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NWLC 1999: PAPERS FROM THE FIFTEENTH NORTHWEST LINGUISTICS CONFERENCE

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FOREWORD

The Department of Linguistics at the University of Victoria is pleased to present Volume 15 of the *Working Papers of the Linguistic Circle of the University of Victoria (WPLC)*. This edition of *WPLC* contains nine papers from the NorthWest Linguistics Conference 1999, which was held at the University of Victoria, March 6–7, 1999. The first five of the papers are of interest to theoretical syntacticians. The first paper, by Ma, uses the non-derivational approach of Head-driven Phrase Structure Grammar to describe Chinese negators. The other four are in the Principles and Parameters tradition and represent cutting-edge research in several areas: the English sequence of tenses (Chung), English bare singular nouns (Eskenazi), 'accusative' adverbs in Japanese (Halada), and an inquiry into the validity of Ura's (1994) examples which putatively suggest violations of the 'ban on superraising' (Dailey-McCartney, Eskenazi, Huang). Smith uses Optimality Theory to describe an effect of L2 learner language transfer. Kiyosawa divides the ocean of Salish applicatives into two basic morpheme types. Roberts and Lee analyze the vowels of modern Korean using two graphemes from its famous writing system. And Bateman notes parallels between the terminologies of singing and phonetics.

All of the articles published in *WPLC* are considered working papers; their appearance here does not preclude subsequent publication elsewhere. As working papers, they are subject to reconsideration and revision. Comments regarding their form and content are welcome.

This volume of *WPLC* has had help from many people over its period of production. The following people, however, have stood out as particularly helpful through their editorial assistance and in other ways:

WPLC Committee:	Allison Benner, Hanne Smaadahl, Heather Steel, Chris Bodenbender
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THE SYNTACTIC STATUS OF CHINESE NEGATORS—*MEI* AND *MEIYOU*

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1.0 Introduction

Chinese negators *meiyou* and *mei*, both of which may be used to denote 'non-completion of an event', are conventionally regarded as synonyms, with *mei* considered as the simplified form of *meiyou* (Chao 1968, See Gebauer 1980, Li and Thompson 1981, Huang 1988, Ernst 1994, Hsieh 1997, among others).

(1) (a) ta hai *meiyou* lai.
he yet not have come
'He hasn't come yet.'

(b) ta hai *mei* lai.
he yet not come
'He hasn't come yet.'

(2) (a) ta zuotian *meiyou* lai.
he yesterday not have come
'He didn't come yesterday.'

(b) ta zuotian *mei* lai.
he yesterday not come
'He didn't come yesterday.'

In general, the conventional analysis holds. However, if we scrutinize the behaviors of *meiyou* and *mei* more carefully, we find that they differ in many respects. A number of questions arise as we examine the properties of these negators:

(3) (a) How do *meiyou* and *mei* differ?

(b) What are the properties of *you*?

(c) Can the differences between *meiyou* and *mei* be unified by underspecification?

(d) What categories do *meiyou* and *mei* belong to?

(e) What is the proper way to represent the special properties of *meiyou* and *mei*?

These questions will be answered, one by one, in this paper. The alternative analysis presented herein differs significantly from the conventional analysis in its lexicalist assumptions. In the following sections, several relevant notions will provide a new perspective on the *meiyou/mei* alternation, enabling us to provide a unified account of the asymmetrical behaviors of *meiyou* and *mei* in VP ellipsis and VP fronting.

2.0 Basic assumptions

Head-driven Phrase Structure Grammar (HPSG) is a non-derivational, constraint-based and surface-oriented grammar. In contrast to derivational approaches, in HPSG, distinct levels of syntactic structure are built up not by derivation but by a concrete X′ (X-bar) theory, a limited set of universal principles and lexical representations. The following theoretical assumptions and concepts are crucial to the analysis. A complete introduction to the theory is beyond the scope of this paper; consequently, only those aspects that are directly relevant to this research are presented.

2.1 No NegP in Chinese

I assume that *meiyou* is a negative verb head with the feature [+AUX], while *mei* is a modifier. Consequently, I assume that there is no need to motivate a functional projection NegP in Chinese. Negation is

achieved not by derivation nor movement, but by unification, in which different linguistic objects each contribute information to the linguistic expressions in which they occur; compatible information yields legitimate linguistic expressions, while incompatible information yields illegitimate expressions.

2.2 Monotonicity

Following HPSG convention (see Brett 1996), I assume that no information from lexical items or expressions is changed in syntactic combination with other items; this accumulation of information without changing any lexical information is referred to as *monotonicity*. It is based on monotonicity that *meiyou* and *mei* are treated as two distinct lexical entries in consideration of the evidence that they have non-identical usages which cannot be unified through underspecification.

2.3 Head-Complement Schema and Head-Modifier Schema

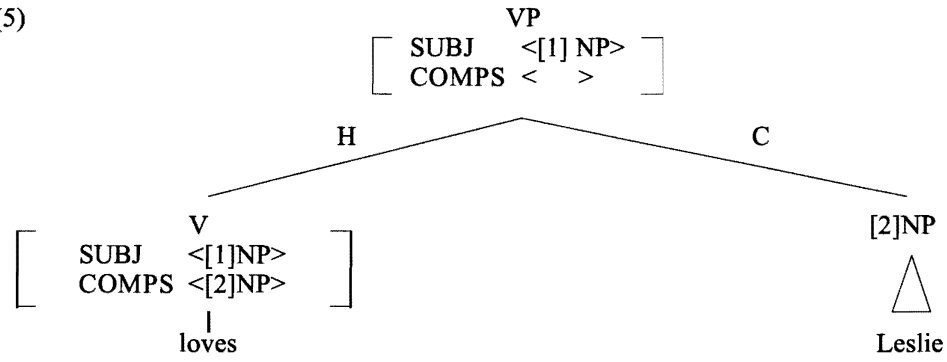
HPSG has a concrete X′ theory, consisting of three schemata: Head-Specifier, Head-Complement and Head-Modifier (Pollard and Sag 1994, Kim 1996). I will employ the Head-Complement and Head-Modifier schemata in this paper.

(4) Head-Complement Schema

X → Lexical Head-Dtr , Comp-Dtr(s) [Dtr = daughter]

The Head-Complement Schema analogous to Government-and-Binding theory's X′ rule, *X′ → X, YP*, allows phrases to have a lexical head daughter and any number of complement daughters, as illustrated in (4).

(5)



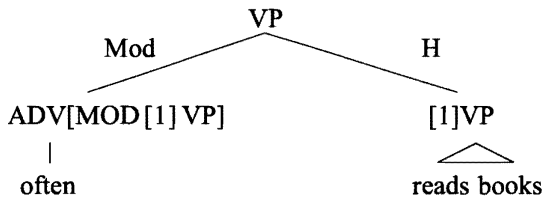
(5) is a well-formed Head-Complement phrase, consisting of a head daughter 'loves' and a complement daughter 'Leslie' selected by the lexical head 'loves'.

(6) Head-Modifier Schema

X → Head-Dtr Phrase, Mod-Dtr
[SYNSEM [1]] [MOD [1]]

The Head-Modifier Schema allows a phrasal head to combine with a modifier phrase. The modifier has the ability to select for the types of head it combines with, as illustrated in (6). There is no such rule in GB.

(7)



(7) is a Head-Modifier phrase, consisting of a head daughter phrase 'reads books', and a modifier daughter 'often'.

3.0 A comparison of *mei* and *meiyou*

Though *meiyou* and *mei* share the same truth conditions and various syntactic and semantic properties, they are different lexical entities. The differences between the two can be observed in their semantic specification and syntactic distribution.

3.1 Semantic comparison

The semantic properties of *meiyou* and *mei* are not identical, though they are similar in quite a number of ways. As noted in (1) and (2), both *meiyou* and *mei* can be glossed as 'not have', expressing the notion of perfective aspect. It has long been observed (by Chao 1968, Wang 1965, and others) that *meiyou* or *mei* has some intrinsic relationship with the perfective aspect marker *-le*. To negate *-le*, one must use the form *meiyou* or *mei*; moreover, *meiyou/mei* usually cannot co-occur with *-le*.[1]

(8) (a) Lisi meiyou / mei chi fan.
Lisi not have / not eat rice
'Lisi hasn't had his meal.'

(b) *Lisi meiyou / mei chi-le fan.
Lisi not have / not eat -ASP rice
'Lisi hasn't had his meal.'

(c) Lisi chi-le fan.
Lisi eat-PERF rice
'Lisi has had his meal.'

(9) (a) ta zuotian meiyou/mei mai fangzi.
he yesterday not have / not sell house
'He didn't sell his house yesterday.'

(b) *ta zuotian *meiyou/mei* mai -le fangzi .
he yesterday not have / not sold-PERF house
'He didn't sell his house yesterday.'

(c) ta zuotian mai -le fangzi.
he yesterday sell -PERF house
'He sold his house yesterday.'

---

[1] Generally, *mei* and *meiyou* do not co-occur with the perfective marker *-le*, but there are exceptions in *ba*-constructions or *bei*-constructions:

(i) Lisi zuotian *mei/meiyou* *ba* tade che mai-*le*
Lisi yesterday not(have) BA his car sell-ASP
'Lisi didn't sell his car yesterday.'

(ii) *Lisi zuotian *mei/meiyou* *ba* tade che mai.
Lisi yesterday not / not have BA his car sell
'Lisi didn't sell his car yesterday.'

(iii) *Lisi *mei/meiyou* *bei* jingcha zhua.
Lisi not / not have BEI police capture
'Lisi hasn't been captured by the police.'

(iv) Lisi *mei/meiyou* *bei* jingcha zhua-*le*.
Lisi not /not have BEI police capture-ASP
'Lisi hasn't been captured by the police.'

Actually, *-le* is obligatory in *ba/bei*-constructions, where the object NP is fronted to the pre-verbal position, and *-le* is required to attach to the verb. The examples are contrary to the general belief that *mei/meiyou* and *-le* are in complementary distribution. So far there is no syntactic or semantic resolution of this issue.

The contrast between the *a* and *b* sentences of (8–9) has led many linguists to believe that the meaning of *meiyou* or *mei* encompasses more than negation. Temporal information is part of the lexical meaning of *meiyou/mei* as well. *Meiyou/mei* carry the same temporal meaning as *-le*, i.e. PERFECTIVE. In addition, in view of the apparent complementary distribution of *meiyou/mei* and *-le*, these scholars claim that *meiyou/mei* and *-le* are allomorphs of the same morpheme.

Generally, *meiyou/mei* and *-le* cannot co-occur in a clause. However, this fact is not sufficient to support the claim that *meiyou/mei* can be considered as variant of *-le*, for they differ morphologically, syntactically and semantically. First, in the standard view, any two forms are allomorphs if and only if they are semantically equivalent and in complementary distribution. Even if *meiyou/mei* and *-le* were in complementary distribution, they are certainly not semantically equivalent: *–le* is not a negator, so the allomorphy hypothesis should be dismissed.[2] Second, while *meiyou* and *mei* are free words, *-le* is a suffix that can only be attached to a verb. As (10) illustrates, *meiyou/mei* can be followed by the adverb *zixi*.

(10) (a) wo meiyou/mei zixi kan zhe-ben shu.
I not have/not careful read this-CL book
'I did not read the book carefully.'

(b) wo zixi kan-le zhe-ben shu.
I careful read -ASP this-CL book
'I read the book carefully.'

Second, as Ross (1995:121) states, *meiyou/mei* and *-le* differ in scope. While *-le* as a suffix has scope over only the preceding verb, *meiyou/mei* negate the entire following VP. For example, (10) does not mean that reading did not occur, but that a careful reading of the book did not occur. Therefore, *meiyou/mei* has scope over the whole VP, not just the verb. In addition, Li and Thompson (1981) provide several examples where *meiyou/mei* cannot negate certain types of sentences where *-le* can occur. (It is beyond the scope of this paper to elaborate on their arguments here.) All the evidence suggests that while *meiyou/mei* and *-le* parallel each other in temporal meaning in many contexts, they are not allomorphs.

Now we return to the focus of this section: the temporal meanings of *meiyou* and *mei*. Do the two negators share the same temporal reference?

Meiyou and *mei* behave differently from each other in future contexts. Both *meiyou* and *mei* (as is the case with *-le*) are incompatible with future temporal adverbials in isolation, as in (11a). However, while *mei* can be salvaged by a future tense marker *yao,* as in (11b), *meiyou* cannot, as in (11c).

(11) (a) *ta mingtian *mei/meiyou* lai.
he tomorrow not / not have come
'He will not come tomorrow.'

(b) ta mingtian *mei yao* lai.
he tomorrow not will come
'He will not come tomorrow.'

(c) *ta mingtian *meiyou yao* lai.
he tomorrow not have will come
'He will not come tomorrow.'

The future tense marker *yao* 'will' is compatible with *mei*, but not with *meiyou*. This asymmetrical behavior between *mei* and *meiyou* may be explained by the different temporal specifications of *meiyou* and *mei*. It seems that *mei* is relatively neutral in terms of tense/aspect, in view of its compatibility with *yao*, while *meiyou* is strictly perfective/past. We have to ask why *mei* differs from *meiyou* in this fashion. As a hypothesis, we may attribute the difference to the temporal meanings of *you*. Though *you*, used as a past tense or perfective aspect marker in affirmative sentences, does not exist in Mandarin, this usage is available in other Chinese dialects, such as Cantonese and Taiwanese. The incompatibility of *meiyou* and *yao* stems from the clash in meaning between *you*

[2] Perhaps the two negatives can be considered as portmanteau morphs, which combine both negation and aspect. In this sense, one might say that the aspectual part of *meiyou* and *mei* is an allomorph of *–le*.

and *yao*. Thus, we can infer that *meiyou* and *mei* carry different temporal specifications. This prediction is again borne out in the context of the progressive aspect marker, *zai*.

The behavior of *meiyou* and *mei* with the progressive aspect marker *zai* parallels that described above with the future tense marker *yao*: *mei* can co-occur with *zai*, while *meiyou* cannot (See Gebauer 1980), as shown in (12).

(12) (a) ta *mei zai* kan shu.
he not PROG read book
'He is not reading a book.'

(b) *ta *meiyou zai* kan shu.
he not have PROG read book
'He is not reading a book.'

