NP}$ every way imaginable].

(from Larson (1985))

Then, the head Focus has the features such as [loc(ation)], [dir(ection)] and [manner] in addition to [tense].

surface position in much the same way as in Topicalization but they occupy structurally different positions.[18] The other possibility is that sentential adverbs are base-generated in their surface positions in contrast with Topicalization. Under this assumption, the suspension of *that-t* can be explained.

Notice that the Topic island effects can be seen in interrogatives as well as in relative clauses. In (26) and (27) above, the topicalized phrase, *Bill* and *that book* occupy the same position as phrasal adverbs. They appear between CP and IP. Based on the analysis of Müller and Sternefeld (1993), I assume that a topicalized phrase moves to the specifier of its own projection Top(ic) Phrase. Therefore, example (27a) has the following structure:



Superficially, topicalized phrases and phrasal adverbs are similar, since they both occur between CP and IP. However, the assumption that phrasal adverbs are base-generated differentiates them, because a movement operation always results in chain formation. On the contrary, phrasal adverbs do not bind a trace. This is crucial for the analysis of the suspension of *that-t* effect in the next section.

3. Reexamination of the *that-t* Effect

Any analysis which treats sentential adverbs and Topicalization equally as instances of movement explains one or the other successfully, but it wrongly predicts that the other is ruled out.[19] A topicalized phrase in an embedded phrase appears superficially in the same position where sentential phrasal adverbs appear, that is, between CP and IP. However, sentential adverbs do not form topic islands. We have assumed instead in section 2 that sentential adverbs are base-generated.

3.1 Base-Generated Sentential Adverbs : A Government Approach[20]

3.1.1 A Functional Head as A Proper Governor

Given a structure like (25), we will consider the status of a proper governor. The *that-t* effect is caused by the movement of the subject wh-phrase over an overt complementizer since the overt complementizer cannot properly govern the trace left behind. On the other hand, an empty complementizer can license the trace by a mechanism such as an instance of indirect agreement (see footnote 1 and Rizzi (1990)). In the present analysis, we have a functional head Focus and it should be able to properly govern the trace regardless of whether it is empty or not (cf. example (5)). The fact that negative adverbs also suspend the *that-t* effect suggests that we cannot think of a proper governor as indirect agreement with the subject trace. It is implausible to have an agreement relation between a sentential adverbial and an auxiliary, because, by transitivity, the sentential adverbs and the subject of the clause which contains the auxiliary are coindexed. Thus, a condition of a proper governor should be stated in terms of something other than indirect agreement. We assume that a functional head must have a certain feature in order to be a proper governor, essentially following Lobeck's (1990) analysis of ellipsis.[21]

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[18] Culicover (1993) proposes an analysis along this line; that is, sentential adverbs move into PolP. PolP stands for a polarity phrase. Following Rizzi (1991), an empty head Pol licenses a subject trace by indirect agreement. Culicover (1991) assumes that the head Pol can be WH and Q for interrogatives and Rel for relative clauses.

[19] Culicover (1991, 1993) assumes that sentential adverbs move to a position between CP and IP, namely PolP by either adjunction or movement (i.e. substitution) to Spec PolP and that Topicalization is an adjunction to IP. Müller and Sternefeld (1993) analyze sentential adverbs and Topicalization in the same manner and fail to explain why the sentential adverbs do not form topic islands.

[20] Throughout the analysis in section 3.1, I assume, following Rizzi (1990), that a trace must be head-governed within an immediate projection of a head.

[21] Lobeck (1990) discusses the licensing condition of ellided elements, as in sentences like the following and proposes the condition (ii):

(i) a. Although John's friends were late to the rally, [NP Mary's [e]] came on time.
b. Mary knew someone was speaking at the rally, but she didn't know [IP who [e]].
c. Because Mary might [VP e], John will attend the rally.
(from Lobeck (1990) p. 348)

(ii) CONSTRAINTS ON ELLIPSIS: A FUNCTIONAL CATEGORY ACCOUNT
•The ellipted constituent is a maximal projection
•The ellipted constituent must be introduced by a functional head
•Only functional heads which assign Kase properly govern their ellipted complements.

Here, "*Kase*" includes not only case assignment in the traditional sense, but also assignments to a specifier by COMP specified [+wh] (p.359)

(29) CONDITION ON FUNCTIONAL HEADS
A functional head must have a certain feature (i.e. Tense) in order to be a proper governor.

The Tense feature qualifies a functional head Focus as a proper governor. Notice that this formulation of a proper governor is different from that in Culicover (1993) and Rizzi (1990), because their process of licensing is accomplished by indexing. So, in (25) the phrasal adverb *for all intents and purposes* must have the same index as the subject in their analyses. But it is unlikely that the phrasal adverb and the subject will have the same index, since the former does not modify only the subject but the whole sentence.

3.1.2. The suspension of the *that-t* Effect

In the last two sections, I have discussed the structure in (25) which has a Focus-P between CP and IP, and the way in which a functional head can be a proper governor. Following Rivero (1992), I have assumed that sentential adverbs in English are also licensed by a Tense feature through Spec-Head agreement. Then, sentence (1a), repeated here, has the structure in (30b).

(30) a. Robin met the man {OP$_i$ that/who$_i$} Leslie said that *(for all intents and purposes) t_i was the mayor of the city.

b. .... the man [Leslie said [$_{CP}$ t_i' that [$_{Focus\text{-}P}$ for all the intents and purposes [e][$_{IP}$ t_i was the mayor of the city]]]

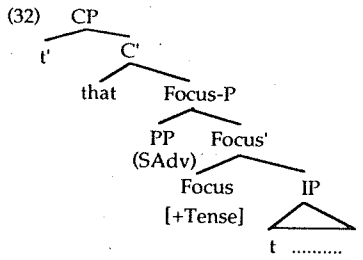
The sentential adverbial is in Spec Focus-P and the head Focus has the Tense feature. The traces are left by the movement of the subject wh-phrase/null operator. The empty head has a Tense feature, so it can govern the initial trace properly.

(30') b. .... the man [Leslie said [$_{CP}$ t_i' that [$_{Focus\text{-}P}$ for all the intents and purposes [e$_{[+Tense]}$][$_{IP}$ t_i was the mayor of the city]]]

In (30'b), there are several maximal projections between the original trace and the intermediate trace t_i'. We have to clarify the barrierhood of the Focus-P and IP. If they are barriers, then it should be stated how movement can circumvent the barriers and how a trace created by adjunction is licensed. We assume the notion of barrier to be like that in Chomsky & Lasnik (1991):

(31) BARRIER
An XP which is not a complement to a proper governor.

It follows that the embedded IP is not a barrier under the definition of barrier above, so the subject wh-phrase does not have to adjoin to it.

(32)


The initial trace is properly governed by the head Focus with the feature Tense. One might argue that Focus-P is also a barrier and that the subject wh-phrase must adjoin to it, since the complementizer *that* is not a proper governor. Under Rizzi's (1990) analysis, the ECP is satisfied, as the original trace is governed by the Focus head with the Tense feature within the immediate projection of the head. Assigned a referential q-role, hence having a referential index, the relevant Identification Condition for the trace is the Binding Condition, not Antecedent-Government.[22] [23]

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[22] Binding Condition, Antecedent-Government and Relativized Minimality are defined as below:

(i) Binding Condition
X binds Y iff
a. X c-commands Y
b. X and Y have the same referential index. (Rizzi (1990), p. 87)

(ii) X antecedent-antecedent governs Y iff
a. ① X is in a A'-position
② X c-commands Y
b. X and Y are coindexed
c. ① no barrier intervenes
② Relativized Minimality is respected.

(iii) Relativized Minimality for antecedent government
X -governs Y only if there is no Z such that
a. Z is a typical potential antecedent -governor for Y,
b. Z c-commands Y and does not c-command X.
where Z is a typical potential antecedent governor for Y, Y in an A'-chain = Z is an A' specifier c-commanding Y.

See also footnote 1 for the case of the extraction of an object and an adjunct.

[23] Heles Contreras (p.c.) reminded me of this account.

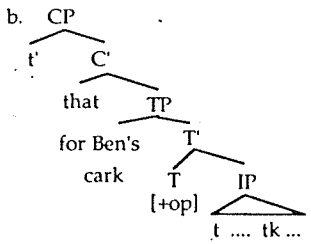
3.1.3 Topicalization and a Condition on Functional Heads

Let us now consider the case of Topicalization. The difference between Topicalization and sentential adverbs is that the former do form chains as a result of movement, but the latter, being base-generated in IP-initial position, do not form chains. I propose a condition on operator-variables chains that prohibits a [+op] head from being a proper governor. The condition will make it possible to explain the reason why a subject extraction is prohibited for Topicalization constructions, while permitted for sentential adverb constructions.

Example (26) is repeated below with partial brackets. We get basically the same structure as (25) assuming Topicalization to be a movement operation.[24] [25]

(33) a. *What$_i$ do you think [CP t_i'' that [TP for Ben's car [T][IP Mary will pay t_i]]]?

b.



The head T has the feature [+op(erator)][26] which triggers Topicalization (Chomsky (1992), Zwart (1993)). Given the structure above, the head T with the feature [+op] fails to govern the IP adjoined trace properly. A close look at the structure reveals that there is a difference between the cases of sentential adverbs and those of Topicalization. A topicalized phrase XP is moved from IP and forms a chain[27] and also has a Spec-Head agreement relation with the head T. The relation is represented below:

(34) i) [+op]<---------->XP<---------->t_j
Spec-Head government
ii) [+op]<---------->t_i
(proper) government

The topicalized phrase must govern the trace of the topicalized phrase in order to satisfy the ECP. Hence they are in a government relation and also in a Spec-Head agreement relation with the head [+op]. If the [+op] head T could be a proper governor, it would have a (head) government relation with the subject trace as in (34 ii). I claim that this multiply-linked relation prevents the [+op] head from being a proper governor. The [+op] head is related to the chain formed by Topicalization and plays a role in the interpretation of operator-variable relations. Notice that in the case of sentential adverbs, the head which licenses adverbs is not in such a relation. Neither the Spec-Head agreement relation between a sentential adverbial and a functional head Focus with the Tense feature nor the proper government relation between the functional head Focus and the subject trace is a part of a chain, since none of them are related to a movement operation. Therefore, the [+op] head T cannot be a proper governor. On the basis of this discussion, I revise the condition of a proper governor defined in 3.1.1 and propose a condition on operator-variable chains.

(35) CONDITION ON FUNCTIONAL HEADS (Revised)
A functional head can be a proper governor when
i) it has a certain feature (i.e. Tense)
ii) it does not violate the condition on operator-variable chains

(36) CONDITION ON OPERATOR-VARIABLE CHAINS
An operator-variable chain cannot be related to another operator-variable chain.

The relation between operator-variable chains is defined as follows.

(37) Two operator-variable chains α and β are *related* iff there is a government relation between a member of α and a member of β.

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[24] Following Müller and Sternefeld (1993)(henceforth M&S), I assume that a topicalized phrase moves to its own projection Top(ic) Phrase. However the present analysis differs from that of M&S (1993). They suppose that sentential adverbs move into Spec TP as an instance of Topicalization, and their analysis cannot explain the fact that sentential adverbs do not form Topic islands.

[25] There are various proposals for the place of topicalized phrases. Chomsky (1977) assumes movement to TOP (= Spec CP), and Baltin (1982) and Lasnik and Saito (1992) suppose adjunction to S(=IP). See those sources for further discussion.

[26] I use the feature [+op] in the same sense as [+wh] and follow Rizzi's (1991) Wh-criterion defined as follows:

The WH-Criterion
a. A Wh-Operator must be in a Spec-head configuration with an X^0[+wh].
b. An X^0[+wh] must be in a Spec-head configuration with a Wh-Operator.

[27] According to conditions on barrierhood, the IP is a barrier for Topicalization, and it should be adjoined to IP. However, the problem is irrelevant and does not cause any problem for the present analysis.

The result of (36) and (37) is that a proper governor cannot be a member of another chain either directly or indirectly. If a functional head is a member of an operator-variable chain, it cannot be a proper governor of an empty category (i.e. a subject trace). Being a proper governor makes the functional head relate two operator-variable chains and violates condition (36).[28] [29]

In section 3, I have argued that there needs to be an additional condition in order for a functional head to be a proper governor, namely (36) the condition on operator-variable chains. As for Topicalization, a topicalized phrase XP forms a chain with its trace in VP. Hence it cannot be a proper governor for the trace and is excluded by the condition. On the other hand, sentential adverbs do not involve any movement operation. A functional head with Tense feature can be a proper governor. Then the IP is not a barrier for extraction from its subject position.[30]

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[28] The following sentence might be a problem for the present analysis. The sentence below is ungrammatical without a stress on *did*:

(i) *Who$_i$ did$_j$ [IP t_i t_j leave]]

I could revise the condition on operator-variables chain to accommodate the data, saying that an operator variable chain cannot be related to any other chain. Then, the auxiliary *did* itself is a member of a chain formed by I-to-C movement. However, the revised condition is too strong and wrongly predicts that the sentence below is out:

(ii) What$_i$ did you buy t_i yesterday?

What is related to *did* by Spec-Head agreement. There is another case that the revised condition gives a wrong prediction for (iii):

(iii) Who would leave?

The Condition on Functional Heads wrongly predicts that the sentence is ruled out. I have no explanation for these cases at the moment. In fact, there are many complicated matters in the cases of subject Wh-phrases. The sentence (i) is perfectly acceptable in an emphatic expression, which suggests that it could be a proper governor. But the following sentence is out:

(iv) *Who DID will leave? (in the sense equal to (i))

[29] Rizzi (1991) explains sentence (i) in footnote 28, assuming that the Wh-Criterion (see footnote. 25) is a requirement on a chain. This means that the Wh-criterion is satisfied when a member of a chain has a feature [+wh]. And he also assumes that in a matrix sentence I^0 carries [+wh]. Hence there is no I-to-C movement in (30):

(i) Who C^0 [t I^0 left]

[Who, C^0, t, I^0] are assigned the same indices by transitivity, since the trace and I^0 and *who* and C^0 are in a Spec-Head configuration respectively.

[30] Now we need to discuss the case of Negative sentential adverbs, which is shown in example (5) and repeated below as (i). The partial structure is given in (ib):

(i) a. Leslie is the man who I said that under no circumstances would run for president.

b. ... who$_i$ [I said [CP that [Focus-P under no circumstances][would$_j$] [t_i t_j run for president]]]]

Following Haegeman and Zanuttini's (1991) NEG Criterion, I assume that the feature [+NEG] triggers SAI. Although the head X is in a Spec-Head relation with SAdv, and is base-generated, SAdv does not form a chain. Having a tense feature (and maybe NEG feature as well) the auxiliary *would* can then be a proper governor for the subject trace.

The NEG Criterion is defined as follows:

(ii) a. Each NEG X^0 must be in a Spec-Head relation with a negative operator.

b. Each negative operator must be in a Spec-Head relation with a NEG X^0.

4. Conclusion

In this paper I have argued that the suspension of the *that-t* effect can be explained by positing a condition on functional heads and a condition on operator-variable chains.[31]

Sentential adverbs are base-generated in the specifier of their maximal projections, and are licensed by a functional head by Spec-Head agreement. The trace which is left by the movement of a subject wh-phrase is, then, licensed by the head which has the feature Tense. On the other hand, the fact that Topicalization forms an island is explained by the condition on functional heads. This analysis can account for why there is no SAI with Topicalization in English and why there is SAI with negative sentential adverbs. In general, it appears that in English, the movement into [+op] head is not allowed in a Topicalization construction or in interrogatives except with auxiliaries like *do*, *would*, *have*, etc. Main verbs do not move to C in general. As Rizzi (1991) suggested, we need to refine the feature system of [+/- op(wh)]. One feature is not enough to explain the inversion facts. Thus, it could be the case that interrogatives have the feature [+op, +Q] and Topicalization (and probably other constructions which have been assumed to involve wh-movement) have the features [+op, -Q], assuming that [+Q] triggers inversion. The proposal must be supported by cross-linguistic investigations, which I leave for future research.

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[31] I will argue in my Master's thesis that the condition of functional heads in (35) can be eliminated under the assumption of the Economy Condition of Chomsky and Lasnik (1991).

References

Baltin, Mark (1982)
A Landing Site Theory of Movement Rules, *Linguistic Inquiry* 13.1, 1-38. MIT Press

Bresnan, Joan (1977)
Variables in the Theory of Transformations, in W. Culicover, T. Wasow, and A. Akmajian eds., *Formal Syntax*. Academic Press Inc.

Chomsky, Noam (1977)
On Wh-Movement, in W. Culicover, T. Wasow, and A. Akmajian eds., *Formal Syntax*. Academic Press Inc.

Chomsky, Noam & Howard Lasnik (1991)
Principle and Parameters Theory, in J. Jacob et. al., eds., *Syntax: An International Handbook of Contemporary Research*. Walter de Gruyter.

Culicover, Peter W. (1991)
Topicalization, inversion, and complementizer in English, in Denis Delfitto, Martin Everaert, Arnold Evers, and Frits Stuurman eds.,*Going Romance and beyond*, 1-43. University of Utrecht.

Culicover, Peter W. (1993)
Evidence against ECP accounts of *That-t* effect, *Linguistic Inquiry* 24.3 557-561

Haegeman, Liliana & Raffaella Zanuttini (1991)
Negative Heads and the NEG Criterion, *The Linguistic Review 8*, 233-251, Walter de Gruyter, Berlin.

Hasegawa, Kinsuke (1993)
That-t effect and Parasitic Gaps, *The Rising Generation*, Vol. CXXXIX. No.8-10.

Jackendoff, Ray (1972)
Semantic Interpretation in Generative Grammar, MIT Press.

Keyser, Samuel J. (1968)
Review of Sven Jacobson, *Adverbial positions in English*, *Language 44*, 357-374

Larson, Richard K. (1985)
Bare-NP adverbs, *Linguistic Inquiry* 16.4, 595-621

Lasnik, Howard and Mamoru Saito (1992)
Move-a, MIT Press.

Lobeck, Anne (1990)
Functional heads as proper governors, *NELS 20*.

McCawley, James D. (1988)
The Syntactic Phenomena of English Vol. 1, The University of Chicago Press, Chicago.

Müller, Geron and Wolfgang Sternefeld (1993)
Improper movement and unambiguous binding, *Linguistic Inquiry* 24.3, 461-507

Rivero, Maria-Luisa (1992)
Adverb incorporation and the syntax of adverbs in Modern Greek, *Linguistics and Philosophy* 15, Kluwer Academic Publishers.

Rizzi, Luigi (1990)
Relativized Minimality. Cambridge, Mass. MIT press.

Rizzi, Luigi (1991)
Residual Verb.Second and the Wh-Criterion,

Rochemont, Michael (1989)
Topic Islands and the Subjacency Parameter, *Canadian Journal of Linguistics* 34, 145-170

Travis, Lisa (1988)
The Syntax of Adverbs, *McGill Working Papers in Linguistics : Proceedings of the IV Workshop on Comparative German Syntax*. McGill University.

Zwart, C. Jan-Wouter (1993)
Verb Movement and Complementizer Agreement, *MIT Working Papers in Linguistics 18 Papers on Case and Agreement*, 297-340, MITWPL.

The Relevance of VSO Languages in Acquisition Studies: Some Empirical Predictions.

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0. Introduction.

In this paper I isolate the predictions of two contrasting hypotheses about language development with respect to children early production. The first hypothesis claims that there is discontinuity in the development of the principles of Universal Grammar. The opposite position claims that the development of these principles is continuous. These two hypotheses differ in their description of the categorial inventory of early child grammar. The discontinuous hypothesis assumes that early child grammar lacks functional categories (FCs). The continuity hypothesis, on the other hand, claims that the child's grammar presents a complete inventory of FCs.

Even though these hypotheses differ with respect to the categorial inventory of the grammar in the early stages of development, both share the same description of the target grammar, namely that of the Principles and Parameters framework described in detail in Chomsky and Lasnik (1991). In many cases proponents of both hypotheses also share the same set of language acquisition data.

In this paper I will show that, at their best, both theories under consideration are compatible with the data they provide. Various methodological and theoretical factors make the interpretation of the data ambiguous. These factors are of two types. The first is related to the fact that the data used as empirical support is primarily spontaneous production data, collected in naturalistic settings. This reliance on production data needs to be discussed (De Villiers 1992). The second factor is related to the idea that children's grammars are often misrepresented when scholars assume a direct relation between performance and competence, as pointed out in (Shipley, Smith and Gleitman 1969; McKee 1992).

From theoretical grounds I will define what could be considered relevant data when questioning the continuity of the principles of Universal Grammar. The proposal is based on a surface word order found in natural languages that can be generated only by movement of the basic VP-internal constituents, namely the VSO order. Since according to the syntactic framework shared by both hypotheses, movement of those constituents requires the presence of Functional Categories, languages which present this surface order offer ideal empirical testing grounds for the validation of any hypotheses concerning the acquisition or development of syntactic categories.

The paper is organized as follows: In the first section I will describe the theoretical framework in which the debate is situated. Section 2 is dedicated to the analysis of the different empirical predictions between grammars that posit a complete inventory of functional categories and grammars without functional projections. In section 3 I will describe and discuss the methodological issues that render the empirical data ambiguous. Sections 4 and 5 constitute the core of the paper. In section 4 I will propose that the relevant evidence for the discussion of the continuity vs. discontinuity debate must be found in the analysis of elicited production and comprehension data of learners of VSO languages. In section 5 I

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will propose a set of empirical predictions for Irish that will serve to test and compare both hypotheses.

1. Continuity vs. Maturation

This section describes the theoretical framework in which the debate between proponents of both the continuity and the discontinuity hypotheses is situated. In this section I will also review some conceptual problems that btoh hypotheses face in order to explain the developmental change from the early grammar to the fully developed grammar of the target language

It is generally assumed that children start to form productive syntactic structures during the "early multi-word" or "telegraphic" stage of development, which lasts typically from around 20 to 24 months of age (Bloom 1993: 7). Typical utterances of this stage are exemplified in (1).

(1) a. Jem want Mummy take it out (Jem, 2;0, Radford 1990b, p.121)
"Jem wants Mummy to take it out"
b. Doing what here? (Claire, 1;11, op.cit., p. 124)
"What are they doing here?"
c. lady cup coffee (Claire, 2;0, op.cit., p. 91)
"the lady's cup of coffee"

This "telegraphic speech" is characterized by short utterances in which both bound and free morphemes are absent. In the examples above, the 3ps agreement morpheme and the infinitival *to* are missing in (1a); the pronominal subject, the landing site of the Wh-word and the Aux. are missing in (1b); and the determiner, the genitive marker and the preposition *of* are missing in (1c). The lack of inflectional morphemes, determiners and complementizers in the child's utterances at the "telegraphic speech" stage raises the question of whether there are differences between the categorial inventories of early child grammar and adult grammar.

Proponents of a <u>discontinuous</u> development in syntactic acquisition claim that there are radical differences. The underlying representation of children's early word combinations are not governed by the same rules that govern adult grammar. The categorial inventory of early child grammar is an impoverished version of that of the adult, as proposed in Guilfoyle & Noonan (1992), Lebeaux (1989), Oulhalla (1990), Platzack (1990) and Radford (1988; 1990), among others. More precisely, these authors maintain that the child's grammar lacks the functional categories COMP, INFL and DET, the projections of these categories and the syntactic operations defined in terms of these projections. The child's grammar is thus represented by purely thematic structures, i.e, structures in which all constituents belong to lexical categories and are thematically inter-related. Children utterances are then to be described according to categorial structures which comprise only projections of the four primary lexical categories N, V, A and P (Radford 1990b: 46-49). These lexical categories must conform in their projections to the principles of X-bar Syntax (op.cit: 51).

Proponents of a <u>continuous</u> development, on the other hand, claim that children's early word combinations are the result of the same rules and principles that order all syntactic categories in the adult grammar. Children have knowledge of all grammatical categories, lexical and functional, from the beginning of syntactic development, as part of an innate language faculty. This position has been presented in Boser et al. (1992), Hyams (1992), McKee (1992), Pinker (1984), Valian (1992), Whitman et al. (1991) and Whitman (1992), among others. As opposed to the grammatical descriptions based on the discontinuous hypothesis, these authors claim that early

grammars include a complete inventory of functional categories. Child grammars are thus consistent with the principles of Universal Grammar. Within the continuity hypothesis it is expected that each stage of the development will contain structures and operations that might differ from the child's target grammatical system but that crucially do not violate the UG principles.

Both hypotheses present some conceptual problems in order to explain the developmental change from the early grammar to the fully developed grammar of the target language. To explain the eventual appearance of FCs in the acquisition process, proponents of the discontinuous hypothesis assume that FCs are the result of "maturation" (Felix, 1987:5; Radford 1990b: 7). Children are not "mature enough" to posit functional projections. The universal principles that characterize UG are taken to be inoperative in the earliest child grammars; they become operative "suddenly" and "simultaneously" only when the child reaches a certain point of development. This concurrent implementation of COMP, INFL and DET is proposed to occur at a precise moment, between ages 2;0 and 2;2 (Radford 1990a: 219).

This maturation process requires that we divorce the study of first language acquisition from the study of linguistic structure to a certain degree, since development is discontinuous from a child grammar which is not consistent with the principles of UG to an adult grammar that is, as noticed in Meisel (1992:3). Since there is no explanation within the theory of UG for such a change, a maturational account of the acquisition of functional categories must place the burden of explanation on biology.

Proponents of the continuity hypothesis claim that in the absence of biological evidence for specific grammatical maturation, the discontinuous hypothesis does not have explanatory validity. As stated in Pinker (1984:7):

> "In the absence of compelling evidence to the contrary, the child's grammatical rules should be drawn from the same basic rule types, and be composed of primitive symbols from the same class as the grammatical rules attributed to adults in standard linguistic investigations… The null hypothesis is developmental psychology is that the cognitive mechanisms of children and adults are identical."

The continuity hypothesis faces a problem of a different kind when explaining the developmental change from child grammar to adult grammar. If the onset of language development is characterized by the presence of the full repertoire of syntactic categories, it becomes necessary to explain why part of this available knowledge is not apparently used initially. This question receives a grammatical internal solution: Language acquisition crucially depends on the parametrized principles of Universal Grammar. The task of the learner is to set the value of the parameters for the language he or she is acquiring. Children's utterances are thus expected to accord to the different variations allowed by different parametrized versions of UG. Considerations internal to current syntactic theory seem to favor the continuity approach, since it is a common assumption that all parametrization in grammar must be located in their functional category systems (Borer, 1984; Chomsky 1991; Chomky & Lasnik 1991). The question raises as to how syntax could develop at all in the absence of functional categories.

Within the maturational view of language development, the parameter setting process that is driven by functional elements would not be able to proceed until some later stage in the

acquisition process. The scholars who argue that not all the FCs are present in early grammars have to address also several questions concerning the eventual realization of these elements: they have to find out whether the acquisition happens simultaneously or in a gradual fashion; if these categories appear in the same order in which they are layered in the adult grammars, as defined by UG and, crucially, the scholars that defend this position must account for the triggering problem, since even a weak version of the continuity hypothesis has to resort to a certain type of combination between continuous development and maturation.[1]

It is necessary to point out that in this section I am describing the most extreme versions of both competing hypotheses, an "all or nothing" alternative, only for explanatory purposes. Between those who defend the total absence of FCs and those who argue for an initially complete inventory of grammatical constituents are many options. The Weak Continuity Hypothesis, defended among others in Clahsen (1990), Deprez and Pierce (1993) and Vainikka (1993), maintains that sentences in the early grammar lack CPs, but the status of lower functional projections is either left open or it is assumed that children have an IP projection from the beginning of acquisition.[2]

To sum up, in this section I have reviewed the basic claims of two opposite hypothesis of languages development in their most extreme versions in order to set the theoretical framework in which the debate is situated. In the following section I will return to a more detailed description of the basic claims of both theories with respect to the description of the child's grammar.

[1] For a comprehensive descripcion of these issues, vid. Meisel (1992). For other arguments, not only syntactic, in favor of the continuity position, vid., McKee (1992).

[2] For a general commentary of these intermediate options, vid. De Villiers 1992.

2. Theoretical and empirical paradoxes in the debate.

Interestingly, proponents of each hypotheses assume the same description of the target language. This description is that of the Principles and Parameters Theory (Chomsky and Lasnik 1991), plus the following assumptions that are going to be relevant for the proposal developed in this paper:

i) Subjects are generated VP-internally (first proposed in Zagona, 1982; for the most specifically articulated proposal, vid. Koopman & Sportiche, 1991)
ii) There are several different inflectional heads, each of which projects its own inflectional phrase: AGRsP, TP, NegP, AGRoP. (Pollock, 1989)

Both hypotheses assume the same description of the target language, and proponents of both hypotheses share the assumptions that substantive elements are present in all grammars and that X-bar principles are part of the grammatical knowledge available to the child prior to specific learning processes. But they assume completely different descriptions of the early grammar. The predictions with respect to the possible syntactic structures generated by each grammar should be clear cut: A theory that assumes that functional categories are absent from the early grammar has to assume that, since CP, IP and the non-lexical categories that they dominate are missing, a wide range of phenomena should be absent as well. For example, without CP grammatical theory cannot account for V2 phenomena, subject-auxiliary inversion in questions, clitic inversion, and fronted wh-phrases. If the child's grammar lacks a Complementizer head, neither complementizers nor subordinates

or relative clauses should be present in his or her syntactic competence. Similarly, the absence of INFL and its projections should entail the absence of tense and agreement inflections, the non-acquisition of the morphosyntax of auxiliaries or the distinction between finite and nonfinite verbal forms. It would also entail the absence of A-movement, since this is Case motivated, and consequently the lack of passives and raising constructions. Without an INFL projection the Case Filter would apply vacuously, and empty subjects and expletive pronouns would not be licensed. Furthermore, if we take DP to be a functional projection, children's utterances should lack determiners, morphologically marked case and personal pronouns.[3]

It would seem reasonable to expect that such a wide and clear set of predictions could be empirically tested in an unambiguous way. But this does not seem to be the case, as can be shown by comparing the different descriptions that some relevant examples receive under both competing hypotheses. To make this point clear, let us return to the utterances that illustrated the stage of telegraphic speech in the first section of this paper.

(1) a. Jem want Mummy take it out(Jem, 2;0, Radford 1990b, 121)
"Jem wants Mummy to take it out"
b. Doing what here? (Claire, 1;11, op.cit., p. 124)
"What are they doing here?"
c. lady cup coffee (Claire, 2;0, op.cit., p. 91)
"the lady's cup of coffee"

[3] It is not the purpose of this squib to analyze in detail all the different predictions of a theory that assumes that FCs are missing.. Instead, my main concern here is the predictions with respect to word order. Nevertheless, it is necessary to point out that all the syntactic phenomena briefly described above have been used to argue that FCs are absent in early productions, in one way or another (eg. Radford (1990), Tsimpli (1991) and Oulhalla (1992)).

As noted by Withman et al. (1990: 51), the view that early child grammar is characterized by the lack of functional categories must analyze the utterances in (1) as projections of lexical categories. For examples like the one in (1a), when the projection is clausal, it has been claimed that the utterance can be described as structurally identical to a Small Clause (Guilfoyle and Noonan; Radford 1990a). Radford (1990b:113) claims that Small Clauses (SCs) lack both COMP and INFL, but that they are nevertheless clauses in the sense that they are subject-predicate structures of the following form:

(2) [XP [NP subject][X'[X head] complement/s]]

In such a structure the NP is the subject and the head of the overall structure would be a nonfinite predicative lexical category. Sentences in early English are assigned the same structures as adult SCs, and the description of (1a) is thus exemplified in (3).

(3) Jem want [VP [NPMummy][V' [Vtake] it out]

As shown in (3), a VP Small Clause corresponds then to an IP in the adult grammar; the relevant functional projection INFL is missing in the child's utterance. Proponents of the Strong Continuity Hypothesis, on the other hand, analyze this utterance by positing grammatical representations fundamentally identical to the representations proposed for the correspondent adult sentences. The structure of (1a) is thus taken to be that of (4a), structurally identical to the adyult representation offered in (4b).

(4) a.Jem want [IP Mummy [I e [VP take it out]]]
(Boser et al.1992:51)
b.Jem wants [IP Mummy [I **to** [VP take it out]]]

In order to justify (4a) and the differences with respect to the adult utterance (4b), Boser et al. (1992:52) argue that there are empty functional heads (INFL in this case) and that empty categories in early child language are licensed by principles of UG.

In a parallel fashion, Wh-sentences like (1b) receive different descriptions. Radford assumes that the structure of a Wh-sentence in early grammar is a VP Small Clause with a Wh-element in situ, as exemplified in (5a). Boser et al. claim that the relevant description is identical to the adult structure, as shown in (5b), with the relevant functional projections present but empty.

(4) a. [VP [V Doing] what there]?
(Radford 1990b:124)
b. [CP [C e] [IP [NP e] [I e] [VP doing what there]]]?
(Boser et al. 1992:52)

And, finally, (1c) can be analyzed as an NP (6a) or as a DP (6b).

(6) a. [NP lady [N' [N cup]coffee]]
(Radford 1990b:91)
b. [DP e lady [D e] [NP e [N' [N cup] [PP [P e] coffee]]]]
(Boser et al. 1992:52)

As shown in the previous examples, the proponents of the maturation hypothesis assume that all the heads that correspond to the functional heads in the adult grammar are initially missing. As a consequence, the syntactic operations that according to grammatical theory involve either a functional head or a landing site under its projection are also absent. The WH-question in (5a) thus lacks the movement of the Wh-element that characterizes the adult Wh-structure and also lacks subject-auxiliary inversion.

Proponents of the continuity hypothesis, on the other hand, argue that the representations of the child are consistent with those of the adult grammar, even when the utterance lacks some elements. The Wh-question in (5a) is thus described as a full CP, in which the relevant surface inflectional heads C^0 and I^0 are omitted. The omission of surface elements is assumed to be consistent with the principles of UG. Assuming that functional heads can be present but omitted allows the underlying representation of the child's utterances to be identical to that of the adult.

However, we also find that children at this stage of development produce a range of different Wh-questions in what appears to be a productive fashion. The relevant questions are formed by an initial Wh-element (*what, who, where*), followed by an optional copula *be* cliticized to the Wh-element, followed by a nominal or pronominal NP. Examples of this questions are given in (7) and (8) below (from Radford 1990b: 125).

(7) a. What's that? (Dewi 18)
b. What's this? (Stefan 19)
c. Where's the helicopter? (Stefan 17)

(8) a. What that? (Dewi 19)
b. Where helicopter? (Stefan 17)
c. Where mummy? (Daniel 19,23,24)

The examples in (7-8) above raise again the question of whether the presence of WH-interrogative indicates a productive CP projection. In (7), the ocurrence of an initial Wh-element and an auxiliary verb seem to indicate the presence of two funcional projections, CP and IP. But it has been argued in Radford (1990b) and Vainikka (1993) that these questions are formulaic and do not provide evidence for or against the presence of functional categories. As pointed in Radford (1990b: 125-6), the child might first analyze the contracted copula *'s* as part of the Wh-word. *What's* in (7a) and *what* in (8a) are thus analyzed as alternate forms of the Wh-word in the child's grammar at this stage. For these two authors it is not obvious either that the structures in (7-8) involve a full CP projection with Wh-movement. Rather they can be analyzed as involving adjunction to either VP or NP.

It is obvious from the analysis of the examples in (3-8) that the same sample of children's data can receive two different descriptions. The difference between these descriptions is reduced to decide whether a functional head is absent from the early grammar or rather present but omitted. This is not an easy task. The grammar assumed by proponents of the continuity of UG principles, and the grammar proposed by supporters of the maturation hypothesis should make clear and different predictions, empirically testable. But in terms of these empirical predictions, none of the criteria is unambiguous. One of the main reasons is that it has been legitimate in the literature to argue that functional categories are present just on the basis of a few occasional utterances; and, parallelly, that it has been as legitimate to conclude that a grammatical category is missing if it is not lexically realized in a small number of contexts.[4] Also, it is extremely difficult to decide whether or not early examples of specific forms indicate productive use of grammatical knowledge rather than being formulaic expressions. But these are not the only factors that make the data ambiguous. In the next subsection I will describe other issues that have to do with this problem.

3. The ambiguity of the empirical data.

In this section I will explore some of the methodological factors that make ambiguous the empirical data used to support the two hypotheses under consideration. These factors conform to two different types. The first is related to the fact that

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4 The list of identical utterances that receive different descriptions according to the two theories under consideration goes on and on. I will offer just a few more: Meisel and Muller (1992) argue that evidence for V2 phenomena in German cannot be taken as evidence of the existence of a CP projection. For the opposite position, Deprez and Pierce (1993). Keeping with the predictions based on the absence or presence of CP, Radford (1990: 198) shows that we can only find wh-in-situ questions in the child's grammar; Deprez & Pierce (1993:58-59) provide evidence for the existence of preposed wh-questions.

With respect to the existence or nonexistence of the IP node, Eubank (1992) argues that agreement markers in children's grammars are not affixes generated in INFL, but base-generated in VP. The functional category Infl is not then needed to explain the data. Similarly, Oulhala (1992:15) argues that inflectional morphemes, even though present in early stages, are produced "randomly."

If INFL is not present, null subjects (*pro*) shouldn't be licensed. But null subjects are frequent in children's speech, as it is widely attested in the literature. Taking the opposite direction, Tsimply (1991:143) assumes that null-subjects are PRO rather than *pro*, that is to say, that they need not be licensed by INFL, but can be generated VP-internally.

the data used as empirical support is primarily spontaneous production data, collected in naturalistic settings. The second factor is related to the idea that children's grammars are often misrepresented when scholars assume a direct relation between performance and competence.

There are several reasons to question the validity of the empirical evidence available for early stages of language development. One of them is that the empirical basis for this kind of research is scarce. We have to take into consideration the fact that the crucial range of this type of studies covers ages 1;10 to 3;0. At these age, children do not use many utterances, and the utterances they use are yet limited to either one or two word combinations or multi-word utterances where several elements may have been omitted, as seen in the examples in section 2 (pp.10-12). As discussed in that section, these data are difficult to interpret. It is an unclear assumption to argue that the child lacks a particular grammatical category in his or her grammar from the absence of a particular lexical item in a specific utterance.

Furthermore, most of the support for both hypotheses comes from production data, naturalistically collected. Arguments based on spontaneous production data present many problems. Perhaps the most crucial one is that an extreme reliance on spontaneous production data tends to equate performance poverty with grammatical poverty. The question that has to be answered is whether the children know more than what they use. It is important to remember that the absence of an particular lexical item in a corpus of spontaneous production does not necessarily reflect the absence of the corresponding category in the child's grammatical competence. As McKee (1992:2) points out, "children's grammar are often misrepresented when judged primarily on the basis of spontaneous production data, and by scholars who assume a shallow, or direct, relation between competence and performance." It is then necessary to study how aspects of competence and performance may interact. In particular, studies of both comprehension and elicited production are needed. Such studies are particularly relevant for the proponents of the continuity assumption, who argue that a lack of a certain morpheme in an utterance does not mean that a functional projection is missing. If a child can demonstrate certain sensitivity to functional elements in comprehension, positing an empty functional element in the description of the child's grammar can be substantiated. Comprehension studies have shown that the children know about the functional categories that they are missing in their early speech productions (Gerken et al. 1990). The specific properties that characterize child language are thus explained as a result of performance constraints rather than as the result of grammatical poverty (Valian 1992; McKee 1992).

A third factor that questions the validity of the empirical data is the strong focus on English that characterizes most of the studies within the maturation framework.[5] The role of functional categories in English is not clearly represented in its morphology or its syntax. The fact that English shows an impoverished agreement, and in general, few inflectional effects, has lead to the conclusion that the early productions of the child learning English present an structural lack. But it has been claimed in recent work that a wide range of empirical data from languages other than English cannot be accounted for under the assumption that early grammars lack functional heads. The types of languages most favored in these studies are those languages where the role of functional categories is overtly represented in their

[5] Perhaps the only notable exception is Platzack's (1990) work on Swedish. For a commentary of the empirical evidence from a variety of languages other than English in favor of the continuity hypothesis, vid. Hyams (1992).

morphology or their syntax, languages with rich inflection and/or strong word order phenomena. The analyses of the acquisition of German, a V-2 language, in Boser et al.(1992) and Whitman (1992), and the analysis of the acquisition of Italian, a language with a rich inflection, in McKee and Emiliani (1992) are both excellent examples in this respect.

For all the above considerations it seem obvious that cross linguistic studies of comprehension are needed to balance the production data. In the next section I argue that the relevant corpus of examples should come from production and comprehension studies of early utterances of children acquiring VSO languages.

4. Proposal: The relevance of VSO languages.

As we have seen from the previous section, the data generally used as supporting evidence is not transparent enough in order to favor one position over the other. The question that raises is: What can be considered transparent data? I will propose that the relevant data should come from an analysis of early speech production in languages with VSO surface order and rich inflectional morphology.

The idea that the relevant data should come from an analysis of word order in the child's speech is based on simple theoretical assumptions. If, according to current syntactic assumptions, word order is fixed by functional categories, grammars which lack these categories are expected to exhibit a relative freedom of word ordering. Variations in the relative position of subject, verb and object are to be expected because of the absence of directionality restrictions on the representations of lexical-thematical constituents (Radford 1990), rather than the application of movement processes. Recall that proponents of both the continuity and the maturation hypotheses assume that subjects are generated VP-internally in their description of the early grammar (section 2: p.9). Since S, V, and O are generated inside the maximal verbal projection, VP, the ordering of its constituents will only be constrained by the limitations imposed by X-bar Theory. The only possible word orders will be then those allowed by X-bar Theory: SVO, VOS, SOV and OVS. On the other hand, word orders in which the subject intervenes between the verb and the object are not to be expected because they constitute a violation of the constraint on crossing branches (*VSO; *OSV).[6]

Let's go back to the idea that functional categories are responsible for syntactic movement. This movement is forced generally by a restricted set of morphological requirements: Case theory requirements force NP movement. The properties of morphological affixes, base-generated as inflectional heads, force head movement. The landing site of a maximal lexical projection that undergoes movement forced by Case considerations is the specifier position of a functional projection. Head movement, on the other hand, raises a lexical head and adjoins it to a functional head.

As discussed above, in a syntactic structure lacking functional categories there are only four possible word orders, SVO, VOS, OVS and SOV. Crucially, there is a word surface order found in natural languages that can be generated only by movement of the basic VP-internal constituents, namely the VSO order. Based on this observation I propose an study of Irish, whose only acceptable surface order is VSO. Notice that the

[6] It is important to notice that, when applied to early language production, this theory assumes the extreme position, defended by Oulhala (1992), that the head-parameter has not been fixed at this stage. Even though this position is controversial, it help us to clarify the predictions of both competing hypothesis.

extreme maturation hypothesis would lead us to the conclusion that Irish children do not understand their caretakers language, and would obviously help us to separate comprehension from production in early speech (it may be the case that the Irish child understands VSO sentences but is unable to produce them).

5. Irish: Some empirical predictions with respect to language development.

There are two descriptive generalizations about Irish that will constitute the basis for the empirical predictions with respect to language acquisition to be developed in this section of the paper. First, Irish is an strict VSO language, with no SVO alternative order in finite clauses. In nonfinite clauses subjects precede the verb, as do objects under certain conditions, which differ from dialect to dialect. Second, subject-verb agreement and overt subjects are in complementary distribution in this language.

In Irish, the unmarked order of elements in finite clauses of all kinds is VSOX, where X covers prepositional phrases, adverbials of various kinds and so on, as exemplified in (9).

(9) Thug mé úll don ghasúr sin inné
gave I an-apple to-that-boy yesterday
"I gave that boy an apple yesterday"
(McCloskey 1983:10)

Even though the order of objects is a little bit freer with respect to other elements of the clause, Irish subjects must occur immediately to the right of their verbs. No clause constituent may intervene between verb and subject. As noted in McCloskey (op.cit: 12), the only claim made referring to VSO languages in Greenberg (1963) that does not hold true of Irish is Universal #6, which maintains that all languages which have a dominant VSO order have SVO as an alternative order. The possibility of having a subject preceding the verb leads to ungrammaticality, as exemplified in (10).[7]

(10) *Mo mháthair chonaic mé
my mother saw me
"My mother saw me" (McCloskey:12)

Based on this fact, McCloskey concludes that "Irish is as good an example of a VSO language as one could hope to find."

The second descriptive observation that will be relevant for our purposes comes from the fact that subject-verb agreement and overt subjects are in complementary distribution in Irish. Taraldsen (1993) shows that in all the Celtic languages, agreement morphemes reflecting the person and number

[7] The VSO order in Irish is usually explained as a result of mandatory V-to-I-to-C movement (Ouhalla 1991; Taraldsen 1993). The particular mechanism that explains the VSO order is not relevant for the purposes of this paper. The fact that this order can be generated only as the result of the movement of at least one of the lexical elements S,V,O outside their thematic domain VP is our main concern.

of the silent subject show up in null subject sentences. When the subject is overt, on the other hand, the verb takes the neutral form 3sg regardless of the number of the subject. This generalization for all Celtic languages applies to Irish, as shown in the following examples from Hickey (1990: 21).

(11) a. Thiteas inné
fell-1sg yesterday
"I fell yesterday"
b. Thit me inné
fell-3sg I yesterday
"I fell yesterday"

In (11a), the null subject is first person singular, and shows up as an agreement morpheme in the verb. But when the subject is overt, the verb presents a default 3sg. in Irish (11b).[8]

The fact that Irish is an strict VSO language will ensure the uniformity of the parents input when studying the early productions of the child learning Irish. Since VSO is the only possible order in the adult grammar, it is safe to assume that this order is the one used exclusively by the parents. Furthermore, since overt agreement morphemes on the verb and overt subjects are in complementary distribution, the absence of inflectional morphology on the verb can not be taken as evidence of the lack of inflectional projections. As a consequence, it will be of crucial importance for our analysis the presence in the early utterances of three verbal constituents, subject, verb and direct object. Utterances in which one of these verbal elements is missing, especially the subject or the object, will be of no relevance for the purposes of this study. The main theoretical claim of this paper is that only surface word orders in which the subject intervenes between the verb and the object cannot be explained without the existence of FCs in the grammatical structure.

The predictions of both the maturation and the continuity hypotheses with respect to word order in early productions of Irish should be clear cut, once we take into consideration the previous descriptive generalizations. Proponents of the maturation hypothesis will expect a noticeable change in the relative frequency of the use of the VSO order around the stage in which the implementation of FCs is expected. According to this, at a crucial period of development, centered around ages 2;0-2;2 (cf. section 1, p.6), the relative frequency of VSO utterances should not only increase, but the VSO order should become the only possible order after this stage. Proponents of the continuity hypothesis, on the other hand, would predict that the relative frequency of the use of VSO utterances in early Irish will not experiment a drastic change at around this stage of development. Furthermore, they would expect the VSO order to be preponderant from the earliest productions.

From the above considerations I propose that a longitudinal study of early Irish production will provide unambiguous empirical data that will be relevant in the continuity vs. maturation debate. The study will analyze the relative frequency of word orders in the production of different subjects, children learning Irish. The ideal range to be covered will be from ages 1;4 to 2;8. The experiments for elicited production and recollection of spontaneous production data should be repeated periodically for each subject at different stages, to correlate production and comprehension.

[8] Taraldesen (1993) explains this phenomena by assuming that the source of an agreement morpheme must always be an incorporated subject in Celtic. Finite sentences will show an agreement morpheme, but no overt subject, if the subject incorporates. Irish sentences will show an overt subject, but no agreement, if the subject does not incorporate.

Although this type of data for Irish is not available in the literature, there are several studies that seem to indicate the possible results of such a study. Cross-linguistic studies of early production have shown that word order errors are very rare, and that knowledge of word order seems to exist even prior to the onset of telegraphic speech (Bloom, 1990; Pinker, 1984; Brown, 1973). Thus, it should be natural to expect that the VSO order will be preponderant in the early productions of Irish children. This prediction, that agrees with the predictions of the continuity assumption, is also reinforced by the results of an experimental study on the acquisition of Irish in Hickey (1990).

Hickey (1990) examines the development of word order patterns in Irish within a framework completely different to the Principles and Parameters framework that characterizes the hypotheses that have been examined in this paper. She assumes that simple cognitions have an SVO structure, the result from a tendency to place new information before given information. From this assumption, she predicts that SOV and SOV orders will be acquired earlier than non-subject-initial orders even in VSO languages like Irish. I will not discuss her theoretical assumptions here, but it is important to notice that some of the results of her analysis are relevant for our purposes. Hickey analyzes the relative frequency of verb-initial and subject-initial utterances in three children learning Irish (Eibhlis, 1;4-2;1; Eoin 1;6-2;6; Cián 1;11-3;0). Her study finds that verb initial utterances are significantly more frequent than subject-initial utterances in the three cases considered (op.cit: pp. 24-26). She also finds that the three children studied used subject-initial utterances considerably more frequently than adults in input. These particular result seems to agree initially with the prediction of the proponents of the maturation hypothesis. But, crucially, a close reading of the data shows that these subject-initial utterances are only due to the omission of the verb 'to be', whether as a main verb or as auxiliary (p.29, table 4). None of the utterances in which the main verb was present shows a subject-initial order.

From the data presented above it is reasonable to expect that the experimental analysis that I have proposed will conform to the predictions of the continuity position, i.e., that VSO order utterances will be uniformly and significantly more frequent in all the stages of the development of Irish language. But it is necessary to observe that this expected presence of the VSO order in early production may also receive an interpretation under the assumption that the child's grammar lacks functional categories.

If it can be argued, as described previously in section 2 (p.15), that at the earlier stages Wh-questions are generated through adjunction of the Wh-element to VP and no by substitution into [Spec, CP], it may be possible to use a similar argument to explain the VSO order without recurring to the presence of functional projections. VSO order could be analyzed as the result of adjunction of the verbal head to the maximal verbal projection VP, in an analysis parallel to that described for Wh-questions. I will posit two objections to such hypothetical analysis.

First, the adjunction analysis is not consistent. While adjunction is a possible derivation for Wh-questions, this analysis fails to predict that in addition to this type of questions children produce embedded interrogatives by age 2;2, as shown in the following examples from Hyams (1992: 390).

(12) a. I show you how to do it
b. I show you what I got

As Hyams points out, unlike questions that can be assumed to be generated by adjunction, this embedded interrogatives are subcategorized for, and hence the Wh-phrase which heads the embedded clause must be in CP. It could also be claimed that the child learns a different subcategorization for these verbs, and that subcategorization frames at this stage are described only in terms of lexical categories. But such an assumption would imply that, at the stage in which the functional categories are implemented, the child should re-learn a huge part of its lexicon. Considering that the average comprehension vocabulary at this stage is of four hundred words, having to unlearn a big portion of it cannot be considered a useful learning strategy.

Another area of inconsistency in the adjunction analysis comes from the fact that proponents of the maturation hypothesis argue that children initially fail to raise subjects out of their VP-internal position because there is no available [Spec, IP] to raise to (Guilfoyle and Noonan, 1988). A similar argument is made for the lack of passive in early English (Radford 1990b). But if movement can be the result of adjunction, nothing prevents the adjunction of the subject to VP in the early grammars. It would be necessary to provide an explanation for the claim that adjunction to VP can apply only to verbs and Wh-elements but not to subjects.

6. Summary

In this paper I have analyzed the predictions of two contrasting hypotheses about language development with respect to children early production, the maturation and the continuity hypotheses. I have argued that several factors contribute to make ambiguous the data that both hypotheses use as empirical support. An excesive reliance on spontaneous production data, a certain anglocentrism and a shallow identification between competence and performance make difficult to separate clear empirical predictions for both hypotheses.

Based on this, I have proposed a longitudinal analysis of early production of Irish, a strict VSO language, that will provide data relevant to the discussion. The possible empirical predictions of both hypotheses with respect to the acquisition of Irish have been discussed.

7. Bibliography

Bloom, P. (ed.). 1993. Language Acquisition - Core readings. Cambridge, Mass.: MIT Press.

Borer, H. 1984. Parametric Syntax: Case Studies in Semitic and Romance Languages. Dordrecht, Foris.

Boser, K., B. Lust, L. Santelman and J. Whitman. 1992. "The Syntax of CP and V-2 in Early Child German- The Strong Continuity Hypothesis," NELS 22, University of Massachusetts, Amherst: GLSA.

Brown, R. 1973. A First Language: The Early Stages. Cambridge: Harvard University Press.

Chomsky , N. 1991. "Some Notes on the Economy of Derivation and Representation," in R. Freidin (ed.) Principles and Parameters in Comparative Grammar. Cambridge, Mass.: MIT Press.

Chomsky, N. and H. Lasnik. 1991. "Principles and Parameters Theory," in Syntax: An International Handbook of Contemporary Research. Berlin: Walter de Gruyter.

Clahsen, H. 1990. "Constraints on Parameter Setting. A Grammatical Analysis of Some Acquisition Stages in German Child Language," Language Acquisition, 1, 361-391.

Deprez. V. and A. Pierce .1993. "Negation and Functional Projections in Early Grammar," Linguistic Inquiry, 24, (1), 25-68.

De Villiers, J. 1992. "On the Acquisition of Functional Categories: A General Commentary," in Meisel (ed.) The Acquisition of Verb Placement. Dordrecht: Kluwer Academic Press.

Eubank, L. 1992. "Verb Movement, Agreement and Tense in L2 Acquisition," in Meisel (ed.). The Acquisition of Verb Placement. Dordrecht: Kluwer Academic Press.

Felix, S. 1987. Cognition and Language Growth. Dordrecht: Foris.

Gazdar, G., E. Klein and G. Pullum (eds.). 1983. Order, Concord and Constituency. Dordrecht: Reidle.

Gerken, L. A., B. Landau and R.E. Remez. 1990. "Function morphemes in young children's speech perception and production," Developmental Psycology 27, 204-216.

Guilfoyle, E. and M. Noonan .1992. "Functional Categories in Language Acquisition," Canadian Journal of Linguistics

Hickey, T. 1990 "The Acquisition of Irish: a Study of Word Order Development," in Child Language 17, 17-41.

Hyams,N. 1992. "The genesis of clausal structure," in Meisel, J.(ed.) The acquisition of verb placement. Dordrecht: Kluwer Academic Press.

Koopman, H. and D. Sportiche .1991. "The Position of Subjects," Lingua 85, 211-258.

McCloskey, J. 1983. "A VP in a VSO Language?," in G. Gazdar, E. Klein and G. Pullum (eds.) Order, Concord and Constituency. Dordrecht, Reidle.

McCloskey, J. and K. Hale .1984. "On the Syntax of person-number inflection in Modern Irish," Natural Language and Linguistic Theory 1: 487-553.Kluwer Academic Press.

McKee, C. 1992. "What You See Isn't Always What You Get," to appear in B. Lust, J. Whitman, and J. Kornfilt (eds.), Syntactic Theory and First Language Acquisition: Crosslinguistic Perspectives- Volume 1: Phrase Structure. Hillsdale, NJ: Lawrence Erlbaum.

McKee, C. and M. Emiliani .1992. "Il clitico: C'e ma non si vede," Natural Language and Linguistic Theory, 10, 415-437. Kluwer Academic Press.

McKenna, A. and E. Wall. 1986. Our First Language: Acquisition of Irish. Dun Laoghaire: Glendale Press.

MacMathúna, S. 1979. "Prolegomena to a Study of Language Acquisition in Irish." Teanga 1. 72-93.

Mac Whinney, R. and C. Snow .1985. "The Child Language Data Exchange System," Journal of Child Language 12.

Meisel, J.(ed.) .1992. The Acquisition of Verb Placement: Functional Categories and V2 Phenomena in Language Acquisition. Dordrecht, Kluwer Academic Press.

Ouhalla, J. 1990. Functional Categories and Parametric Variation. London: Croom Helm.

Ouhalla, J. 1992. "Functional Categories, Agrammatism and Language Acquisition," Sprachwissenschaft in Frankfurt, Arbeitspapier, Nr. 9.

Pollock, J.Y. 1989. "Verb Movement, Universal Grammar, and the Structure of IP," Linguistic Inquiry 20, 365-424.

Platzack, C. 1990. "A Grammar without Functiona Categories; a Syntactic Study of Early Child Language," Nordic Journal of Linguistics, 13, 107-126.

Radford, A. 1990a. "The Syntax of Nominal Arguments in Early Child English," Language Acquisition, 1 (3), 195-223.

---------- 1990b. Syntactic Theory and the Acquisition of English Syntax. Oxford: Basil Blackwell.

Sadler, L. 1988. Welsh Syntax: A GB Approach. Croom Helm, London.

Sproat, R. 1985. "Welsh Synyax and VSO Structure," Natural Language and Linguistic Theory 3, 173-216.

Taraldsen, K.T. 1993. "Subject/verb Agreement and Word Order in Celtic and Romance," NELS, 23, II. University of Massachusetts, Amherst.

Tsimpli, I.A.1991. "On the Maturation of Functional Categories: Early Child Speech," Working Papers in Linguistics, 3. London: University College London, 123-148.

Vainikka, A. 1993. Case in the Development of English Syntax. ms. University of Pennsylvania.

Valian, V. 1992. "Categories if First Syntax: Be, Be+ing, and Nothingness," in Meisel, J.(ed.) The Acquisition of Verb Placement. Dordrecht: Kluwer.

Villiers, J. 1992. "On the Acquisition of Functional categories: A General Commentary," in Meisel, J.(ed.) The acquisition of verb placement. Dordrecht: Kluwer.

Whitman, J.B., K.O. Lee and B. Lust .1991. "Continuity of the Principles of Universal Grammar in First Language Acquisition: The Issue of Functional Categories," NELS 21, University of Massachusetts, Amherst: GLSA.

Whitman, J. 1992. "A Strong Continuity of the Acquisition of Verb Second," to appear in B. Lust, J. Whitman, and J. Kornfilt (eds.), Syntactic Theory and First Language Acquisition: Crosslinguistic Perspectives- Volume 1: Phrase Structure. Hillsdale, NJ: Lawrence Erlbaum.

Zagona, K. 1982. Government and Proper Government of Verbal Projections. Ph. D. dissertation, University of Washington.

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Subevent Temporal Arguments and Inner AspP: An Analysis of Double-Object, Verb-Particle Constructions and the Distribution of Manner Adverbs

Hiromi Sato

0.0 Introduction

The previous transformational approach to double object constructions such as Larson (1988) fail to account for the difference between 'dative-shifted' constructions and 'dative-nonshifted' constructions with respect to the aspectual properties of events described. Sentence (1.a) below describes the process of Jason's sending a letter so that the letter reaches Kelly. But this sentence does not necessarily imply that Kelly actually received the letter. On the other hand, sentence (1.b) strongly implies that Kelly actually received the letter from Jason.

(1) a. Jason sent a letter to Kelly.
b. Jason sent Kelly a letter.

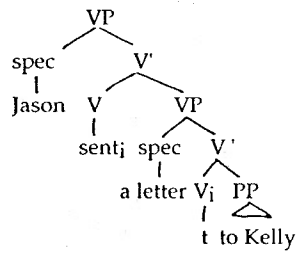
The goal of this paper is to provide an analysis to account for the contrast observed in sentences such as the ones in (1). I propose that verbs with telic subevent structure project Inner AspP (cf. Travis 1992) with a strong aspectual feature that forces overt V-raising and object raising to its head and specifier position respectively. It will be shown that the proposed analysis can be extended to verb-particle constructions in English and *teiru* constructions in Japanese. The analysis proposed in this paper will provide additional arguments for Travis's (1992) proposal on Inner Aspect Phrase and Zagona's (1993) proposal on Inner VP's subevent temporal arguments.

In the first section, I present problems for Larson's analysis of 'dative-shifted' structure. Next, I discuss the extension of the Larsonian VP-shell structure to verb-particle constructions and problems for this analysis. In the second section I propose an analysis that can solve the problems presented in the first section. It is shown that the proposed analysis can also account for the correlation between the position of a manner adverb and its interpretation. In the third section, I show how the proposed analysis can provide a syntactic account of the two different interpretations associated with Japanese *teiru* constructions. In the last section, I summarize the discussion and present some speculations concerning Case-marking and agreement features as remaining problems for future research.

1.0 Problems

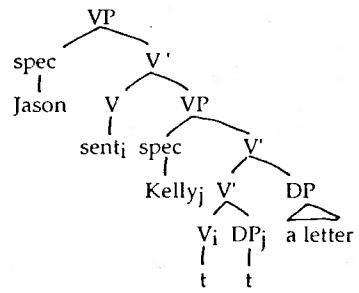
Larson (1988) proposes the structure given in (2) for 'dative-nonshifted' double object constructions:

(2)



In Larson (1988), 'dative-shifted' double object constructions are derived from the structure shown in (2) above by a process analogous to passivization. The resulting structure is given in (3):

(3)



1.1 Aspectual Difference

Although Larson's Case-oriented analysis of 'dative-shift' constructions has several nice consequences concerning structural relation of the two arguments and the interaction of double objects with "Heavy NP Shift", as mentioned in the previous section it fails to capture the difference

between 'dative-shifted' and 'dative-nonshifted' constructions with respect to their temporal interpretation.

As noted by Green (1974), one difference between sentence (4.a) and (4.b) below is that the former entails that the telegram reached Sam and it is in his possession (at least for some time), whereas the latter does not have such entailment. This difference in entailment explains the acceptability difference between (4.c) and (4.d). The unacceptability of (4.e), in contrast to acceptable (4.f), may be attributed to the inability of San Francisco to be in the relevant possession relation.

(4) a. Chris sent Sam a telegram.
b. Chris sent a telegram to Sam.
c. ?*Chris sent Sam a telegram, but he didn't receive it.
d. Chris sent a telegram to Sam, but he didn't receive it.
e. *Chris sent San Francisco a telegram.
f. Chris sent a telegram to San Francisco.

These examples suggest that 'dative-shifted' and 'dative-nonshifted' constructions denote aspectually different types of event. The culmination of the event described by (4.a) is marked by a point in time where Sam receives a telegram, while in (4.b) the culmination of the event is achieved when Chris finishes the process of sending a telegram (intending that it be received by Sam (but it may not necessarily happen)). The following examples illustrate the same point:

(5) a. Paul threw Jamie a ball.
b. Paul threw a ball to Jamie.
c. *Paul threw first base a ball.
d. Paul threw a ball to first base.

The difference in acceptability among these sentences conforms to the above observation concerning the aspectual differences between the two constructions. Sentence (5.a) describes an event that consists of the process of Paul's throwing a ball toward Jamie and the result of this process, i.e., Jamie's catching the ball. In contrast, sentence (5.b) denote an event that consists only of Paul's throwing a ball toward Jamie. A 'dative-shifted' sentence (5.c) is unacceptable unless someone at first base is being referred to: First base is incapable of catching a ball. A 'dative-nonshifted' sentence (5.d) is acceptable with the same indirect object as (5.c).

In Larson's analysis of double object constructions illustrated in (2) and (3) above as well as in the other previous analyses, these differences between 'dative-shifted' and 'dative-nonshifted' constructions cannot be captured.

1.2 Position of Manner Adverbs

1.2.1 Double Object Construction

Koizumi (1993) notes problems with Larson's analysis of double object constructions with respect to the distribution of manner adverbs in double object constructions. With the Larsonian VP-shell structure, it seems necessary to assume that manner adverbs are in V'-adjoined positions, not in VP-adjoined positions in order to account for the contrast observed in the following sentences:

(6) a. Tracy quickly gave a ring to Holly.
b. Tracy gave a ring quickly to Holly.
c. *Tracy gave quickly a ring to Holly.