(12) provides some support for our contention that *meiyou* and *mei* have different temporal specifications. While *meiyou* is strictly PERFECTIVE, *mei* is only conditionally 'PERFECTIVE'. It may be that the perfective meaning of *mei* is a default temporal specification; when tense aspect auxiliaries co-occur with *mei*, the perfective aspect meaning can be neutralized, making *mei* a pure negator with no temporal specification of its own. By contrast, *meiyou* cannot occur in these contexts as a variant of *mei*, largely due to the perfective connotation inherent in *you* 'have' (See Gebauer 1980). As I interpret it, the temporal meaning of *meiyou* is specified as a feature in the lexical entry of *meiyou*, and cannot be changed in syntactic processes. By contrast, the default temporal meaning of *mei* is not a lexical feature, consequently, its alternation with other aspectual meanings is expected.

3.2 Syntactic comparison

This section concerns the syntactic properties of *meiyou* and *mei*. The distributional possibilities of the two negators with respect to other elements in a sentence are not identical, though they overlap in many respects. Their different behaviors in the VP ellipsis construction, the VP fronting construction, the question formation and the A-not-A construction suggest that the two negators belong to different categories. In these constructions, *mei* behaves like an adverb, parallel to *bu*, while *meiyou* behaves like a head.

3.2.1 Similarities

In general, if we assume that SVO is the canonical word order in Chinese, both of the negators in question can occur between the subject and the verb phrase, i.e. Subject + *meiyou/mei* + Verb Phrase, as shown in (13).

(13) (a) Lisi *mei/meiyou* kan zhei-zhong shu.
Lisi not / not have read this-CL book
'Lisi has not read / does not read this type of book.'

(b) Lisi zuotain *mei/meiyou* lai .
Lisi yesterday not / not have come
'Lisi didn't come yesterday.'

However, in Chinese, SOV word order alternates with the canonical SVO. When SOV order occurs, the negators always follow the displaced object, as shown in (14a).

(14) (a) Lisi zhei-zhong shu_i *mei/meiyou* kan t_i.
Lisi this-CL book not (have) read
'Lisi has not read / does not read this type of book.'

(b) *Lisi *mei/meiyou* zhei-zhong shu_i kan t_i .
Lisi not (have) this-CL book read
'Lisi has not read / does not read this type of book.'

In (14a), the object 'this type of book' is fronted to the preverbal position, located between the subject and the negator(s). (14b) indicates that neither *meiyou* nor *mei* can occur before the fronted object. In this respect, their behavior is the same.

In terms of scope relations, *meiyou* and *mei* are also identical.

(15) (a) Lisi meiyou/mei ouer chouyan.
Lisi not have / not occasionally smoke
'It is not the case that Lisi occasionally smoked.'

(b) Lisi ouer meiyou/mei chouyan.
Lisi occasionally not have / not smoke
'It is occasionally that Lisi did not smoke (He smoked almost all the time).'

In (15a), both negators have scope over the following VP, 'occasionally smoked'. In (15b), both take scope over 'smoke'.

3.2.2 Differences

3.2.2.1 Negation and modal verbs

In spite of these similarities examined above, there are properties which distinguish *meiyou* on the one hand, from *mei* and *bu* on the other, in terms of VP ellipsis, VP fronting, modal verb selection and so on. While *mei* behaves exactly like an adverb, *meiyou* behaves in the opposite fashion, showing strong head properties.

Meiyou exhibits a high degree of selection with respect to its complements, while *mei* exhibits a low degree of selection with respect to the heads it modifies. In addition to their different behaviors with auxiliary verbs (as discussed in Section 3.1), *meiyou* and *mei* demonstrate different selective properties with respect to modal verbs. While *mei* can co-occur with some, though not many, modal verbs, *meiyou* is excluded from this usage. Teng (1973:21) observes that modal verbs can be negated by *mei,* as in (16a), but not by *meiyou*, as shown in (16b).

(16) (a) wo zuotian **meiyou* neng lai.
I yesterday not have can come
'I couldn't come yesterday.'

(b) wo zuotian *mei* / bu neng lai.
I yesterday not / not can come
'I couldn't come yesterday.'

(c) Lisi *mei/bu* / *meiyou gan lai.
Lisi not / not / not have dare come
'Lisi dared not come.'

There are quite a number of modal verbs in Chinese. Generally, these verbs are negated by the negator *bu* 'not'. While *bu* can negate all the modals, and *mei* is restricted to a few of them, *meiyou* simply cannot negate any. In (16), *neng* and *gan* are examples of modals that can be negated by *mei* or *bu*, but not by *meiyou*. The asymmetrical behaviors of *meiyou* and *mei* may be interpreted as a consequence of the different selectional properties associated with the two words. While *mei* selects both auxiliary (including modals) and lexical verbs, *meiyou* selects only lexical verbs. This selectional distinction is largely due to the syntactic role played by *you*. In other Chinese dialects such as Cantonese or Taiwanese, *you* is construed as an auxiliary head. While *you* is not used this way in Mandarin, the head-modifier property persists in the combination of *you* and *mei*, and ultimately derives from the head status of *you* in other dialects.

3.2.2.2 Question constructions

Meiyou and *mei* contrast in A-not-A question formation. *Mei* can occur in A-not-A questions, while *meiyou* cannot. A-not-A questions are formed by reduplication of the questioned element and an infixation of the negator *bu* or *mei* between the reduplicant and the base. The element A in an A-not-A question can be an adjective, a preposition or a verb. (See Zhang 1996.) The following examples are typical A-not-A constructions.

(17) (a) Lisi lai-mei-lai?
Lisi come-not-come
'Has Lisi come yet?'

(17) (b) *Lisi lai-meiyou-lai?
Lisi come-not have-come
'Has Lisi come yet?'

(c) Lisi lai-bu-lai?
Lisi come-not-come
'Will Lisi come or not?'

(d) Lisi neng-bu-neng lai?
Lisi can-not-can come
'Can Lisi come or not?'

(e) Lisi yao-mei-yao lai?
Lisi will-not-will come
'Will Lisi come or not?'

(f) Lisi you-mei-you gei ni qian?
Lisi have-not-have give you money
'Has Lisi given you any money?'

The behavior of *mei* parallels *bu* in this context, though *mei* and *bu* have different temporal meanings, as shown in the glosses of (17a) and (c). *Meiyou* cannot occur in this construction, as shown in (17b).[3] As observed above, *mei* and *bu* behave similarly with respect to modal verbs, while *meiyou* demonstrates an independent property. This pattern reveals itself again in the A-not-A formation. Even though *you* used as a perfective marker does not exist in Mandarin Chinese, *you* can appear in the A-not-A form (17f), paralleling the behavior of modal verbs in these constructions (17d–e). Therefore, we can infer that the verbal status of *meiyou* is likely connected with *you*.

Meiyou and *mei* also contrast in another type of question construction, where *meiyou* can occur while *mei* cannot. *Meiyou* occurs at the end of a sentence as a question marker (or operator):

(18) (a) Ni chi-(le) fan *meiyou*?
You eat-ASP rice not-have
'Have you had your meal?'

(b) *Ni chi-(le) fan *mei*?
You eat-ASP rice not
'Have you had your meal?'

(18b) is unacceptable to most native speakers, while (18a) is acceptable to all.

3.2.2.3 VP Ellipsis

A more striking property that differentiates *meiyou* from *mei* lies in VP ellipsis (VPE). In Chinese as well as in many other languages, it is generally held that only certain heads license VPE. As shown in (19), VPE is not permitted immediately after adverbs like *always* or *often* (Postdam 1997, Hsieh 1997, among others).

(19) (a) *Lisi zongshi chi - dao, Zhangsan ye zongshi ∅. (VP Ellipsis)
Lisi always late come Zhangsan also always
'Lisi always comes late; so does Zhangsan.'

(b) Lisi zongshi chi dao, Zhangsan ye zongshi chi-dao.
Lisi always late come Zhangsan also always late-come
'Lisi always comes late; so does Zhangsan.'

(c) *ta neng manmande chi, wo ye neng manmande ∅.
he can slowly eat I also can slowly
'He can eat slowly; I can, too.'

(19) (d) ta neng manmande chi, wo ye neng ∅.

[3] Zhang (1996) among others suggests that there is a morphophonological constraint on the prosodic shape of the infix, that is, the infix of the reduplicated A-not-A must be consistently monosyllabic. This is one reason, but there may be others.

he can slowly eat I also can
'He can eat slowly; I can, too.'

(19a) and (c) show that VPE is not allowed immediately following an adverb such as *zongshi* 'always' or *manmande* 'slowly', while VPE is permitted following the modal verb head, as shown in (19d).

Meiyou behaves differently from *mei* in this respect: VPE is possible immediately following *meiyou*, but not *mei*.

(20) (a) *Zhansan *mei* chi fan, Lisi ye *mei* ∅. (*VP Ellipsis)
Zhangsan not eat rice Lisi also not
'Zhangsan did not have his meal; Lisi didn't, either.'

(b) Zhansan *mei/meiyou* chi fan, Lisi ye *meiyou* ∅.
Zhangsan not have eat rice Lisi also not have
'Zhangsan did not have his meal; Lisi didn't, either.'

(c) *Zhansan *bu hui* shuo yingyu, Lisi ye *bu* ∅. (*VP Ellipsis)
Zhangsan not can speak English Lisi also not
'Zhangsan cannot speak English; Lisi cannot, either.'

(d) Zhansan *bu hui* shuo yingxu, Lisi ye *bu hui* ∅.
Zhangsan not can speak English Lisi also not can
'Zhangsan cannot speak English; Lisi cannot, either.'

(e) ta meiyou manmande chi, wo ye meiyou ∅.
he not have slowly eat I also not have
'He didn't eat slowly; I didn't, either.'

(20a) indicates that *mei* cannot be stranded after VP ellipsis. By contrast, *meiyou* can stand alone, as in (20b). As shown in (19b), *mei* and *meiyou* are interchangeable in the first part of the sentence, but not in the latter part, where only *meiyou* is permissible in the VP ellipsis construction. In this case, the behavior of *mei* is again parallel to *bu*, as in (20c). (20d) demonstrates that *bu* must be supported by a modal, just as *mei* has to be supported by *you*. In this sense, *you* is parallel to a modal verb, as seen in comparing (19d) with (20e).

3.2.2.4 VP Fronting

Stranding can be seen as a test for heads. Generally speaking, only heads can be stranded, while modifiers cannot. From VPE, we can see that there is a parallelism between *meiyou* and verb heads on the one hand, and between *mei*, *bu* and adverbs on the other. More evidence of this distinction in terms of stranding can also be found in VP preposing constructions, as in (21).

(21) (a) ta lian kan Lisi yi yan$_i$ ye meiyou t$_i$.
he even look Lisi one glimpse also not have
'He didn't even throw a glimpse at Lisi.'

(b) *ta lian kan Lisi yi yan ye *mei*.
he even look Lisi one glimpse also not
'He didn't even throw a glimpse at Lisi.'

(c) *ta lian kan Lisi yi yan ye *bu*.
he even look Lisi one glimpse also not
'He didn't even throw a glimpse at Lisi.'

In (21a), when the VP is preposed, *meiyou* becomes stranded. By contrast, neither *mei* nor *bu* can be stranded, as shown in (21b–c). The facts can be captured by my claim that *meiyou* is a head, while *bu* and *mei* are modifiers. Otherwise, the asymmetrical behaviors of the negators with respect to stranding cannot be explained.

Meiyou is more or less the negative form of the auxiliary verb *you*, though *you* in this sense does not exist in Mandarin Chinese, as I have discussed. This observation supports my claim that *meiyou* is a head, while *mei* and *bu* are modifiers.

4.0 Lexical entries for *meiyou* and *mei*

Given the asymmetrical behaviors of *meiyou* and *mei* in terms of semantic interpretation and syntactic distribution, we claim that *meiyou* and *mei* belong to two distinct categories, i.e. *meiyou* is a head and *mei* is a modifier. I take the negative auxiliary *meiyou* to have the following minimal lexical information:

(22)

$$\textit{meiyou}: \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ +\text{AUX} \end{bmatrix} \\ \text{SUBJ} & \langle \text{NP} \rangle \\ \text{COMPS} & \langle \text{VP: [}-\text{AUX]} \rangle \\ \text{CONT} & \begin{bmatrix} \textit{not-rel} \\ \textit{Perfective} \end{bmatrix} \end{bmatrix}$$

This lexical entry specifies that *meiyou* is a verbal head with [+AUX] value. The [–AUX] value in the COMPS list indicates that the complement verb cannot be an auxiliary. The evidence for this specification is seen in the incompatibility of *meiyou* and other auxiliary verbs, as mentioned in Section 3. With respect to semantic information, the *not-rel* value indicates that *meiyou* is a negator, while the *Perfective* value suggests that *meiyou* is encoded with lexical perfective aspect meaning that cannot change in the syntactic process. By contrast, this feature does not exist in *mei*'s lexical entry, since perfective aspect meaning is a default meaning only. Based on the principle of monotonicity, PERFECTIVE is not a legitimate feature in the lexical entry of *mei*.

Given that *mei* is an adverb-like element, we may assume that *mei* is an independent word modifying a phrasal unit, i.e. a VP, and assume its lexical entry is something like (23):

(23)

$$\textit{mei}: \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{adv} \\ \text{MOD VP} \end{bmatrix} \\ \text{CONT} & [\ \textit{not-rel}\ ] \end{bmatrix}$$

Some explanations are necessary for this entry. According to Pollard and Sag (1994:55–57), adjuncts with the MOD feature can select the heads with which they will combine. The modified VP may contain auxiliary verbs and/or lexical verbs, to accommodate the *mei* + *auxiliary verb* combinations mentioned above (e.g., *mei neng* 'could not', *mei yao* 'will not', *mei gan* 'dare not', and so forth). Further concern with this analysis arises from the scope of *mei* in coordination. If *mei* is a VP modifier, it should show wide scope over a VP coordination. This prediction is borne out, as shown in (24).

(24) Lisi mei chang-ge, tiao-wu.
Lisi not sing (-song), dance
'Lisi did not sing a song, nor dance.'
*'Lisi did not sing a song, but danced.'
*'Lisi sang a song but did not dance.'

In both sentences, *mei* has scope over the whole coordination, which is expected from the present analysis.

5.0 VP Ellipsis lexical rule and VP Fronting lexical rule

The assumption that *meiyou* is a head and *mei* a modifier is necessary empirically, since no further specification with respect to stranding is needed for the COMPS features of *meiyou*, nor for the MOD(ified) features of other non-head negators, since they follow more general universal constraints such as the VP Ellipsis Lexical Rule (Kim 1996:125) and the VP Fronting Lexical Rule (Kim 1996:135). *Meiyou* as a negative auxiliary head is subject to these rules, which do not apply to non-head negators.

(25) VP Ellipsis Lexical Rule (Kim 1996:125)

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} verb \\ \text{AUX+} \end{bmatrix} \\ \text{COMPS} & \langle \text{VP} \rangle \end{bmatrix} \Rightarrow \quad [\ \text{COMPS} \ \langle \ \ \rangle\ ]$$

The lexical rule requires VP ellipsis to apply only to an auxiliary verb head selecting a VP complement. Given that *meiyou* is a negative auxiliary verb, VPE can be applied to *meiyou*, but not to non-head negators. The input of VPE is an auxiliary verb; the output is another lexical entry whose VP complement is not realized syntactically.[4]

The VP Fronting Lexical Rule (Kim 1996) has the same impact in Chinese. It can be modified and applied to Chinese.

(26) VP Fronting Lexical Rule (VPFLR) (Kim 1996:135)

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} verb \\ \text{+AUX} \end{bmatrix} \\ \text{SUBJ} & \langle [1]\text{NP} \rangle \\ \text{COMPS} & \langle \text{VP [LOC[3]]} \\ \text{AGR-S} & \langle [1], [2] \rangle \end{bmatrix} \Rightarrow \begin{bmatrix} \text{COMPS} & \langle \ \ \rangle \\ \text{AGR-S} & \langle [1],[2][\text{SLASH}\{[3][\text{-ASP}]\}] \rangle \end{bmatrix}$$

The input of (26) is an auxiliary verb taking a VP complement, and the output is another auxiliary verb whose VP complement is not realized syntactically. This lexical rule requires VP fronting to apply only to an auxiliary verb head whose input COMPS has a VP element. This rule can be used to account for the VP fronting facts, as in (20). The feature [–ASP] is introduced to the lexical rule to exclude the English auxiliaries *have* and *be* from the SLASH elements in the output. Therefore, though *have* and *be* are auxiliaries, they are not subject to the rule. Similarly in Chinese, if we consider the pre-verbal progressive aspect marker *zai* as an auxiliary, then the feature [–ASP] is also necessary in Chinese, since *zai* cannot be stranded.

(27) *ta lian chi-fan$_i$ dou mei zai t_i.
he even eat-rice DOU not ASP
'He is not even eating.'

6.0 Final remarks

The syntactic status of a lexical entry is a component of HPSG signs, necessary information for any analysis. On the status issue, we are immediately confronted with three hypotheses: Chinese negators are heads,

[4] (25) can be more generalized to accommodate the following VP ellipsis facts:

(i) wo jide huan-le nei-bi qian, Lisi ye jide ∅.
I remember repay-ASP that-CL money, Lisi also remember
'I remember paying back the money; Lisi remembers, too.'

(ii) Lisi qitu taobao, Zhangsan ye qitu ∅.
Lisi intend escape Zhangsan also tend
'Lisi intended to escape; Zhangsan intended, too.

In Chinese, 'remember' or 'intend' is not an auxiliary, but can have its complement VP deleted, as shown in (i). However, (25) cannot generate (i). The same is true with (ii). Therefore, I may suggest a revision of (25) to eliminate the feature [+AUX] from the sign. At the time being, this idea is only a hypothesis.

modifiers, or complements. Chinese negators cannot be complements, given their position with respect to possible verbal heads, so it is not necessary to discuss this possibility. With respect to the other possibilities, I have argued that *meiyou* is a head, while *mei* is a modifier. The differences in their semantic specification and syntactic distribution cannot be unified by underspecification. This head-modifier distinction is more elegant than a unitary analysis, since it is compatible with other universal constraints (as shown in Section 5), and helps simplify our analysis. This lexical analysis differs significantly from derivational analysis. It implies that there is no need to motivate a functional category NegP in Chinese.

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A TWO-TIERED ANALYSIS OF SEQUENCE OF TENSES IN ENGLISH*

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1.0 Introduction

There have been two general approaches to the tense of the complement clause in English: the deictic approach and the sequence-of-tenses approach. Under the deictic appraoch, the tense of the complement clause has the same deictic center or speech point as the main clause and it has an independent interpretation. Under the sequence-of-tenses approach, the tense of the embedded clause is relative to the tense of the matrix clause. In order to account for the tense in the complement clause, especially when the main clause is in the past tense, various claims have accordingly been made. Thus, a transformational tense-agreement rule is applied at deep structure; the past tense of the complement clause is semantically null (Hornstein 1990) and it is put through the tense deletion rule which is the Rule of the Sequence of Tenses (SOT) (Ogihara 1995).

As a result, several authors, including Stowell (1995), have argued that when the main clause has a past-time reference, the English past morpheme has two meanings: a simultaneous reading (PRESENT) and a past-shifted reading (PAST). But these analyses do not provide a consistent explanation for the overt past tense form. In fact, I assume that the morphological differences between languages like English and languages like Russian and Japanese, must be reflected at all levels of structure, whether it is syntactic or interpretative.

In this paper, I make use of a two-tiered approach to tense as developed in Chung (*in prep*). This approach utilizes the mechanism of a Deictic Tense Projection (TP) and an Anaphoric Tense Projection (ATP). I argue that the Rule of the Sequence of Tenses in languages like English is a syntactic rule that copies the Deictic Tense Projection (TP) of the matrix clause into the embedded clause, in order to set up an anaphoric link within the clause boundary. And I claim that the past morpheme has one meaning, i.e. PAST. For the simultaneous reading, the rule is applied to the complement clause, whereas for the past-shifted reading, it is not.

2.0 Definition of the Sequence-Of-Tenses rule

In many languages, such as Russian, Korean, and Japanese, a subordinate clause has a time relation relative to the situation time of the matrix clause. English also shows this effect in complement clauses.

(1) (a) John will say that Mary left/has left.
(b) John will say that Mary will leave
(c) John will say that Mary is happy. (Giorgi & Pianesi 1997)

The subordinate tenses in (1), present perfect (or past), future, and present, are interpreted as anterior, posterior and simultaneous, respectively, with respect to the time of saying, which is in the future.

However, unlike a number of other languages of the world, including Korean, Japanese, and Russian, English takes past tense morphemes in the complement clause when the main clause has a past tense, as in (2).

(2) (a) John said that he knew Mary.
(b) John said that Mary left.
(c) John said that Mary had left.
(d) John said that Mary would leave.

* I would like to thank Drs. Donna Gerdts and Charles Ulrich for their comments, criticism, and help with my English.

In addition, while the event times of the subordinate clauses of (2c) and (2d) unambiguously represent past in the past (past-shifted) and future in the past, those of (2a) and (2b) are ambiguous: past-shifted or simultaneous with respect to the time of saying which is in the past.

According to Comrie (1985:111), English is like Russian except for the addition of the Sequence of Tenses rule. This rule is a syntactic rule, which takes the tense of the original speaker's words (*I will leave*), and puts them into the corresponding past tense (the future in the past, *I would leave*). As in traditional grammars, this rule is necessarily involved in the change of direct discourse into indirect discourse, and it cannot account for other complement clauses whose matrix verbs do not have a direct discourse (e.g., *John believed that Mary loved him*).

Conversely, according to Hornstein (1990), the sequence of tenses is 'tense shifting' relative to the event time of the main clause, which is not restricted to languages like English, but a universal phenomenon in the complement clause. The sequence-of-tenses structures have two basic characteristics: 1) the embedded clause displays a shifted temporal interpretation relative to the event time of the matrix clause; 2) the sequence of tenses applies not only when the main clause is in the past, but also when the main clause is non-past. But the difference is that in the former, there is a morphological change, whereas in the latter, no morphological change occurs, and the morphological change in tense form is superficial in the sequence of tenses construction (Hornstein 1990:123). This means that there is no Rule of the Sequence of Tenses specific to languages like English.

On the other hand, Ogihara (1995:673) says that the Sequence of Tenses rule optionally applies at LF (Logical Form) before the syntactic structure is interpreted, and that it is a tense deletion rule:

(3) The rule of SOT:

> A tense morpheme α can be deleted if and only if α is locally c-commanded by a tense morpheme β (i.e., there is no intervening tense morpheme between α and β), and α and β are occurrences of the past tense morpheme (Ogihara 1995:673).

(4) (a) John PAST say that Mary PAST be sick.

(b) John PAST say that Mary Ø be sick.

The Sequence of Tenses rule turns (4a) into (4b) when both event times of the main clause and the subordinate clause are simultaneous. If this rule does not apply, the tense of the subordinate clause has an anterior reading to that of the main clause. Ogihara's SOT rule accounts for the tense interpretation of the complement clause under the past tense. However, in fact, from an empirical perspective, it has a weak foundation in that it deletes a morpho-syntactically given tense even if it occurs at LF.

Moreover, Enç (1987:635–6) declares that "the sequence of tense rule is a late morphological rule that applies at PF [Phonetic Form], and the complements have present tense at S-Structure and at LF, ... since the correct reading is obtained only if the semantics is entirely blind to the past ... whose function seems to be rendering meaning opaque." According to Enç, the Sequence of Tenses rule is totally useless.

In contrast, Shaer (1998:12) provides a much more plausible view that the SOT rule is not a mere reflex of a semantically inert rule, but rather a temporal tracking device, which makes temporal relations transparent. In terms of the function of the Sequence of Tense rule, I agree with this view.

3.0 Recent analyses of tense morphemes in English

Recently the ambiguity of the past tense morpheme has been suggested. Stowell (1995, 1996) says that complement clauses of intentional verbs like *say* and *believe* always have a construal dependent on the tenses of their matrix clauses, whereas relative clauses usually have an indexical construal. The difference of interpretations between complement clauses and relative clauses depends on LF movement. This is because complement clauses never undergo LF movement, while relative clauses must be moved at LF out of the c-command domain of the matrix PAST.

The problem arises with the simultaneous interpretation of the past tense in the complement clause when the main clause is in the past, as Stowell says, because such an interpretation can have only the past-shifted reading under his analysis. So he claims that English has two different past tenses: a true past (PAST, past-shifted) and a

false past (PRESENT, simultaneous).[1] Semantically, present and past are, according to him, "polarity-sensitive elements encoding an LF-scope relation with respect to the true PAST tense, which is analogous to the behavior of *some* and *any* vis à vis negation" (1995:394). Thus his analysis is that *past* indicates the presence of PAST in a c-commanding LF position, while *present* indicates its absence with no difference in meaning.

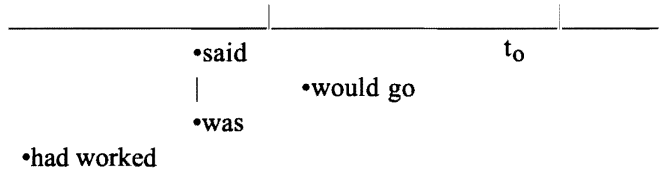
In order not to admit the morphological difference that is a language-particular or parametric property, Stowell pays a higher cost. First, one past tense morpheme has two types of tenses that, in themselves, are opposed to each other in concept. Second, the motivation of LF movements is inconsistent. It is motivated by case for relative clauses, but by polarity for complement clauses.

Declerck (1995) analyzes the ambiguity of past tense from a slightly different perspective, saying that English past tense may be semantically ambiguous between an absolute interpretation and a relative interpretation.[2] According to Declerck, English has two past tenses, an absolute past tense and a relative past tense. The former is back-shifted but the latter is retained (simultaneous) in a past domain, while the past perfect tense is a pure relative past tense in English.[3] The meaning of the past tense morpheme of a relative past tense is "STO (situation time) and Binding TO (time of orientation, or reference point) in a domain which is past with respect to $\mathbf{t_0}$ (Speech point)" (Declerck 1995:32).[4]

According to Declerck (1995:6), the time of the matrix clause establishes a domain and serves as the 'central' TO (referred to by the absolute tense form). The times of the other clauses are temporally related (subordinated) to the TO. The analysis is given below (Declerck 1995:7).

(5) (a) John said that he had worked hard all day, that he was tired and that he would go to bed early.

(b)



The past perfect form *had worked* in the first *that*-clause of (5a) is a relative tense representing the time of its situation as anterior to the central TO (saying time). The past form *was* is also a relative tense form expressing a relation in the past domain, i.e. the relation of simultaneity. Finally, *would go* is a relative tense form, representing the time of situation as posterior to the central TO.

In fact, in languages like Korean that show pure relative temporal relations in the complement clause, the sentence in (5a) should be represented as (6a).

(6) (a) John said that he worked (PAST) hard all day,
that he is (Ø, PRESENT) tired and that he will (FUTURE) go to bed early.

(b) John-un haluchongil yelsimhi ilha-ess-ko,
John-TOP all day hard work-PAST-CONJ
kulayse pikonha-ko/se ilccik ca-keyss-ta-ko malha-ess-ta.[5]
and.then be.tired-CONJ early sleep-FUT-DECL-COMP say-PAST-DECL

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[1] Stowell (1995:394) says that, unlike the Japanese past tense morpheme, which is a true tense, English present and past are not true tenses, and that, supposing that present and past are of the type Z (the head of the referential category ZP), the true predicative tenses PRESENT and PAST (the heads of TP) are phonetically null in English.

[2] More correctly, Declerck (1995:4) claims that English has two homophonous past tenses, an absolute and a relative, which happen to correspond to the same grammatical form.

[3] Declerck (1995:8) says that while past perfect tense is a pure relative tense and future perfect an absolute-relative tense, nonfinite verb forms are tenseless. According to Comrie (1985), both perfect tenses are absolute-relative tenses and the tense of nonfinite verbs is a pure relative tense.

[4] Declerck (1995) divides English tenses into two domains: present time-sphere tenses (the present tense, the present perfect tense, future tense, and future perfect) and past time-sphere tenses (the past tense or preterite, the past perfect, the conditional tense, and the conditional perfect).