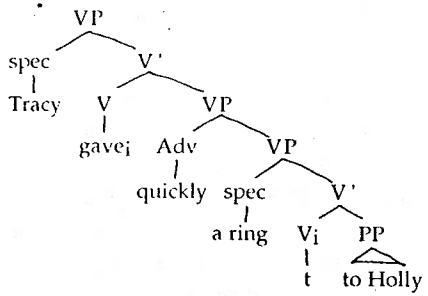
If manner adverbs are allowed to be in a VP-adjoined position as in (7) below, sentences like (6.c) would wrongly be predicted to be grammatical.[1]

[1] One might argue that sentences like (6.c) can be ruled out on the basis of the adjacency requirement for Case assignment. However, as pointed out in Johnson (1991) and Pesetsky (1989), there are some empirical problems with this requirement. For instance, it holds only for object Case assignment and not for nominative Case assignment as illustrated in the following examples:

(1) a. Gary probably has left.
b. Gary in fact will leave.

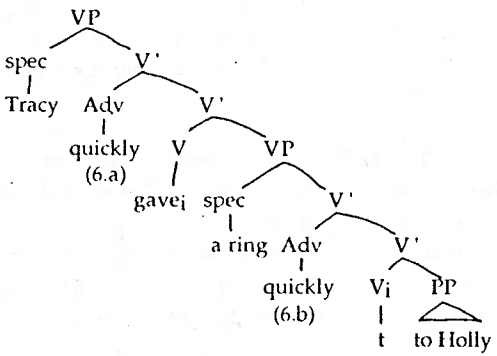
In this paper, I attempt to show that the adjacency requirement can be derived from a certain structural configuration and licensing requirements for adverbials. Therefore, I do not consider the adjacency requirement to be a solution to the current problem.

(7) *



If adverbs can only be in V'-adjoined positions, the grammatical sentences (6.a) and (6.b) can be derived and ungrammatical (6.c) can be ruled out.

(8)



Koizumi (1993) notes that if manner adverbs can only appear in V'-adjoined positions, this assumption appears to make a wrong prediction for the 'dative-shifted' structure proposed by Larson (1988). If a manner adverb is in a position adjoined to the lower V' in the Larsonian structure, sentences like (9) are derived.

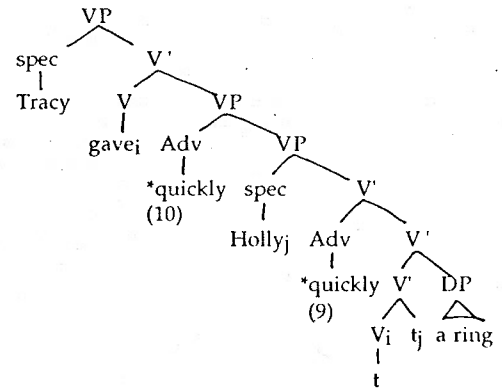
(9) a. *Tracy gave Holly quickly a ring.
a'. Tracy [V' gave$_i$ [VP Holly$_j$ [V' quickly [V' t$_i$ t$_j$ a ring]]]]

Notice that even if an adverb is allowed in a VP-adjoined position, unacceptable sentences like (10) are derived.

(10) a. *Tracy gave quickly Holly a ring
a'. Tracy [V' gave$_i$ [VP quickly [VP Holly$_j$ [V' t$_i$ t$_j$ a ring]]]]

The position of the adverbs in sentence in (9) and (10) is represented in (11) below:

(11)



The fact that the sentences in (9) and (10) are unacceptable might seem to suggest that no adverbs can adjoin to the lower VP in the Larsonian structure. However, this would wrongly rule out acceptable sentences like (6.b) in which an adverb is adjoined to the lower V' as shown in (8). Thus, with the Larsonian VP-shell structure, the distribution of manner adverbs has to be stated differently for 'dative-shifted' and 'dative-nonshifted' structures. Obviously, this solution is too construction-specific and misses a generalization.

1.2.2 Verb-Particle Constructions

In verb-particle constructions, object DPs can appear either to the right or to the left of the particles as shown in the following examples:[2]

2 When the object of a verb-particle combination is a pronoun, it must obligatorily appear to the left of the particle. Stressed pronouns, pronouns with deictic force, and conjoined pronouns are exceptions to this requirement. Deising and Jelinek (1993) argue that the obligatoriness of the pronoun shift is due to the semantic requirement of pronouns, i.e., specificity, to move out of VP and the clitic-like nature of pronouns which allows them to attach to a verb. However, it is not

(12) a. Heather looked up the reference.
b. Heather looked the reference up.

In this section, I show that a verb-raising analysis can account for these two structures. Although it may seem that the Larsonian analysis can be extended to these constructions, later in the section I show that once again this analysis poses problems in accounting for distribution of manner adverbs.

1.2.2.1 Overt Verb Raising in English

As proposed by Johnson (1991), the two possible relative orders of the object DP and the particle in verb-particle constructions can be analyzed as a consequence of the raising to a higher head position of a verb-particle complex or of a verb with a particle being stranded. Before analyzing the structure of verb-particle constructions in detail, we will first consider several arguments for overt verb-raising in English motivated independently of verb-particle constructions.

Pesetsky (1989) argues that in English there are instances of overt V-raising to a higher head position. One of the arguments he presents is based on adverbial scope. Citing Andrews (1983), Pesetsky notes that when adverbs are stacked on the right periphery of a VP, the adverb to the right takes scope over the adverb to the left, and when adverbs are stacked on the left periphery of a VP, the scope dependency among the adverbs is reversed as shown in the following examples:

(13) a. John knocked on the door intentionally twice.
twice>intentionally (two events of intentional knocking)
b. John intentionally twice knocked on the door.
intentionally>twice (one intention to knock twice)

In the sentences in (14) below, two adverbs intervene between the main verb and its complement PP, and the adverb *stupidly* has a scope over *twice*:

(14) a. As for Mary, Bill relied stupidly twice on her. stupidly>twice
b. Mary's the one who Bill relied stupidly twice on. stipidly>twice

In these examples, although the relative position of the adverbs with respect to the verb is parallel to that of sentence (13.a), the scope relation of the two adverbs is parallel to that of sentence (13.b). If these sentences were derived through the rightward shift of the PPs and have the structure shown in (15), the expected scope relation of the adverbs would be parallel to that of the adverbs in (13.a), i.e., twice>stupidly, which is contrary to the fact.

(15) ...[[[[relied t_i]V' stupidly]V' twice]V' [PP on ...]$_i$]V'

Furthermore, notice that (14.a) is a focus construction and (14.b) involves extraction, and as noted by Pesetsky a rightward shift analysis is implausible for the PPs in such constructions. On the basis of this observation, Pesetsky argues that in (14.a) and (14.b) the verb moves out the VP as shown in (15') below, rather than the PP being rightward shifted:

(15') ...relied$_i$ [VP stupidly [V' twice [V' t_i on ...]]]]

Next, Pesetsky presents an argument for V-raising on the basis of extraction facts. He argues that since extraction from a rightward-shifted phrase is blocked in English, the V Adv Obj order in sentence (16.a) below is derived from (16.b) by moving the main verb leftward over the adverb rather than through the extraction out of a shifted PP.[3]

made clear in their analysis why only pronouns must overtly move out of VP but not other specific NPs. One of the motivations for them to attribute the obligatory pronoun shift to specificity is the fact that the indefinite pronoun *one* can appear to the right of the particle unlike other (specific) pronouns. However, since *one* can also appear to the left of the particle, their argument based on this observation is not conclusive. Alternatively, if we assume that *one* is a full NP unlike other clitic-like pronouns, the behavior of the former type of pronoun can be accounted for in the same way as the regular NPs. Due to their clitic-like nature, the pronouns of the latter type must attach to a verb before Spell-Out (at S-structure). Since they cannot stand alone, if they are unattached to a verb, it will lead to a PF violation. Thus, the obligatoriness of the pronoun shift is derived.

[3] In Pesetsky's original examples, a temporal adverb, *recently*, is used instead of a manner adverb, *intensely*, used above.
(i) (=Pesetsky's (60.a-b))
a. This is what Bill has looked recently at _.
b. This is what Bill has recently looked at _.
Several native speakers whom I consulted with found the sentence in (i.a) marginal. As discussed later in section 2.5, since temporal adverbs are licensed by a feature of T^0, they are generated in a higher position than the position of the raised main verb. Thus, the marginality of sentence (i.a) is predicted in the present analysis. In contrast, sentence (16.a) in the text is judged to be acceptable. This is also predicted in the present analysis since manner

(16) a. This is what Bill has looked intensely at __.
b. This is what Bill has intensely looked at __.

Bowers (1993) also argues for overt verb-raising in English. One of his arguments is based on the following conjoined structures:

(17) a. Sue will put the books on the table and the records on the chair.
b. Harriet gave a mug to John and a scarf to Vivien.
c. They told Sue who to talk to and Virginia when to leave.

Under the usual assumption that only constituents can be conjoined, the above sentences are problematic for the standard analysis of VP.[4] Bowers argues that these sentences should be analyzed as instances of across-the-board extraction of V from a conjoined VP to the head of a functional category (PrP in his analysis) between the conjoined VP and I^0.[5] Thus, sentence (17.a), for instance, is analyzed as having the structure shown in (17'.a) below:

adverbs are licensed by a feature of V^0, and thus, a manner adverb like *intensely* can be generated in a lower position than the position of the raised main verb.

4 Bowers argues that the sentences in (17) are not derived by the application of gapping in conjoined Pr' as shown in (i):

(i) Sue$_i$ will [$_{PrP}$ t_i [$_{Pr'}$put [$_{VP}$ the book on the table]] and
[$_{Pr'}$ ø [$_{VP}$ the records on the chair]]]

He shows that gapping is generally bad when the gapped constituent contains more than two constituents as shown in (ii):

(ii) *Mary put the books on the table and Sue ø the records on the chair.

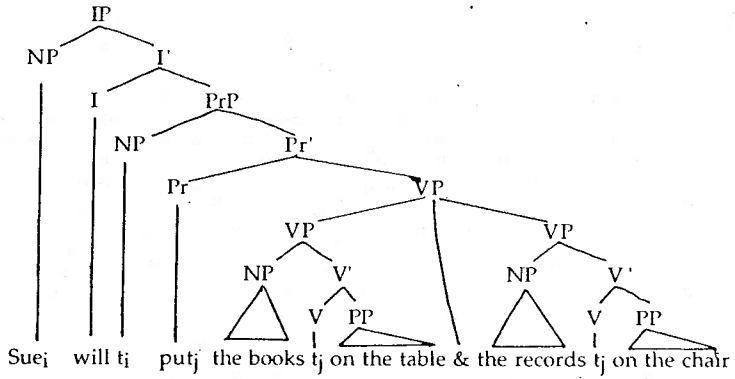
However, instances of VP-coordination are not subject to such a restiction as shown in (iii):

(iii) John gave the books to Mary at Christmas and the records to Sue on New Year's Eve.

5 Larson (1988) also proposes a similar analysis of across-the-board V-raising for conjoined structures of double object constructions. In Larson's analysis, V raises to the head of the higher VP-shell, not to the head of a functional projection as in Bowers' analysis.

(17') (=Bowers' (17))

a.



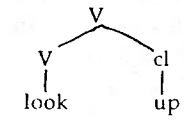
In the subsequent discussion, I will show that the different linear orders of the object DP and the particle in verb-particle constructions can be derived as a consequence of the overt V-raising, which is independently motivated as shown in the analyses presented above.

1.2.2.2 VP-Shell Structure for Verb-Particle Constructions

Given that in English verbs can raise to a higher head position, for the time being let us assume the Larsonian VP-shell structure for verb-particle constructions.

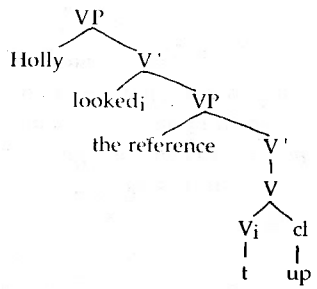
Johnson (1991) argues that the verb and the particle in verb-particle constructions are inserted at D-structure in a single position rather than being generated as an independent V and the head of PP. (See Johnson (1991) for arguments against 'V PP analysis' of these constructions.) Keyser and Roeper (1992) propose that the particle in a verb-particle construction originates as being cliticized to the verb as shown in (18) below:

(18)

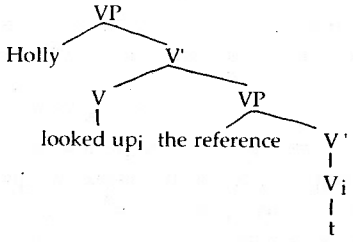


Assuming these analyses and the Larsonian structure, the two instances of verb-particle constructions shown in (13) above can be derived as shown in (19):

(19) a.



b.



In (19.a) only the verb *look* is raised to the higher V position stranding the clitic *up*, whereas in (19.b) the complex V *look up* is raised to the higher head position as a singleton.

Thus, with the Larsonian structure, the two possibilities in the relative order of the particle and the object DP can be ascribed to the two possible derivations illustrated in (19.a) and (19.b): only a verb is raised to the head of the higher VP-shell stranding the particle, or a verb-particle complex is raised as a single element. However, in the next section I will show that the Larsonian structure makes wrong predictions with respect to the distribution of manner adverbs in verb-particle constructions.

1.2.2.3 Manner Adverbs

The following paradigm shows that the Larsonian structure is problematic with respect to the distribution of manner adverbs in verb-particle constructions:

(20) a. *Holly looked the reference quickly up.
b. *Holly looked quickly the reference up.
c. *Holly looked up quickly the reference.

I will show below that whether manner adverbs are adjoined to V' or VP in the Larsonian structure, it will make wrong predictions for the sentences in (20).

First let us consider the case where a particle is stranded in the lower V position (cf. (19.a)). If manner adverbs are adjoined to V' in this structure, unacceptable sentences like (20.a) above will be derived. If manner adverbs are allowed in VP-adjoined positions, sentences like (20.b) will be wrongly predicted to be grammatical. The internal structures of (20.a) and (20.b) are schematized below:

(20') a. Holly [V' looked$_i$ [VP the reference [V' quickly [V' [V t$_i$ up]]]]]
b. Holly [V' looked$_i$ [VP quickly [VP the reference [V' [V t$_i$ up]]]]]

With structure (19.b) where a particle is not stranded in the lower VP, sentences like (20.c) could be derived if manner adverbs are allowed in VP-adjoined positions as shown below:

(20') c. Holly [V' [V looked up]$_i$ [VP quickly [VP the reference [V' t$_i$]]]

Thus, the Larsonian structure is problematic with respect to the distribution of manner adverbs in verb-particle constructions as well as in double object constructions.

2. 0 Analysis

In this section, building on the proposals by Travis (1992) and Zagona (1993) I argue that in double-object constructions and verb-particle constructions, due to the temporal argument structure of the predicates a functional projection, AspP, is projected between the two VP projections in the Larsonian structure. I show that with this structure, the problems

discussed in the previous section are no longer problematic both in double object and verb-particle constructions. Before discussing the details of the proposal, let us first consider the aspectual properties of the predicate in double object constructions and verb-particle constructions.

2.1 Telicity in Verb-Particle and Double Object Constructions

2.1.1 Verb-Particle Constructions

Tenny (1987) notes that particles in verb-particle constructions impart a resultative sense to the sentences, and they have the semantic property of imposing temporal delimitedness on the event described. In other words, a verb-particle construction denotes an event which has a temporal endpoint, i.e., a telic event. For instance, in (21.a) the location to which the object moves as a result of the activity of pushing a table is expressed, and time when the object reaches that location is the endpoint of the event. In contrast, in (21.b) no such temporal endpoint of an activity is expressed.

(21) a. Amy pushed a table over.
b. Amy pushed a table.

Predicates that denote telic events and the ones that denote atelic events can be distinguished, for instance, by restrictions on types of time adverbials they allow. While telic predicates allow *in*-phrase time adverbials, atelic predicates do not allow these adverbials as shown in the following examples (cf. Dowty 1979):

(22) a. Rolf painted a picture in an hour. (telic)
b. *Rolf walked in an hour. (atelic)

This diagnostic confirms that verb-particle constructions denote telic events:

(23) a. Shelly thought up an answer in an hour.
b. Shelly thought an answer up in an hour.
c. Meg dusted off the counter in an hour.
d. Meg dusted the counter off in an hour.
e. Ryan looked up the reference in an hour.
f. Ryan looked the reference up in an hour.

The fact that stative verbs such as *know, have, believe*, do not take particles seems to support the idea that verb-particle constructions denote telic events. The inherent property of stative predicates is not compatible with the notion of the temporal endpoint of an event, which is expressed in verb-particle constructions. Thus, expressions like **know up the lesson, *know the lesson up* are not possible.[6]

2.1.2 'Dative-Shifted' Constructions

Tenny (1987) also notes that the dative object in a 'dative-shifted' construction delimits the event described by the sentence. In the introductory section, I showed that 'dative-shifted' and 'dative-nonshifted' constructions are interpreted differently with respect to the aspectual properties of the event described. For instance, in a 'dative-shifted' construction (24.a) below, it is strongly implied that Mercy receives the keys, and thus the event described by the sentence is temporally delimited when Mercy catches the keys. In contrast, for a 'dative-nonshifted' construction (24.b) such implication is not necessarily present.

(24) a. Ken threw Mercy the keys.
b. Ken threw the keys to Mercy.

Thus, while sentence (24.b) holds true even if Mercy did not catch the keys, sentence (24.a) sounds considerably worse than the former sentence to describe the same situation as shown in the following examples.

(25) a. ?*Ken threw Mercy the keys, but she didn't see them.
b. Ken threw the keys to Mercy, but she didn't see them.

The above observation along with the ones presented in the introductory section suggests that 'dative-shifted' and 'dative-nonshifted' constructions denote different types of event. For example, the event denoted by sentence (24.a) consists of the process of throwing the keys and the result of this process, i.e., Mercy's catching the keys. In contrast, the event denoted by sentence (24.b) consists of the process of throwing the keys toward Mercy and

[6] I am grateful to Heles Contreras for this observation.

the result of this process, i.e., the keys thrown and they are no longer in Ken's hand.

Similar observations have been made for double object constructions with a so-called 'benefactive' argument. Citing Culicover (1982), Tenny (1987) shows that while in 'dative-nonshifted' sentences like (26.a), the oblique object can be interpreted either as a benefactive or a recipient, in 'dative-shifted' sentences like (26.b), the dative object can only be interpreted as a recipient.

(26) a. John baked a cake for Mary.
b. John baked Mary a cake.

Suppose Mary is dead and John baked a cake in her memory. Sentence (26.a) can be used to describe this situation whereas sentence (26.b) cannot. This contrast follows if the dative object must be, but the oblique object does not have to be interpreted as a recipient in these sentences. The time when a cake is received by Mary is the endpoint of the event denoted by sentence (26.b) just like the case in sentence (24.a). Thus, these examples also show that the dative object in 'dative-shifted' sentences temporally delimits the event, but the oblique object in 'dative-nonshifted' sentences does not necessarily do so.

2.2 Inner AspP and Subevent Temporal Arguments

Pustejovsky (1988) describes different types of event in terms of subevent structure. Pustejovsky assumes three primitive event-types; state, process, transition. A state is analyzed as a single event that is evaluated relative to no other event, and a process is a sequence of identical eventualities. A transition is analyzed as a single eventuality which consists of two subevents as illustrated below:

(27) Transition (T): $[_T\ \varepsilon_1\ \varepsilon_2]_T$ (ε is a variable for any event type)

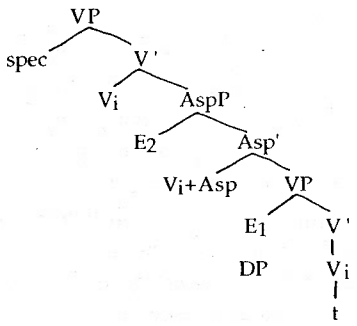
Pustejovsky's term *transition* corresponds to telic events in our previous discussion. Zagona (1993) proposes that the subevents discussed in Pustejovsky (1988) are subevent temporal arguments selected by verbs, and the distinction between telic and atelic events is represented syntactically. In Zagona (1993) it is argued that non-stative verbs have the subevent temporal arguments shown in (28) below, which are the syntactic realization of subevents.

(28) a. V: E_1 (atelic)
b. V: E_1 E_2 (telic) (Zagona 1993 (43))

Thus, in Zagona's analysis, while the verb in an atelic event sentence has only one subevent temporal argument, E_1, the verb in a telic event sentence has two subevent temporal arguments, E_1 and E_2, which correspond to the initial process and the result-state of the process, respectively.

Building on Travis' (1992) proposal of Inner AspP (See Ramchand 1993 and Guilfoyle 1994 for arguments for Inner AspP), Zagona proposes that a verb assigns E_1 to its argument position, the specifier position of the VP, and for telic predicates E_2 is assigned to the specifier position of AspP by the verb which raises to the head of AspP as illustrated in (29) below:

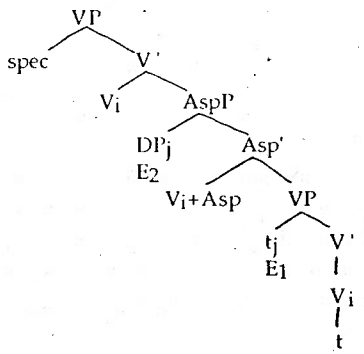
(29)



In Zagona's analysis the object DP of the verb moves to [spec, AspP], where it receives one of the subevent temporal arguments, E_2. Temporally, the object DP can be construed as undergoing subevent E_1 followed by subevent E_2, which is the result of the preceding subevent E_1 or the final state of the event.

Assuming Zagona's proposal of Inner VP's subevent temporal arguments and their relation to the subevent structure of predicates, I propose that if a verb has subevent temporal argument E_2 to assign, the object DP must overtly raise to [spec, AspP] to receive this subevent temporal argument as illustrated in (30):

(30)



I assume that subevent temporal argument E_2 is analogous to strong features in the sense of Chomsky (1992), and if a verb has E_2 it projects Inner AspP with a strong aspectual feature. Thus, the verb must be adjoined to Asp^0 to check its aspectual feature against Asp^0 and E_2 must be assigned to an overt nominal argument.[7] In particular, I propose that the dative argument in 'dative-shifted' constructions and the object DP in verb-particle constructions must raise to [spec, AspP] to be assigned E_2.

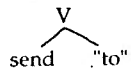
2.3 Double Object Constructions

In this section I argue that the difference between 'dative-shifted' and 'dative-nonshifted' structures with respect to temporal interpretation is due to the difference in the assignment of subevent arguments and the position of the indirect object. In what follows I show that subevent temporal argument E_2 is assigned to the "dative" object in 'dative-shifted' structures, but it is assigned to the direct object in 'dative-nonshifted' structures. Building on the proposal by Keyser and Roeper (1992), I propose that certain double object verbs in English allow E_2 to be assigned to either the direct object or the "dative" object due to two different ways to license the "dative" object.

Keyser and Roeper (1992) present arguments to support that verbs in English are associated with a category-neutral abstract clitic position. In their framework the difference between *give*-type verbs and *donate*-type verbs with respect to the availability of 'dative-shifted' structures can be accounted for under the assumption that the abstract clitic position of *give*-type verbs is occupied by a *to*-dative marker that licenses either DP or PP while *donate*-type verbs lack such a dative marker.[8]

Following Keyser and Roeper (1992), I assume that the verbs like *send*, which allow 'dative-shifted' structures, have an abstract clitic position with an obligatory *to*-dative marker as shown below:

(31)



The abstract dative marker can license either DP or PP by assigning a θ-role, goal or benefactive. I assume that the abstract dative marker "to" is licensed

7 In the present analysis the subevent temporal arguments E1 and E_2 are inherent features of verbs. Thus, if a verb has E_2 as well as E_1 it must be assigned to the verb's nominal argument in [spec, AspP] regardless of the property of this argument. An apparent problem is that even though a verb has both E_1 and E_2, the resulting sentence does not necessarily denote a telic event. As observed in the following contrast, properties of the arguments of a verb such as bare plural/mass vs. count noun distinction can affect the telicity of the described event. (cf. Tenny 1987, among others):

(i) a. Meg drew a circle (in an hour). telic
b. Meg drew circles (?? in an hour/for an hour). atelic

Yet, it is clear from the following examples that such property of the object of a verb alone cannot determine the telicity of the described event:

(ii) a. Meg built a wall (in an hour). telic
b. Meg kicked a wall (*in an hour/for an hour). atelic

The sentences in (ii a) and (ii.b) both have a spatially delimited object *a wall* as the object of the verbs. Despite this property of the object, with an activity verb *kick* the sentence does not denote a telic event. Furthermore, Tenny (1987) notes that bare plural objects need not always create atelic events. According to her, the sentence *'John opened doors.'* could represent a telic event in which, for instance, John opened indefinite number of doors at once by pushing a button. Also, a sentence like *'NASA astronauts found animals on Mars'* can be ambiguous between telic and atelic reading. Notice that even in the atelic reading of these sentences, there is an endpoint in each event which constitutes infinite number of events of John's opening a door/NASA astronauts' finding an animal on Mars. For the purpose of the paper, I assume that in sentences like (i b) above, a telic verb *draw* assignes E_2 to its object *circles* and this subevent argument marks the endpoint of each event of drawing a circle. Thus, even though sentence (i.b) receives an atelic event interpretation due to the interpretation of the bare plural object, the verb assigns both E_1 and E_2 in the same way as the verb does in sentence (i.a), and there is no difference between these two sentences in terms of the syntactic representation.

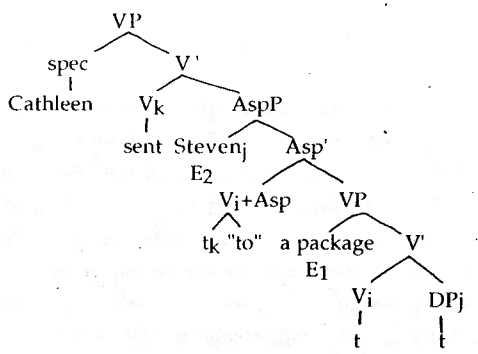
8 Their argument predicts that a prefix *re-*, which is argued to occupy the abstract clitic position in their analysis, can attach to *donate* since its clitic position is empty whereas *re-* cannot attach to *give* since it conflicts with the dative clitic. Their prediction is borne out as shown in the following examples:

a. John redonated his body.
b. *John regave his body. (Keyser and Roper 1992: 114)

either by being realized as P to head a goal PP or by adjoining to Asp^0 to be in the spec-head configuration with the dative argument.

Since verbs like *send* can form a sentence denoting a telic event, they have two subevent temporal arguments, E_1 and E_2. In the present analysis, if a verb has E_2 it must adjoin to Asp^0 to check off its aspectual feature and assign this subevent argument to an argument in [spec, AspP]. Assuming with Larson (1988) that the dative argument of double object verbs is base-generated in the position sister to the V head, I propose the following structure for a 'dative-shifted' sentence with *send*:

(32)



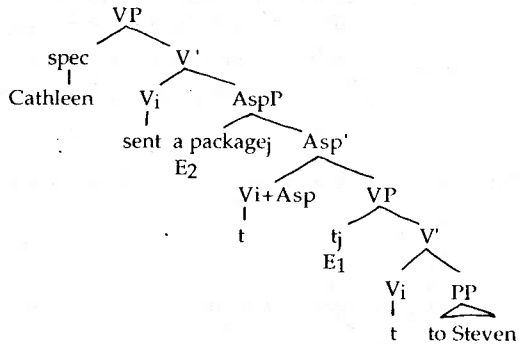
If the θ-role of the abstract dative marker has not been assigned to the dative argument in its base-generated position, the appropriate recipient of the θ-role must raise to [spec, AspP]. In the case of *send*, the goal argument DP is raised to [spec, AspP] and assigned E_2 by the verb and goal θ-role by the abstract dative marker as illustrated in (32) above[9]. After its aspectual feature is checked off, the verb *send* is further raised to the head of the higher VP shell leaving the abstract dative marker behind. Hence, a 'dative-shifted' structure, *Cathleen sent Steven a package*, is derived. Notice that since subevent E_2 describes the state resulting from subevent E_1, the 'dative-shifted' structure in (32) correctly capture the fact that the sentence strongly

[9] I am assuming that DP in [spec, VP] is assigned Case through government by V+Asp^0, and DP in [spec, AspP] is checked its Case feature through spec-head agreement. These DPs are both assigned structural Case.

implies that the events are delimited by Steven's receiving the package that Cathleen sent.

As mentioned above, the abstract dative marker can license PP as well as DP. If the abstract dative maker licenses PP by assigning goal θ-role to it, the goal argument stays in its base-generated position and it is assigned structural Case by the preposition *to*. Then, the goal argument cannot raise to [spec, AspP] to receive subevent temporal argument E_2. If it does, there will be a Case conflict for the goal argument. However, since verb *send* has E_2, the strong aspectual feature of AspP must be checked off by the verb overtly raised to Asp^0, and the E_2 must be assigned to an overt nominal argument. Therefore, in such cases, the direct object in [spec, VP] is raised to [spec, AspP] and is assigned E_2 as illustrated in (33).

(33)



In (33) E_2 is assigned to the direct object, *a package*, as opposed to the indirect object, *Steven*, in (32).[10] Unlike in (32), in (33) the sentence does not imply that the event is delimited by Steven's receiving Cathleen's package. The structure in (33) represents the construal that the event is delimited at the moment when the package is sent. Thus, the difference in temporal interpretation between 'dative-shifted' and 'dative-nonshifted' structures can be accounted for in terms of the structural difference.

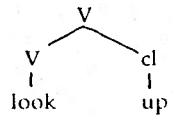
[10] Notice that [spec, VP] and [spec, AspP] are both structual Case position and the direct object *a package*$_j$ in (33) is not assigned more than one type of Case/case. Hence, no Case conflict is involved here.

2.4 Verb-Particle Constructions

As discussed in section 2.1.1, verb-particle constructions denote telic events. Then, it follows from Zagona's analysis that particle verbs have two subevent temporal arguments E_1 and E_2 assigned to the nominal arguments in the specifier position of AspP and that of the lower VP projection respectively, just like the case in double object constructions.

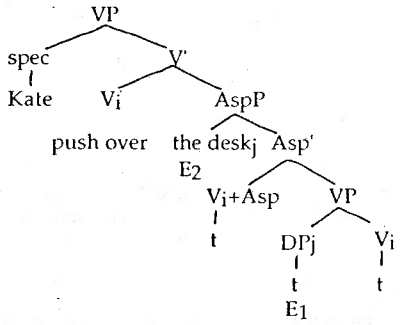
As mentioned in Section 1.2.2 above, I assume that the particle in a verb-particle construction originates as being cliticized to the verb as shown in (34):

(34)

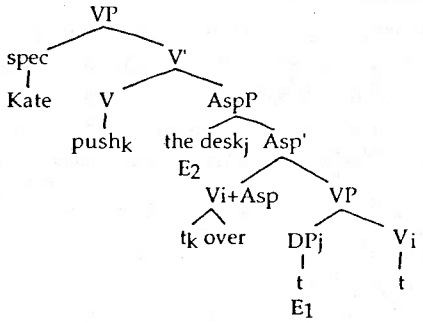


Since the verb in a verb-particle construction has a subevent temporal argument E_2 to assign to [spec, AspP], it must adjoin to Asp^0 and the object DP must raise to [spec, AspP] so that E_2 can be assigned. Note that since a verb-particle complex as a whole has this strong aspectual feature to be checked, both the verb head and the particle must raise to Asp^0 as a single element. Therefore, the particle cannot be stranded in the head position of the lower VP. The verb must overtly raise further to the V slot in the higher VP projection in order to license the external argument of the V, which is in the specifier position of the higher VP. The different linear orders V-particle-DP and V-DP-particle can be derived by assuming that the particle can be stranded in the adjoined position to Asp^0 when the verb undergoes the subsequent movement to the head of the higher VP projection. Thus, the following two derivations are available for verb-particle constructions:

(35) a.



b.



Now we consider the following examples. ((36.a) and (36.b) are from Johnson 1991.)