[5] Abbreviations: CONJ: Conjunctive, COMP: Complementizer, DECL: Declarative, FUT: Future.

With respect to the time of John's saying, the tense of his working is past (anterior), that of his being tired is present (simultaneous) and that of his going to bed is future (posterior). However, this not the case in the English sentences where, instead, these tenses are past perfect, past, and future in past (represented by the past form *would*).

Declerck gives the relative past tense the same 'PAST' meaning that the past perfect tense has. However, one is retained in the past domain, having a simultaneous reading, while the other is back-shifted (anterior) without an explicit account. If the past perfect tense is a relative past tense, as Declerck claims, the past tense should be a relative present tense, with the meaning 'PRESENT' or 'SIMULTANEOUS'. The vague definition of relative past tense also cannot account for other relative tenses whose matrix tenses are in the future tense, even though Declerck's domain theory accounts for the temporal asymmetry between past and non-past tense in English. Thus, Declerck's analysis turns out to be not all that different from the previous analyses.

The overall problem of these analyses is that they ignore the relevant difference between languages like English and languages like Korean and Japanese. It seems to me that this difference should be either the Rule of the Sequence of Tenses, which, presumably, languages like English have, or it should be a kind of tense neutralization phenomenon that languages like Korean have. This difference should be recognized and accounted for structurally.

4.0 The predicative theory of tense

Several approaches have been taken to the grammatical category of tense. Among them are the tense-as-an-operator theory, the referential theory of tense (Partee 1973, 1984; Enç 1987), the adverbial theory (Hornstein 1990), and recently the predicative theory (Zagona 1990; Stowell 1995, 1996). In this paper I adopt the predicative theory of tense, following Stowell (1996).

The problem with the referential theory is that it cannot deal with the relational property of tense satisfactorily. Tenses are similar to nominals not only because they are referential, but because they both can have indexical properties as deixis. Reference—referring to some entity—alone cannot give the full interpretation of indexical elements. To take a spatial expression as an example, the meaning of *there* cannot be obtained fully without reference to *here* and the same reasoning is true of temporal expressions.

According to Nunberg (1993:8), the meaning of indexical expressions consists of three components: 1) the deictic component, 2) the classificatory component,[6] 3) the relational component. He analyzes the meaning of *yesterday* "as the 'calendar day' (classificatory component) that 'precedes' (relational component) 'the time of speaking' (deictic component)". This means the relational component of *now* or the first person pronoun *I* can be a zero relation (Ø). Thus, if we want to capture the exact interpretation of tense, whether it is at LF or at Conceptual Structure, at least those two components—deixis and relation—should be considered structurally.

But in Enç's (1987) analysis, the role of COMP (the complementizer node) is not clear. The problem is that COMP may or may not have a temporal index, assuming that one is able to support the notion of COMP having a temporal index in the first place. This problem follows exactly from the view that tense is a referential entity.

Zagona (1990, 1995) has introduced the predicative theory of tense, in which tense takes an external temporal argument (construed as speech time) and an internal argument, i.e. VP, whose temporal index is construed as event time. Applying Binding Theory to the temporal arguments,[7] she discusses tense in terms of the coreference and disjoint reference between the speech time and the event time. This, however, does not account for the main problem, the ambiguity of the past tense morpheme in the complement clause.[8]

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[6] Classification includes such (possibly inflectional) features as plurality, animacy, and grammatical and natural gender (Nunberg 1993:8-9).

[7] Binding Theory can be applied to tense as follows:

[+Past]: [–anaphoric], [+pronominal] => Binding Condition C applies.
[–Past]: [+anaphoric], [–pronominal] => Binding Condition A applies only to present tense.

As a result, past and future have disjoint reference, and hence they both are subject to Binding Condition C (Zagona 1995:403).

[8] Here Zagona (1995:405) mentions LF movement—adjoining to the matrix VP—for the simultaneous meaning of the past tense of complement clauses, when the matrix clause is in the past tense.

Furthermore, what is significant in tense is not a matter of coreference or disjoint reference between time points, but the relationships between those temporal entities that can be captured in structure.

5.0 An alternative

Before turning to my analysis, I need to briefly clarify some terminological confusion regarding the concept of the Rule of Sequence of Tenses. In the analyses so far, there are two different concepts used for this term. One is the temporal dependency of the subordinate clause on the main clause, which means that tenses lower on the generative tree show a temporal relativity to higher tenses, not to the speech point. The other is a formal arrangement of the tenses of sequential clauses, which have temporal relationships in a sentence, allowing the tense form of lower clauses to agree with those of higher clauses.

I assume that the former is a cross-linguistic phenomenon concerning the interpretation of tense in the subordinate clause, as Hornstein (1990) notes. Tense in subordinate clauses is closely related to a hierarchical relationship in the structure. However, how this semantic interpretation is formalized can vary from language to language. Depending on the language, the Rule of Sequence of Tenses can be made use of for the former phenomenon, or not. Hence, languages like English have the rule optionally, whereas languages like Korean or Japanese do not. Henceforth, I refer to this rule as the SOT.

5.1 A two-tiered analysis of the SOT rule

Tense was first given its own syntactic projection TP under Pollock's (1989) Split Infl Hypothesis, in which Infl has two different sets of features ([± Tense, ±Agr]), and each feature is the syntactic head of a maximal projection such as TP and AGRP.

From the deictic and the relational component of the meaning of indexical elements, it follows that tense must have the speech point as its given deictic center as well as another relational temporal point that refers to situation time or reference point. Just as a predicate must have only one subject (Extended Projection Principle), a tense always has a subject-like temporal entity, the external argument, and a complement-like temporal entity, the internal argument. In other words, tense is parallel to a lexical predicate, in that a tense has two temporal arguments. The parallelism between tenses and lexical predicates, however, is incomplete since a tense always has two arguments. And unlike lexical predicates, tenses are also functional categories, having a null form.[9]

In addition to the indexical property, another similarity between tenses and nominals that we cannot ignore is their anaphoric use. Once they establish an indexical relation, they can be referred to by anaphoric machinery, as long as they are accessible, and constraints on anaphors of course vary from language to language. This means that languages have different ways to constitute the anaphoric link, and the SOT rule is one of them.

Therefore, I further split this tense projection into two maximal projections, according to the feature [±Anaphoric]: Deictic Tense Projection (TP) and Anaphoric Tense Projection (ATP) (Chung *in prep*). Although Giorgi and Pianesi (1991) and Stowell (1995, 1996) provide two-tiered tense structures, their structures do not fully account for why they should be two-tiered. Here Anaphoric Tense means a relative tense that takes a time point other than the speech point as its reference point (a shifted deictic center S′ or orientation time),[10] and this is the external argument in Anaphoric Tense Projection, which is bound to a higher time point or a time given in context, depending on the language.

My argument (Chung *in prep*) is that each tense morpheme has its basic meaning in the simple sentence, such as the deictic present or past tense or the anaphoric present or past,[11] and this basic property can be modified

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[9] Zagona (1990, 1995) and Giorgi and Pianesi (1991) take the position that tense is a lexical category, not a functional category. According to Giorgi and Pianesi (1991:194), since tense, unlike AGR, assigns a T-role, it cannot be a functional category, and hence tense cannot have a null form. However, T-roles and Q-roles are different in nature. Tenses are predicative-like functional categories that are higher than predicates in structure. What is encoded by a null form in tense varies from language to language (Chung *in prep*).

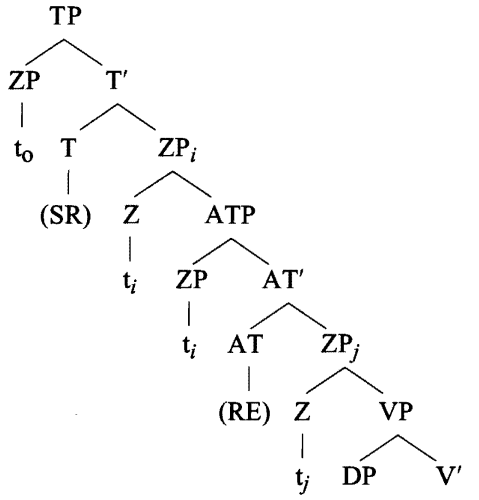
[10] As Comrie (1985:63) says, relative tenses can take the speech point as their reference point if no reference point is given explicitly by the context. Thus, relative tenses are tenses that do not necessarily take the speech point as its reference point but can take time points other than the speech point as their reference point, depending on the situation.

[11] English simple tenses are basically deictic, represented as S,E, E_S, and S_E, and they are represented as S,R, R_S, and S_R, only when they have lower anaphoric tense. On the other hand, perfect tenses (represented by the

by the position where the tense is placed. Hence even anaphoric tense can be deictic when there is no potential higher tense available to bind it. In the same way, deictic tense can be anaphoric when it has a higher tense that c-commands it. On the other hand, depending on the language, deictic and anaphoric tense can have distinctive roles, and in addition, different languages can have different constraints on usage.

I propose that every clause, whether it is a main clause or a subordinate clause, can have two temporal structures, a deictic tense structure and an anaphoric tense structure, and that the basic tense structure is as follows (Chung *in prep*):[12]

(7)



(*t_0: S, the speech point;
t_i, t_j: time points other than S.)

Here each tense has two time-denoting arguments, ZPs—external and internal. The head T takes the speech point as its external argument and the external argument of AT is bound to the internal argument of T. When a clause has only deictic tense, the T has only the SE relations, i.e. relations between the speech time and the situation time.

The SOT rule copies the deictic tense projection of the main clause, in order to give the reference point of the subordinate tense the anaphoric link to the situation time of the main clause within the same clause, which means that the domain of an anaphoric link[13] is a clause, not the whole sentence. On the other hand, in case the rule does not apply, the domain of the anaphoric link is a whole sentence, as in languages that do not have the SOT rule.[14] I define the rule of sequence of tenses as in (8) below:

(8) The Rule of Sequence of Tenses:

Where α, β are finite clauses, and α is in the past tense,

(i) copy the TP of α into β if and only if the external argument of the tense of β is linked to the internal argument of the tense of α, and

(ii) the external argument of ATP of β is linked to the internal argument of the higher tense in β.

The example sentences in (1), in which this SOT rule does not apply, repeated here below, have the temporal structures as in (9), following.

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past participle *have*) are anaphoric, represented as E_R. (See Chung *in prep* on the role of the reference point in tense.)

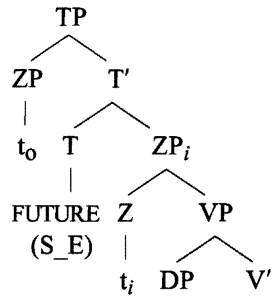
[12] Here I do not address the positions of auxiliary verbs, because languages differ in how tenses are grammaticalized. Some languages make use of auxiliary verbs, while others make use of particles or suffixes. This temporal structure is slightly different from Stowell's (1995, 1996), even though I adopt his temporal argument, ZP (zeit-phrase), which is a referential time-denoting category (Stowell 1996:280).

[13] Here it is not important whether the term 'binding' or 'link' is used. What matters is a kind of binding, which gives more flexibility in coreference than the Binding theory gives, since temporal arguments are not the same as nominals and, thus, not subject to the same Binding Conditions.

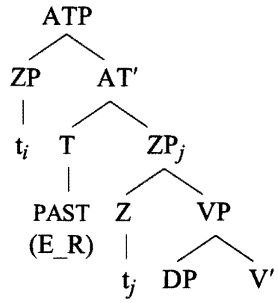
[14] In Arabic, imperfective relative simultaneous tense can be bound to the event time of the preceding sentence (Kinberg 1992).

(1) (a) John will say that Mary left/has left.
(b) John will say that Mary will leave.
(c) John will say that Mary is happy. (Giorgi & Pianesi 1997)

(9) (a) The main clause of (1a): [(1a) John will say that Mary left/has left.]



(b) The complement clause of (1a):

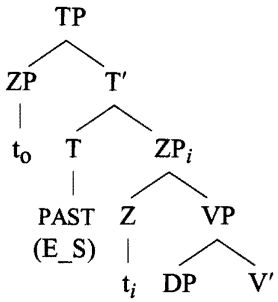


The structures in (9) show that the external argument (t_i) of the subordinate tense is bound to the internal argument of the matrix tense itself, denoting that the tense of the complement clause constitutes an anaphoric link to that of the main verb. The internal argument (t_j) of the subordinate tense has an anterior relation to the external argument.

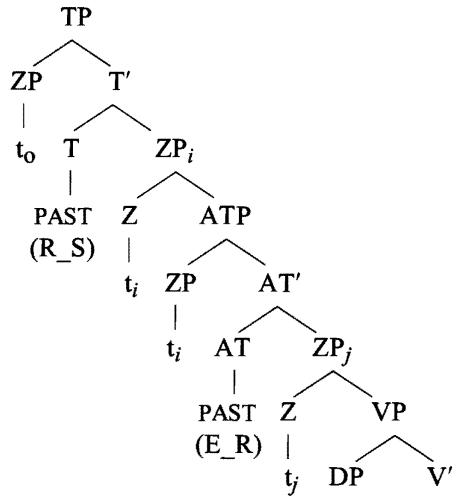
Using the SOT rule, we can account for the data in (2c) and (2d), repeated below. The temporal structure of the complement clauses of (2c) and (2d) is a combination of a deictic tense and an anaphoric tense.

(2) (c) John said that Mary had left.
(d) John said that Mary would leave.

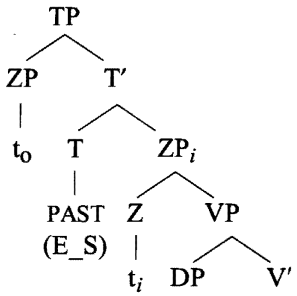
(10) (a) The main clause of (2c): [(2c) John said that Mary had left.]



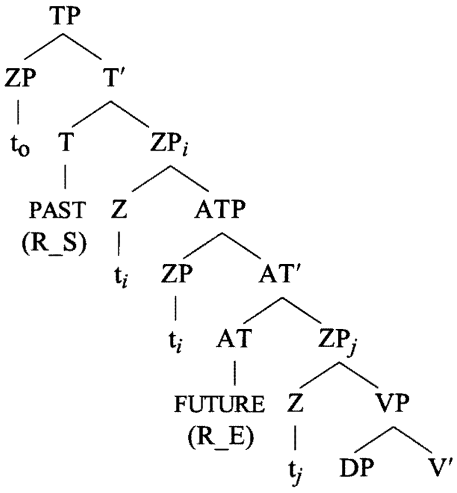
(b) The complement clause of (2c): [(2c) John said that Mary had left.]



(11) (a) The main clause of (2d): [(2d) John said that Mary would leave.]



(b) The complement clause of (2d):



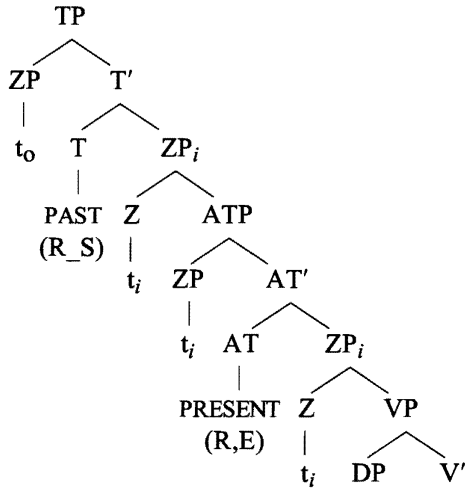
The TPs (deictic tense projections) in the complement clauses of (10b) and (11b) are copied from those of the main clauses by the SOT rule. Thus, the external arguments (t_i) of the ATPs (anaphoric tense projections) are directly linked to the internal arguments of the adjoining higher TPs in the same clauses, with respect to which the ATPs have a past and a future time reference, respectively. In terms of tense interpretation, SOT structures as in (10) and (11) and non-SOT structures as in (9) are, in fact, the same in that the event time of the complement clause is dependent on the event time of the matrix clause.

However, in terms of syntactic effect of the SOT rule, the anaphoric linking is possible within one finite clause, thus paralleling nominal anaphors. This means that the external argument of ATP—here, the reference point of anaphoric tense—and its antecedent are in the same clause. Thus, as Shaer (1998) points out, the SOT rule makes it easier to track the temporal antecedent of the reference point of anaphoric tense.

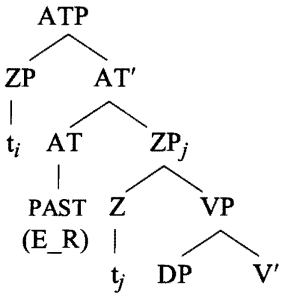
On the other hand, (2a) and (2b) are ambiguous because the event time of the complement clause can be either simultaneous with or prior to that of the main clause. Thus, the complement clauses have two different structures, as in (12).

(2) (a) John said that he knew Mary.
(b) John said that Mary left.

(12) (a) Simultaneous with the event time of the main clause:[15] [(2a) John said that he knew Mary.]



(b) Prior to the event time of the main clause :



Because of the application of SOT in (12a), the reference point (t_i) of the ATP is linked to its antecedent via the copied TP that is the adjoining higher tense in the same clause. To this past reference point, the ATP has a PRESENT relation, which is represented by a phonetically null form, Ø.

In contrast, the complement clause in (12b) has only ATP, which means that, without copying the TP of the main clause (i.e., no application of SOT), the reference point or external argument of ATP is bound to the internal

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[15] Many scholars including Stowell say that the eventive verb in the complement clause under past tense has only a past-shifted reading. On the other hand, in British English, when the matrix verb is *believe,* a back-shifted meaning is blocked and the simultaneous meaning only is allowed: in fact the eventive verb in (i) seems unacceptable (Giorgi and Pianesi 1997:286–7).

(i) John believed that Mary left. => SHIFTED: *British E; American E
(ii) John believed that Mary was pregnant. => SHIFTED: *British E; American E

argument of the TP of the main clause itself. In the case in which the SOT rule does not apply, an event in the context usually implies the temporal relation between the main clause and the subordinate clause. This optionality of the SOT rule in its obligatory environment is related to an interaction between the lexical properties of the verbs, the uniqueness of the English present tense, and a particular contextual implication.[16]

In sum, whether or not the SOT rule applies, the tense of the complement clause is dependent on that of the main clause. Thus, like other languages, English has this dependency in tense interpretation as a default rule. On the other hand, the SOT rule is a syntactic mechanism in which an anaphoric link is constituted within a finite clause in order to aid the interpretation of tense dependency between the matrix clause and the embedded clause.

5.2 The double-access reading and the SOT rule

Regarding the application of the SOT rule, English has a clear asymmetry in its tense system, just as it does in terms of the morphology of tense. This past/non-past asymmetry is a common phenomenon in languages. In the same fashion, the tense phenomena in the SOT domain—when the main clause is in the past—and those in the non-SOT domain exhibit different features, even though both have similar tense interpretations. I assume that the double-access readings also are related to the SOT rule.[17]

The dependent interpretation is the default interpretation. However, embedded tenses can be interpreted at any time independent of the matrix tenses when other elements intervene. When the matrix clause is not in the past tense, there is no morphological distinction between dependent and independent interpretations. Here the dependent reading is the unmarked reading, whereas in order to have an independent reading, the embedded clause needs extra elements which override the default reading, as in (13) below.

(13) (a) One day John will say that he is treating me like this.

(b) Seth will finally meet the woman who lives down the street from you.

(c) The police will believe that he was killed yesterday.

(d) Little Wilt will regret that he will be tall. (Shaer 1996:239)

Strong deictic elements (*this*, *now*, *from you*, *yesterday*) or deictic implications from the context or the event (*regret*) are the only way to distinguish the independent (deictic) readings. This is exactly the way that non-SOT languages have to solve the ambiguity between deictic readings and anaphoric readings in complement clauses.

On the other hand, in the obligatory SOT domain, i.e. when the main clause is in the past, there is a morphological distinction between dependence and independence (although, among many speakers, there is a recent trend that ignores this distinction).

(14) (a) John said that Mary is sick.

(a′) John said that Mary was sick.

(b) John said that Mary will leave.

(b′) John said that Mary would leave.

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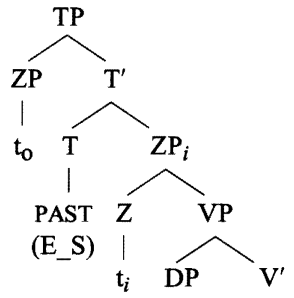
[16] For non-stative verbs, the English present tense usually does not imply an ongoing event at the speech point but a slightly bounded one at the moment of speech, which is different from languages like Korean, where the present tense means an exactly progressive event. This fact is related to the shifted meaning of past tense when it is embedded within past tense. However, I think we have to recognize the different trend in American English where without SOT application, the complement clause has a relative past sense even under the past tense because of characteristics of the eventive verbs (boundedness) which can predict the situation; as Shaer (1998) puts it, because of 'recoverability'.

[17] The double-access reading is a double mapping of the situation time of the subordinate clause onto the speech point on one hand, and onto the matrix clause on the other. In the case of present tense embedded under the past tense (e.g., *John said that Mary is pregnant*), the situation of the subordinate clause is interpreted both as holding *now* at the speech point and, at the same time, simultaneous with the past time referred to by the matrix clause (Giorgi and Pianesi 1997:281).

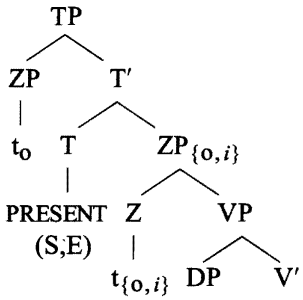
This morphological distinction does not allow the potential ambiguity that the non-SOT environments have, which implies that the same deictic elements are not necessarily required, and that such deictic elements as in (13) do not completely override the default reading, even if they are present.

Due to these differences between the SOT domain and the non-SOT domain, the possibility of the double-access reading is stronger in the SOT domain than in the non-SOT domain. That is the reason why the sentences in (14a) and (14b) can have a double-access reading. The complement clauses of (14a, a′) are represented as in (15).

(15) (a) Non-SOT domain of (14a): [(14a) John said that Mary is sick.]



(b) Double-access reading of (14a′): [(14a′) John said that Mary was sick.]



The SOT rule does not apply to the complement clause since it has an independent interpretation. Thus, the complement clause has a deictic tense with a strong possibility of a dependent interpretation. The internal argument of AT (anaphoric tense) has a zero relation to its own external argument, i.e., it is simultaneous with the speech point. At the same time it is linked to the internal argument of the matrix tense, due to the default interpretation. Thus this double-access reading shows a similarity to the anaphoric relation of a 'split antecedent' reading, as in (16).

(16) $John_i$ told $Mary_j$ that $they_{\{i,j\}}$ should leave. (Higginbotham 1983:400)

6.0 Conclusion

The SOT rule is a formal mechanism to capture the cross-linguistic phenomenon of the dependency of embedded tenses on matrix tenses—a default interpretation, which is closely related to syntactic hierarchy. Secondly, it is not a useless LF or PF rule, as previously claimed, but rather a syntactic rule that establishes an anaphoric link in a finite clause, in order to make it easy to track down the temporal antecedent. At the same time, the SOT is an important mechanism that prevents the ambiguity between a deictic reading (independent interpretation) and an anaphoric reading (dependent interpretation) that exists in non-SOT languages. The optional application of the SOT rule in its obligatory environment is related to the predictability of the temporal relationship between the matrix clause and the complement clause.

In terms of application of the SOT rule, English has an asymmetry between past and non-past tense. In this respect, we cannot say that English is a SOT language. Rather, English has a SOT domain and a non-SOT domain. With regard to independent interpretation, the two domains have different dynamics between the default rule and a deictic interpretation, which is also closely related to the degree of possibility of the double-access reading.

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THE STRUCTURE OF ENGLISH BARE SINGULARS AND THE LICENSING OF COMPLEMENTS IN DP

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1.0 Introduction

Singular count nouns must be accompanied by some sort of determiner in English:

(1) Larry placed *(the) book on the table.

(2) Sam is considered *(a) genius by his friends.

This requirement holds both for nominal arguments (1), and predicates (2). There are, however, a number of exceptions to the generalization expressed above:

Objects of manner PPs

(3) Frank usually commutes by *train.*

(4) The papers were sent via *messenger.*

Profession-class predicates

(5) Nader was appointed *campaign-reform czar.*

(6) Who made him *king of the office*?

Vocatives and appositives

(7) Ok, *genius,* tell us how to do it.

(8) Few of us ever got to know Katherine Janeway, *gardener* and *pasta-lover.*

Synthetic Compounds

(9) Sandy doesn't much like *potato* peeling.

While all of the constructions in (3–9) will be considered in this paper, only the prepositional objects in (3, 4) will be analyzed in detail. I will argue that the syntactic properties of such objects can be fully accounted for by combining two assumptions: first, that the head of these manner PPs c-selects NP, and second, that complements of nouns are licensed by raising to the specifier of #P for Case, i.e., these complements can be assigned structural case within the DP. The latter assumption not only explains some unexpected properties of (3, 4), but also some otherwise puzzling facts about casemarking and subject-to-subject raising out of derived nominals. From a theoretical perspective, this runs counter to previous analyses of "*of*-insertion" (Chomsky 1986a), claiming instead that case assignment in DP is analogous to clauses: structural and inherent case assigned in both domains.

2.0 Syntactic properties of bare singulars

We will begin by looking at the properties of just the bare singulars in synthetic compounds and *by-* and *via*-PPs, returning later to the cases in (5–8), which have somewhat different properties. The first thing to notice is that the bare singulars in these constructions cannot be modified:

(10) He arrived by *plane* (*with four engines).

(11) The papers arrived via (*speedy) *messenger.*

(12) Each part was built by *machine* (*that no longer exists).

(13) Miles is a book (*about whales)-*collector* (*about whales).

It is possible to have a full DP after *via*, subject to certain semantic restrictions, e.g., (17).

(14) We heard, via *rumor* (*about John), that his mother is having an affair.

(15) ?We heard, via *a particularly nasty rumor* about John, that his mother is having an affair.

(16) ?We heard, via *Sean's nasty rumor* about John, that...

(17) Nigel usually commutes via *train/the morning train/*this train/??one of these trains*.

Crucially, the PP modifier *about John* is only acceptable if accompanied by a determiner or possessor, as in (15–16).[1]

Next, note that it is impossible for any sort of bare noun to have an overt complement:

(18) Clinton communicated with the African leaders via eight interpreters of different Bantu languages.

(19) *Clinton communicated with the African leader via interpreter of Chichewa.

(20) Geoff is a convention observer (*of linguists).
(*cf.* Geoff is an observer of conventions of linguists.).

The postnominal PP in (18) differs from that in (15) with respect to the '*one* rule':

(21) I heard a rumor about Bob and he heard *one* about me.

(22) *I met an interpreter of English and she met *one* of Chinese.

This rule is known to apply to a constituent smaller than QP (consider, for example, *each one*, *every one*) but at least as big as NP (hence *one* replaces N and any true complement within N′). What this suggests is that the PPs in (18) and (22) are true complements, while those in (15) and (21) are actually modifiers.

The next fact about bare singulars concerns their referentiality: they cannot serve as the antecedent of a pronoun. (In the examples below, the symbol # below is meant to signify that an anaphoric relation between N and pronoun can only be established via accomodation.)

(23) Max commuted by bus$_i$ yesterday. #It$_i$ was filthy.

(24) The contract arrived via messenger$_i$. #His$_i$ name was Ted.

(25) Marty is potato$_i$-peeling at the moment. #It$_i$'s a big one.

However, examples like (23) and (24) improve when the generic reading of the bare noun is emphasized:

(26) Max always commutes by train, because they're cleaner than buses.

(27) Many who claim to have flown by lear jet$_i$ have never even seen one$_i$.

This suggests that bare singulars in manner PPs can denote a *kind* (and perhaps must in the case of *by*-PPs).

It is also true of bare singulars that they resist extraction:

(28) *What$_i$ does Fred commute by **t**$_i$?

(29) *Fax$_i$, I like to send important papers via **t**$_i$.

(30) *By what$_i$ do you usually travel **t**$_i$?

We might conclude from (28) that the object of *by* cannot be moved via A′-movement, but (30) suggests that *what* may be incapable of substituting for the bare singular noun, though at this point it is unclear why.

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[1] Note that none of the properties below hold of bare plurals and mass nouns. I assume this reflects the presence of an empty determiner, as argued by Longobardi (1994).