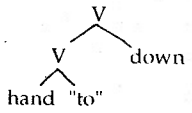
(36) a. Sam handed Mittie down the tools.
b.*Sam handed down Mittie the tools.
c. *Sam handed Mittie the tools down.
d. Sam handed down the tools to Mittie.
e. Sam handed the tools down to Mittie.

These examples show the characteristics of both double object constructions and verb-particle constructions. Below I will show that the present analysis can predict the acceptability of (36. a, d, e) and the unacceptability of (36.b, c).

According to Keyser and Roeper's (1991) analysis, the abstract dative marker and particles occupy the same abstract clitic position. Therefore, it is

predicted that they do not co-occur for a single verb. In fact, constructions like (36.a, d, e) are not possible for all double-object verbs. For instance, double-object verbs like *give, teach, refuse,* and *promise* do not allow such constructions. I assume that certain lexically specific verbs with the abstract dative marker can be reanalyzed as a head and can select a particle. I propose that the verbs in the sentences in (36) have an internal structure as shown below:

(37)

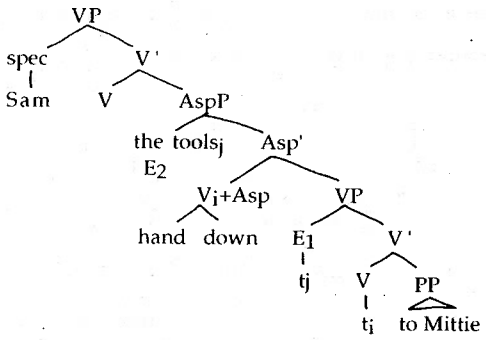


This structure is supported by the fact that the verb *hand* allows both 'dative-shifted' and 'dative-nonshifted' structures without a particle as shown in the following examples:

(38) a. Jennifer handed the file to Kelly.
b. Jennifer handed Kelly the file.

With the structure given in (37), in order to derive acceptable sentences in (36.d) and (36.e) it is necessary to assume that the abstract dative marker "to" can license PP *to Mittie* from the embedded position in the complex verb, or the feature of "to" percolates up to the highest V node and it licenses the PP. With this assumption, the partial derivation of these sentences can be illustrated as follows:

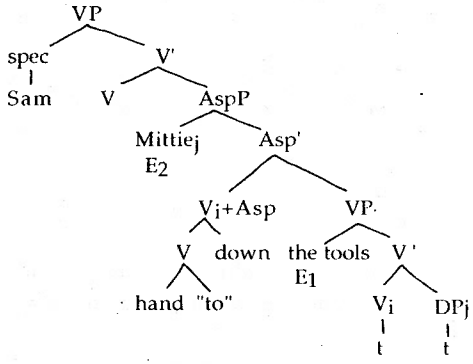
(39)



Since a particle-verb is involved in these sentences, the verb must be adjoined to Asp^0 and it assigns E$_2$ to the DP raised to [spec, AspP] as shown in (39). If the complex verb *hand down* raises to the head position of the higher VP projection, (36.d) is derived. If only *hand* raises stranding the particle *down*, (36.e) is derived.

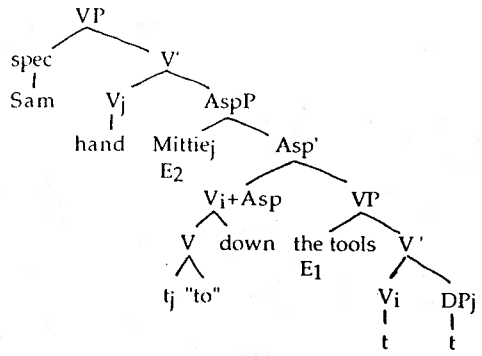
Instead of licensing PP in its base position, the abstract dative marker "to" can adjoin to Asp^0 along with the other components of the verb. Then, in order to derive well-formed sentences, it is necessary for the verb to assign E$_2$ to the DP raised to [spec, AspP] and for "to" to license the DP by assigning it the goal θ-role as illustrated in (40):

(40)



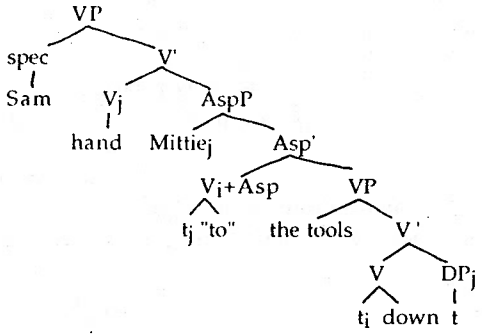
As mentioned earlier, in the above configuration for the abstract dative marker to be licensed, it must stay in the adjoined position to Asp^0 and be in the spec-head configuration with the goal argument. The contrast between (36.a) and (36.b) follows from this assumption: since the verb *hand* and the particle *down* do not form a constituent, they cannot be raised to the head of the higher VP leaving "to" behind. Therefore, sentence (36.b), which involves this illicit raising is ungrammatical. In order to leave "to" in the adjoined position to Asp^0, the particle *down* must be stranded as well as shown in (41) below: thus, sentence (36.a) is grammatical.

(41)



As pointed out earlier, particles cannot be stranded in the head position of the lower VP since a verb-particle complex as a whole has a strong aspectual feature to be checked and assigns subevent temporal arguments. In sentence (36.c) the particle is stranded in the head position of the lower VP as shown in (42) below: thus, the sentence is ungrammatical.

(42)



In this section, I have shown that telicity of the events described by verb-particle constructions can be represented by the same structure as the one proposed for double-object constructions.

2.5 Distribution of Manner Adverbs

In this section I show that the analysis proposed above can solve the problems with the distribution of manner adverbs discussed in 1.2.

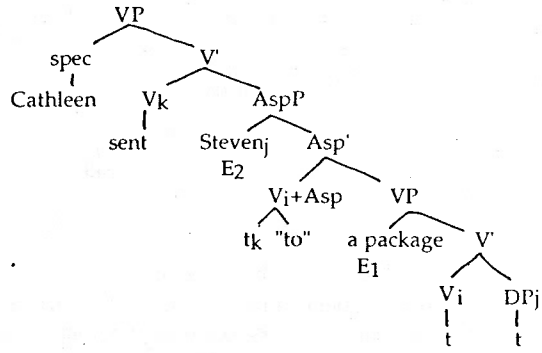
As discussed earlier, with Larson's (1988) analysis the generalization concerning the position of manner adverbs in 'dative-nonshifted' structures does not hold for 'dative-shifted' structures. The relevant examples are repeated here as (43):

(43) a. Tracy [V' quickly [V' gavei [VP *quickly [VP a ring [V' quickly [V' ti [to Holly]]]]]]]
b. Tracy [V' quickly [V' gavei [VP *quickly [VP Hollyj [V' *quickly [V' ti tj [a ring]]]]]]]

With the Larsonian structure, in a 'dative-nonshifted' sentence like (43.a) manner adverbs can only adjoin to V', while in a 'dative-shifted' sentence like (43.b) they may not adjoin to V' or to VP. I will show below that under the present analysis with Inner AspP, the distribution of manner adverbs can be generalized for both 'dative-shifted' structures and 'dative-nonshifted' structures.

In section 2.3 I proposed the following structure for 'dative-shifted' sentences like *Cathleen sent Steven a package*:

(44)



In this structure, if a manner adverb is adjoined to V' in either the higher or lower projection of VP, the resulting sentences are acceptable as follows:

(45) a. Cathleen quickly sent Steven a package.

b. Cathleen sent Steven a package quickly.

In fact, the above two sentences exhaustively indicate the possible relative positions of manner adverbs in 'dative-shifted' sentences. If manner adverbs are allowed to adjoin to VP', unacceptable sentences like (46) would wrongly be allowed:

(46) *Cathleen sent Steven quickly a package.

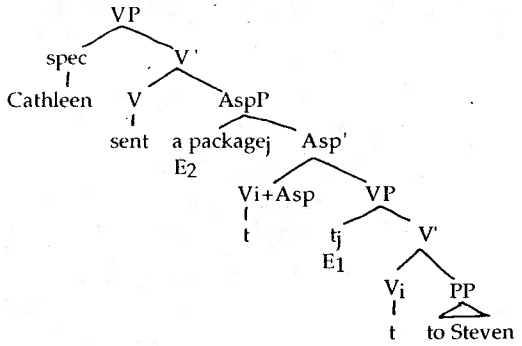
The adjunction of manner adverbs to the projections of Asp^0 should also be precluded in order to rule out unacceptable sentences as follows:

(47) a. *Cathleen sent quickly Steven a package. (to AspP)
b. *Cathleen sent Steven quickly a package. (to Asp')

Thus, with structure (44), manner adverbs can only adjoin to V'.

In 'dative-nonshifted' structures like (48) below, if a manner adverb adjoins to V', only grammatical sentences can be derived as shown in (49):

(48)



(49) a. Cathleen quickly sent a package to Steven.
b. Cathleen sent a package quickly to Steven.
c. Cathleen sent a package to Steven quickly.

In (49.a) and (49.b), the adverb is left-adjoin to the higher V' and the lower V' respectively. In (49.c) the adverb is right-adjoined to either the higher or the lower V'. In case of the right-adjunction, adverbs are always placed at the end of a sentence.

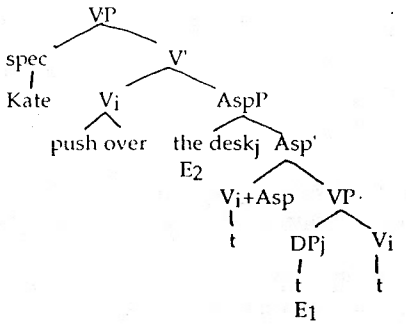
The adjunction of manner adverbs to AspP' should again be precluded in 'dative-nonshifted' structures in order to rule out ungrammatical sentences like (50):

(50) *Cathleen sent quickly a package to Steven.

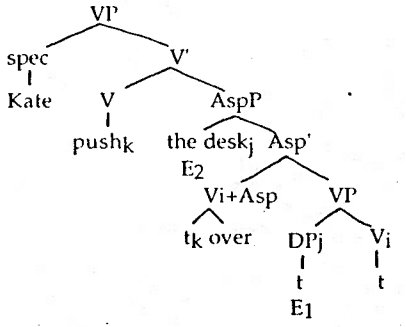
Unlike the cases of 'dative-shifted' structures, in 'dative-nonshifted' structures like (48) even if manner adverbs are adjoined to VP or Asp', it does not seem to produce any unacceptable word orders. In fact, the sentences derived by adjoining a manner adverb to VP' or Asp' in these structures will have exactly the same word order as the sentences derived by adjoining an adverb to V' in the lower VP as in the sentences in (49). However, since the adjunction of manner adverbs to VP are precluded in 'dative-shifted' structures and V'-adjunction covers the same range of data, there is no need to allow VP- and Asp'-adjunction only in 'dative-nonshifted' structures. In fact, later in this section, these adjunctions will be argued against on the basis of the licensing of manner adverbs. Then, with the proposed structures shown in (44) and (48), we can resolve the asymmetry between 'dative-shifted' and 'dative-nonshifted' structures in Larson's analysis with respect to the distribution of manner adverbs.

The distribution of manner adverbs was also problematic in verb-particle constructions assuming the Larsonian-type structure. (cf. 1.2.2.3) In section 2.4 the following structures were proposed for verb-particle sentences such as *Kate pushed over the desk* and *Kate pushed the desk over*:

(51) a.



b.



In 'dative-shifted' and 'dative-nonshifted' structures, manner adverbs are only allowed to adjoin to V'. The question is whether extension of this analysis to verb-particle constructions can rule out unacceptable sentences and make only correct predictions. If a manner adverb adjoins to the higher or lower V' in (51.a) and (51.b), the resulting sentences are acceptable as shown in the following examples:

(52) a. Kate [V' carefully [V' pushed overi [AspP the deskj [VP tj ti]]]]
b. Kate [V' pushed overi [AspP the deskj [VP tj [V' carefully [V' ti]]]]]
c. Kate [V' carefully [V' pushedk [AspP the deskj [Asp' [V tk over]i [VP tj ti]]]]]
d. Kate [V' pushedk [AspP the deskj [Asp' [V tk over]i [VP tj [V' carefully [V' ti]]]]]]

If a manner adverb adjoins to the projection of Asp^0 in (51.a) and (51.b), unacceptable sentences like the following would be derived:

(53) a. *Kate pushed over carefully the desk. (to AspP in (51.a))
b. *Kate pushed carefully the desk over. (to AspP in (51.b))
c. *Kate pushed the desk carefully over. (to Asp' in (51.b))

Unlike the case of double object constructions, in verb-particle constructions the adjunction of manner adverbs to VP does not seem to make wrong predictions. In fact, if a manner adverb adjoins to the higher or lower VP in (51.a) and (51.b), the relative positions of the adverb in a sentence will be exactly like those observed in the acceptable sentences in (52), and no unacceptable word order is derived since both the subject and the verb must be raised to higher positions. This observation appears to go against the generalization that manner adverbs can only adjoin to V'. However, in the following discussion I give two theory-internal arguments that the adjunction of a manner adverb to VP is precluded because VP does not agree with its head in syntactic features, and the manner feature of V^0 that licenses a manner adverb cannot percolate up to VP.

Travis (1988) argues that adverbs are licensed by designated features associated with heads (C^0, I^0 (T^0), V^0). The relevant feature of V^0 to license a manner adverb must be its manner feature. I assume that an adverb can appear in positions within its licensing domain, which is determined by the feature percolation based on the agreement between the licensing head and its projections. Then, if some projection of the licensing head does not agree with the head with respect to some syntactic/semantic features, the relevant feature of the head cannot percolate up to that projection and adverbs cannot be licensed in positions beyond that projection.

As discussed above, non-stative verbs assign a subevent temporal argument E_1 in the specifier position of the lower VP projection. Due to the assignment of this subevent temporal argument to its specifier position, VP can be understood as being marked with some temporal feature, presumably [+event]. Since V^0 does not denote an event by itself or is not marked with this temporal feature, V^0 does not agree with its maximal projection with respect to this feature. Then, the manner feature of V^0 cannot percolate up to VP. A similar explanation should hold for the feature percolation within the

higher VP projection. Assuming with Zagona (1988) that T^0 assigns a temporal thematic role to VP, the higher VP does not agree with V^0 either. Hence, manner adverbs cannot be licensed in the adjoined position to either higher or lower VP.

With the assumption that manner adverbs are licensed by the manner feature of V^0 , the adjunction of manner adverbs within the projections of Asp^0 can also be excluded.

Thus, with the assumptions about the licensing of adverbs, the structures proposed in the present analysis can account for the distribution of manner adverbs in double object constructions and verb-particle constructions, which poses problems for the Larsonian-type structure without AspP.

The presence of AspP in the structure of telic event-type sentences can account for the interpretive possibilities of manner adverbs in such sentences.

It is pointed out by McConnell-Ginet (1982) that sentence (54) is ambiguous. The sentence can mean (i) it was rude of Lisa to depart, and (ii) Lisa departed in a rude manner.

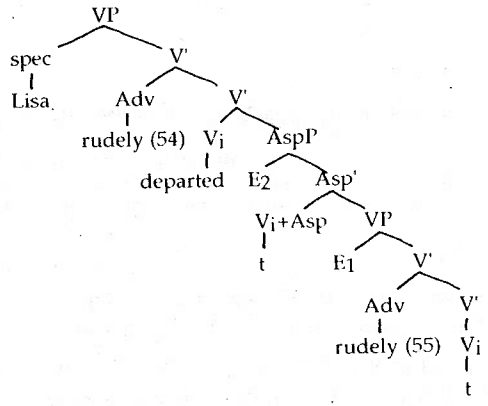
(54) Lisa rudely departed.

However, when the adverb is in the sentence-final position as in (55), the sentence is no longer ambiguous only with the reading given in (ii) above.

(55) Lisa departed rudely.

On the basis of the argument above, the position of adverb in sentence (54) and (55) is as shown below:

(56)



As mentioned earlier, telic events consist of two subevents; process and result-state, which are syntactically realized as E_1 and E_2 respectively. For instance, in a sentence like *Lisa departed*, the process part of the event is Lisa's undergoing a process of changing her location, and the result-state is the state of Lisa's not being in the place where she was before. In interpretation (ii) for (54) and (55) above, the adverb modifies the process part of the event, while in interpretation (i) the event as a whole is modified by the adverb. As shown in structure (56), in sentence (55) the adverb c-commands only E_1.[11] This configuration of the event argument and the adverb can be viewed as that the adverb modifies the relevant part of the event: process, or E_1. Thus, (ii) is the only reading available for (55). On the other hand, in sentence (54) the adverb is located in a position that c-commands both E_1 and E_2. Then, the adverb can be understood to modify either the entire event or a part of it as long as the semantic properties of the adverb are compatible with the properties of the (sub)event it modifies. Thus, in (54) the adverb can modify the process part of the event as well as the entire event rendering the interpretation of (i) and (ii). But, the adverb cannot modify the result-state only since it is not compatible with the manner feature of the adverb.

Similar facts obtains in the following examples:

[11] I am assuming the definition of c-command as in Aoun and Sportiche (1983).
α c-commands β iff every maximal projection dominating α dominates β, and $\alpha \neq \beta$.

(57) a. John generously gave money to his children.
(i) It was generous of John to give money (any amount) to his children.
(ii) John gave money to his children in a generous manner.
b. John gave money to his children generously.—only (ii)

(58) a. John stupidly greeted that woman.
(i) It was stupid of John to greet that woman.
(ii) John greeted that woman in a stupid manner.
b. John greeted that woman stupidly.—only (ii)

(59) a. Michael quickly learned Japanese.
(i) It took Michael a short period of time to master Japanese.
(ii) Michael learned Japanese in a quick manner.
b. Michael learned Japanese quickly.—only (ii)

In the (a) sentences in (57)-(59) the adverbs can be interpreted to modify the entire event, whereas such interpretation is not available for the adverbs in the (b) sentences, which are adjoined to V' in the lower VP projection. Thus, the following descriptive generalization seems to obtain:

(60) When a manner adverb modifies the entire event, it cannot be in a position adjoined to V' in the lower VP projection.

In the proposed analysis, the generalization stated in (60) can be derived from the subevent structure of the verb and the position of the adverb in relation to the subevent temporal arguments.

3.0 *Teiru* Constructions in Japanese

In this section I argue that the difference in interpretation of Japanese *teiru* constructions is due to the differences in scope relation between *teiru* and the subevent temporal argument(s) of the stem verb.

An aspectual morpheme *teiru* attaches to non-stative verbs, and it changes the aspect of the stem verb into progressive or result-state depending on the aspectual property of its host. When *teiru* attaches to a process verb like *hashiru* 'run', the resulting sentence describes a progressive event as in

(61.a) below.[12] When it attaches to an achievement verb like *nakusu* 'lose', the aspectual property of the described event is result-state as in (61.b). When it attaches to an accomplishment verb like *tateru* 'build', the resulting sentence can be understood as describing either a progressive event or result-state as in (61.c).

(61) a. Ken-ga hashit-teiru
Ken-nom run *-teiru*
'Ken is running' <progressive>
b. Ken-ga saifu-o nakushi-teiru
Ken-nom wallet-acc lose *-teiru*
'Ken has lost his wallet' <result-state>
c. Ken-ga ie-o tate -teiru
Ken-nom house-acc build-*teiru*
'Ken is building a house' <progressive> or
'Ken has built a house' <result-state>

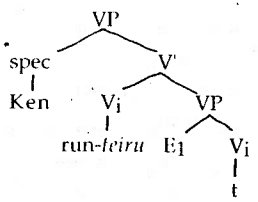
Process verbs have only one subevent temporal argument, E_1, since they form sentences that typically describe atelic events. Accomplishment verbs and achievement verbs form sentences that describe telic events. Thus, these types of verb have two subevent temporal arguments, E_1 and E_2. E_1 and E_2 are the syntactic realization of the subevents process and result-state, respectively. Stative verbs, which lack these subevent temporal arguments, cannot form interpretable *teiru* constructions. This observation suggests that there is a correlation between the types of subevent temporal argument available for the verb and the interpretation of the *teiru* construction. Since result-state reading of *teiru* constructions is possible only for verbs that have E_2, i.e., accomplishment and achievement verbs, it is plausible that this reading is possible only when *teiru* is associated with E_2. More precisely, I suggest that *teiru* constructions receive a result-state interpretation when *teiru* has a scope over E_2, and a progressive interpretation is possible when *teiru* has a scope only over E_1.

---

[12] When a phrase that indicates the event is delimited is present, *teiru* constructions of the same verb can be ambiguous between progressive and result-state reading:
Ken-ga Boston Marathon-o hasit-teiru
-nom -acc run *-teiru*
'Ken is running the Boston Marathon / Ken has run the Boston Marathon'

First we will consider the case of process verbs. The structure of sentence (61.a) is as follows:

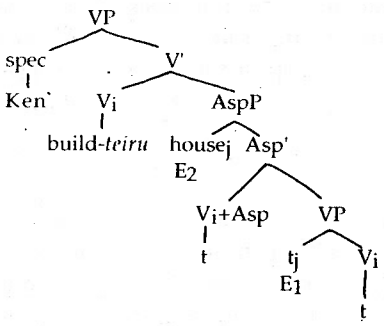
(62)



Since process verbs lack E_2, *teiru* has a scope only over E_1. Thus, the resulting reading is progressive.

Unlike process verbs, accomplishment verbs have both E_1 and E_2. The structure of sentence (61.c) is given below:

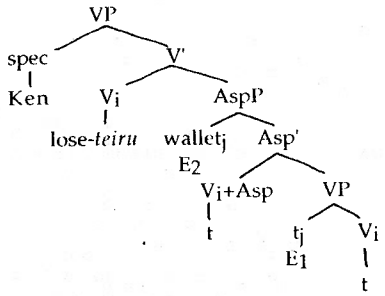
(63)



In (63), *teiru* has a scope over both E_1 and E_2. Then, just like the case of manner adverbs in the previous section, *teiru* can be associated with either E_1 or E_2. Thus, sentence (61.c) is ambiguous between a progressive and a result-state reading.

Achievement verbs have subevent temporal arguments E_1 and E_2 both, just like accomplishment verbs. Thus, the structural representation of sentence (61.b) is as shown in (64) below.

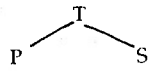
(64)



This structure predicts that a progressive and a result-state interpretations are both available for this sentence. However, unlike accomplishment verbs the *teiru* constructions of these verbs do not receive progressive interpretations. I suggest that this difference is due to the difference between accomplishment and achievement verbs with respect to the temporal properties of E_1.

Pustejovsky (1991) proposes the event structure given in (65) for both accomplishment and achievement verbs:

(65)



Pustejovsky (1991) argues that the difference between these two types of verb is the presence vs. absence of an agentive role for the verbs: Accomplishment verbs have an agentive role while achievement verbs do not. This difference cannot predict the availability of progressive readings of *teiru* constructions. For instance, progressive readings are still possible for process verbs with an inanimate subject as in the following example:

(66) Kikai-ga ugoi-teiru.
machine-nom move-*teiru*
'The machine is working'

What distinguishes achievement verbs from accomplishment verbs seems to be that while some sort of activity is involved in the process part of accomplishment-type events, there is no sense of activity involved in the process part of achievement-type events. Sentences formed by achievement

verbs such as *lose, die, arrive, spot*, etc., denote a change from one state to another, and no sense of activity is involved. For example, a sentence like *My cat died* describes the event of the change of the state that my cat went through; changing process from the state of being alive to the state of not being alive. Therefore, I propose that E_1 of achievement verbs is specified for the feature [-activity] as shown in (67), while that of accomplishment verbs lack such feature specification.

(67) $V_{achievement}$: E_1 E_2
[-activity]

If the process part of achievement-type events denotes a changing process which does not involve an activity, this can be viewed as a concatenation of changing states. Since *teiru* is not compatible with stative events, the unavailability of progressive reading for achievement verbs can be attributed to the feature specification for E_1 of this type of verbs. Thus, even if *teiru* has a scope over E_1 in (64), unlike the case of accomplishment verbs, progressive reading is not available for achievement verbs due to the incompatibility of the properties of *teiru* and E_1.

4.0 Conclusion

Building on the proposals by Zagona (1993) and Travis (1992), I have argued that in double object and verb-particle constructions, the verb overtly raises and adjoins to Asp^0 in order to check off the strong aspectual feature of Asp^0, and the verb assigns a subevent temporal argument E_2 to an object DP which is raised to [spec, AspP]. In 'dative-nonshifted' structures, the direct object of the verb moves to [spec, AspP] and is assigned E_2 by the verb. In "dative-shifted" structures, the "dative" object of the verb moves to [spec, AspP] to be assigned a goal θ-role and E_2 is assigned to this object. The difference between these two structures with respect to their temporal interpretations can be accounted for as the difference in the recipient of E_2 in [spec, AspP], which marks the result-state of an event.

The distribution of manner adverbs was problematic for double object constructions and verb-particle constructions assuming the Larsonian-type structure. I have shown that in the structures I proposed, it is no longer problematic, and the adjacency condition for Case assignment can be derived configurationally. The proposed analysis can also provide an explanation for the correlation between the position of a manner adverb in a sentence and its interpretation in terms of the structural configuration of the adverb and the subevent arguments. In the last section, I have shown that the different interpretations of Japanese *teiru* constructions can be accounted for in a similar way.

The analysis proposed here provides arguments for the existence of AspP proposed by Travis (1992) and for the syntactic representation of the subevent structure of verbs proposed by Zagona (1993). One of the remaining questions is the properties of AspP. Under the assumption that Case properties of object DP are checked through spec-head agreement in AspP, the properties of AspP include the properties of AgrP proposed by Chomsky (1992). Or, alternatively, AgrP subsumes the properties of AspP. This supposition seems plausible since if a language has aspectual verbal morphology, the aspectual properties of a verb and an aspectual morpheme can be checked against each other as a agreement process. For the English verbs that do not have E_2, I assumed that AspP is not projected before Spell-out. However, it may be necessary to project AspP at LF for Case-checking purpose.

References

Aoun, J. and D. Sportiche (1983) "On the Formal Theory of Government," *The Linguistic Review* 2: 211-236.
Bowers, J. (1993) "The Syntax of Predication," *LI* 24:591-656.
Chomsky, N. (1992) "A Minimalist Program for Linguistic Theory," *MIT Occasional Papers in Linguistics* No.1.
Chomsky, N. and H. Lasnik (1991) "Principles and Parameters Theory," to appear in J. Jacobs, A. van Stechow, W. Sternefeld, and T. Vennemann, eds. *Syntax: an International Handbook of contemporary Research*. De Gruyter, Berlin.
Diesing, M. and E. Jelinek (1993) "Distributing Arguments," ms. Cornell University and The University of Arizona.
Dowty, D. (1979) *Word Meaning and Montague Grammar: the Semantics of Verb and Times in Generative Semantics and in Montague's PTQ*. D. Reidel Publishing Company, Dordrecht.
Emonds, J. E. (1976)*A Transformational Approach to English Syntax*, Academic Press.
Green, G. M. (1974) *Semantics and Syntactic Regularity*, Indiana University Press, Bloomington.

Guilfoyle, E. (1994) "VNPs Finiteness and External Arguments," Paper presented at the 1993 NELS conference.
Johnson, K. (1991) "Object Positions," *NLLT* 9: 577-636.
Keyser, S. and T. Roeper (1992) "Re: The Abstract Clitic Hypothesis," *LI* 23: 89-125.
Koizumi. M. (1993) "Object Agreement and the Split VP Hypothesis," *MIT Working Papers in Linguistics* vol. 18.
Larson, R. (1988) "On the Double Object Construction," *LI* 19:335-392.
Larson, R. (1990) "Double Object Revisited: Reply to Jackendoff," *LI* 21: 589-632.
McConnell-Ginet, S. "Adverbs and Logical Form: a Linguistically Realistic Theory," *Language* 58: 144-184.
Pesetsky, D. (1989) "Language-Particular Process and Earliness Principle," ms. MIT.
Pustejovsky, J. (1988) "The Geometry of Events," in C. Tenny (ed.) *Lexicon Project Working Papers* 24, MIT.
Pustejovsky, J. (1992) "The Syntax of Event Structure," in B. Levin and S. Pinker (eds.) *Lexical & Conceptual Semantics*, Blackwell, Cambridge, MA.
Ramchand, G. C. (1993) "Aspect Phrase in Modern Scottish Gaelic," Paper presented at the 1992 NELS conference.
Travis, L. (1988) "The Syntax of Adverbs," McGill Working Papers in Linguistics: *Proceedings of the IV the Workshop on Comparative Germanic Syntax.*
Travis, L. (1992) "Derived Objects, Inner Aspect, and the Structure of VP," Paper presented at the 1991 NELS conference.
Zagona, K. (1988) *Verb Phrase Syntax: A Parametric Study of English and Spanish*, Kluwer.
Zagona, K. (1989) "Time as Temporal Argument Structure," ms. Univ. of Washington.
Zagona, K. (1993) "Perfectivity and Temporal Arguments," Paper presented at the 23rd Linguistic Symposium on Romance Languages.

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The Role of the Head-Direction Parameter in the Acquisition of Japanese Noun Phrases by English and Chinese / Korean Speakers

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1. Introduction

In this study, I assume the parameter-setting model of language acquisition as expressed in Universal Grammar (UG). In this framework, a number of UG principles are associated with certain parameters, which specify dimensions of structural variation across languages (Flynn, 1989). One such parameter is the head-initial/head-final parameter of the X-bar theory of phrase structure rules. Languages differ with respect to the place of the head in relation to its complement. In head-initial languages such as English, Spanish and French, complements follow their heads. In contrast, in head-final languages such as Japanese, Chinese and Korean, complements precede their heads.

Flynn (1989), in the framework of principles and parameters, investigated whether a match/mismatch in the head-direction of the L1 and the L2 significantly determines L2 patterns of learning for English relative clauses. Flynn tested two groups of adult learners — Spanish and Japanese — at three levels of English proficiency on their elicited production of English restrictive relative clauses (RRC). She predicted that the Spanish learners of English would have less difficulty in acquiring this type of construction since English and Spanish match in terms of head-direction, while the Japanese learners would have more difficulty since Japanese and English do not match in head-direction parameter. Her predictions were borne out. Results indicate significant differences in patterns of acquisition between the Spanish and Japanese speakers. Flynn concluded that these differences were due to the match/mismatch between the L1 and the L2 in branching direction (head direction) of complex sentences.

If the hypothesis that "if the L1 and the L2 match in head-direction, L2 acquisition is facilitated, however, if not, it is disrupted" is correct, we would expect to obtain similar results regardless of the languages investigated, or the direction of the L1 and the L2 investigated. One of the purposes of this study is to test this hypothesis, by reversing the L1 to L2 direction employed in Flynn's research. I investigated the L2 patterns of learning Japanese (L2) by speakers of English (L1). In addition, I chose speakers of Chinese and Korean, languages which match Japanese in head-direction, for a comparison with speakers of English in L2 patterns of learning. My prediction is that speakers of Chinese and Korean would outperform speakers of English with respect to acquisition of noun phrases in question. If the hypothesis is confirmed, it will support the claim that head-direction parameter-setting is relevant in second language acquisition across languages.

The second purpose of this study is to investigate whether or not L2 has any effect in the acquisition of L3. More specifically, I would like to elucidate the nature of the head-direction parameter: Can the value of the head-direction parameter in L2 be transferred in L3? If this is the case, then we would expect that English learners of Japanese as L3 who have studied either Chinese or Korean as L2 would perform better than other English speakers who have no such language background. If the value of the head-direction parameter in L2 can be transferred to L3 when it matches in L2 and L3, learners need not reset the value of the parameter. Consequently, it was predicted that learners with relevant L2 background would outperform others in their acquisition of L3. If the value of the parameter in L2 is totally inert in L3 acquisition, then we would expect that there will be no significant

difference in L3 acquisition by learners regardless of their L2 background. It follows that English learners who have studied either Chinese or Korean will show a similar acquisition pattern as those who have no such language background.