3.0 Potential analyses

In the next three sections, we will consider some potential analyses of the data in examples (10–30).

3.1 Evidence that *by*-PPs are not lexically derived

The properties discussed above would be expected if phrases like *by train* were composed in the lexicon. Indeed, similar-looking phrases, such as *by heart* and *off hand,* do seem to be frozen expressions.[2] There are some good reasons, though, to doubt this proposal.

First, these bare objects can be conjoined:

(31) To be sure the news was received, we sent it by both e-mail and snail mail.

(32) He always commutes by either [train or bus].

(33) *Dole's frequent use of off [hand and color] remarks ended up hurting him.

If the *by*-PP in (31) were lexically derived, it would be predicted to be ungrammatical, under the standard assumption that conjunctions only operate on syntactic constituents. Just as important, (31) and (32) are evidence against generating *by train* via (overt) syntactic incorporation: this theory would require adjacency between *by* and the bare N object, which is clearly not what happens in (31, 32).

Secondly, these manner PPs are completely productive: any new form of transportation or communication can appear in this construction, which contrasts with some similar looking PPs which are definitely lexically-frozen expressions.

(34) (a) sent by fax
(b) travel by lear jet
(c) transmitted via satellite

(35) *play a song by artificial heart/pig heart

One last bit of evidence against the lexical approach comes from the contrast below:

(36) Many who fly by lear jet$_i$ today wouldn't have flown by one$_i$ 20 years ago.

(37) *Anyone who can play Mozart by heart$_i$ can play Beethoven by one$_i$ too.

The lexical approach leads us to expect an anaphoric island effect for both (36) and (37), but only the latter, which contains the frozen PP, bears this prediction out.

3.2 The c-selection analysis

A rather direct way of accounting for the data is to claim that *by* c-selects a bare NP, and *via*, either NP or a DP. This analysis succeeds in accounting for most of the observed properties of manner PPs. The impossibility of modifying bare singulars is predicted, if Longobardi (1994) and others are right in attaching attributive adjectives in the functional structure between D and NP; heavier modifiers such as PPs and relative clause are presumably right-adjoined to the same functional structure.

(38) $[_{DP}$ D $[_{\#P}$ [Adj $[_{\#P}$ $[_{\#P}$ # $[_{NP}$ N (complements)]] PP/RelClause]]]]

The analysis also predicts that bare singulars (= NPs) cannot serve as antecedents, assuming D to be the locus of reference (alternatively, we could assume that #P is the minimal amount of structure required for supplying a pronoun with an antecedent). The absence of a #P might also explain why **commute by trains* is ungrammatical,

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[2] To avoid any uncertainty over lexical versus syntactic origin, I have been ignoring a large class of other PPs containing bare singulars *(over budget, up to code, on alert, on target, on demand,* etc.), which seem less productive than *by-PPs,* but certainly more transparent in meaning than *by rote.*

since #P is arguably required to morphologically express the plural. Further, the bare singular in *by train* is semantically unspecified for number—when one commutes by train, any number of trains might be involved. If number is an interpretable feature, and bare NPs lack this feature, then this semantic property of *by train* is expected under our analysis.

A c-selection analysis has been proposed by Longobardi (1996) for a similar set of facts in Italian. As in English, arguments in Italian generally require a determiner. Example (38) shows that this goes for objects of prepositions as well (Longobardi's examples):

(39) *Gianni é a giardino/ufficio/treno.
Gianni is at garden/office/train

(40) Gianni é in giardino/ufficio/treno.
Gianni is in garden/office/train

(40) represents an exception: the preposition *in,* like English *by* and *via,* allows a bare singular object. As seen in *nel* in (41), *in* also allows a DP (like *via*), and in this case, possessors and modifiers are licensed. Crucially, though, it is not possible to have a possessor or modifier in (41), where a bare NP is selected:

(41) Gianni é nel giardino pubblico/di Maria.
Gianni is in-the garden public/of Maria

(42) *Gianni é in giardino pubblico/di Maria.
Gianni is in garden public/of Maria

Given Longobardi's assumption that adjectives and possessors appear between D and NP, (42) is ungrammatical because there is no determiner position for N raise to (and, in fact, the functional structure for the adjective and possessor is also missing). Longobardi (1994) suggests that modifiers of all kinds require the presence of a determiner; an empty determiner is not an option here, since these, he assumes, are restricted to mass nouns and bare plurals.

C-selection of NP leads to the prediction that the object of *in* should itself be able to take an overt complement. Longobardi does not give examples of this, and it turns out to be too difficult to construct plausible examples with *in*. However, the facts from English (examples (18–20) above) show that the prediction is incorrect:

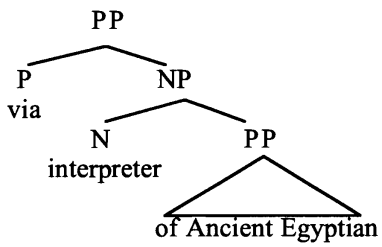
(19) *Clinton communicated with the African leader via interpreter of Chichewa.

(19′) Clinton communicated with the African leader via an interpreter of Chichewa.

In order to express what (19) is trying to say, an overt determiner is required, as in (19′).

What we lack at this point is a real explanation of why complements and modifiers of N require the presence of a determiner; in other words, what rules out structures like (43) below? Ideally, this explanation should also account for the other unexplained properties of bare singulars observed in (10–20).

(43)



[(43′) ... via interpreter of ancient Egyptian]

4.0 Licencing complements of N

The issue of how nominal complements of N are licensed is a particularly murky one. Chomsky (1995: Chapter 1) proposes that N and A assign inherent genitive Case to their complements. How this translates into checking theory is far from clear. I want to propose here that complements of N are not assigned *inherent Case*—but rather s*tructural Case*. Thus, in parallel with verbal arguments, they must raise to the specifier of some

functional projection, either by Spell-out or LF. Within the Minimalist framework, the entire issue of inherent Case has been left unresolved; indeed, the old conception of inherent Case cannot be easily integrated into a feature checking framework such as the MP.

Aside from the problems this raises within the Minimalist framework, we should question the validity of extending what is generally meant by *inherent Case* (i.e., Case associated with a specific theta role) to N complements. While just a small subset of verbs assign inherent case, all deverbal nouns are standardly assumed to only assign inherent case; yet the internal theta role assigned by *solution* and *solver*, for example, is presumably no different than the one assigned by *solve* (which assigns structural, not inherent case). Therefore there is no reason to suppose that inherent Case plays any part in licensing N complements in such instances. Parallelism among the lexical categories was the major insight behind X-bar theory in Chomsky's (1970) paper, "Remarks on nominalizations". Thus the standard account of casemarking complements of N represents an unjustified departure from Chomsky's earlier insight.

Assuming for the present that N complements do have to raise for feature checking, we would expect to find some languages that meet this requirement in overt syntax and others that do it in LF. The question then is, can we find examples of the complement raising above N to [Spec, FP]? There is evidence for this in languages such as Chinese, Korean and Turkish:[3]

(44) $[_{NumP}$ [Na-sho sh]$_i$ huanmiou te $[_{NP}$ chieshi t_i]] pei tueihuai. (Chinese)
that-CL poem ridiculous GEN interpretation PSV rejected
'A ridiculous interpretation of that poem was rejected.'

(45) Elton John-eyuyhan [nolay-uy]$_i$ say $[_{NP}$ t_i chuyip-un] sengkongecki-et-ta. (Korean)
Elton John-by song-GEN new recording-TOP successful-PAST-IND
'Elton John's new recording of the song was successful.'

(46) Hasan-in [benim komputer-i] yeni calinma-si (Turkish)
Hasan-GEN my computer-3SG recent theft-3SG
'Hasan's recent theft of my computer'

As the word order in these examples suggests, the DP complement of the N raises to a position between N and D. The position of the adjective rules out the possibility that the complement is base-generated to the left of N. It is also notable that in Chinese and Korean, the complement cannot appear between the adjective and N. In Turkish, the order [Adj Comp N] is possible, but only if the adjective is understood as modifying the complement 'computer', not the selecting noun 'theft':

(44′) *Huanmiou te $[_{NP}$ chieshi na-sho sh] pei tueihuai. (Chinese)
ridiculous GEN interpretation that-CL poem PSV rejected
'A ridiculous interpretation of that poem was rejected.' [= the same meaning as (44)]

(45′) *Elton John-eyuyhan say $[_{NP}$ nolay-uy]$_i$ chuyip-un] sengkongecki-et-ta. (Korean)
Elton John-by new song-GEN recording-TOP successful-PAST-IND
'Elton John's new recording of the song was successful.'

(46′) Hasan-in [yeni komputer-i] calinma-si. (Turkish)
Hasan-GEN recent computer-3SG theft-3SG
#'Hasan's theft of the recent computer'

This suggests that the complement of N must overtly raise over the adjective to some specifier position. I propose, then, that the structure of the DP in (46) is the following:

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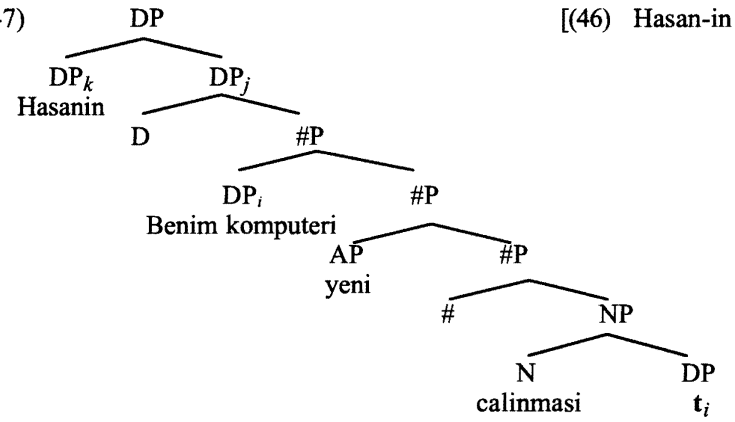
[3] I would like to thank my informants, Soowon Kim (Korean), Chia-hui Huang (Chinese), and Dilara Blake (Turkish).

(47)



[(46) Hasan-in [benim komputer-i] yeni calinma-si.]

Now let us consider what happens when, for whatever reason, there are no functional projections above N. As argued in Longobardi (1994), referential arguments have two ways of being licensed: either by incorporation into another lexical head, such as V or P, or by N raising to D. Since we are considering arguments with no functional structure, that means the only possibility for licensing would be N to V/P incorporation. The consequence of these assumptions is that if a noun appears in a structure lacking #P and DP, then any referential argument of that N cannot be licensed. The implication goes as follows:

(48) (a) If N has a complement, #P is required above N.

(b) If there is such a #P, there must also be a DP.

The claim that there cannot be a #P without DP is based on the assumption that # would block incorporation of N into a higher lexical head, leaving only one other option for licensing N, namely raising to D. The intuition here is that lexical heads can move through other heads within their own extended projection for feature checking, but incorporation is a more restricted process, in that nouns can only incorporate into other lexical heads. The intuition has been codified as the Proper Head Movement Generalization. (See Baker (1995:284) for discussion.)

(49) *Proper Head Movement Generalization*

A lexical category cannot move into a functional category and then back into a lexical one.

(50) The book weighs *five pounds*.

(51) He ran *five* ***long*** *miles*.

The implication in (48) requires some qualification. We have not yet discussed measure phrases, as in (50), which I assume to be bare #Ps. Since these are non-referential, there is arguably no DP present, and the noun apparently does not incorporate, given the possible presence of numerals. I will assume that it is a special property of #Ps that they can be interpreted as measure phrases, and that this method of interpretation is distinct from the method utilized for both referential arguments and bare NP predicates. It is then predicted under our analysis that measure phrases, as #Ps, may be modified. (The nouns are typically not complement takers, i.e., are not derived from verbs.) Although semantic situations involving modification of MPs are often implausible, there are limited examples of modification, as in (51).

To summarize this section, we have argued that complements of N are not assigned inherent case, but structural case, which is checked in the specifier of #P. We examined evidence from Turkish which suggested that a raising of the complement can occur in overt syntax, in contrast to English, where it takes place during the computation to LF. This theory of licensing in DP provides an answer to the puzzle concerning the complements of objects of *by* and *via* PPs, as in (18–19), and gives a more principled account of *of*-insertion, i.e., one that treats verbs and the nouns derived from them in a similar fashion.

5.0 Licensing arguments in derived nominals and gerunds

It has been a long-standing puzzle why raising in derived nominals is ungrammatical:

(52) *This led to John's appearance to have won.

(53) This led to the appearance that John had won.

(54) *John$_i$'s belief [t_i to be intelligent]

(55) the belief that John is intelligent

(56) John$_i$ is believed [t_i to be intelligent].

There is nothing wrong with (52) semantically, as the paraphrase in (53) shows. Similarly, we might expect (54) to be as acceptable as (55), given the grammaticality of the sentential equivalent in (56).

One approach to (52), going back to Ross (1967), is that movement out of N complements leads to illformedness. In somewhat more formal terms, we can assume that the IP complement of N constitutes a barrier to movement, for reasons having to do with what is sometimes referred to in the literature as the "inherent defective nature of N". Chomsky (1986b:36) suggests that N is not a proper governor. Grimshaw (1990) and Cinque (1990) both propose that N is a defective theta marker; for Cinque, the notion 'barrier' is defined as an XP "that fails to be directly selected by a category nondistinct from [+V]" (1990:55), which has the consequence that complements of N are always barriers.

If the IP complement of N in (52) and (54) is a barrier, we expect A-movement across this IP to lead to strong ungrammaticalty (an ECP violation), since A-movement is subject to stricter locality constraints than X-movement. Here, let us follow Rizzi's (1990) view that every link in an A-chain requires antecedent government, which depends on there being no barriers and no potential landing sites between the head and tail of the chain. A′-chains, on the other hand, only suffer subjacency effects when an argument crosses a barrier.