The third purpose of this study is to see whether the type of tests affect the results of the experiment. In her research, Flynn used the elicited imitation task, which asks a learner to repeat a sentence as it is presented by an experimenter. Flynn claims that this type of elicited oral imitation task is a standardized validated experimental task used in language acquisition studies (1989:95). However, although it may be a good experimental tool to assess both comprehension and production, no convincing arguments were provided validating the elicited imitation task. My conjecture is that the results would differ depending on the type of testing: oral or written. Since the oral imitation task also challenges examinees in memory processing, it is possible that their performance would be influenced by factors such as the memory capacity for each individual, length of a sentence, physical and mental conditions of an examinee and so forth. Thus, in this study, in order to investigate whether the same results can be replicated, I conducted two types of test: a written test and an elicited imitation task. These two tests are assumed to assess two aspects of language competence; comprehension and production.

2. Method

Subjects

The subjects were students learning Japanese as a second language at the University of Washington. All were volunteers who were willing to participate in this experiment after class during a 7-15 minute break. There were three levels of Japanese proficiency distinguished by the year of study (first-year, second-year, and third-year). I used this classification by year as the learners' proficiency measurement. It would have been more desirable if all learners had been administered a standardized placement test. However, in the current circumstances, this was not possible. Given that students were assigned a class in the beginning of each quarter, depending on their length of study and their proficiency in Japanese, and an incoming student was obliged to take a placement test to be assigned an appropriate class, I assumed that students of any one year were nearly equal in proficiency. Since Chinese and Korean speakers are not numerous, and not equal in number across all levels, I classified these two language groups into one. Given that Chinese and Korean are, like Japanese, a head-final language, it is assumed that considering them as homogeneous would not affect the results of the experiments.

In the beginning of the written test, I questioned the subjects about their language background, eliciting such information as i) native language, ii) age when starting to learn Japanese, iii) length of Japanese study, iv) length of residence in Japan, if any, and v) any other foreign languages learned and the length of study.

I administered the two types of test: a written test and an elicited imitation task. The number of subjects for the written tests are summarized in Table 1.

Table 1 Numbers of Subjects for the Written Test

	1st Year	2nd Year	3rd Year
English	22	25	5
English with Chinese	4	4	0
Korean	3	7	0
Chinese	4	5	2
Others (Indo-Euro)	3	1	0

(Non Indo-Euro)	3	1	0
	39	43	7
TOTAL			89

Secondly, I administered an oral elicited imitation task with Flynn's previous study as a model. As this experiment was scheduled around the end of the spring quarter, I could not obtain a sufficient number of subjects. Thus, I decided to administer this type of test only to the second year students. They were chosen as a sample because they had just learned the second type of structure: noun phrases with a relative clause[1], which had not yet been taught to the first year students. Number of subjects for the elicited imitation task are summarized in Table 2.

Table 2 Numbers of Subjects for Elicited Imitation Task

	2nd Year
English	4
English with Chinese	3
Korean	1
Chinese	2
German	1
TOTAL	**11**

I have to admit that the number of subjects obtained for this test are so small that any findings are far from conclusive. Especially the one Korean and the one German speaker cannot be representative of a broader population.

[1]In the grammar of Japanese language, a relative clause is sometimes called "sentence modifier" (Jorden, 1988).

Materials and Procedures

In this study, I am exclusively concerned with acquisition of noun phrases (NP) in Japanese, since configuration of a noun phrase is typically different from that of English in terms of head-complement placement. I assessed the acquisition of two types of noun phrases; i) a noun with a prepositional phrase (PP) and ii) a noun with a sentence modifier. Since the grammatical structures taught in the Japanese program at this university vary depending on the year, the structures I tested for each year are as follows (each head is in bold):

a) First year: NP (PP + **N**) (Complement - **Head**)
b) Second year and third year: NP (PP + **N**) (Complement - **Head**)
NP (S + **N**) (Complement - **Head**)

Noun phrases with a prepositional phrase are illustrated as follows (each head is in bold):

Noun phrase with a prepositional phrase (PP)

1) a. eki-no-**mae**
station-of-front
"**the front** of the station"

b. mae-no-**eki**
front-of-station
"**the station** in front"

2) a. ginkoo-no-tonari-no-**mise**
bank-of-next door-of-shop
"**the shop** next door to the bank"

b. mise-no-tonari-no-**ginkoo**
shop-of-next door-of-bank
"**the bank** next door to the shop"

As we can see, the configuration of a noun phrase in Japanese is exactly opposite to that in English with respect to the placement of head and complement.

Flynn (1989) differentiated four types of restricted relative clauses in English. Following her model, I differentiate the four types of noun phrase

with a sentence modifier in Japanese. Here are some sample sentences of each type, S/S, S/O, O/S, and O/O[2] (each head is in bold):

I. S/S
||Sakki kita| **hito**-ga | kuruma-o kaimasita.
just now came person-NOM car-ACC bought
"|**The person** |who came just now|| bought the car."

vs.
||Sakki kuruma-o kau| **hito**-ga| kimasita.
just now car-ACC buys person-NOM came
"|**The person** |who is going to buy the car|| came just now."

II. S/O
||Tanaka-san-ga okutta| **nimotu**-ga| kinoo kokoni tukimasita.
Mr. Tanaka-NOM sent package-NOM yesterday here arrived
"|The **package** |that Mr. Tanaka sent|| arrived here yesterday."

III. O/S
Tanaka-san-ga ||kinoo kokono tuita| **okyakusan**-o| annaisita.
Mr. Tanaka-NOM yesterday here arrived guest-ACC guided
"Mr. Tanaka guided |the **guest** |who arrived here yesterday||.

IV. O/O
||Yuube karita| **video**-o| mimasita.
last night (I) rent video-ACC watched
"I watched |the **video** |that I rent last night||."

The written test

The written test was divided into two parts, composed of three sections each: part 1 for NPs with a prepositional phrase (I - III), and part 2 for NPs with a sentence modifier (IV - V). Only I to III were used in testing for the first year students, while all sections were given to the second and the third year students. Each section aimed at assessing the following skills:

I. Aural comprehension (multiple choice)
II. Aural comprehension
III. Production

IV. Production
V. Aural comprehension (multiple choice)

Before administering the experimental test, I conducted pilot studies with four native speakers of Japanese and five non-native speakers of Japanese, who are teaching Japanese as Teaching Assistants in the Department of Asian Languages and Literature at the university. Their correct responses in the test reached 90 to 100 percent.

In the beginning of each section, I gave subjects a sample question in order to make sure that they understood the question, thereby increasing the reliability of the results. In the following, I will describe briefly the type of question asked in each section.

I. Aural comprehension

Subjects listened to eight sentences, each of which contained a noun phrase with a prepositional phrase. With the understanding that they were to respond to this in English, they were instructed to select more appropriate answer from the two choices. Each sentence was read only once, and choice time was limited to 10 seconds. One of the questions in this section is the following:

Experimenter says: Gakko-no-**doko** ni ikimasitaka?
"**Where** in the school did you go?"

[2]Following Flynn (1989), I use this notation to distinguish the types of sentence modifier. The first grammatical position refers to the grammatical function of the noun phrase ,NP, (in brackets) in the main clause. The second grammatical position refers to the grammatical function of the head noun in the sentence modifier. (Flynn, 1989: 96, fn.2)

(not doko-no-gakko "which school")

Response: a. I went to the University of Washington.
b. I went to the library.

Answer: b

II. Aural comprehension

In this section, subjects were shown a map which contained shops, buildings and the like. Looking at the map and assuming that they were standing in the position indicated on the map, subjects listened to four questions delivered orally once , and answered each question by specifying the kind of building. The choice time was limited to 10 seconds.

Experimenter says: [[Migi no kissaten no] **usiro**]-wa nan desuka?
"What is [**behind** [the coffee shop on the right]]?"

In the map, it is the bookstore that is behind the coffee shop on the right.

Answer: (bookstore)

III. Production

Looking at the pictures, subjects listened to five questions delivered orally once and answered the question in Japanese. The choice time was limited to 20 seconds.

Experimenter says: Tanaka-san no kuruma wa doko desuka?
"Where is Tanaka's car?"

In the picture, Tanaka's car is in front of the building in the rear.

Answer: (Tanana-san no kuruma-wa [[usiro no biru no] **mae**] ni arimasu.)
Tanaka of car-TOP back no building of front in is
"Tanaka's car is in [**front** [of the building in the rear]]."

IV. Production

Looking at the pictures, subjects listened to four questions delivered orally once and answered the questions in Japanese. The choice time was limited to 20 seconds.

Experimenter says: Tanaka-san-wa dono hito desuka?
"Which person is Tanaka?"

In the picture, Tanaka is reading a newspaper while sitting among other people.

Answer: (Tanana-san-wa [[sinbun-o yonde-iru] **hito**] desu.)
Tanaka-TOP newspaper-ACC reading-is person is
"Tanaka is [**the one** [who is reading a newspaper]]."

V. Aural comprehension

Subjects listened to eight Japanese sentences including sentence modifiers, each read only once. From the two choices, they were asked to select the English sentence that is closer in meaning to the Japanese sentence they heard. The choice time was 10 seconds.

Experimenter says:
[[Suzuki-san-ga sitteiru] **hito**]-ga sensyuu kekkon simasita.
Suzuki-NOM knows person-NOM last week got married
"[**Someone** [Suzuki knows]] got married last week."

Answer
a. Suzuki knows someone who got married last week.
b. Someone Suzuki knows got married last week.

In presenting stimulus sentences to subjects in the aural comprehension sections, in order to avoid unspecified bias, only one experimenter (that is me) administered all of the experimental sentences to all classes.

Elicited imitation task

The imitation task was administered individually to each subject with an appointment. Students were asked to repeat, one at a time after the experimenter, 16 sentences in total (either with NP with a preposition phrase or NP with a sentence modifier). In principle, each stimulus sentence was read only once. However, as conducted by Flynn (1987), if the subject was unable to catch the sentence due to auditory reasons, or s/he was not able to repeat any of the sentence or was able to repeat only the first word of the sentence, then the sentence was read a second time by the experimenter. Subjects' responses were tape-recorded during the experiment. Among the 16 stimulus sentences, there were four sentences containing an NP with a prepositional phrase and 12 sentences containing an NP with a sentence modifier (three each for four different types of construction, O/O, O/S, S/O, S/S). Here are some sample stimulus sentences given in the test:

NP with a prepositional phrase
[[Ano terebi no ue no] **sinbun**] -o totte kudasai.
that TV of top of newspaper-ACC take please
"Could you take [that **newspaper** [on top of the TV]]?"

NP with a sentence modifier
Sakki [[Tanaka-san-o sitteiru] **hito**-ga] kaisya ni kimasita. (S/S)
just now Tanaka-ACC know person-NOM company to came
"Just now someone who knows Tanaka came."

3. Results

Findings

Written tests: I had to discard the data obtained from Section II (comprehension) for two reasons. First, it seems that subjects had difficulty in figuring out which direction would be "front", "back", "over there" and so on in the map shown to them. Secondly, it seems that a fairly large number of subjects had forgotten the vocabulary of direction, as indicated by the confused use of the lexical items in the test. Thus, the data from this section might have been largely affected by vocabulary, which is not relevant for the head-direction parameter.

Section III (production) could not be administered for the students of first year due to a lack of time. Consequently, Section I (comprehension) is the only data obtained from the first year.

Appendix A to C show the number and percentage of correct responses for each subject and includes background information concerning their language learning. Table 3 summarizes the data obtained in the written test.

Table 3 Data obtained

	NP with prepositional phrase	NP with sentence modifier
1st	I (Comprehension)	----------
2nd	I (Comp.) III (Prod.)	IV (Prod.) V (Comp.)
3rd	I (Comp.) III (Prod.)	IV (Prod.) V (Comp.)

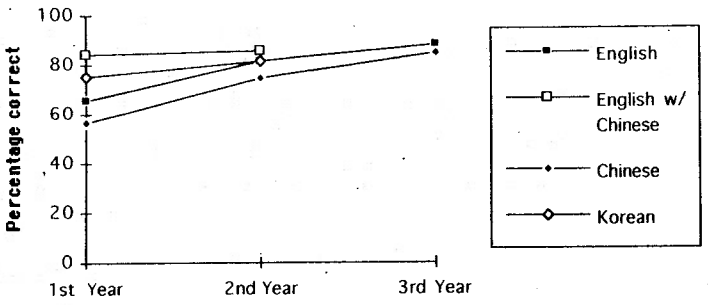
The percentages of correct responses for each language group across the three levels are summarized in Table 4 and Chart 1.

Table 4 Percentage of Correct Responses

	English		**Chinese & Korean**		**Others**	
	English	*with Chinese*	*Chinese*	*Korean*	*Indo-Euro.*	*Non Indo-Euro*
1st Year	65.3 (22)	84.4 (4)	56.3 (4)	75.0 (3) 64. (7)	83.3 (3)	62.5 (3)
2nd Year	81.0 (25)	85.8 (4)	74.5 (5)	81.3 (7) 78.5 (12)	93.8 (1)	84.4 (1)
3rd Year	88.3 (5)		84.9 (2)			

( ) number of subjects

Chart 1 Percentage of Correct Responses



Conclusions that can be drawn from these data are as follows:

1) The percentages of correct responses improve as the level of Japanese goes up (first year < second year < third year).

2) The higher the level of Japanese, the smaller the difference between the English and the Chinese / Korean group.

3) English with Chinese language background always performed better than English without such language background.

4) Korean subjects performed better than Chinese subjects. This suggests that it might be questionable to treat these two language groups as homogeneous.

Table 5 and Chart 2 and 3 on next page show the percentage of correct responses for each section in the written test.

Table 5 Percentage of Correct Responses for Each Section

Year	Lang.group		I (C)	NP with PP III (P)	NP with sentence modifier IV (P)	V (C)	AVERAGE
1	E	English	65.3				65.3
		English w/C	84.4				84.4
	C/K	Chinese	56.3				56.3
		Korean	75				75
	Others	Indo-Euro.	83.3				83.3
		non.Indo-Euro.	62.5				62.5
		AVERAGE	**71.1**				**71.1**
2	E	English	73.5	82	86	78.5	81
		English w/C	87.5	90	81.3	79.9	85.8
	C/K	Chinese	80	88	60	70	74.5
		Korean	66.1	91.4	78.6	89.3	81.3
	Others	Indo-Euro.	75	100	100	100	93.8
		non.Indo-Euro.	62.5	100	100	75	84.4
		AVERAGE	**74.1**	**91.9**	**84.3**	**82.1**	**83.1**
3	E	English	72.5	84	100	97.5	88.3
	C/K	Chinese	56.3	90	100	100	84.9
		AVERAGE	**64.4**	**87**	**100**	**98.8**	**87.6**

Chart 2 Percentage of Correct Responses for Each Section (The Second Year)

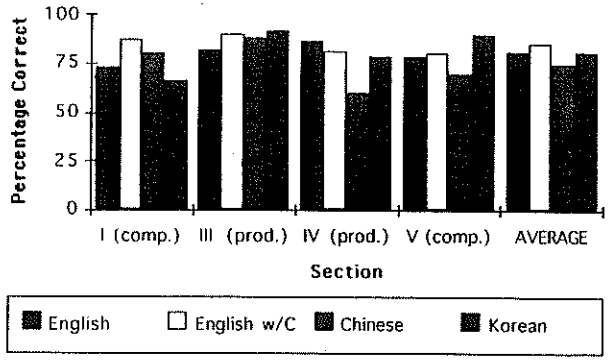
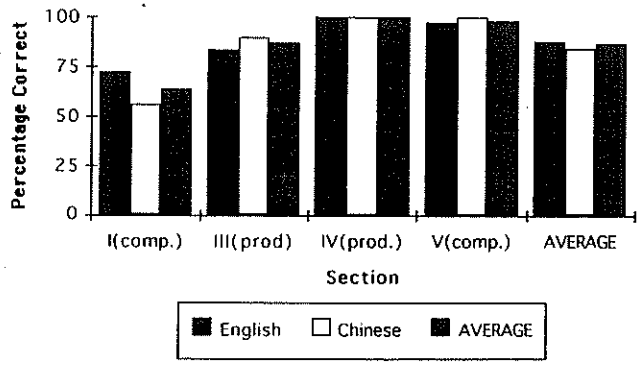


Chart 3 Percentage of Correct Responses for Each Section (The Third Year)



A close examination of the data reveals the following:

1) Acquisition of noun phrases (NP) with a prepositional phrase (PP) is slower than that of noun phrases with a sentence modifier. This is prominently shown in the lower rate of improvement from the first year to the second year (71.4% - 74.1%) or degeneration in the third year (64.4%) in comprehension of noun phrases with a prepositional phrase. Compared to NPs with a PP, NPs with a sentence modifier seems easier to acquire: 82. 1% -- 98.8% (comprehension), 84.3% -- 100% (production). In spite of the fact that subjects learned the latter structure relatively recently (the second students learned it a month ago, and the third years almost a year ago), their attainment of this structure is far better than that of the other type of NP, NP with PP; in the third year they attain almost 100% correct responses in both comprehension and production.

2) Korean (the second year) and Chinese (the third year) performed relatively poorly on the comprehension of NP with a PP (66.1 % and 56.3%, respectively).

3) Chinese (the second year) performed poorly on production of NP with a sentence modifier.

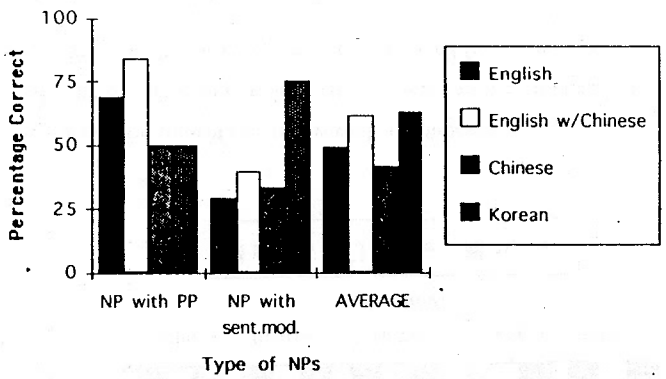
Elicited Imitation Task: Table 6 and Chart 4 summarize the results of elicited imitation task.

Table 6 Percentages of Correct Responses in Elicited Imitation Task

	Lang. group		NP with PP #	NP with PP %	NP with sent.modifier #	NP with sent.modifier %	AVERAGE %
E	English	(4)	2.75	68.8	3.5	29.2	49
	English w/C	(3)	3.3	83.3	4.7	39.2	61.3
C/K	Chinese	(2)	2	50	4	33.3	41.7
	Korean	(1)	2	50	9	75	62.5
Others	German	(1)	.4	100	10	83.3	91.7

( ) number of subjects

Chart 4 Percentages of Correct Responses in Elicited Imitation Task



Because of the smaller number of subjects, reliable findings may hardly be obtained. Nonetheless, as well as in this type of oral test, we still notice that English speakers who have Chinese background outperformed other English speakers (English speakers with Chinese background -- 61.3% vs. other English speakers -- 49.0%).

4. Discussion

Poor performance by Chinese / Korean subjects

Contrary to the hypothesis, Chinese / Korean, especially Chinese speakers, performed more poorly than English speakers. Smaller percentages of correct responses by those speakers in the written test may be attributed to the experimental methodology; since English was used as an intermediary language of the test (Section I and V), these non-native speakers of English might have been handicapped. This is typically shown in the percentage of correct responses in Section I: in the first year, Chinese speakers had 56.3% of correct answer, Korean speakers, 75.0%. In the second year, accuracy was Chinese - 80.0%, Korean - 66.1%. In the third year, accuracy was Chinese - 56.3% (see Table 5). In the aural comprehension sections, I and V, they had to listen to the sentences in Japanese, then read the given choices in English, and choose the answer. Some of the choices given in English are fairly long, thus, given a limited amount of time, it might not have been as easy for them to read and understand English as it was for native English speakers. This suggests that if English is used as a tool in an experiment, subjects' proficiency of English has to be taken into consideration.

There is another factor that seems to have affected the results in aural comprehension. When subjects did Section I and V, they read the given choices while listening to the sentences delivered orally. It might have facilitated their comprehension of the sentences. Even though they had not fully understood the meaning of the sentences, they could have filled the gap of comprehension by looking at the given choices as the sentences were read. Thus, this procedure of the test may not assess the subject's intrinsic comprehension competence. It may be crucial in this type of test, to not allow subjects to read the given choices either *before* or *as* the sentences are read.

Errors in lexical items

Some wrong responses in the written test may be attributed to the gap in lexical items. It seems that subjects had not yet acquired all the lexical items used in the test. Before designing this written test, I carefully chose

vocabularies that had been covered by the textbook by the date of the experiment. Nonetheless, lexical errors, especially in vocabularies of direction such as "back", "behind", "in front of " and so on, figure prominently in Section I and III. In order to eliminate the possibility of interference through a lack of vocabulary, Flynn (1984, 1989) provided each subject with a list of lexical items occurring in the experiment so that they could prepare beforehand. In addition, before administering the test, subjects were tested to ensure 100% comprehension of all lexical items on the given list. I should have administered a vocabulary pre-test before carrying out the written test to ensure that subjects had mastered all the lexical items used in the experiment.

Problem with treating Chinese and Korean as homogeneous

As I have observed, Korean speakers always performed better than Chinese speakers. The relevant data are found in the second year students' score in Table 5: Chinese - 74.5% vs. Korean - 81.3%. The same tendency can be seen in the data obtained from the elicited imitation task in Table 6: Chinese - 41.7% vs. Korean - 62.5%. With respect to the head-direction, Japanese, Chinese and Korean are a head-final language. Thus, we expected that there should not have been any significant difference in performance between Korean and Chinese speakers. This phenomenon may or may not be attributed to morphological or syntactic differences that exist among the three language. A close examination of the configuration in noun phrases reveals that the three languages differ slightly in terms of morphological properties. They don't necessarily overlap at least as far as the morphological structures of the types of noun phrase in question are concerned. The following examples illustrate the configuration of the two types of NP in Japanese, Korean and in Chinese, respectively:

(1) NP with a PP

J: tsukue	no	ue	no	hon	"the book on the table"
K: cheksang	0	ui	ui	chek	
C: zhuozi	0	shang	de	shu	
table	of	top	of	book	

(2) NP with a sentence modifier

J: kinoo	yonda	0	hon	"the book which I read yesterday"
K: ochae	ilgun		chek	
C: zuotian	wo kan	de	shu	
yesterday	I read		book	

In NP with a PP, Korean and Chinese exactly overlap each other in that they do not allow the occurrence of the genitive morpheme "of" after the leftmost noun "table". This is manifested in the errors made by both Korean and Chinese speakers in the elicited imitation task. The speakers with these language backgrounds tended to drop the first genitive marker "of" inserted between nouns. Here are some examples of mistakes:

(3) *stimulus sentence:*

..... mukoo no baiten no usiro.....
over there of shop of rear
"the rear of the shop over there"

response:

..... mukoo 0 baiten no usiro

(4) *stimulus sentence:*

..... suupaa no mae no resutoran
supermarket of front of restaurant
"the restaurant in front of the supermarket"

response:
..... supaa 0 mae no resutoran

On the other hand, in NP with a sentence modifier, Chinese does require the occurrence of *de* "of" between the complement (sentence modifier) and the head, *shu* "book". Insertion of *no*, (*no* corresponds to *de* in Chinese), in this particular position, between a sentence modifier and a head, can be frequently seen in the mistakes made by native Chinese speakers both in the written and elicited imitation task. Here are one of the examples of errors of this sort.

(5) *stimulus sentence*:
[Haha-ga tukutta] 0 keeki .....
mother-NOM made cake
"the cake [that my mother made]"

response:
[Haga-ga tukutta] no keeki

However, in Korean, although the genitive marker "of" is not inserted between a sentence modifier and a head, a different type of morpheme *un*, in the example (2), is suffixed at the verb in sentence modifier. This morpheme is a marker of past tense and relative clause, and it always appears before the head noun that it modifies.[3] Although Korean shows a similar property to Chinese in that they possess a kind of morpheme inserted between a sentence modifier and a head noun, the Korean speaker made none of the morphological errors described in (5) in the elicited imitation task. Percentage of correct responses of the Korean speaker (62.5%) is much higher than that of the Chinese speakers (41.7%). With these morphological differences that exist among the three languages, it is still difficult to pinpoint where the significant difference in performance between Korean and Chinese speakers come from. To improve the experiment, larger number of subjects are needed. At any rate, what the results of this study suggest us is that classifying these two languages into one category only due to matching in head-direction is not theoretically motivated. It is necessary to separate these two language groups.

Outperformance by English speakers with Chinese background

English speakers who have learned Chinese outperformed others through all of the sections in written test and elicited imitation task. This may be an indication that their knowledge in L2 (Chinese) is activated and utilized in learning L3 (Japanese). In other words, the value in head-direction parameter in L2 (Chinese) is transferred to L3 (Japanese) , winning over the value of their L1 (English). This suggests a possibility that L2 may influence the acquisition of L3 if the relevant value of parameters is involved.

5. Conclusion

The results of this study do not replicate the previous study by Flynn (1989). As discussed earlier, this may be attributed to methodological

[3]One of my Korean friends pointed me out that if a sentence modifier is in present tense, a different morpheme "nun" is used:

i) ochae ilgun chek "the book I read yesterday"
yesterday (I) read-PAST book

ii) ilgnun chek "the book I read/ am reading"
(I) am reading/ read-PRES book

problems in my experiment. The results obtained from the two types of tests, written and oral, indicate us that there is no significant difference created by the types of test. However, given the methodological problems in the written test and the smaller number of subjects used in elicited imitation task, it may be too precocious to jump to conclusions. Further research is needed to confirm the results obtained in this study. Finally, what is consistently noticeable in this study and does not seem to be affected by any methodological problem is the fact that English speakers with Chinese background performed better than other English speakers both in the written and the oral tests. This is summarized in the following chart.

Written Tests

1st: *English with Chinese* > Indo-Euro. > Korean > *English* > Chinese

2nd:(Indo-Euro.) > *English with Chinese* > Korean > *English* > Chinese

3rd: English > Chinese

Elicited Imitation Task
(German) > (Korean) > *English with Chinese* > *English* > Chinese

This fact may indirectly support the hypothesis that the head-direction parameter plays some role in acquisition of NP in Japanese.

My studies suffered from a number of methodological problems. Thus I refrain myself from drawing any decisive conclusion. I have to postpone more sophisticated analyses of the study until further investigation is carried out.

BIBLIOGRAPHY

Chomsky, N. 1980. *Rules and Representations*. New York: Columbia University Press.
Chomsky, N. 1981. *Lectures on Government and Binding: The Pisa Lectures*. Dordrecht, The Netherlands: Foris.
Chomsky, N. 1982. *Some Concepts and Consequences of the Theory of Government and Binding*. Cambridge, Mass: MIT Press.
Chomsky, N. 1986. *Knowledge of Language:Its Nature, Origin, and Use*. New York: Praeger.
Corder, S.P. 1975. "Language Distance and the magnitude of the Language Learning Task." *Studies in Second Language Acquisition*. 2. 27-36.
Eubank, L. 1989. "Parameters in L2 learning:Flynn Revisited." *Second Language Research*. vol 5, no.1. 43-73.
Eubank, L. 1993. "Sentence Matching and Processing in L2 Development." *Second Language Research*. 9. 3. 253-280.
Flynn, S. and I. Espinal. 1985. "Head Initial /Head Final Parameter in Adult L2 Acquisition of English." Second Language Research 1. 93-117.
Flynn, S. 1986. "Production vs. Comprehension: Differences in Underlying Competences." *Studies in Second Language Acquisition*. 8. 135-164.
Flynn, S. 1989. "The role of the Head-initial/Head-final parameter in the acquisition of English Relative Clauses by Adults Spanish and Japanese Speakers." *Linguistics Perspectives on Second Language Acquisition*.
Gass, S. 1979. "Language Transfer and Universal Grammatical Relations." *Language Learning*. 29:1. 327-344.
Johnson, J. and E. Newport. 1989. "Critical Period Effects in Second Language Learning: The Influence of Maturational State on The Acquisition of English as a Second Language." *Cognitive Psychology*. 21. 60-99.
Jorden, H. E. 1988. *Japanese: The Spoken Language*, PART 2. Westford, Mass.: Yale University Press.
Myhill, J. 1982. "The Acquisition of Complex Sentences: A Cross-Linguistic Study." *Studies in Second Language Acquisition*. 4. no. 2. 193-201.
Yule, G. and M. Powers, D. Macdonald. 1992. "The Variable Effects of Some Task-Based Learning Procedures on L2 Communicative Effectiveness." *Language Learning*. 42:2. 249-277.

APPENDICES

In the following tables , I included means for the percentage correct for each language group; English speakers, English speakers with Chinese or Korean background, Korean speakers, Chinese speakers, speakers of other languages, either Indo-European such as German, French, Spanish, or non Indo-European such as Tagalog, Thai, Laotian).