Now consider another difficult puzzle about derived nominals:

(57) *The appearance of John to win

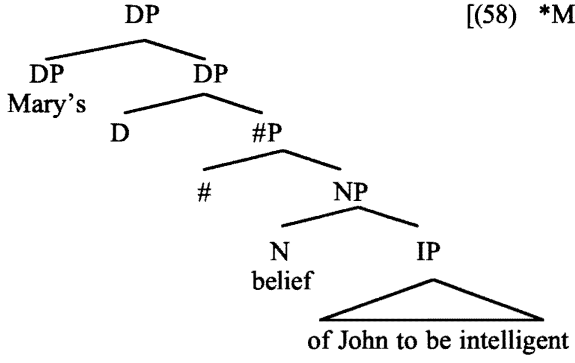
(58) *Mary's belief of John to be intelligent

(59) *The belief of John to be intelligent

The impossibility of *of*-insertion in contexts like (58) is unexpected; this example would not seem to involve raising out of IP, and these nouns trigger *of*-insertion in other contexts.[4] The standard account of (51–53) proposes that *of* realizes inherent Case, which is only assigned to an argument of N, not *John*, the subject of *win*. This certainly does not follow from anything outside the theory of *of*-insertion..

Under our current assumptions, we can explain the phenomena in (57–59) just as we explained (54); in (58), *John* must raise to [Spec, #P] for Case in LF. This means *John* must cross an IP barrier on its way to a Case position:

(60)



[(58) *Mary's belief of John to be intelligent.]

The landing sites for *John* in (54) and (58) differ slightly (having specifiers of DP and FP, respectively), but the result of crossing IP in each case leads to an ECP violation.

[4] I am grateful to Kyle Johnson for pointing out the significance of these two puzzles to me.

In addition, we should expect a contrast among the gerund counterparts of the derived nominals above, specifically between the *of*-ing type and the POSS/ACC-ing type. In the former case, the infinitival clause is a complement of N, while in the latter case, this IP is a complement of V. Hence, it would not constitute a barrier to movement. This prediction is borne out:

(61) *This led to the appearing of John to be intelligent.

(62) *John$_i$'s believing [$\mathbf{t}_i$ to be intelligent] is unfounded.

(63) *The considering of [John rude] is unfair.

(64) *John$_i$'s considering [$\mathbf{t}_i$ (to be) rude] is unfair.

(65) We remember John$_i$('s) appearing [$\mathbf{t}_i$ to be intelligent].

(66) We remember them/their believing [John to be intelligent].

(67) Our considering John (to be) rude is unfair.

(68) John$_i$'s being considered [$\mathbf{t}_i$ (to be) rude] is unfair.

(61) is predicted to be bad for the same reason as (57): when *John* raises at LF for Case, it crosses an IP barrier (the structure is [$_{NP}$ N$_{ing}$ IP]. The same problem occurs in (62)—which is the counterpart of (54), **John's belief to be intelligent.* Here, the noun *believing* fails to L-mark its IP complement, making any raising out of IP illformed. (63) and (64) illustrate similar points for the small clause predicate *considering.*

When POSS/ACC-ing gerund counterparts are constructed, they are fully grammatical. This is presumably because *appearing* and *believing* in (65) and (66) are verbs; therefore each counts as an L-marker, whereas N does not. As the pair (67, 68) shows, POSS/ACC-ing gerunds license the infinitival or small clause subject via accusative case. When passivization removes this possibility, *John* must raise out of the lower IP for Case reasons. In both cases, IP is not a barrier, since V L-marks IP in the structure [$_{DP}$ D [$_{AgrOP}$ AgrO [$_{VP}$ V$_{ing}$ IP]]].

Thus, we find indirect but strong evidence for the existence of a functional projection in which *of*-marked DPs are licensed. This analysis allows us to give a unified explanation for two puzzling phenomena—the impossibility of raising and *of*-marking in certain derived nominals—without resorting to unmotivated assumptions about Inherent Case.

6.0 Some potential counterexamples

Recall the early data of (5–8) in Section 1.0.

Profession-class predicates

(69) Clinton appointed Nader *campaign-reform czar.* [Cf. (5).]

(70) For their children's sake, Linda and Bob named Alex *guardian.*

Vocatives and appositives

(7) Ok, *genius,* tell us how to do it.

(8) Few of us ever got to know Katherine Janeway, *gardener* and *pasta-lover.*

Like the manner PP construction, these examples constitute exceptions to the general requirement that English count nouns have an overt determiner. It turns out they are also exceptions to the correlation that we have seen between overt D on the one hand, and modifiers and complements on the other:

(71) Linda and Bob named Alex *guardian of their children.*

(72) Sally was elected *(the) smartest student in the class.*

(73) I consider John *(the) smartest student in class.

(74) *I appoint John Max a person.

The italicized nominals in (71) and (72) are titles; the appearance of a determiner here is usually optional. This generalization only holds when the italicized string appears within the small clause complement of *appoint, elect, name,*and so forth (cf. (73)), so there is nothing inherent about the bare nouns in (71) and (72) that makes them immune to having a determiner.

Apparently, this verb class selects a nominal small clause that denotes a property, but the property generally only holds for one individual at a time. Furthermore, the property must be temporary (cf. (74)). These predicate nominals are also exceptional in other ways: unlike complements of the *consider*-class, they are resultatives and, as Stowell (1989) observed, they can be headed by *as.*

I cannot offer any explanation of these exceptional properties here, but I do want to suggest an answer to the problem presented in (71). We said before that the #P that licenses the complement of a noun can be present when this noun heads a referential argument, but not when N is non-referential, as in *by* ***train*** and *goat-herder;* in the latter case, #P would arguably block incorporation of N into V or P. However, for predicate nominals, there is no *a priori* reason to expect N to raise; and even if it did raise, the motivation for this would be distinct from the motivation for N-to-D raising. (One likely possibility is the raising of N to some other functional head, perhaps Pred, following Bowers 1993.) Therefore, we have no reason to claim that #P *could not* intervene between N and the verb that s-selects the whole predicate nominal.

(75) *(*A/this) dear friend,* can you spare some change?

(76) Katherine Janeway, *(a) tireless defender of the homeless,* is nowhere to be found.

(57) *The appearance of John to win

This explanation essentially carries over to the cases in (75) and (76) as well. Vocatives and appositives are adjuncts, hence they too escape the N-raising requirement argued for by Longobardi. In fact, there is no real evidence that they are DPs. However, nothing rules out the possibility that they contain a functional projection, assuming it serves some purpose, such as licensing a complement of N, as in (57). These data are therefore not counterexamples, but an additional source of support for the analysis we have proposed. We expect cases like these to allow complements and modifiers without an overt determiner.

It should be pointed out that my analysis predicts that any sort of modifier should be allowed in (69, 70, 7, 8) (e.g., AP, PP, and so on). This prediction holds true for appositives and vocatives, but not always for small clauses.

(77) Linda and Bob named Alex (?new) guardian of their children.

(78) *Nader was elected new president.

(79) Roger was appointed temporary chair.

There seem to be some subtle semantic distinctions at play here, having to do with the question of what is an appropriate modifier for a nominal denoting a title. I will therefore assume that these facts can be handled outside the syntax.

Another question that arises from the discussion of (69, 70, 7, 8) is whether the object of *by* and *via* is simply a predicate. If this were the case, we could no longer distinguish it from the predicates in (69), and its syntactic properties would no longer be accounted for. There is a clear difference, though, between objects of manner PPs and nominal small clauses: the NPs in small clauses have additional functional structure above them (such as Pred or Voice) which allows the noun to get interpreted as a predicate without incorporating. This structure provides a position for the subject of the small clause as well. Bare NP objects, on the other hand, do not have any functional structure above them and never license subjects. Their only option is to incorporate into the P or V that selects them. We can assume that they lack this functional projection, be it PredP or VoiceP, precisely because NP is c-selected. Placing a Pred/VoiceP below *by* or in a synthetic compound would ultimately lead to uninterpretability, since PredP and VoiceP denote states/events, and what *by* is looking for is an entity (e.g., *plane)* that denotes some mode of transportation.

7.0 Conclusion

In this paper we have examined a number of exceptional constructions from a range of languages and found a striking similarity which binds them together. The exceptional aspect of the constructions derived from necessity: we needed to find special contexts which allowed a determiner to be omitted, and, crucially, that determiner had to normally be obligatory in the language in question. The property which all of these constructions shared was a correlation between the presence of DP, and the possibility of modifiers and complements of N.

We also found that a relatively simple assumption about how complements are licensed, in combination with Longobardi's assumption about the position of nominal modifiers, fully accounted for this correlation, even correctly predicting cases where complements should be possible *without* the presence of DP. This analysis also allowed a more elegant proposal to be forwarded for English bare singulars in manner PPs. The ungrammaticality of examples like *via interpreter of Chichewa* provided particularly strong evidence for the analysis. Finally, our analysis provided a new perspective on some old puzzles concerning raising out of derived nominals. An advantage of our theory was a more principled account of *of*-insertion in derived nominals in comparison with previous analyses.

There remain some areas for further exploration. Can we show that #P is the functional projection responsible for licensing noun complements? More also needs to be said about the variation that is found in predicate nominals. Why is the vacuous determiner required in most nominal small clauses, optional in the *vote*-class, and prohibited in vocatives? Is the presence of the determiner here semantically governed?

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ON 'ACCUSATIVE' ADVERBS IN JAPANESE: A NOTE ON ADVERB LICENSING*

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1.0 Introduction

The tenet of theories of adverb licensing in recent literature can be characterized as assuming the significance of certain features of functional categories that 'license' the adverbs under certain structural configurations (see Travis 1988 and Cinque 1996, among others). For the sake of discussion, I call such a view the 'pure-featural licensing' view. The pure-featural licensing view is immediately in question if adverbs in a language possess properties that are quite similar to arguments, since arguments are, as their fundamental property, licensed by being a recipient of a θ-role without having recourse to any functional heads. The aim of this paper is to discuss basic properties of a class of adverbs in Japanese in order to point out the inadequacies of the pure-featural licensing view. The class of adverbs in question is what I call 'accusative' adverbs, those which appear with the accusative case-marker and thus have the same morphological form as arguments. The organization of this paper is as follows. In section 2, a brief overview of the pure-featural licensing view is given, along with its inadequacies. Section 3 discusses basic properties of 'accusative' adverbs in Japanese. Various syntactic tests reveal that accusative adverbs in Japanese have a status that is quite similar to that of arguments. Based on this observation, in section 4 a proposal is made which integrates such an extraordinary class of adverbs into a universal theory of adverb licensing. It is argued that adverbs can be licensed by direct merger to a verb. Section 5 discusses some implications of the proposed approach. Section 6 concludes the discussion.

2.0 Theories of adverb licensing in the literature

Let us start with a brief overview of the issue of adverb licensing. Within the current framework (Chomsky and Lasnik 1993, Chomsky 1993, and Chomsky 1995, among others), it has been assumed that a linguistic expression must be a legitimate object at LF (logical form) in order to have an appropriate interpretation. For example, arguments are 'legitimate' by virtue of their bearing a θ-role. Otherwise, a syntactic object will violate the principle of Full Interpretation (henceforth FI), which essentially bans any occurrence of superfluous symbols at the interpretive level (see Chomsky 1995 for discussion). Under such a view, adverb licensing poses an interesting question, since adverbs are, by definition, not arguments and do not bear any θ-role. Thus, they must have recourse to some way other than being a θ-role recipient to be 'licensed' at the relevant level without violating the FI.

The main feature of recent proposals regarding adverb licensing is that adverbs are licensed by *certain heads*. Two major proposals along these lines are summarized below in (1)–(2).[1]

(1) Travis (1988): 'Head feature licensing'
   (a) Adverbs are 'defective' categories.
   (b) A feature of the licensing head (N or V) licenses the modifying head (A or N).
   (c) V: V (Manner); Infl: E(vent), Agr(eement); C: Illocutionary force

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[1] See Ernst (1998) and Rochette (1990) for another type of theory of licensing adverbs. Ernst (1998) specifically argues against Cinque (1996) and proposes a theory where adverbs are licensed if their "scope-requirements" are satisfied. Note here that such a scope-based theory as Ernst's brings back the problem of globality into the theory of grammar since, under such an approach, it is not possible to determine if a derivation converges before LF. Thus we need to compare derivations, which increases computational complexity (see Chomsky 1995 for discussion).

(2) Cinque (1996)

Adverbial phrases are the unique specifiers of distinct maximal projections.

Travis (1988) assumes that adverbs are 'defective' categories and that they require a feature of a certain head to be licensed; (1c) lists the relevant features that Travis postulates. Another theory of adverb licensing is proposed by Cinque (1996), who follows Kayne's (1994) theory and assumes that specifiers are adjuncts. In Cinque's theory, an adverb is licensed by being in the specifier position of a unique functional category. To account for the distribution of various adverbs, he proposes the fully-articulated structure of functional categories shown below in (3), which consists of innumerable functional projections. The assumption in this theory is that each head licenses a distinct adverb in its specifier.

(3) The universal hierarchy of clausal functional projections:

[*frankly* $\text{Mood}_{\text{Speech act}}$ [*fortunately* $\text{Mood}_{\text{evaluative}}$ [*allegedly* $\text{Mood}_{\text{evidential}}$ [*probably* $\text{Mood}_{\text{epistemic}}$ [*once* T(Past) [*then* T(Future) [*perhaps* $\text{Mod}_{\text{irrealis}}$ [*(not) necessarily* $\text{Mood}_{\text{alethic}}$ [*willingly* $\text{Mood}_{\text{volitional}}$ [*inevitably* $\text{Mood}_{\text{obligation}}$ [*cleverly* $\text{Mood}_{\text{permission/ability}}$ [*usually* $\text{Asp}_{\text{habitual}}$ [*again* $\text{Asp}_{\text{repetitive(I)}}$ [*often* $\text{Asp}_{\text{frequentative(I)}}$ [*quickly* $\text{Asp}_{\text{celerative(I)}}$ [*already* T(Anterior) [*no longer* $\text{Asp}_{\text{terminative}}$ [*still* $\text{Asp}_{\text{continuative}}$ [*always* Asp [*just* $\text{Asp}_{\text{retrospective}}$ [*completely* $\text{Asp}_{\text{SgCompletive(I)}}$ [*tutto* $\text{Asp}_{\text{PlCompletive}}$ [*well* Voice [*fast* $\text{Asp}_{\text{celerative(II)}}$ [*completely* $\text{Asp}_{\text{SgCompletive(II)}}$ [*again* $\text{Asp}_{\text{repetitive(II)}}$ [*often* $\text{Asp}_{\text{frequentative(II)}}$

Both of the theories mentioned above are based on rich cross-linguistic data and have certain consequences. However, they also pose some difficulties. First, within the current syntactic theory (Chomsky 1993, 1995), theoretical devices are limited to those that are necessary at the two interface levels PF (phonological form) and LF, and thus any technical device will require sufficient empirical justification. However, the status of the majority of functional heads proposed in Cinque's theory raises the question of whether they are well-justified on empirical grounds. In order to see this point, let us consider the licensing of the adverb *evidently*. In Cinque's theory, this adverb is assumed to be licensed by being in the specifier position of the functional head called 'Evaluative'. The following data from agglutinative languages such as Korean and Japanese, given in (4) and (5) respectively, raises a question with regard to the status of the 'evaluative' functional heads Cinque proposes.[2]

(4) *Korean*

(a) Ku say-ka cwuk-ess-keyss-**kwun**-a
That bird-NOM die-PAST-may-EVALUATE-DECL
'That bird must have died!'