Appendix A First Year Students' Score

*A.S.= Age of Starting to learn Japanese
*Y.S.= Years of Study *Length of Staying in Japan

	Native Language	Age	Gen.	A.S.	Y.S.	L.S.	# correct	% correct	Comments
#1	English	18	M	15	3		4	50	
#2	English	18	F	14	5		5	62.5	
#3	English	18	M	14	4	4M	6	75	
#4	English	18	M	15	3		6	75	
#5	English	19	F	18	3Q		3	37.5	
#6	English	19	F	17	2	1.5M	3	37.5	
#7	English	19	F	16	3		4	50	
#8	English	19	F	16			5	62.5	
#9	English	19	M	15	3		7	87.5	
#10	English	19	F	17	1Y3 Q	2-3M	7	87.5	
#11	English	19	M	15	2.5		8	100	
#12	English	20	F	20	3Q		3	37.5	
#13	English	20	M	19			6		
#14	English	20	M	19	3Q	1Y	6	75	
#15	English	21	M	20			8	100	
#16	English	21	M	19	2	1.5M	3	37.5	
#17	English	21	F	20	3Q		6	75	
#18	English	21	F	20	3Q		7	87.5	
#19	English	22	M	22	3Q		4	50	
#20	English	23	M	22			7	87.5	
#21	English	25	M	24	3Q		2	25	
#22	English	29	M	27	2		5	62.5	
								65.3	
#23	English	21	M	19	3Q		7	87.5	Chinese 1 Y
#24	English	22	M	17	2to3	1M	8	100	Chinese 1 Y
#25	English	30	M	30	3Q		6	75	Chinese 10Y
#26	English	40	M	39	3Q		6	75	Chinese 4 Y
								84	
								84.4	
#27	Korean	19	F	16	2Y1 Q		8	100	
#28	Korean	26	M	24	1.5		4	50	
#29	Korean	29	M	28	3Q		6	75	
								75	
#30	Chinese	18	M	15	3		4	50	
#31	Chinese	19	M	17	3		5	62.5	
#32	Chinese	21	F	19	3Q		4	50	
#33	Chinese	25	M	24	3Q		5	62.5	
								56.3	
					Korean + Chinese Average			64.3	
#34	German	25	M	23	3Q		7	87.5	
#35	French/German	26	M	25	3Q	1M	7	87.5	
#36	Spanish	28	M	27	3Q		6	75	
								83.3	
#37	Tagalog	19	M	18	3Q		6	75	
#38	Thai	20	F	20	1Y3 Q	1.5M	6	75	
#39	Laotian	21	F	20	3Q		3	37.5	
								62.5	

Appendix B Second Year Students' Score

	N.L.	A	G	AS	YS	LS	I #	I %	III #	III %	IV #	IV %	V #	V %	AVE.
#1	English	19	M	16	3		4	50	3	60	3	75	4	50	58.8
#2	English	19	F	6	11		7	87.5	4	80	2	50	7	87.5	76.3
#3	English	19	F	18	2	5M	7	87.5	5	100	4	100	7	87.5	93.8
#4	English	19	M				7	87.5	5	100	4	100	7	87.5	93.8
#5	English	19	M	10	8Y1 Q	1Y	8	100	5	100	4	100	7	87.5	96.9
#6	English	20	F	18	2	1M	4	50	1	20	2	50	4	50	42.5
#7	English	20	F	15	4	6W	3	37.5	3	60	3	75	5	62.5	58.8
#8	English	20	M	16	6		3	37.5	4	80	4	100	5	62.5	70
#9	English	20	M	16	5	11 M	8	100	3	60	2	50	7	87.5	74.4
#10	English	20	M	16	4	3M	6	75	5	50	4	100	3	37.5	78.1
#11	English	20	F		2	1M	5	62.5	5	100	4	100	8	100	90.6
#12	English	20	M	17	2.5	2M	5	62.5	5	100	4	100	8	100	90.6
#13	English	20	F	18	2	3	7	87.5	5	100	4	100	6	75	90.6
#14	English	20	F	14	6		8	100	5	100	4	100	7	87.5	96.9
#15	English	20	F	15	4	9M	8	100	5	100	4	100	7	87.5	96.9

#16	English	20	F	12	7	1Y	7	87.5	5	100	4	100	8	100	96.9
#17	English	21	F	18	2	6M	5	62.5	5	100	4	100	7	87.5	87.5
#18	English	21	F	19	2		6	75	5	100	4	100	6	75	87.5
#19	English	21	M	19	2		7	87.5	5	100	4	100	8	100	96.9
#20	English	22	M	19	2.5	3M	4	50	5	100	3	75	8	100	81.3
#21	English	24	F	19	3	1Y	4	50	0	0	3	75	6	75	50
#22	English	24	F	20	3	1Y	7	87.5	5	100	4	100	7	87.5	93.8
#23	English	25	F	23	2		5	62.5	2	40	0	0	6	75	44.4
#24	English	25	F	22	2		7	87.5	5	100	4	100	6	75	90.6
#25	English		F	'	2	6W	5	62.5	5	100	4	100	7	87.5	87.5
															81

*Heard as a child

#26	English	21	F*1	18	2		7	87.5	5	100	3	75	7	87.5	87.5
#27	English	23	F*2	22	2		7	87.5	5	100	4	100	7	87.5	93.8
#28	English	26	F*3	25	1		7	87.5	3	60	2	50	6	75	68.1
#29	English	26	M* 4	24	2		7	87.5	5	100	4	100	7	87.5	93.8
															85.8

*1 Chinese 1 year
*2 Chinese 1 year
*3 Chinese 9 years
*4 Chinese 5 years

#30	Korean	20	F	19	2		3	37.5	2	40	0	0	6	75	38.1
#31	Korean	20	F	19	2		3	37.5	5	100	2	50	6	75	65.6
#32	Korean	20	F	18	3		7	87.5	5	100	4	100	8	100	96.9
#33	Korean	21	F	16	3		5	62.5	5	100	4	100	8	100	90.6
#34	Korean	21	F	20	1Y3 Q		7	87.5	5	100	4	100	8	100	96.9
#35	Korean	25	M	23	2		6	75	5	100	4	100	6	75	87.5
#36	Korean	27	F	19	2		6	75	5	100	4	100	8	100	93.8
															81.3
#37	Chinese	18	M	18	2		6	75	3	60	0	0	6	75	52.5
#38	Chinese	20	F	20	1		7	87.5	5	100	4	100	5	62.5	87.5
#39	Chinese	21	F	19	2		7	87.5	5	100	2	50	8	100	84.4
#40	Chinese	21	F	19	2		7	87.5	5	100	2	50	4	50	71.9
#41	Chinese	22	M	20	2		5	62.5	4	80	4	100	5	62.5	76.3
															74.5

Korean + Chinese Average **78.5**

#42	German	29	M	27	2		6	75	5	100	4	100	8	100	**93.8**
#43	Viet.	22	M	21	2		5	62.5	5	100	4	100	6	75	**84.4**

Appendix C Third Year Students' Score

							I		III		IV		V		
	N.L.	A	G	AS	YS	LS	#	%	#	%	#	%	#	%	AVE.
#1	English	20	F	10	5	8M	7	87.5	5	100	4	100	8	100	96.9
#2	English	22	M	5	3	13Y	6	75	2	40	4	100	8	100	78.8
#3	English	22	M	15	5	1Y	5	62.5	6	100	4	100	8	100	90.1
#4	English	24	M	21	3	2Y	6	75	5	100	4	100	7	87.5	90.1
#5	English	40	F	20	3	3M	5	62.5	4	80	4	100	8	100	85.6
															88.3
#6	Chinese		F	18	3		5	62.5	4	80	4	100	8	100	82.3
#7	Chinese	55	F	20	1.5		4	50	5	100	4	100	8	100	87.5
															84.9

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The Peg Prefix, the Foot and the Word Minimum: evidence from Salcha Athabaskan

Siri G. Tuttle

1. Introduction: The foot-minimum hypothesis

Rice (1990a) presents evidence from Hare (a northern Athabaskan language) for a binary foot, left-strong in verbs, which serves as domain for a number of phonological rules. Rice's (1990a) treatment relates this foot to a familiar Athabaskan phenomenon, the insertion of a dummy syllable before a morphologically bare verb stem (described in Li 1946). This dummy syllable is often called the "peg" prefix, and occurs in almost all Athabaskan languages.

In Hare, an underlying verb string made up of a stem and phonetically empty inflection surfaces with two syllables: one is the stem and the other is the "peg" prefix, a whole epenthetic syllable. Rice (1990a) gives the following example:

(1) [hɛ]jɛ̨
hɛ- 'epenthetic' + ∅ '3 subject' + - jɛ̨ 'sing'

Rice views this epenthetic syllable as a natural consequence of a prosodic requirement for the Hare verb: it must be represented prosodically by a foot. If two syllables are not underlyingly present, a morphologically empty, but phonetically realized, syllable is added.

Rice's foot-minimum hypothesis is an attractive candidate for generalization to other Athabaskan languages. The epenthetic syllable is so prevalent in the language family that an explanation based on a word minimum seems naturally extendable. It is worthwhile, therefore, to test the robustness of Rice's explanation across the language family. In this paper I will contribute some evidence which appears to support the foot-minimum hypothesis.

Salcha Athabaskan, spoken until the summer of 1993 in the Fairbanks area of Alaska, provides an opportunity to test Rice's foot-minimum hypothesis. This is the case for two reasons. First, Salcha, like Ahtna, Dena'ina and Kato, has no peg requirement - that is, a verb stem which is inflected only with phonetically empty morphemes surfaces as a bare stem. Second, Salcha has an active stress system, so there is abundant evidence for the nature of the Salcha foot. If Rice's (1990a) account for Hare is generalizable, Salcha's foot structure and word minimum requirement will prove to differ systematically from the foot structure and word minimum observed in Hare.

Evidence from Salcha supports the generalization of the foot-minimum hypothesis to languages other than Hare. Salcha's stress system uses a moraic trochee, a foot which can be made up of a single heavy syllable. The fact that Salcha does not require a "peg" prefix is consistent, then, with a one-foot-minimum for verbs; if the foot does not require two syllables, neither should the verb.

The Salcha material used in this paper was compiled in two intensive periods of research (winter 1991, summer 1991) and scattered sessions through 1991-93 with Eva Moffit, the last speaker of Salcha. Additional material has been drawn from the lexicon created by James Kari and myself from our field notes and those of Michael Krauss, Nancy McRoy, Elizabeth Andrews and others. In addition, James Kari and Michael Krauss have provided assistance in analysis of my notes, without which my study of Salcha would have been impossible.

2. The Peg Prefix Hypothesis

2.1 Athabaskan Verb Structure (telescoped)

In this section I will explain what is meant by a "peg" prefix. For the sake of clarity, I begin by discussing the Athebaskan verb as an abstract entity.

Every analysis of an Athabaskan verb, in any of the languages, has an implicit Athabaskan-universal proposal within it. The verb has a life of its own as an abstraction, and its problems are scrutinized through the different lenses provided by each language. Constant comparison is a safeguard against rash claims for language-family-universal structure based on language-specific oddities. For this reason, it is useful to make explicit some of the Athabaskan verbal structure which I assume. The following comments are to be read as no more than a loosely framed introduction for readers unfamiliar with the language family, no particular language is represented here.

In (2) I give a diagram of a (very stylized) Athabaskan verb

(2)

(DISJUNCT)#(OBJ)/SBJ+	ASP/THEM+	CONJ/MODE+	SBJ+	CLASS+	STEM+	(SUF-)
Adverbs	Dir Obj,	Aspect	Conjugation	Rtward	Voice	Basic
Incorporates	Leftward	Thematic	& Mode	Subj		Meaning
Postpositional	Sbj		(Tense)			
Phrases						

In this diagram, words printed in bold represent elements which *must* be morphologically presented in every inflected verb. Words enclosed in parentheses represent elements which may be present morphologically. "Subject" is not bolded but is not enclosed in parentheses, because some subject must be present but its position varies.

Athabaskan verb formation starts with the stem, which contains the basic kernel of meaning, often very abstract, that the finished verb carries. Verb stems are the most numerous elements in an Athabaskan lexicon (Salcha's incomplete lexicon records 1,200).

"Classifiers" do not classify verbs, but are sometimes predictive of argument structure. There are usually three classifiers with phonetic form and one which is considered to be present in zero-form, but the phonetic instantiations vary from language to language.

The "rightward subject" position contains some of the subject markers for every Athabaskan language, but which these are will vary. Because these morphemes are often closed up in a syllable coda with the classifier, they tend to

undergo heavy phonological changes.

The conjugation and mode positions contain morphemes which give information about tense. Aspect markers to their left are also involved in tense marking. Thematic elements are prefixes which may have no identifiable meaning to the speaker, but are required to make up the finished verb.

The leftward subject position contains information about subjects which has been called "deictic"; in some languages all the information about a particular subject morpheme shows up in this position. In this diagram I let the direct object precede the leftward subject, but this ordering is not invariant and is not an issue in the present paper.

The "disjunct" area is closely involved with verbal morphology (disjunct elements may be thematic) but prosodically more distinct than the "conjunct" area of prefixation to its right. (Sapir, in his 1914 description of Chasta Costa, observed that a disjunct adverb or postposition "while best considered as a non-integral part of the verb, forms a rather close syntactic unit with it." I have not yet found a better way to say this.)

A diagram like (2) is needed to keep track of the many homophonous morphemes in Athabaskan verbs; **n**, for example, may appear as a postpositional object in the disjunct area, or a direct object to the left of thematic morphemes and mode, or it may itself be a thematic morpheme, a conjugation morpheme, a mode morpheme or part of a subject morpheme. Knowing its slot in the verb complex tells us how to figure out how it is functioning, and hence what the word means.

The tricky part of a discussion of the Verb as linear sequence is that some of the elements which must be *morphologically* present may be *phonologically* empty. A verb must be marked for subject, conjugation and mode, and classifier in order to be properly inflected; but in particular situations, subject, conjugation, mode and classifier may be phonologically null in form. So it is possible *to have a fully inflected verb in which only the stem has underlying phonological form.* It is the assumption that the previous statement is true for all Athabaskan languages (i.e., it is an Athabaskan Universal) that allows the peg prefix hypothesis.

2.2 The peg prefix hypothesis: Li (1946) < Sapir (1914)< Goddard (1912)

What I call the "peg prefix hypothesis" can be stated informally as follows:

> Because it is possible for all required elements of an Athabaskan verb, except the stem, to be phonetically empty even though morphologically present, the morphology predicts that there will be verbs which contain only the stem. Therefore, the presence of an additional syllable in verbs of this type is not morphologically, but phonologically motivated.

Rice (1990a) uses Li (1946) as an example of a "peg" analysis, but the notion of an epenthetic syllable in Athabaskan verbs precedes Li's Chipewyan sketch. Sapir (1914), describing Chasta Costa (a Pacific Coast Athabaskan language, spoken in northern California), gives the following comments (the "third modal element" is what has since been named a classifier; (*) indicates an underlying form, slashes represent syllable boundaries):

"If the verb form consists, properly speaking, of the stem alone, without prefix of any kind, an inorganic *A*- completed by a consonant that depends for its form on the first consonant of the stem is prefixed for the third person:

As/se/t'e "he must cry" (<*se/t'e; cf. dō/*A*c/se 'I'm not crying' < **A*c/se)"
(in modern orthography: **əs.sé.te, do:## əš.sé**)

"...This *A*- at the beginning of a third personal form appears also when the verb begins with a third modal element:

Al/Áz 'he sneezes'"
(in modern orthography: **əl.əz)**

"In this respect Chasta Costa differs from Kato, which need have nothing preceding the stem; with *As se* compare Kato *tce'* 'he cried'." (Sapir 1914, p. 319)
(in modern orthography: Chasta Costa **əs.sé**, Kato **čeh)**

Sapir's assumption that the third person singular subject marker is phonetically empty is also stated in the 1914 article: "...the third person, apart from possible deictic prefixes, is marked by the absence of any pronominal element." He sticks to this representation of the third person subject despite a confusing example.

"x-

tc!é/x*A*θ/t!ō 'he swims across' (contrast *tc!e/θit/t!ō* 'you swim across')"
(modern orthography
č'e.xəθ.t'o: **'he swims across'**
č'e.θit.t'o: **'you swim across')**

"This **x**- seems to have no parallel in Hupa or Kato (is it connected with third person objective *xō*- of Hupa, *k<u>u</u>*- of Kato?). Were it not that -*t!ō* 'to swim, bathe' is used only of singular subjects, one might surmise that *x*- is really plural *xA*- ." (Sapir 1914, p. 306)

In other words, Sapir finds a phonologically non-null element (xə) in the third person singular of 'swim' where he expects to find a phonologically null element. Because it is not present in second person, it cannot be easily related to the preceding syllable (č'e). Because the syllable xə is not regularly present in third person singulars, however, (only ə is) he dismisses the example as anomalous.

What is important about Sapir's discussion of the "inorganic *A*" in Chasta Costa, as opposed to Kato, is that it assumes that the difference between the two languages is not morphological. That is, it is considered already established that Kato and Chasta Costa both mark the third person singular subject morphologically by the same device, a phonologically empty morpheme. There is no suggestion that Chasta Costa possesses a third person subject morpheme which Kato does not, or that Chasta Costa requires the presence of a morpheme which Kato allows to be omitted.

Li's (1946) description of Chipewyan also assumes a phonetically empty third person singular subject. Using the same paradigm as Sapir for an example, he illustrates the position of the "peg" prefix:

"a peg element hɛ- is added to the verb in this position when there is no other prefix preceding the pronominal subjective prefixes. This element does not appear in the second singular and is regularly dropped in the perfective, the future etc., where we require other prefixes preceding the pronominal subjects."

Li's example, [hɛtsay] 'he's crying' is considered underlyingly 0-imperfective, Ø-subject, and θ-classifier. Therefore, the syllable hɛ- is

morphologically empty, but required. Interestingly, in the same paradigm he gives a third person dual/plural form [hɛhɛtsaɣ] which *does* have a prefix "preceding the pronominal subject prefixes" (at least the rightward ones) -- [hɛ-] third dual/plural subject. Yet the peg prefix is still present even though the morphological string provides a phonologically solid syllable without help: hɛ+∅+∅+∅+tsaɣ (third person plural, empty conjugation, empty mode, empty subject, empty classifier, stem.)

The little anomalies in Sapir's and Li's third person paradigms, however, have not been taken by other researchers to suggest that third person singular subjects in the Athabaskan verbal complex have any phonetic form; the empty third person singular is generally assumed. Thus the peg syllable has been accepted as being phonologically, not morphologically motivated.

In this paper, the assumption of a phonologically empty third person singular marker underlies all prosodic explanation of peg syllables. It is worth noting, however, that if the findings for Salcha and Hare prosody are not generalizable to other languages in the Athabaskan family, morphological explanation for the differences between pegging and nonpegging languages may be a possible avenue for exploration.

3. Hare

Rice's (1990a) account makes explicit a prosodic explanation for the peg phenomenon, by tying the peg syllable to a minimum word requirement and a metrical foot. In so doing, it makes possible the testing of the whole peg hypothesis.

The claims made by Rice are:

- There is a two-syllable minimum for the Hare foot
- There is a two-syllable minimum for the Hare verb
- The second statement is explained by the first, if a verb has a prosodic minimum requirement of one foot.

3.1 The foot in Hare

The foot described by Rice (1990a) and exemplified in Rice (1990b) for Hare, which defines the minimal verb for that language, is a disyllabic, quantity-insensitive, left-strong foot. It mirrors exactly the CV(C)CVC verbal structure which is canonical in peg-prefix languages. Rice explicitly demonstrates disyllabicity and rhythmic type (left-strong), however, she does not explicitly state the absence of quantity-sensitivity.

The left-strong property of the Hare foot is shown by two phenomena: difference in intensity between the strong and weak branches of the foot, and a rule of tone shift which associates a high tone underlyingly attached to a stem to the syllable preceding the stem. Stress generally falls "on the vowel immediately preceding the stem of a verb" (Rice 1990b) in Hare, evidenced by a greater intensity of this vowel relative to the intensity of the stem vowel. That the tone is underlyingly attached to the stem is shown by comparison with the Beaulake dialect, which does not have this tone shift rule.

(3) a) né?a 'you sg. eat' (Bearlake form [ne?á]
b) góhts'i 'I lie' (Bearlake form [gohts'í]
c) hélu 's/he nets, snares' (prestem vowel is epenthetic)

Quantity-insensitivity is harder to show in Hare, both because of the limited distribution of the foot in verbs (it appears only on the final two syllables), and because of the nature of stem syllable development in Hare. Verb-stem-final nonsonorants in Slave generally neutralize to [h] word-finally (Rice 1990b, 93); in Hare, they often delete as well when they are not followed by a suffix. Stem-final nasals are deleted when not followed by a vowel-initial suffix in Hare, and Rice (1990a, b) gives no tone-shift examples with stems ending in other sonorants.

However, it is possible to infer quantity-insensitivity from Rice's analyses on the basis of rule ordering considerations. Rice (1990b, 950) states that peg-epenthesis is a Level 1 rule, taking place along with stem formation. However, nasalization must be a late rule, occurring after word formation is complete: stem-final nasal vowels alternate with oral vowels followed by overt [n] when followed by a vowel-initial suffix. (4) shows examples of this alternation in Hare nouns and verbs:

(4a) (Rice 1990b, 83)
shį /chin/ 'stick'
-shiné /chin + é/ 'stick', possessed form

(4b) (Rice 1991a, 218)
hįwɛnɛ 'it is pimply'
hį- 'epenthetic' + wɛ́n 'star' + ɛ 'stem-formative'

The alternation in (4a) shows that nasalization has not taken place at the level of stem formation in nouns, since the inflectional possessive suffix must attach to a VN sequence; (4b) shows that the application of the stem-formative suffix to a descriptive verb must also precede nasalization.

Epenthetic vowels may themselves be nasalized. (5) shows two examples from Rice (1990b, 521) in which the /n/-conjugation and /ñ/-perfective markers show up as nasalization on an epenthetic vowel.

(5a) /n + ñ + ∅ + D + la/ 'arrive', perfective
hęla 's/he arrived'

(5b) /n + ñ + ∅ + D + ch'i/ 'arrive crawling', perfective
ęch'i 's/he arrived crawling'

From examples (4) and (5), I conclude that nasalization rules must follow peg-epenthesis. This means that a stem with nasalized vowel is of the form /CVN/ at the point in the derivation when epenthesis takes place. The order of derivation must be

1) Foot formation
2) Epenthesis
3) Nasalization

A nasal-final verb, then, may be taken to contain a canonically heavy (CVC) stem syllable. Example (6) (Rice 1990a, 217) has the configuration (CV)(CVN however, the tone shift rule is operative in this as in other examples, in the contrasting Bearlake dialect, the high tone appears on the stem.

(6) Hare Bearlake Stem
wodǫ wodǫ́ -dǫ /-dom/ 's/he will/ must drink'

A derivation of this verb would start with the underlying stem /don/; foot formation would demand a preceding syllable, despite the CVN structure of the stem, and tone shift would associate the high tone of the stem to the left branch of the foot.

It is possible for Athabaskan quantity systems to depend on vowel quality, even when syllables closed by consonants are not counted as heavy. In the Pacific Coast Athabaskan language Galice, for example, "full" vowels (V) are metrically strong but "reduced" (*ə) vowels are metrically weak (Tuttle 1994). For this reason, it is important to rule out this type of quantity-sensitivity for Hare. This is easily done from the examples given in (3), above, given again here as (7).

(7)
a) néʔa 'you sg. eat' (Bearlake form [neʔà]
b) góhts'i 'I lie' (Bearlake form [gohts'i]
c) hélu 's/he nets, snares' (prestem vowel is schwa)

In (3, 7a, b, c), the stem vowel is "full" in Athabaskan terms; in a quality-based quantity system, each of these stems would be metrically strong. However, even in (c), where the prestem vowel is epenthetic and thus cannot be other than "reduced" in Athabaskan terms, the high tone associates to the prestem and not the stem syllable. Therefore, the Hare foot shows no sensitivity to syllable weight either of the CV/CVC or the Cə/CV variety.

I conclude that the Hare foot has the following properties, two of which are explicitly stated by Rice (1990a, b) and one of which may be inferred from Hare phonology:

1) it is obligatorily disyllabic
2) it is left-strong
3) it is quantity-insensitive

This description of the Hare foot gives us a basis for comparison with foot structure in other Athabaskan languages.

3.2 The minimal verb in Hare

The prosodic minimum for Hare verbs is in clearest evidence in verbs which consist of a stem (one syllable), a -classifier (that is, a classifier without phonetic form), a third-person singular subject (another null morpheme) and no consonantal prefixes to the left of the subject. This is the only verb configuration which provides *only* one syllable's worth of phonological material for morphological reasons.

I repeat Rice's Hare example (given above as (1)

(8) [hé jį̀ɛ
he- 'epenthetic' + ∅ 3 subject' + - jɛ 'sing'

Rice's account predicts, then, that the minimum foot requirement will match the minimal verb requirement, and that a syllable added to make up a prosodic minimum will be added only to a foot that needs it: one that must contain two syllables.

The definition of the disyllabic foot as prosodic minimum for the verb explains the addition of epenthetic syllables neatly, and is well supported in Rice's account by other facts of Hare phonology. This account, including the structure

of the foot employed, makes the implicit prediction that verb minima will be tied to foot structure in other Athabaskan languages. In particular, a language which does not require epenthetic prestem syllables, or pegs, should cooccur with a foot which need not be disyllabic.

4. Salcha

Before Salcha can be compared with Hare, both foot type and word minimum requirements must be separately established. In order to discuss syllable weight in Salcha, it is necessary to show the distinction (already referred to, and common to Athabaskan languages) between full and reduced vowels. For this reason, and to facilitate reading of examples, I include here consonant and vowel inventories and some discussion of vowel quality.

4.1 Salcha Consonant and vowel inventory

The phonetic inventory of Salcha consonants is given in (9). Allophonic variants which will be present in examples are enclosed in parentheses and explained below

(9) Phonetic inventory of Salcha Consonants

Plain	b	d	dl	dð	dz	j	g	'
Aspirated		t	tl	tθ	ts	ć	k	
Glottalized		t'	tl'	tθ'	ts'	ć'	k'	
Fricative (-vce)				θ	s	ś	x	(h)
Fricative (+vce)	(β)			ð	z		γ	
Sonorant (+vce)	(m)	n	l		y			
Sonorant (-vce)		(nh)	l		(yh)			

This inventory is based on those proposed in Krauss (1982) and Moffit, Kari and Tuttle (1991). As is usual in Athabaskan orthography, symbols used in English for voiced vs. voiceless stops (**d vs. t**) are used for plain vs. aspirated stops. **nh** and **yh** represent voiceless allophones of **n** and **y** which occur word-finally. **β** and **m** are allophones of **b**; **β** is a voiced bilabial fricative which is found intervocalically; **m** is found stem-initially when a nasal follows within the stem

h in Salcha has two sources: it is an allophone of **x**, most often seen syllable-finally in prefixes, and it represents partial voicelessness in word-final full vowels in stems.

The phonetic inventory of Salcha vowels is presented in (10). As with the consonants, allophonic variants are enclosed in parentheses and explained below

(10) Phonetic inventory of Salcha vowels

Full-long	i (i̯)	æ (æ̯)	a (ą)	u (ų)
Full-short	(ı)	(æ)	(a)	(u)
Reduced	(ɪ)	(ɑ)	ə (ə)	o (o)

The basic distinction in Salcha vowels is between what are called "full" and "reduced" vowels in Athabaskan discourse. "Reduced" does not mean "derived" in Athabaskan terminology, the reduced vowels are reflexes of historical schwa or rounded schwa. The two types of vowels behave very differently

Full vowels tend to be constant in quality, although they may vary in duration. Full vowels are long in open syllables (**i:, æ:, a:, u:**) and distinctly shortened (**i, æ, a, u**) in closed syllables. Word-finally, full vowels are partially devoiced, for which the orthographic convention is **Vh**. A full-vowel - nasal consonant sequence within a syllable usually results in nasalization of the vowel and deletion of the nasal (producing surface i̥:, æ̥:, ḁ:, u̥:) so that much of the nasality in full vowels is predictable, though there are a few examples of lexicalized nasality. In this paper, I will show length and nasality in surface forms.

Reduced vowels, on the other hand, are very inconstant in quality, being subject to much variation due to assimilation. They are always short in duration. A reduced vowel followed by a nasal consonant word-finally results in **ənh**, not nasalization and deletion as with a full vowel.; nasalized reduced vowels only occur before glottal stop. Reduced vowel variations are derived historically as well as synchronically. The rounded variant, which I represent with **o**, occurs adjacent to historically labialized velars which no longer carry a feature for rounding themselves. Since labialized velars do not surface anywhere else in the language, but **o** does (as in **šos, 'black bear'**) and since **b** does not spread rounding to neighboring vowels, I consider that a reduced vowel **o** must be considered underlying.[1] The high front variant (**ɪ**) occurs contiguous to coronal consonants and historically coronal consonants - i.e., **k, g** < ***k̟, g̟**. Since the raising rule appears to be synchronically active, I do not consider the high front variant to be underlying. The same reasoning applies to **ɑ**, which occurs only in the environment of **x**.

The inventory as given in (6) separates full and reduced vowels orthographically so that they do not share symbols, this will make it easier for the reader to track the full vs. reduced distinction, which is important to the metrical argument. In examples, nasalization, shortening, raising and lowering will be represented orthographically. A syllable containing a full vowel is abbreviated **CV:**, a syllable containing a reduced vowel will be abbreviated **Cə**. **CVC** will stand for any closed syllable, with either a full or reduced vowel.

Examples in this paper are transcribed showing some surface variation: nasalization, length in full vowels, reduced vowel raising and lowering, and devoicing of sonorants will be represented.

4.2 Salcha stress system

I assume here that the foot required for a word minimum will be the same foot as that employed in the assignment of stress. Accordingly, this section will define the foot as it appears to operate in the Salcha stress system.

Salcha's foot formation rule assigns binary, left-strong, quantity-sensitive iterative feet, which I will formalize as moraic trochees, beginning at the right edge of specified domains. In this section I will present examples showing how this foot structure is motivated.

4.2.1 Foot Structure and quantity-sensitivity

Stress in Salcha is realized as increased intensity, and sometimes heightened pitch, on a stressed syllable. Primary and secondary stresses are audible.

The nouns in (11), below, show the left-strong nature of the foot. Multisyllabic monomorphemic words in Athabaskan are rare; in Salcha, the words in (11) and (12) represent the whole inventory of native multisyllabic morphemes, all of which are nouns. All the words in (11) have penultimate stress, shown here with bolding of stressed syllable. All the vowels in (11) are "reduced", i.e., historically schwa, so the configuration represented here is CəCə, or light-light.

(11) a) **jɪ.gɪ** 'blueberry'
b) **ts'ə.βə** 'spruce'
c) **də.βə** 'sheep'

Penultimate stress, as in (11), occurs in Cə.Cə configurations. However, in CəCVC or CəCV:, stress is final. (12) shows monomorphemic nouns with final CVC syllables.

(12) a) **tl'əɣəs** 'snake'
b) **t'əɣəθ** 'cottonwood'
c) **tthəɬyh** 'ground squirrel'

Full vowels (as opposed to reduced vowels) also make syllables heavy. (13) contains examples of disyllables with final full vowels.

(13) a) **də.næh** 'man, person'
b) **bə.zhu:** 'king of hearts' (from French *monsieur*)

In (13), a final stress pattern is seen which is parallel to the pattern in (12), where final syllables are closed by a consonant. (The [h] at the end of 'person' is not a consonant, it should be remembered, but an effect of word-final devoicing.)

(14) shows nouns which are not readily analyzable as compounds, but which have a sequence of two heavy syllables. In these sequences, both heavies receive stress, but the leftward foot is stressed more heavily (shown with underlining), this is an effect of word stress, which will be discussed more completely below. (Loanwords make the best examples of these HH-monomorphemes, because native words tend to contain one foot or less per morpheme.)

(14) a) **gi:.hi:** 'priest, minister'
b) **ga:.hi:** 'coffee'
c) **gel.ki:** 'key'

In two-syllable verbs, quantity-sensitivity is demonstrated by contrasts between heavy and light prefix syllables, rather than contrasts in stem syllables. This is because stem syllables in Salcha are all "heavy", that is, either CV: or CVC. The verb theme in (15), which uses no classifier and no disjunct prefixes, allows the contrast of light and heavy syllables: in this theme the leftmost prefix is an indefinite direct object ('something'). The vowels in the first and third person singular are schwas, the vowel in the second person singular is a full nasalized

vowel. As with the nouns in (11), a stressed syllable is bolded; if two syllables are stressed, the more prominent is also underlined.

(15) ɕ' + subject + 'a:ɬ

a)	ɕ'**ə<u>s</u>.'a:ɬ**	'I'm eating something'	subject: əs
b)	ɕ'**i<u>:</u>.'a:ɬ**	'you (sg.) are eating something'	subject: i:
c)	ɕ'**ə.'a:ɬ**	's/he is eating something'	subject: not marked (prestem V optional)
	~ ɕ'.'a:ɬ		

The forms in (15a, b) show stress on both prestem and stem syllables, which reflects the fact that both syllables are stressed when heavy. *Relative* weight of the two feet in a CVX.CVX verb is determined by word stress, which will be taken up below.

A future form from the same paradigm shows that a vowel cluster carries the same moraic weight as a full vowel; in the future, where the third person singular has a long vowel in the prestem syllable, stress is penultimate just as in first and second person. The a: in this example is made up of ɤ (progressive), which has vocalized, plus a schwa which has assimilated to the ɤ by lowering to a.

(16) ɕ' + ɬ + ɣ + subject + 'a:ɬ

ɕ'**ɬɣə<u>s</u>.'a:ɬ**	'I will eat something'
ɕ'**ɬɣi<u>:</u>.'a:ɬ**	'you will eat something'
ɕ'**ɬa<u>ɤ</u>.'a:ɬ**	's/he will eat something'

These examples show that not all prefix syllables receive equal treatment in Salcha's stress system: full vowels and vowel clusters are stressed, as are syllables closed by consonants, but light, that is, open syllables with reduced vowels, are not stressed. From these contrasts in the prefix syllables I conclude that Salcha recognizes syllable weight based on vowel quality and consonant closure.

4.2.2 Definition of the Salcha Foot

Preference for heavy syllables, coupled with penultimate stress in light-light sequences, suggests a trochaic or left-strong foot. I adopt here Hayes' (1991) moraic trochee, which is defined thus:

(17) Moraic Trochee: (x .) (x)

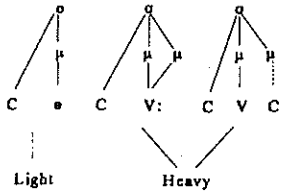
‿ or ‿‿

The breve mark (‿) indicates a light syllable, as defined by the mora association rules of the language, – indicates a heavy syllable. The moraic trochee is made up of two moras, both of them may be in the same syllable (–) or there may be one in each of two syllables (‿‿).

For Salcha, moraic assignment will reflect two weight distinctions: the distinction between full and reduced vowels mentioned earlier (full vowels will be bimoraic, and reduced vowels monomoraic), and the distinction between open and closed syllables. V and VC will both count as bimoraic sequences *within* a syllable, and CəCə as a bimoraic sequence over two syllables.

Moraic assignment is underlying in the case of vowels, as might be expected, but consonants are moraic only in codas. I assume that consonants in codas are assigned a mora. (18) shows the moraic structure I assume:

(18) Moraic Assignment



(18) represents the basic quantitative contrast in Salcha syllables: **Cə** is a light syllable, where ə stands for a reduced vowel, but both **CV:** (where **V** is a full vowel) and **CVC**, where **V** is any vowel, are heavy.

4.2.3 Directionality of foot-building

The Salcha trochee is iterative, and is assigned beginning at the right edge of the word. The directionality of assignment is seen in the examples in (19), a light syllable at the left edge will not be included in a foot if it turns out to be a moraic odd-man-out. In (19), feet are enclosed in parentheses, and stressed syllables are boldfaced (no word stress is shown in these examples). Crucial syllables - those not footed *because* of direction of footbuilding - are in italics in (19):

(19a) *nə*(ɣəjə)(**ji:t**) 'I was scared'
*(nəɣə)*jə*(**ji:t**)

(19b) *x*(dədlə)(**tth'i**)(**yæ:**) 'they are not staying'
*(xədə)*dlə*(**tth'i**)(**yæ:**)

(19c) *ć'*(**dɣun**)(**li:k**) 'you sg ought to sing'
*(ć'ədə)(**ɣun**)(**li:k**)

(19d) *ts'ə*(yədzə)(**dzi:ts**) 'I danced'
*(ts'əyə)*dzə*(**dzi:ts**)

It is the sequence of Cə.Cə.Cə which shows directionality, as a left-to-right footbuilding sequence would result in the stranding of the third, instead of the first, of the Cə syllables. It should be noted here, however, that the starred forms in (19) should be considered highly marked rather than strictly ungrammatical, intonational interactions and rhythmic shifts may result in variations in footing of identical underlying sequences. The unstarred forms are those which I consider canonical. For this reason I conclude that the direction of foot construction is right to left.

4.2.4 Word stress and the domain of stress

The domain of verb stress consists of the "conjunct verb" or verb word, consisting of the verb stem, any suffixes, and prefixes to the right of the disjunct boundary. This is shown by comparison of conjunct-only verbs (verbs which include no elements to the left of the disjunct boundary) and verbs which include

disjunct prefixes. The former behave like single words for purposes of stress; the latter follow the same pattern as noun compounds.

Within the conjunct domain, the leftmost foot receives the strongest stress, as shown in (20). In (20), main stress is shown **bold-underlined**; secondary stress is shown **bold.**

(20) a) **(nəjə)(jət)** 'I'm scared'
b) **(ts'i:n)(dzəs)** 'you're (sg) dancing'

The separateness of the disjunct prefixes is shown by a comparison of noun compounds to verbs with disjunct elements. No monomorphemic nouns are long enough to show iteration and word stress; however, when noun stems are combined into two and three-member compounds, a compound stress pattern emerges. Each member of a noun compound is stressed (all nouns, as will be discussed below, consist minimally of a foot), and the rightmost member of a compound receives strongest stress. (21) shows examples of noun compounds:

(21) a) **(sa:)(bi:l)** 'rainbow'
sun#snare

b) **s(kæ)(la:)(gɪnə')** 'my toenails'
my foot#hand#'claw

When examples like those in (21) are compared to verbs with disjunct "prefixes", the structures are clearly parallel even though the right member of this type of verbal compound is typically longer (two feet or more) than a one-foot noun. Again, the right-hand member of the compound bears the stronger stress; and within the right-hand member, the leftmost foot receives main stress. The result is a contour like this: xXxx, or xxXxx, or xXx. Examples are given in (22)

(22)
a) **(da:)#(dɪjɪ)(di:x)** 'I'm learning (verbal skill)'
b) **(k'a:)#(txəjɪ)('ʊk)** 'I will swim around'
c) **(k'a:#)(ni:)#(ç'əs)də(ðɪk)** 'I'm thinking'

Note also that each morpheme followed by the # symbol (disjunct element) carries its own word-like stress.

4.2.5 Summary of Stress Analysis

The basic description of stress in Salcha can be summed up in the following statements:

- Foot type is moraic trochee
- Feet are iterative
- Feet are assigned from right to left
- Domains of stress include:
  - conjunct verb + suffixes
  - noun stem
  - disjunct element
- Word stress is leftmost within domain of stress (end rule left)
- In compounds the rightmost member is stressed more strongly (end rule right)

4.3 Salcha noun and verb minima

With these facts about Salcha prosody established, it is now possible to discuss the relationship of the foot to the minimum verb word as manifested in the absence of a "peg" requirement. The difference between Salcha, which does not have a "peg" requirement, and Hare, which does, turns out to relate to the type of

foot which forms the minimum for a verb. In Salcha, the foot is bimoraic, which allows monosyllabic verbs to fulfill the prosodic minimum; in Hare, the foot is disyllabic and so, obligatorily, is the verb.

The minimal word in Salcha is isomorphic with the (moraic trochee) foot, for both nouns and verbs. All nouns minimally consist of one heavy syllable or two light syllables.

(23)	a)	(ts'ex)	'hat'
	b)	(tu:)	'water'
	c)	(jɪgɪ)	'berries'
	d)	(ts'əβə)	'spruce'

The nouns in (23) consist of one foot. There are no examples of nouns or verbs of the pattern Cə, however, CV: (23b) is possible because a full vowel is bimoraic.

Verb stems, which are all monosyllabic in Salcha, are all heavy syllables. They may be CV: or CVC.

(24)	a)	-da:	'sg. sit'
	b)	-dzi:ts	'dance
	c)	-'əs	'sneeze'
	d)	-tsəx	'cry'

There are no stems, verb or noun, of the form Cə.

Since CV:/CVC is required to make up a verb stem or a noun stem in Salcha, and CV., CVC and CəCə are the possible feet defined by the moraic trochee, I argue that Salcha, like Hare, appears to have a prosodic minimum for nouns and verbs, which is the same foot used in the stress system. To show whether or not Salcha facts support the Foot-Minimum Hypothesis, however, it is

necessary to go beyond the statement of such a prosodic minimum and see whether "peg" prefixes are required by Salcha. Given that the foot-minimum is made up by the stem itself in Salcha, the absence of "pegs" would support the hypothesis that epenthetic prestem syllables are motivated by a prosodic minimum.

(25) shows that in fact Salcha verbs do not require the "peg" prefix before verb stems. The minimal verb word is shown in forms which have no classifier, a third person singular subject, and no consonantal prefixes to the left of the subject, examples are given in (25) (unfortunately, the Hare theme for 'sing' is not paralleled in Salcha, so other Ø-classifier themes must be compared.)

25a)	(tsəx)	's/he's crying'
	3 cries	
(25b)	lu:gə (t'a:0)	's/he's cutting fish'
	fish 3 cuts	
(25c)	s'ægə (ɣɑ)	'she's making my dress'
	s ɪ 'æk ɪ ə	
	my dress POSS 3 makes	

Each of these verbs makes up the Salcha prosodic minimum of one foot within its stem. For this reason, there should be no reason for an epenthetic syllable to be added, and in fact it is absent.

I conclude that the Salcha data support the Foot-Minimum Hypothesis as articulated by Rice (1990a).

5. Conclusion and predictions

Evidence from Salcha supports the generalization of the foot-minimum hypothesis to languages other than Hare: Salcha's stress system uses a moraic trochee, a foot which can be made up of a single heavy syllable. The fact that Salcha does not require a "peg" prefix is consistent with a one-foot-minimum for Athabaskan verbs; if the foot does not require two syllables, neither should the verb.

The Salcha stress data show that quantity in Athabaskan syllables can be based on vowel quality (the full-reduced vowel distinction) and consonant closure of syllables. In comparison with the Hare data, they also show that definitions of syllable weight and foot structure may vary within this language group.

Further testing of the generalizability of the foot-minimum hypothesis can be carried out based on the Salcha-Hare comparison. If the hypothesis is truly generalizable, languages which **do** require two syllables in their verbs should also require two syllables in their feet. Thus, I would expect to find that languages which have the peg requirement and show some effect of stress will not show quantity sensitivity. (A canonical *iambic* foot, as defined in Hayes (1991) is disyllabic. However, a proper iamb can be constructed from a single heavy syllable. For this reason, I consider it possible that a language with an iambic foot might go either way with respect to epenthetic syllables, depending on whether its verb minimum were a proper (acceptable) foot or a canonical (perfect) foot.)

In (26), I give a tabular summary of findings on foot type and minimality based on my own field notes and the claims of Rice (1990) and Hargus (1994). The foot type indicated for Ahtna here differs from that claimed by Hargus (1994), and is based on analysis of my field notes.

(26) Summary of facts and fragments on pegging and foot-type: well established relationships are bolded, predictions from partial analysis are italicized.

Language	**Peg or not?**	**Foot type**	**Quantity sensitivity**
Hare (Rice 1990)	**Peg**	**Trochaic**	**Insensitive**
Salcha	**Non-Peg**	**Trochaic**	**Sensitive**
Babine-Witsuwit'en (Hargus 1994)	**Peg**	**Iambic**	**Sensitive**
Ahtna (Tuttle, field notes)	*Non-Peg*	*Trochaic*	*Sensitive*
Lower Tanana (Minto) (Tuttle, field notes)	*Non-Peg*	*Trochaic*	*Sensitive*
Galice (Tuttle, analysis of Jacobs field notes 1935-38)	*Peg*	*Iambic*	*Sensitive*

(26) shows that so far, what is known about foot type and minimality in Athabaskan supports the claim that a minimal verb must be a metrical foot. If Dena'ina and Kato can be shown to share quantity-sensitivity with Salcha and Ahtna, and if languages such as Hupa, Chasta Costa, and Galice (which require peg prefixes) can be shown to employ a canonically disyllabic foot, there would be even stronger reason to believe that the motivation for the "peg" prefix in the Athabaskan language family is in fact satisfaction of a prosodic minimum for the verb word.

Notes

[1]Sapir's Kato source was Goddard's 1910 texts; the form *tce'* is probably imperfective, not perfective, as Goddard (1912) lists [tc' gûn tce ge] (his orthography) for 'he cried'. The bare-stem form is found in a text where a "historical present" would not be unexpected.

[2]Interestingly, Li (1946) notes for Chipewyan that "in the prefix syllable the low pitch [unmarked in Chipewyan] is slightly more elevated in pitch than the low pitch in the stem syllable". I take this to mean that a low-low verb comes out more like mid-low, pitchwise. This descriptive note suggests that Chipewyan also shows some evidence of foot structure, and that this structure is the same as that described by Rice for Hare.

[3]Krauss (1982) takes the position that the rounded reduced vowel in Salcha is predictable, and that labialized velars are underlyingly present; he attributes the rounded vowel in 'black bear' to a downriver (Lower Tanana) influence. Mrs. Moffit's pronunciation of this word was consistent, however, in contrast to forms in which she could vary from Salcha to Lower Tanana. For this reason, and since Krauss' analysis involves an absolute neutralization of secondary labialization, it seems preferable to attach the rounding feature to the reduced vowel.

[4] Salcha allows certain consonants to appear optionally as metrical strays (sonorants, fricatives and glottalized affricates): that is, a morpheme which is underlyingly C may surface as C or Cə when it is not required to make up the first syllable of a foot, when it *does* have to take stress, epenthesis must supply ə. For purposes of this paper, I will analyze stray C's as nonmoraic and unsyllabified. They do not (with the exception of stops preceding ɣ) form clusters with following consonants.

Bibliography

Hargus, Sharon (1988) *The Lexical Phonology of Sekani*. Garland Publishing, New York.

Hayes, Bruce (to appear) *Metrical Stress Theory: Principles and Case Studies*. Ms., UCLA.

Goddard, Pliny E (1910) "Kato Texts" University of California Publications in American Archeology and Ethnology, v. 5, Berkeley

Goddard, Pliny E (1912) *Elements of the Kato Language*. University of California Publications in American Archeology and Ethnology, v. 11. Berkeley

Kari, James (1990) *Ahtna Athabaskan Dictionary*. Alaska Native Language Center and Ahtna, Inc., Fairbanks and Glennallen, Alaska.

Krauss, Michael (1982) "Comments on Salcha Phonology" Ms., Alaska Native Language Center, Fairbanks, Alaska

Li, Fang-Kuei (1946) "Chipewyan" *Linguistic Structures of Native America* Viking Fund Publications in Anthropology 6. New York

Moffit, Kari and Tuttle (1991) *Salcha Writing System and Keywords*. Ms. Alaska Native Language Center, Fairbanks, Alaska

Moffit, Kari and Tuttle (1994) *Salcha Lexicon*. Ms. Alaska Native Language Center, Fairbanks, Alaska

Rice, Keren (1990a) "Prosodic constituency in Hare (Athapaskan) evidence for the foot" Lingua 82, 201-245

Rice, Keren (1990b) *A Grammar of Slave*. Mouton de Gruyter. Berlin

Sapir, Edward (1914) *Notes on Chasta Costa Phonology and Morphology*. University of Pennsylvania Anthropological Publications, Vol. II, number 2. Philadelphia

Tuttle, Siri (1991) "Metrical Structures in Salcha Athabaskan". in Redden, James (ed) *Occasional Papers on Linguistics #16: Papers from the American Indian Languages Conferences, Santa Cruz.* Department of Linguistics, Southern Illinois University, Carbondale, Illinois.

Tuttle, Siri (1994) "Metrical evidence for the full-reduced vowel distinction in Galice Athabaskan". Paper presented at Athabaskan Languages Conference, Stoney Creek, BC.

On the accent of two-character Sino-Japanese words: Are they really two—yes, two—two morphs in one?*

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Abstract

The first objective of this paper is to introduce a 10,000+ word database of Sino-Japanese words, Japanese words that are either borrowed from Chinese or formed from morphemes borrowed from Chinese. This database provides a significant amount of data with which to judge the accuracy of a particular theory or aspect of a theory.

The second objective is to present an analysis of various possible accent assignment rules for this class of words in order to determine what form an accent-assigning rule applying to this portion of the Japanese lexicon would take. The database shows that the most comprehensive of the accent assignment rules discussed accounts for about 81% of the forms in the database. As a synchronous rule, this is the case where morphemes such as *gaku* 'pertaining to academics' were borrowed as *gak* as per Itô (1986) and Itô & Mester (1993, 1994), and accent assignment occurs before the rules that produce the allophonic variants found in the Sino-Japanese section of the Japanese lexicon (Martin 1952, McCawley 1968; Itô & Mester 1993, 1994).

The third objective is, following Wydell et al. (1993, 1994), to introduce evidence that these words are not synchronically derived from their constituent morphemes during the speech act as has been assumed in previous works, but that they are historically-derived, word-level lexical entries. This is based on several considerations: psycholinguistic experiments on subjects' recognition and reading of these compounds, the nature of first language acquisition, the semantic opacity of many of these compounds, and the selectional restrictions of a large number of ambiguous Chinese characters. Lexical storage of these words suggests that they do not undergo the various phonological rules that have been posited as applying to this class of words.

In light of the above-mentioned evidence I will maintain that 2-character SJ words are stored as words. Due to the large number of exceptions to the most comprehensive accent assignment found in this investigation, I will also maintain that their accent is lexically marked.

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1. Introduction

1.1 Japanese lexical segregation

Most analyses of the Japanese consider it to have four 'strata' of morphemes in its lexicon, corresponding to the source of the morphemes contained in that strata:

(1)	Strata	Japanese Term	Source
	Native or *Yamato*	*wago*	Old Japanese
	Sino-Japanese	*kango*[1]	Chinese
	Onomatopoeia	*giongo*[2]	Old Japanese
	Foreign	*gairaigo*	Recent loanwords

This division of the lexicon is supported by the apparently different restrictions on both their segment inventory and their templatic structure, and that each strata typically undergoes a different set of phonological rules (Martin 1952, McCawley 1968). For example, the well-known sequential voicing rule of *Rendaku* (Itô & Mester 1986), whereby *kamidana* 'god shelf' is formed from *kami* 'god(s)' and *tana* 'shelf', is said to typically apply only to compounds formed from *Yamato* vocabulary.

1.2 The Sino-Japanese strata

For the Sino-Japanese (hereafter SJ) strata, there are four types of alternations that appear to be strata-specific (alternating segments are underlined):

(2) Alternations observable in SJ compounds
- i. ga<u>k</u>u-i 'degree' ga<u>k</u>u-sei 'student' ga<u>k</u>u-mei 'scientific name' ga<u>k</u>-koo 'school' ga<u>k</u>-ka 'academic dept.'
- ii. be<u>ts</u>u-mei 'pseudonym' be<u>ts</u>u-in 'branch temple' be<u>p</u>-pai 'farewell dinner' be<u>s</u>-soo 'villa' be<u>k</u>-ko 'separate house'
- iii. gyuu-<u>h</u>o 'snail's pace' sui-<u>h</u>o 'drunken stagger' <u>h</u>o-koo 'walking' san-<u>p</u>o 'a walk' kan-<u>p</u>o 'a slow walk'
- iv. ī<u>ch</u>i '1' ik-kai 'once' it-too '1 statue' ha<u>ch</u>i '8' hak-kai '8 times' hap-po '8 steps'

In (i), the mora *k u* appears to form a geminate with a following /k/ but not with any other following segment. In (ii), when *tsu* is the second mora of a SJ morpheme it appears to form a geminate with any following unvoiced obstruent. (iii) shows that a morpheme with an initial *h* in all other environments surfaces with an initial *p* when following a coda nasal. Finally, in (iv) then the mora *chi* is the second mora of a SJ morpheme, it forms a geminate with a following unvoiced obstruent in the counters Japanese uses for ordinal and cardinal numbering.[3] Vowel deletion analyses of these SJ alternations (e.g

[1] *kango* were borrowed from Chinese in several waves beginning about the 5th century. They can be subdivided into two classes, *kan-on* and *go-on*, associated with the two main waves. However, many words currently classified as *kango* were not of Chinese origin, but were loan translations of English terms that occurred during the 19th century Meiji Reformation using existing Chinese character readings (Shibatani 1990).

[2] Japanese onomatopoeia are grouped in three classes: *giseigo*, mimetic expressions of natural sounds; *gitaigo*, which depict states, conditions, and manners of the external world; and *gizyoogo*, which depict mental conditions or sensations (Shibatani 1990). See also Schourup & Tamori (1992).

[3] *h* also appears to form a geminate consonant in some nominals, such as *ichiban* 'first' (Sino-Vietnamese), but SJ morphemes of the form CVchi have the alternative reading CVtsu, making the underlying form of the morpheme opaque.

gaku-ka → gakka, gaku-sei → gakusei) are found in Martin (1952), McCawley (1968), Aoki (1981), and Uchida (1992); a vowel epenthesis analysis (e.g. *gak-ka → gakka; gak-sei → gakusei*) is found in Itô (1986) and Itô & Mester (1993, 1994).

It is also worth noting that these alternations in SJ compounds have one other distinct feature: the alternations discussed in (1) above do not apply cyclically during word formation. These SJ alternations are found only in what McCawley (1968) calls the 'innermost level of compounding' (henceforth referred to as core words); that is, the two morphemes in a longer compound that exhibit the alternations appear to be the core word that the longer one is formed from (examples adapted from McCawley 1968):

(3) *e e* 'run, manage' + *z e n* 'repair' → *e e z e n* 'building and repairing'
e e z e n + *h i* 'cost' → *e e z e n h i* 'building and repair cost' **e e z e n p i*
m a n '10,000' + *n e n* 'year' → *m a n n e n* 'ten thousand years'
m a n n e n + *h i t s u* 'writing brush' → *m a n n e n h i t s u* 'fountain pen'
(lit. '10,000 year brush') **m a n n e n p i t s u*
h a t s u 'disclose, start' + *m e e* 'next' → *h a t s u m e e* 'invention'
s h i n 'new' + *h a t s u m e e* → *s h i n h a t s u m e e* 'new invention'
**s h i n p a t s u m e e*

No morphemes added to the beginning or the end of the core word exhibit these alternations.[4] McCawley (1968) attributes this to an internal word boundary in the two-morpheme compound that the rules deriving the alternations are sensitive to, but in most current models of word formation direct marking of morpheme and word boundaries is not thought to be satisfactory.

These alternations that only apply regularly within compounds formed from SJ morphemes provide most of the argument for a separate strata of SJ morphemes.[5] This non-cyclicity of the SJ alternations also sheds doubt on the synchronic derivation of these 2-character SJ compounds, unless one is willing to admit the existence of morphological boundaries.

1.3 Pitch accent assignment

On the subject of pitch accent assignment of Japanese words, however, most analyses of compound word accent assignment (e.g. McCawley 1968, Haraguchi 1977, Higurashi 1983) treat the Native and SJ vocabulary together and forward accent compound word assignment rules that do not distinguish on the basis of these word origins.[6] This seems to be a reasonable a priori assumption; differences due to word origin should be encoded in the lexicon, while post-lexical accent assignment should take place after lexical instantiation where the idiosyncratic lexical information was no longer available. McCawley (1968) specifically excludes the accent assignment of two-character SJ words because "...I have been unable to construct any satisfactory rules." (p. 131). As is evidenced by Akinaga (1958),[7] this is by no means a failing of that work; it appears that there is no single satisfactory rule for accent assignment of accent in the class of two morpheme SJ words.

1.4 Aims and organization

This paper has three aims: 1) to describe a large database of SJ words (approximately 10,000 words) under construction for use in this and other research; 2) to discuss the accent assignment of two-morpheme SJ words using percentages derived from the database; and 3) to introduce external evidence that two-morpheme SJ words are not derived synchronically during the speech act, but are stored as one lexical unit. Further, I will argue that although an accent assignment rule capable of deriving about 80% of the database forms exists, accent assignment of these words is not derived but is instead lexically stored with the word just as the lexical accent of words from the other sections of the lexicon is.

The database's characteristics will be discussed in §2; this will both allow the reader to judge the percentages cited in the paper and whether or not the database would be useful for their own work.

§3 contains a discussion of the accent assignment of these words centered on statistics generated from the database. Various possible accent assignment rules are presented. The most comprehensive of the accent assignment rules discussed accounts for about 80% of the forms in the database. The implications of the two considerations—the storage of two-morpheme SJ words as single lexical units and the scope of the most comprehensive accent assignment rule—are also discussed.

§4 presents arguments against the lack of synchronic derivation of these words: 1) psycholinguistic experiments on subjects' recognition and reading of these compounds; 2) the nature of first language acquisition; 3) the semantic opacity of many of these compounds; and 4) the selectional restrictions of a large number of ambiguous Chinese characters. Concluding remarks will be made in §5.

I will first turn to a description of the database.

2. The Database

2.1 Database Contents

The database under discussion was extracted from a 3.5 Megabyte file consisting of 68,000+ entries; the database has been compiled by several Japanese researchers over the course of the last couple of years using several accent dictionaries. Each entry in this larger file has 9 fields: number, romaji, *kana* (Japanese script), *kanji* (Chinese characters), accent location, romanization with accent marked by an apostrophe after the accented mora, part of speech, conjugational information for verbs, and the source of the word. Based on the part of speech fields of this larger file, SJ words were extracted and a separate SJ database was formed. From this set, the following types of words have been deleted as they have been found: compounds containing non-SJ morphemes (hybrid words); words containing Chinese characters with non-standard readings assigned by The Japanese Ministry of Education (*ateji* readings); and entries of adverbial SJ morpheme particle combinations such as *betsu ni* 'not especially'. This left 10,182 entries containing morphemes of SJ origin with standard readings.

These entries were then marked for individual morphemes, individual morpheme CV structure, and number of morphemes. Other fields were added

[4]Unless, of course, two two-morpheme words are concatenated, as in *ippo-ippo* 'step by step'.
[5]See McCawley (1968), Martin (1988) Shibatani (1990) or Itô & Mester (1993) for discussion of segmental distribution differences among the strata.
[6]In contrast, almost all works discussing the Foreign strata posit a separate rule deriving their accent if the original accent was not borrowed along with the word (McCawley 1968, Poser 1984, Martin 1988).
[7]Kazue Akinaga's description contains a thorough listing of the characteristics of all types of Japanese compounds, including those with only 2 SJ morphemes, but it is a long list of conditions with many exceptions.

for glosses and to mark exceptions to what are considered regular rules in SJ word formation, but only sporadic entries have been made into these fields. The entry for the word *aiiku* 'tender loving care' is shown in Figure 4.[8]

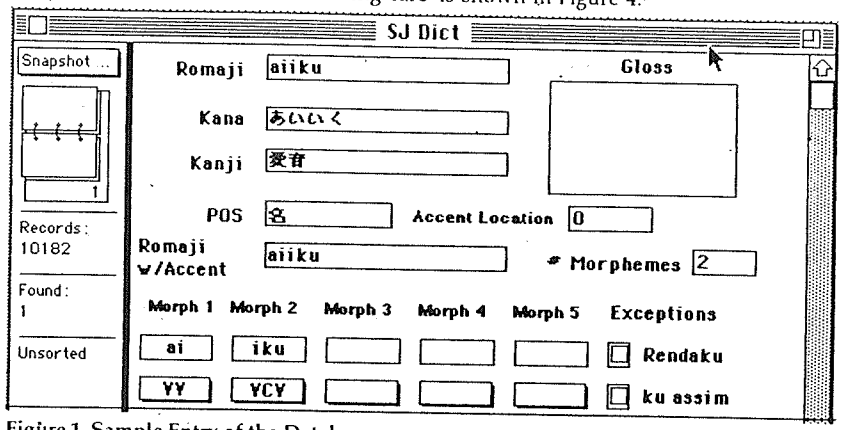

Figure 1. Sample Entry of the Database

The database now exists in FileMaker Pro™, Microsoft Excel™ and plain text formats for the Macintosh™, and as a plain text file for DOS systems.

2.2 Range of entries

Tables I and II give the word-level characteristics of the SJ database. Table I shows the breakdown by number of morphemes; note that the vast majority of entries (89.3%) contain two morphemes. Table II shows the breakdown by accent location by mora for both the full database and the two-morpheme entries; by far the highest proportion of the words are either unaccented or accented on the initial mora. Note that a two-morpheme SJ word contains at most 4 mora, so that accent on a fifth or sixth mora is impossible (total percentages not equaling 100% are due to rounding):

Table I
Entries by # of morphemes

# Morphs	# Entries	%
1	457	4.5
2	9097	89.3
3	575	5.6
4	52	.5
5	1	.0
Total	10,182	99.9

Table II
Entries by mora accent location

Accented μ	Total #	%	# 2-morph	%
unaccented	6655	65.4	6493	70.9
1st μ	2581	25.3	2206	24.1
2nd μ	404	4.0	181	2.0
3rd μ	475	4.7	209	2.3
4th μ	37	.4	8	.1
5th μ	29	.3	-	-
6th μ	1	.0	-	-
Totals	10,182	100.1	9097	99.4

One question that must be asked about any database is how closely it approximates native speaker knowledge. Because no truly accurate measure of any speaker's lexical knowledge exists, indirect methods must be used. As a measure of the distribution of the entries in the database, I used a popular college-level dictionary—Kenkyuusha's 1984 *Lighthouse Japanese-English Dictionary*. I assume this to be fairly equivalent a typical speaker's knowledge.

The first two columns of Table III show the number and percentage of two-morpheme entries grouped by the initial mora of the word; they are arranged by 'line'[9] as in a standard Japanese dictionary. Those numbers are compared with the number of pages and relative percentage of the entries in Kenkyuusha's *Lighthouse Japanese-English Dictionary* (in figuring dictionary page percentages, page count is assumed to have an accuracy of ±10 pages due to the inconsistent number of entries on each page):

Table III
Entries by 1st mora

Line	2-morph Entries	%	Dictionary Pages	%
a	571	6.3	221	13
ka	2297	25.3	346	20
sa	2598	28.6	338	19
ta	1207	13.3	272	16
na	223	2.5	91	5
ha	1209	13.3	242	14
ma	322	3.5	114	7
ya	274	3.0	47	3
ra	380	4.2	64	4
wa	16	.2	19	1
Totals	9097	100.2	1754	102

This is not intended to be a hard-and-fast analysis of the percentage of each line's constituents in a Japanese speaker's lexicon, since the number of entries per dictionary page varies widely. However, it does give a rough indication of the relative distribution of each word-initial type of word in the dictionary. The distribution of words in the database approximates the distribution of the entries in a dictionary of common words fairly well.

As for individual morpheme characteristics, Tables IV and V show the two-morpheme breakdown by morpheme CV structure. Table IV gives the number of words containing morphemes with each templatic structure.

[8] The character in the Part Of Speech field is *mei* 'nominal', short for *meishi* 'noun'.

[9] These are referred to as the 'a-line', the 'ka-line', etc. The 'a-line' contains all words beginning with vowels: a, i, u, e, and o; the 'ka-line' contains words with initial ka, ki, ku, ke and ko, their voiced counterparts ga, gi, gu, ge and go, as well as those with initial palatalized consonants kya, kyu, kyo, gya, gyu and gyo.

Table IV
2-morpheme Words by Structure

Morph. Structure	Morph. 1	%	Morph. 2	%
V	129	1.4	98	1.1
CV	1966	21.6	1856	20.4
VV	118	1.3	73	0.8
VN	208	2.3	173	1.9
VCV	116	1.3	77	0.8
CVV	3193	35.1	3393	37.3
CVN	1906	21.0	1646	18.1
CVCV	1461	16.1	1781	19.6
Totals	9097	100.1	9097	100.0

Table V shows the distribution of morpheme combinations based on morpheme structure. Percentages of the total number of 2-morpheme words are in parentheses.

Table V
2-morpheme Combinations by Morpheme Structure

M1 Struc.	M2 Structure							
	V	CV	VV	VN	VCV	CVV	CVN	CVCV
V	—	29 (0.3)	—	3 (0.0)	1 (0.0)	43 (0.5)	27 (0.3)	26 (0.3)
CV	22 (0.2)	338 (3.7)	16 (0.2)	42 (0.5)	13 (0.1)	769 (8.5)	368 (4.0)	398 (4.4)
VV	2 (0.0)	30 (0.3)	1 (0.0)	2 (0.0)	1 (0.0)	43 (0.5)	21 (0.2)	18 (0.2)
VN	1 (0.0)	38 (0.4)	4 (0.0)	6 (0.1)	—	75 (0.8)	39 (0.4)	45 (0.5)
VCV	—	19 (0.2)	2 (0.0)	1 (0.0)	2 (0.0)	47 (0.5)	24 (0.3)	21 (0.2)
CVV	47 (0.5)	699 (7.7)	26 (0.3)	71 (0.8)	32 (0.4)	1168 (12.8)	583 (6.4)	567 (6.2)
CVN	20 (0.2)	405 (4.5)	16 (0.2)	18 (0.2)	19 (0.2)	726 (8.0)	327 (3.6)	375 (4.1)
CVCV	6 (0.1)	298 (3.3)	8 (0.1)	30 (0.3)	9 (0.1)	522 (5.7)	257 (2.8)	331 (3.6)

There are several combinations that are not represented in the database (e.g., V-V); however, a check of some 50 morphemes with readings of *a* and *e* in the 47,000-word Spahn & Hadaminzky (1989) and in Micro Cabin Corp's 50,000-word CD-ROM.*Neo Japanese Dictionary* revealed no V-V or V-VV compounds in those works either. These are apparently gaps in this component of the Japanese lexicon.

Overall, it appears that a fairly representative slice of two-morpheme SJ compounds has been obtained.

2.3 Caveats

It must be noted that, as in all databases, certain decisions were made at the outset. In order to allow for ease of morpheme identification, entries are kept parallel to those found in standard Japanese dictionaries. Therefore there are no p-initial entries for SJ morphemes, only h-initial ones—in keeping with lexicographical standards, the constituent morphemes of *sanpo* 'a walk' are listed as *san* and *ho*. The morpheme *gaku* 'pertaining to academia' is listed in the standard fashion as *gaku* rather than the underlying *gak* that Itô (1986) and Itô & Mester (1993) argue for. Also, palatalized variations of consonants are listed in romaji as clusters (i.e., *kyaku* 'guest' instead of *k^{y}aku* 'enclosure') for ease of entry but are listed under morpheme structure as CV, not CCV.[10] The various possibilities for underlying codas will be taken into account in later analyses, the various possibilities for different underlying onsets will be taken into account in later work.

I will now turn to an analysis of the accent of these two-morpheme compounds.

3. Accent of two-morpheme SJ compounds

Many possibilities for accent assignment exist; this work will investigate only the most straight-forward of them due to time constraints. The success of a particular rule will be judged by how high of a percentage of the forms in the database the accent assignment rule can account for.

3.1 Possible accent assignment rules

3.1.1 Accent a heavy syllable

The first possibility I will look at is that an accent assignment rule is triggered by a heavy syllable in the word, without regard to where in the word the heavy syllable is.

Before examining this rule in more detail, however, two things must be taken into consideration. The first of these is the underlying form of morphemes such as *gaku*—were they stored as CVC structures as in Itô & Mester (1993) or as CVCV structures as assumed in vowel deletions analyses? Secondly, at what point in the derivation of a word the accent was assigned is just as important, since these alternations can change a morpheme containing a heavy syllable into one that does (i.e., *gak* becomes *gaku* at the end of a word).

There are four logical possibilities for the underlying forms and the alternation and the accent assignment rule ordering. These are listed in (4), along with sample derivations exemplifying them[11] (accent is marked by an apostrophe after the accented mora's vowel):

(4) a. Ordering 1: underlying *gak* → accent assignment → alternation rules

underlying forms	gak-shi	gak-ka	ka-gak
accent assignment	ga'k-shi	ga'k-ka	ka-ga'k
alternations	ga'ku-shi	-	ka-ga'ku
surface forms	ga'kushi	ga'kka	kaga'ku

b. Ordering 2: underlying *gaku* → accent assignment → alternation rules

underlying forms	gaku-shi	gaku-ka	ka-gaku
accent assignment	-	-	-
alternations	-	gak-ka	-
surface forms	gakushi	gakka	kagaku

[10]The decision to treat this palatalization as a secondary articulation is based on a pilot study of palatalized Japanese consonants done two years ago.

[11]The accents marked on these examples are for explanatory purposes only. In reality, *gaku-hi* 'school expenses' and *gakka* 'schoolwork' are unaccented; Table XII in the Appendix shows that the number of words in the SJ database of the form CVCV-CV are fairly equally divided between unaccented and accented on the first mora (148 and 126, respectively). In contrast, *kagaku* 'science' is accented on the first mora; the number of words of the form CV-CVCV are divided almost 3 to 1 between unaccented and accented on the first mora (284 and 107, respectively).

c. Ordering 3: underlying *gak* → alternation rules → accent assignment

underlying forms	gak-shi	gak-ka	ka-gak
alternations	gaku-shi	-	ka-gaku
accent assignment	-	ga'k-ka	-
surface forms	gakushi	ga'kka	kagaku

d. Ordering 4: underlying *gaku* → alternation rules → accent assignment

underlying forms	gaku-shi	gaku-ka	ka-gaku
alternations	-	gak-ka	-
accent assignment	-	ga'k-ka	-
surface forms	gakushi	ga'kuka	kagaku

Notice that the last two orderings have the same output; if the rules producing the alternations apply before accent assignment, then the difference between the underlying forms is neutralized and the accent is assigned to the same mora. Therefore these last two possibilities can be collapsed under (c) in (5) below.

(5) a. Ordering 1: underlying *gak* → accent assignment → alternation rules
b. Ordering 2: underlying *gaku* → accent assignment → alternation rules
c. Ordering 3: underlying *gak/gaku* → alternation rules → accent assign.

Returning now to the discussion of an accent assignment rule triggered by a heavy syllable, Tables VI, VII, and VIII show the breakdown of the accent of two-morpheme compounds based on the three possible orderings listed in (5). 'M1' refers to the first morpheme; 'M2' refers to the second morpheme; 'heavy' refers to a morpheme that contains (is) a heavy syllable; and 'light' refers to a syllable that does not contain a heavy syllable. (Figures in these and the following tables are derived from Tables XII.a and XII.b in Appendix B; see Appendix A for discussion.)

Table VI
Ordering 1: underlying *gak* → accent assignment → alternation rules

Accent	M1 L/M2 L	M1 H/M2 L	M1 L/M2 H	M1 H/M2 H
unaccented	25	467	1283	4718
1st mora	328	1051	357	470
2nd mora	36	27	61	57
3rd mora	—	20	5	184
4th mora	—	—	—	8
Totals	389	1565	1706	5437

Table VII
Ordering 2: underlying *gaku* → accent assignment → alternation rules

Accent	M1 L/M2 L	M1 H/M2 L	M1 L/M2 H	M1 H/M2 H
unaccented	816	1229	1780	2668
1st mora	597	1043	251	315
2nd mora	88	0	93	0
3rd mora	8	23	35	143
4th mora	4	4	0	0
Totals	1513	2299	2159	3126

Table VIII
Ordering 3: underlying *gak/gaku* → alternation rules → accent assignment

Accent	M1 L/M2 L	M1 H/M2 L	M1 L/M2 H	M1 H/M2 H
unaccented	630	1415	1490	2958
1st mora	560	1080	236	330
2nd mora	88	0	93	0
3rd mora	7	24	18	160
4th mora	0	8	0	0
Totals	1285	2527	1837	3448

Notice in Tables VII and VIII that no words are accented on the second mora when M1 is heavy; this tendency to mark the accent of a heavy syllable on its first mora has been well documented in the literature (see Vance 1987: 80-81 for discussion). The rules discussed below will therefore be written as assigning accent on this first mora.

Below, permutations of an accent assignment rule triggered by a heavy syllable are given below, along with the percentage of forms that they accurately predict; the percentages in parentheses correspond to Orderings 1, 2, and 3, respectively. Only rules marking accent on the first mora or leaving the word unaccented are checked, since the numbers of words with accent marked on the second, third, and fourth moras are so small that any rule assigning accent to them would create many more exceptions than forms that conformed to the rule.

(6) a. Accent the first mora of a heavy syllable; if there are no heavy syllables, the word is unaccented; if there are two heavy syllables, accent the first mora of the first syllable. (17.0%, 24.3%, 22.6%)
b. Accent the first mora of a heavy syllable; if there are no heavy syllables, the word is unaccented; if there are two heavy syllables, accent the first mora of the second syllable. (13.9%, 22.4%, 20.8%)
c. Accent the first mora of a heavy syllable; if there are no heavy syllables, the word is accented on the first mora of the first syllable; if there are two heavy syllables, accent the first mora of the first syllable. (20.4%, 21.9%, 21.9%)
d. Accent the first mora of a heavy syllable; if there are no heavy syllables, the word is accented on the first mora of the first syllable; if there are two heavy syllables, accent the first mora of the second syllable. (17.2%, 20.0%, 20.0%)
e. Accent the first mora of a heavy syllable; if there are no heavy syllables or there are two heavy syllables, the word is unaccented. (67.1%, 47.7%, 50.7%)

The best of these accounts for only 67.1% of the words in the database; a different rule that accounts for a higher percentage can be found.

3.1.2 Accent x is x is heavy

A second possibility is that there is an accent assignment rule based on whether or not a specific morpheme contains a heavy syllable:

(7) Accent the first mora of the word if M1 (/M2) contains a heavy syllable; otherwise the compound is unaccented.
The compound is unaccented if M1 (/M2) contains a heavy syllable; otherwise accent the first mora.

Various permutations of this type of rule and the percentages generated by the data in Tables VI through VIII are listed below.

(8) a. If M1 contains a heavy syllable, accent the first mora of the word; if M1 does not contain a heavy syllable, the word is unaccented. (31.1%, 43.5%, 38.8%)
b. If M1 is contains a heavy syllable, the word is unaccented; if M1 does not contain a heavy syllable, accent the first mora of the word. (64.5%, 52.2%, 56.8%)
c. If M2 is contains a heavy syllable, accent the first mora; if M2 does not contain a heavy syllable, the word is unaccented. (14.5%, 28.7%, 28.7)
d. If M2 is contains a heavy syllable, the word is unaccented; if M2 does not contain a heavy syllable, accent the first mora. (81:1%, 66.9%, 66.9%)

The rule among this set that best matches the data accounts for about four-fifths of the words in this database. This is the rule corresponding to (8.d, Ordering 1), in the case where morphemes like *gaku* are underlying CVC as posited by Itô (1986) and Itô & Mester (1993, 1994). In this case, the accent assignment rule in (8.d) applies to these underlying forms, and then the epenthesis rules insert a vowel where a consonant is not licensed in the syllable coda. However, I will argue in §4 that this is not a synchronic alternation but a remnant of the process by which these morphemes were borrowed.

Can any other accent assignment rule do as well or better?

3.1.3 Accent x if x is heavier than y

Tables IX, X, and XI give statistics for combinations of morphemes in order to check a rule of the sort:

(9) If M1 is heavier than M2 because it contains a heavy syllable and M2 does not, accent the first mora of M1; otherwise the compound is unaccented.

Table IX
2-Morpheme SJ Compound Accents by Relative Weight of Morphemes
Ordering 1: underlying *gak* → accent assignment → alternation rules

Accent	M1<M2	M1=M2	M1>M2	Totals
unaccented	981	3794	1718	6493
1st mora	228	795	1183	2206
2nd mora	57	76	48	181
3rd mora	2	179	28	209
4th mora	—	0	8	8
Totals	1268	4844	2985	9097

Table X
2-Morpheme SJ Compound Accents by Relative Weight of Morphemes
Ordering 2: underlying *gaku* → accent assignment → alternation rules

Accent	M1<M2	M1=M2	M1>M2	Totals
unaccented	1780	3484	1229	6493
1st mora	251	912	1043	2206
2nd mora	93	88	0	181
3rd mora	35	151	23	209
4th mora	0	4	4	8
Totals	2159	4639	2299	9097

Table XI
2-Morpheme SJ Compound Accents by Relative Weight of Morphemes
Ordering 3: underlying *gak/gaku* → alternation rules → accent assignment

Accent	M1<M2	M1=M2	M1>M2	Totals
unaccented	1490	3588	1415	6493
1st mora	236	890	1080	2206
2nd mora	93	88	0	181
3rd mora	18	167	24	209
4th mora	—	0	8	8
Totals	1837	4733	2527	9097

In the same format as before, permutations of the rule type given in (5) are shown below.

(10) a. If M1 is heavier than M2 because it contains a heavy syllable and M2 does not, accent the first mora; otherwise the compound is unaccented. (65.5%, 69.3%, 67.7%)
b. If M1 is heavier than M2 because it contains a heavy syllable and M2 does not, the compound is unaccented; otherwise accent the first mora. (30.1%, 26.3%, 27.9%)
c. If M2 is heavier than M1 because it contains a heavy syllable and M2 does not, accent the first mora; otherwise the compound is unaccented. (63.1%, 54.6%, 57.6%)
d. If M2 is heavier than M1 because it contains a heavy syllable and M2 does not, accent the first mora; otherwise the compound is unaccented. (32.5%, 41.1%, 38.0%)
e. If M1 and M2 both contain heavy syllables, accent the first mora; otherwise the compound is unaccented. (38.4%, 43.1%, 41.7%)
f. If M1 and M2 both contain heavy syllables, the compound is unaccented; otherwise the compound is unaccented (57.2%, 52.5%, 53.9%)

This best of these accounts for 69.3% of the data, corresponding to the case where forms such as *gaku* are underlyingly CVCV, and accent assignment precedes the rules generating the alternations. This is not as high a percentage as was obtained with the rule in (8.d) that considered only the weight of the second morpheme

individual morphemes of two-morpheme words did not significantly reduce response times as they should have if the subjects were reading and combining separate morphemes. The prior presentation of a single character later found in a two-character word also did not lower reaction times.

Both of these studies support a model of orthographic and lexical access and storage where two-morpheme SJ words are stored as units, and are not derived on-line.

4.2 First language acquisition

A second consideration is the nature of word acquisition by Japanese children. By the time they have begun learning *kanji* and their associated SJ morphemes in the first grade, they have already acquired a large vocabulary containing a large number of SJ compounds.[14] However, before their prescriptive learning of the individual *kanji* (and hence individual SJ morphemes), they are not regularly exposed to the individual morphemes found in two-morpheme SJ words[15] and therefore have little motivation to decompose words they have learned into individual morphemes. In addition, one would expect regular mistakes in children's language production, where the wrong morpheme was substituted for a phonologically or semantically alike morpheme. None have been described in the literature, and I have not observed any such mistakes in my bilingual daughter's production.[16]

4.3 Semantic opacity

Thirdly, this decomposition of these constituent morphemes is especially suspect in light of how semantically opaque many of these compounds are. For example, the two morphemes of the compound *sanpo* 'walk' have respective meanings of 'distribute or scatter' and 'step(s)'. It is hard to imagine anyone producing a mental image of scattering footsteps when someone tells them, "*Sanpo shiyoo*!" 'Let's take a walk!" This judgment is shared by my native speaker colleagues and my wife. And indeed, many times I have asked someone what the component characters of a 2-morpheme SJ word are, only to be told that they do not know the meaning of one (or both) of the characters, although they do know the meaning of the word. It appears that children learn words, not compositional morphemes, before their prescriptional education begins.[17]

4.4 Character ambiguity

A fourth, related reason is the number of ambiguous readings that several hundred of these characters have (Vance 1987: 169). Many of these ambiguous readings are dependent on their combination with another character; they will be read differently depending on which two-morpheme word they are found in.

[14]As attested by my 4-year-old daughter and her classmates' verbal abilities.

[15]One morpheme SJ words do exist, of course—they comprise 4.5% (426 entries) of the 2-morpheme SJ database to be discussed in §2. And there are preparatory schools where 2- and 3-yr. old children spend the day learning and being quizzed on hundreds of *kanji* and SJ words in order to prepare them for academic success in the 'fast lane' of the Japanese educational system. These morphemes and children are in the minority, however.

[16]She most certainly makes mistakes; however, I have never observed her substituting one SJ morpheme for another based on semantic content. The errors are always the substitution of phonetically similar morphemes or whole-word substitution.

[17]I have first-hand experience of the non-productivity of many of these morphemes—most of my attempts to recall a particular word from constituent morphemes is met with a quizzical "*Ee?*" 'Huh?'

This represents a complication of a model of reading (and storage and word formation) based on the individual reading of characters and the combining of the morphemes they represent into a word—one would necessarily have to read the combination in order to decide which combination was correct. In regard to word formation, an incredibly complex system of subcategorization would be needed to allow the speaker to determine which of the hundreds of SJ morphemes could combine with another, both for when it occurred first in the compound and when it occurred second in the compound. The complexity of any system that would be able to handle the selectional restrictions these morphemes are subject to, as well as the experimental and anecdotal evidence against the productivity of many of these morphemes, supports a model of word formation whereby two-morpheme SJ words are stored as lexical units, in accordance with the model advanced by Wydell et al. (1993, 1994).[18]

Accepting this as correct then shifts the focus of investigation to the nature of these 2-character lexical units. What is their underlying form? Are they stored in the same form as they are learned, or do alternation and accent assignment rules derive the correct surface form? An easy answer is, of course, that they are stored as they are learned. What of the alternations observable in (2) above, then? The accent assignment rule found in §3.1.2 above strongly suggests that the Chinese morphemes like *gaku* were borrowed as *gak* as per Itô & Mester's analysis, with a vowel epenthesis rule preventing illicit consonant clusters. Compounds formed today or during the Meiji Reformation of the mid-19th century[19] would obey these conditions by analogy, rather than the surface forms being derived on-line.

Accent could be derived on line even if the alternations are not, but again the large number of exceptions to the most comprehensive assignment rule suggests that the accent assignment was active at the time these morphemes were coming into Japanese, but that the accent of words is now lexically stored. The source of these exceptions is most likely accent assignment rules from other dialects that have survived throughout the language's history.

5. Conclusion

The use of a database of two-morpheme SJ compounds has provided a more thorough look at the distribution of accent within this class of words. The most comprehensive of these, accounting for 81% of the compounds in the database discussed in this paper, corresponding to the case where synchronically VCV and CVCV forms such as *aku* and *gaku* were processed as CVC forms (as per Itô 1986 and Itô & Mester 1993, 1994), with accent assignment applying before the rules producing the alternations observed in these compounds.

However, based on considerations from reading experiments, language learning, semantic opacity, and character ambiguity, I follow Wydell et al. (1993, 1994) in that two-morpheme SJ compounds are not derived from individually stored morphemes during the speech act, but are stored and retrieved as lexical units.

[18]This is not to say that all SJ words are not derived; quite to the contrary, SJ compounds of more that three morphemes tend to exhibit the same pitch accent patterns that compounds of words from other strata, and some of the SJ prefixes are quite productive.

[19]As noted in Shibatani (1990), J.C. Hepburn noted in his 1886 revision of his dictionary that he had added 10,000 additional words since the 1867 edition.

3.1.4 No accent rule

Since Table II shows such a high percentage of compounds that are unaccented, an obvious possibility is that these words are not accented by rule—no accent is assigned after compounding, and any word carrying accent is lexically marked for that accent. Table II also shows that of the 9097 two-morpheme words in this database, 6493 (70.9%) are unaccented, 2206 (24.2%) are accented on the 1st mora, and the remaining 398 (4.4%) are accented on either the 2nd, 3rd, or 4th mora.[12] The 28.6% of the words carrying a pitch accent would be exceptions to the rule, creating more exceptions than the rule found in §3.1.2.

3.1.5 Pre-accents and post-accents

There is another possibility, and that is to use a device that McCawley (1968) used with compound accent rules for other classes of words: to allow morphemes to have been marked with pre-accents and post-accents. That is, the lexically-marked accent of some morphemes would not surface unless they had been combined with another morpheme. For example, a pre-accented morpheme's accent would not show up if it were the first morpheme in a compound (and the accent would be deleted since it would not be linked to any segmental material), but it would show up if the morpheme were the second in a compound so that the accent had segmental material to link to:

(11) 'gaku + sei → gakusei
dai + 'gaku → dai'gaku

This would be an incredibly complex analysis, however, requiring accent adjustment rules to handle accenting conflicts that would arise when two accented morphemes were compounded (see McCawley 1968: 167ff for details). *A priori* it seems too daunting a task to be undertaken by a language learner, but it is certainly possible given the resources of the brain. Testing this type of hypothesis for a significant sample of morphemes would take a significant amount of time, however, and so will be left for future work.

3.2 Accent Summary

The best of the accent assignment rules uncovered in this study accounted for a little more than 80% of the 9097 2-character words in the database. This still leaves a large number of exceptions that would be necessary lexically marked for accent. Other rules can be devised and tested, but the spread of the data in Tables XII.a and XII.b suggest that no one algorithm will be able to account for a lion's share of the word accents. Combined with the considerations discussed in the next section, this suggests that the accent of this class of two-character SJ morphemes is not derived by rule, but is lexically stored.

I will now turn to a review of the evidence against the synchronic derivation of the alternations observed in the SJ strata of Japanese.

[12] The number of compounds containing more than four moras is quite small. However, all compounds contain at least two moras, and the decrease in number of words with a large number of moras cannot account for the discrepancy between the number of forms that are unaccented or accented on the first mora and the few that are accented on the second mora.

4. Against the Synchronic Derivation of Two-morpheme SJ Words

As noted in the introduction, external evidence suggests that these two-morpheme SJ words are not synchronically derived from their constituent morphemes, but are stored as lexical units. Four arguments for this position will be presented in this paper: 1) psycholinguistic studies suggesting that native speakers read these compounds as single units; 2) children acquiring these compounds in first language acquisition have no motivation for decomposing them into constituent morphemes; 3) these compounds are for a large part semantically opaque, making decomposition impossible; and 4) the decompositional reading of ambiguous characters of compounds would require an enormously complicated system of subcategorization.

4.1 Psycholinguistic evidence

In a series of psycholinguistic studies, Wydell, Butterworth & Humphries (1993) and Wydell, Butterworth & Patterson (1994) presented native speakers with two-character (and hence two morpheme) SJ words flashed on a computer monitor. Subjects were prompted to read the words out loud as quickly as possible. The rationale of the experiments was that if people read two-morpheme SJ compounds by accessing the morpheme represented by each Chinese character (*kanji*) one at a time and then combine them, it should take longer to read words that contain *kanji* that have unusual or ambiguous readings. For example, the word 親類 (*shinrui* 'relatives') contains two characters; the first character can be read either *shin* or *oya*, depending on the word it is in, while the second can be read either *rui* or *tagui*. Other words have characters that have only one possible reading—the word 俸禄 (*houroku* 'pay, salary') contains the characters *hou* and *roku*, and neither character has any other readings. The more combinations that are possible for the pair of characters, the longer it should take the subject to decide on the correct combination.

Wydell et al. found that ambiguity had no significant effect on the time it took the subjects to read the words; the only significant variable was the frequency of the characters. In other words, the more common the characters were (directly affected by how common the words that contain them are), the faster those words were read. Since ambiguity of the character readings had no significant effect on word recognition, their work supports a model of reading that utilizes whole word storage for two-morpheme SJ compounds, not combinations of individual morphemes. These results seem to be extendible to lexical storage—if the orthographic representation of two-morpheme SJ words are stored at the word level, the constituent morphemes themselves are most likely stored at the word level as well.

Their results also support the work of Morton, Sasanuma, Patterson & Sakuma (1992), who used priming effects[13] to test the response times of word recognition. They found that the only priming that significantly affected the subjects' response times was single character priming, where a character representing a free SJ morpheme (a one-morpheme word) was presented about 10 minutes prior to its being presented again in an identification task. Priming of

[13] Priming is the introductory presentation of a stimulus before it is again presented in the task that is actually being investigated. In their study, two tasks were given to the subjects, the first task's purpose was only to present subjects with morphemes and words (priming) that they would be asked to recognize in the second task.

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he numbers marked in bold in the VC and CVC rows in both Table XII.a and II.b are not included in the total count. The numbers in these rows are subsets f the cell directly below them; they are those words which display a geminate nvoiced consonant (see Footnote 4 for examples). The numbers in these rows re used to determine the figures shown in Tables VI-XI. See §3 for discussion. 'ells with dashes (—) indicate that gemination is not possible for that iorpheme combination in those cells so that the first morpheme will always arface as a VCV or CVCV morpheme.

Blank cells in both tables indicate accent on that mora for that morpheme ombination is not possible (e.g., in a V-V word there are only two moras; accent n the 3rd or 4th mora is not possible).

'able XII.a

ccented Mora by Morpheme Structure Combination

M1	Acc	M2 Structure								Totals
Struct	mora	V	VV	VN	VCV	CV	CVV	CVN	CVCV	
V	unacc.	0	0	1	0	2	32	21	15	71
	1	0	0	2	1	26	11	5	11	56
	2	0	0	0	0	1	0	1	0	2
	3		0	0	0		0	0	0	0
	4									
VV	unacc.	0	1	2	1	7	38	21	17	87
	1	2	0	0	0	22	4	0	1	29
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	1	1	0	0	2
	4		0	0	0		0	0	0	0
VN	unacc.	0	4	6	0	15	62	36	38	161
	1	1	0	0	0	23	8	3	5	40
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	5	0	2	7
	4		0	0	0		0	0	0	0
VCV	unacc.	0	2	0	1	6	35	16	13	73
	1	0	0	0	0	7	0	0	1	8
	2	0	0	1	1	5	7	4	3	21
	3	0	0	0	0	1	5	4	0	10
	4		0	0	0		0	0	4	4
VC	unacc.	—	—	—	—	**3**	**18**	**11**	**4**	—
	1	—	—	—	—	**4**	**0**	**0**	**0**	—
	2	—	—	—	—	**0**	**0**	**0**	**0**	—
	3	—	—	—	—	**0**	**3**	**4**	**0**	—
	4	—	—	—	—		**0**	**0**	**4**	—
	Acc.	V	VV	VN	VCV	CV	CVV	CVN	CVCV	Totals
M2 Tot.	unacc.	0	7	9	2	30	167	94	83	392
	1	3	0	2	1	78	23	8	18	133
	2	0	0	1	1	6	7	5	3	23
	3	0	0	0	0	2	11	4	2	19
	4		0	0	0		0	0	4	4
Totals		3	7	12	4	116	208	111	110	571

Table XII.b

Accented Mora by Morpheme Structure Combination

M1	Acc	M2 Structure								Totals
Struct	mora	V	VV	VN	VCV	CV	CVV	CVN	CVCV	
CV	unacc.	1	12	30	3	22	628	257	284	1237
	1	20	2	12	10	282	106	90	107	629
	2	1	2	0	0	34	34	20	4	95
	3		0	0	0		1	1	3	5
	4									
CVV	unacc.	4	21	68	28	198	1029	489	505	2342
	1	43	1	3	4	490	99	61	59	760
	2	0	0	0	0	0	0	0	0	0
	3	0	4	0	0	11	40	33	1	89
	4		0	0	0		0	0	2	2
CVN	unacc.	0	16	18	14	87	602	255	315	1307
	1	20	0	0	5	314	91	45	54	529
	2	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	4	33	27	4	68
	4		0	0	0		0	0	2	2
CVCV	unacc.	2	7	25	7	148	478	236	312	1215
	1	3	0	1	0	126	17	5	3	155
	2	1	1	4	2	21	11	8	15	63
	3	0	0	0	0	3	16	8	1	28
	4		0	0	0		0	0	0	0
CVC	unacc.	—	—	—	—	**75**	**178**	**83**	**104**	—
	1	—	—	—	—	**33**	**11**	**4**	**0**	—
	2	—	—	—	—	**0**		**0**	**0**	—
	3	—	—	—	—	1	7	3	0	—
	4	—	—	—	—			0	0	—
	Acc.	V	VV	VN	VCV	CV	CVV	CVN	CVCV	Totals
M2 Tot.	unacc.	7	56	141	52	455	2737	1237	1416	6101
Table XIb	1	86	3	16	19	1212	313	201	223	2073
	2	2	3	4	2	55	45	28	19	158
	3	0	4	0	0	18	90	69	9	190
	4		0	0	0		0	0	4	4
XIb Tot.		**95**	**66**	**161**	**73**	**1740**	**3185**	**1535**	**1671**	**8526**
X1a Tot		**3**	**7**	**12**	**4**	**116**	**208**	**111**	**110**	571
Totals		98	73	173	77	1856	3393	1646	1781	9097

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i, Kazu (1958) *Tookyo Akusento Hoosoku ni Isuite* (On the Rules of the 'o Accent). In Sanseido (1981).
ıul (1981). *Gemination in Japanese*. Ph.D. dissertation. Univ. of WA.
:hi, Shosuke (1977). *The Tone Pattern of Japanese: An Autosegmental ry of Tonology*. Tokyo: Kenkyuusha.
hi, Yoshiko (1983). *The Accent of Extended Word Structures in Tokyo dard Japanese*. Tokyo: EDUCA Inc.
:o (1986). *Syllable Theory in Prosodic Phonology*. Ph.D. dissertation, ersity of Massachusetts.
:o & R. Armin Mester (1993). *Stem and word in Sino-Japanese: A minary study*. UCSC Technical Report LRC-93-10. Presented at the 1993 :yu International Forum—Speech Recognition and Phonology.
:o & R. Armin Mester (1994). "Japanese phonology". In J. Goldsmith, ed. *andbook for Phonological Theory*. New York: Basil Blackwell. pp. 817-838.
Yoshiro, & Takebayashi, eds. (1984) *Kenkyuusha's Lighthouse Japanese-'sh Dictionary* (*Laitohausu Waei Jiten*). Tokyo: Kenkyuusha.
Samuel (1952). *Morphophonemics of Standard Colloquial Japanese. uage* 28(3.2) Supplement, Language Dissertation No. 47.
Samuel (1988) *A Reference Grammar of Japanese*. Rutland: Ch. Tuttle.
ey, James (1968). *The Phonological Component of a Grammar of ıese*. The Hague: Mouton.
J., S. Sasanuma, K. Patterson & N. Sakuma (1992). "The organisation of :xicon in Japanese: Single and compound Kanji." *British Journal of hology* 83: 517-531.
anese Dictionary (ShinKokugo/Kanji Jiten) (1993) Yokkai City, Mie cture, Japan: Micro Cabin Corp.
)85) *Nihongo Hatsuon Akusento Jiten (Japanese Pronunciation Accent onary)*. Tokyo: Nihon Housou Kyoukai (NHK).
) (1981) *Meikai Nihongo Akusento Jiten* (*Clear Japanese Accent Dict.*). hiko Kindaiichi (Supervisor); Kazue Akinaga (ed). Tokyo: Sanseido.
.i, Masayoshi (1990). *The Languages of Japan*. Cambridge: Cambridge.
p, Lawrence & Ikuhiro Tamori (1992) "Palatalization in Japanese :tics: Response to Itō". *Language* 68(1): 139-148.
.lark, & Wolfgang Hadamitzky (1989) *Kanei Jukugo Rebaasu Jiten ıese Character Dictionary With Compound Lookup via any Kanji)*. ın: Cheng & Tsui.
Akihade (1992). "Syllable theory and inflectional morphology in ıese." *Working Papers in Linguistics - UW* 10: 283-305.
'imothy (1987). *An Introduction to Japanese Phonology*. Albany: SUNY

Taeko Nakayama, et al. (1994). "The inconsistency of consistency effects ıding: The case of Japanese Kanji". Proceedings of the Intn'l Conference ıoken Language Processing 1994, Yokohama Japan. pp 1127-1130.
T.N., et al. (1993). "Phonologically mediated access to meaning for Kanji: :OWS still a ROSE in Japanese Kanji?" *Journal of Experimental ology: Learning, Memory, and Cognition* 19(3): 491-514.

Appendix A

The following scheme was used in conjuction with Tables XII.a and XII.b in Appendix B to calculate the numbers reported in Tables VI through XI in the paper. First the weight of the first morpheme (M1) is reported for each of the three possible orderings; secondly, the weight of the second morpheme (M2) is reported for each of the three possible orderings. The numbers in Tables VI through XI were generated by combining the two. For example, the following combinations were used for Table VI, Ordering 1, M1 L/M2 L, unaccented.

M1	V	V	CV	CV		
	|	|	|	|		
M2	V	CV	V	CV		
	0	2	1	22	=	25

For M1 heavy and light, the following were used. In the case of Ordering 1, the structures VCV and CVCV are considered heavy since the accent assignment rules apply to the underlying forms of VC and CVC (i.e., they are both heavy when the accent assignment rule applies). For Ordering 2, the structures VCV and CVCV are both light when the accent assignment rules apply. For Ordering 3, the number of VCV and CVCV structures that surface as geminates (i.e., occur in words where the second morpheme begins with an unvoiced obstruent) are considered heavy syllables, since the accent assignment rules will be operating on VC and CVC structures. Those numbers have been subtracted from the total number of VCV and CVCV forms since the rules producing the alternations will segregate them as heavy and light before the accent assignment rules apply no matter which underlying form is used:

Ordering 1		Ordering 2		Ordering 3	
light	heavy	light	heavy	light	heavy
V	VV	V	VV	V	VV
	VN	VCV	VN		VN
	VCV	CV	CVV	VCV-VC	VC
CV	CVV	CVCV	CVN	CV	CVV
	CVN				CVN
	CVC			CVCV-CVC	CVC

For M2 light and heavy, the following were used. In the case of Ordering 1, the accent rule applies to the underlying forms so that VCV=VC and CVCV= CVC (i.e., they are both heavy). For Ordering 2, the accent rule applies to the underlying forms of VCV and CVCV (i.e., they are both light). For Ordering 3, the rules generating the alternations will produce only VCV and CVCV morphemes word-finally (i.e., they are both light):

Ordering 1		Ordering 2		Ordering 3	
light	heavy	light	heavy	light	heavy
V	VV	V	VV	V	VV
	VN	VCV	VN	VCV	VN
	VCV	CV	CVV	CV	CVV
CV	CVV	CVCV	CVN	CVCV	CVN
	CVN				
	CVC				

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