(b) Minea-nun ttena-ss-te-**kwun**-yo
Minea-TOP leave-PAST-EVID-EVALUATE-POLITE
'I noticed that Minea had left!' (Cinque 1996)

(5) *Japanese*[3]

(a) Sono tori-ga sin-de-simat-ta-ni **tigai-na**-i ... (koto)
That bird-NOM die-GER-end.up-PAST-P may-EVALUATE-PRES
'That bird must have died.'

---

[2] The abbreviations used in this paper are as follows:

ACC:	Accusative Case marker	CAUS:	Causative		
CED:	Constraint on Extraction Domain	Comp:	Complementizer	DAT:	Dative Case marker
DECL:	Declarative	DP:	Determiner Phrase	EVALUATE:	Evaluative
EVID:	Evidential	GEN:	Genitive	GER:	Gerundive
NOM:	Nominative Case-marker	P:	Pre-/Post-position	PAST:	Past tense marker
PP:	Adjunct phrase	POLITE:	Politeness marker	PRES:	Present tense marker
Q:	Question morpheme	TOP:	Topic marker	V, VP:	Verb (Phrase)

[3] To avoid awkwardness resulting from a topicless sentence in Japanese, the example in (5a) is followed by *koto* 'the fact', which is omitted in the gloss.

(b) Mary-wa syuppatusi-ta-ni **tigai-na**-i.
Mary-TOP leave-PAST-P may.EVALUATE-PRES
'I noticed that Mary had left.'

In both languages, the functional head 'evaluative' is realized as a verbal suffix. In particular, in the case of Japanese, this 'evaluative' head is a fixed phrasal expression which consists of a noun (*tigai* 'different') followed by an adjective functioning as negation (*na-i* 'not'). In other words, this expression consists exclusively of lexical categories.[4] Hence, it would be too *ad hoc* to claim that it was an instance of a functional head.

(6) He has evidently gone home.

Even in an English sentence, such as in (6), there is apparently no overt realization of the functional head. Of course, Cinque himself is aware of this point and states that "... if each adverb class indeed corresponds to a different functional head, then, we have evidence that the entire array of functional heads (and projections) is available even where there is no overt morphology corresponding to the heads, as the respective specifiers are available" (Cinque 1996:§4.28). He further claims that, if one were to reject this conclusion, most adverbs would not be systematically related to a functional head and that UG would then have to countenance two distinct conditions—one ruling over the hierarchy of heads, the other over the hierarchy of AdvPs. He then concludes that his theory is superior to the alternative in that it does not require these two seemingly unrelated conditions. However, note that under the framework that we assume here (i.e., that of Chomsky 1995), postulating a phonetically null element requires ample justification. At this point I have not found any strong empirical evidence for postulating a null evaluative head in example (6).[5] Hence, a strong dependence on the existence of null functional categories should be avoided. The following example in (7) illustrates the same point. As the example and its translation show, the adverb *cleverly* can be licensed without any presence of a modal-like element in both English and Japanese.

(7) John-ga kenmeinimo tenkiyohoo-de asu-no tenki-o sirabe-ta.
-NOM cleverly weather.forecast-with tomorrow-GEN weather-ACC check-PAST
'John cleverly checked the weather forecast for the weather tomorrow.'

If postulating a phonetically-null functional head is not a desirable option, it is not clear how in Cinque's theory the majority of adverbs such as *cleverly* or *evidently* in English can be licensed, when there is no clear realization of a relevant licensing functional head. In summary, the majority of the functional heads proposed in Cinque's theory either (i) have the status of a lexical category rather than that of a functional category, or (ii) are null elements without sufficient empirical justification.

Another inadequacy with the pure-featural licensing approach is the existence of languages where adverbs have the syntactic properties of an argument. Before looking at actual examples, I would like to clarify some terminology. I essentially follow Perlmutter's (1978) Unaccusative Hypothesis, which assumes that the initial unergativity vs. unaccusativity dichotomy cannot vary from language to language. I also adopt Tsujimura's (1990) observation that the unergative-unaccusative distinction found in English exists in Japanese as well. In other words, it is basically assumed that an instance of an unergative in English is realized as an unergative *in Japanese as well*. Bearing this assumption in mind, let us observe the following data.

(8) (a) Taroo-ga **hon-o** yon-da. (transitive)
-NOM **book-ACC** read-PAST
'Taro read a book/books.'

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[4] *Na-i* can be identified as an adjective due to its inflectional ending. In Japanese, adjectives, but not verbs, take *-i* as the present tense morpheme, and adjectives cannot take *-ru*, the present tense marker for verbs.

(i) (a) utukusi-i 'beautiful + PRES [for A]' *utukusi-ru 'beautiful + PRES [for V]'
(b) aka-i 'red + PRES [for A]' *aka-ru 'red + PRES [for V]'

The following data show that the negative element *na-* patterns with adjectives, and not with verbs, with regard to tense inflection.

(ii) na-i *na-ru

[5] I thank Kazue Takeda for relevant discussion on this issue.

(b) Hanako-ga **ringo-o** tabe-ta. (transitive)
-NOM **apple**-ACC eat-PAST
'Hanako ate an apple/apples.'

(9) (a) Yumi-ga **Taroo-o** warat-ta. (unergative)
-NOM -ACC laugh-PAST
'Yumi laughed at Taro.'

(b) Yuuko-ga **undoozyoo-o** hasit-ta. (unergative)
-NOM **playground**-ACC run-PAST
'Yuko ran on/in the playground.'

As shown in the Japanese examples in (8), an internal argument of a transitive verb is usually marked by the accusative marker *-o*. In contrast, the verbs in the examples in (9) are intransitive verbs which, in English, take only the agent/external argument. In this sense, they can be classified as unergatives and are not supposed to take any *o*-marked phrase (i.e., the canonical morphological shape of an internal argument). However, in addition to the agent marked by the particle *ga*, there *is* another phrase marked by the accusative marker *o* in the examples in (9). As the English translation shows, the *o*-marked phrases are PP adjuncts in English and are usually *not* regarded as arguments of the verb. Hence the *o*-phrases in (9) can be regarded as adjuncts as well. The existence of an adverb marked by *o* of the sort in (9b), occurring with a verb of motion, has already been noted in the literature (see S.-I. Harada 1973 and Kuroda 1978, among others), while that of (9a) has never been discussed in the literature. For the sake of discussion, I will refer to adjuncts such as those in (9), which are marked by the accusative marker *o*, as 'accusative adverbs'. The point here is that the adverbs in (9) are marked by *o*, just like the internal argument of a transitive verb is; in other words, they behave as if they were arguments, which clearly shows that Japanese uses a completely different mechanism from the one that is proposed in Travis's or Cinque's theory.[6]

Note further that the existence of accusative adverbs highlights a further inadequacy in Travis's assumption that adverbs are "defective". The "adverbs" in (9) are all full-fledged nominal phrases followed by a case-particle, and it is not clear in what sense they are "defective". The point is that examples such as (9) with accusative adverbs suggest that we need a theory of licensing adverbs as a 'full category', rather than as a 'defective' category.

In this section, we saw the major licensing theories of adverbs and their problems. In the next section, I examine the data to study the properties of accusative adverbs in Japanese.[7]

3.0 Properties of 'accusative adverbs' in Japanese[8]

3.1 The position of accusative adverbs

First, let us look at the word-order properties of accusative adverbs. Due to the strict head-final word order of the language, adverbs in Japanese can never occur after a verb. As shown in (10), the adverb *undoozyoo-de* 'in the playground' can occur in any position, but it never occurs in sentence-final position, as the ungrammaticality of (10d) demonstrates.

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[6] According to Lin and Wu (1999), Chinese also allows certain types of adjuncts, e.g., an instrumental phrase, to be realized as "objects." See Lin and Wu (1999) for the data and discussion.

[7] In addition to the accusative adverbs discussed in this paper, there are (at least) three more types of adverbs in Japanese, shown below in (i–iii).

(i) NP + P	e.g.,	naihu-de knife-P	'with a knife'
(ii) A + an inflectional ending	e.g.	haya-ku early-inflectional.ending.for.the.adverbial.form.of.A	'early; quickly'
(iii) NP alone	e.g.	kyonen	'last year'

Though the approach taken here may cover (i–ii) with a slight modification of the proposal to be given in section 4, in this paper, I focus on accusative adverbs alone, leaving discussion of other types of adverbs for future research.

[8] Throughout this paper, I focus on the case pattern of mono-clausal structures.

(10) (a) John-ga kinoo **undoozyoo-o** hasit-ta. 'John ran on the playground.'
-NOM yesterday playground-ACC run-PAST

(b) **Undoozyoo-o** John-ga kinoo hasit-ta.

(c) John-ga **undoozyoo-o** kinoo hasit-ta.

(d) *John-ga kinoo hasit-ta **undoozyoo-o**.

3.2 Co-occurrence restriction on "accusative" adverbs

Next, let us consider the types of verbs with which accusative adverbs cooccur. The examples in (11) through (16) show that accusative adverbs can never appear with verb types other than unergatives.[9]

The examples in (11) show that unergative verbs such as *waraw-* 'laugh', *okor-* 'get angry', or *hasir-* 'run' can take an adverb with the accusative marker *o*.

(11) *Unergatives*[10] (an adjunct appears with *-o*)

(a) Makiko-ga Taroo-no sippai-o warat-ta.
-NOM -GEN mistake-ACC laugh-PAST
'Makiko laughed at Taro's mistake.'

(b) Taroo-ga Ziroo-no hutyuui-o okot-ta.
-NOM -GEN careless-ACC mad-PAST
'Taro got mad at Jiro's carelessness.'

(c) Yuuko-ga undoozyoo-o hasit-ta.
-nom playground-acc run-past
'Yuko ran on/in the playground.'

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[9] There are a few exceptions to this generalization. A certain class of unaccusative verbs seems to host an accusative adverb, as shown below.

(i) miti-o ik-u 'go on a street' (ii) ie-o de-ru 'leave home'
street-ACC go-PRES home-ACC leave-PRES

It seems that verbs of motion can generally accommodate accusative adverbs, crossing the two verb classes. I leave for future research a unified account of the distribution of accusative adverbs, including these examples. I thank K. I. Harada for helpful discussion on this issue.

[10] Kazue Takeda (personal communication) has brought to my attention that example (11a) sounds degenerate if the *o*-marked phrase is *Taroo* instead of *Taroo no sippai* 'Taro's mistake', as shown in (i) below.

(i) ?~??~?*Makiko-ga Taroo-o warat-ta.
-NOM -ACC laugh-PAST
'Makiko laughed at Taro.'

Judgments vary among native speakers, the reasons for which I leave aside here. Kazue Takeda has also observed, interestingly, that (i) contrasts with (ii) if the verb *okot-* (< *okor-*) is interpreted as 'to scold', while (ii) is ungrammatical and thus patterns with (i) if *okot-* is interpreted as 'to get mad at'.

(ii) Taroo-ga Ziroo-o okot-ta.
-NOM -ACC mad-PAST
'Taro scolded Jiro for his carelessness.' vs. *'Taro got mad at Jiro for his carelessness.'

This has to do, as Kazue Takeda suggests, with the fact that the inherent meaning of the verb 'scold' presupposes the presence of the theme of the action following the 'scolder', but there is no such presupposition in the case of the verb 'laugh'. Assuming that an *o*-marked phrase bears some holistic interpretation, the contrast between (i) and (ii) is expected only with a verb that presupposes the presence of the patient following the agent (i.e., 'scold') where the *o*-phrase—inherently carrying a notion of *total affectedness*—is most easily construed. Otherwise, the example is ungrammatical. This is consistent with the ungrammmaticality of (ii), where the verb *okor-* is interpreted as 'get mad': the action of getting mad can take place without the presence of the theme of the action.

However, not all 'intransitive' verbs behave in the same way. As shown in (12), unaccusative verbs are not compatible with accusative adverbs, and any occurrence of an adverb must be marked by a postposition or a particle other than *o*.

(12) *Unaccusatives* (an *o*-phrase cannot co-occur with other particles)

(a) Hanako-ga gakkoo-e / -ni / *-o it-ta.
-NOM school-to / -DAT / *-ACC go-PAST
'Hanako went to school.'

(b) Satosi-ga watasi-no ie-ni / ?-e / *-o ki-ta.
-NOM I-GEN house-DAT / ?-to / *-ACC come-PAST
'Satosi came to my house.'

(c) Sohu-ga ni-nen-mae-ni / *-o gan-de / *-o nakunat-ta.
grandfather-NOM two-years-ago-DAT / *-ACC cancer-by / *-ACC pass.away-PAST
'(My) grandfather passed away from cancer two years ago.'

When a verb is transitive, all occurrences of *o*-phrases are true arguments, as shown in (13) and (14).

(13) *Transitives* (*o*-phrases = theme/patient)

(a) Taroo-ga hon-o yon-da.
-NOM book-ACC read-PAST
'Taro read a book/books.'

(b) Satosi-ga ringo-o tabe-ta.
-NOM apple-ACC eat-PAST
'Satosi ate an apple/apples.'

(c) Ziroo-ga hon-o kat-ta.
-NOM book-ACC buy-PAST
'Jiro bought a book/books.'

(14) *Causative-Transitives* (*o*-phrases = theme/patient)

(a) Taroo-ga kabin-o kowasi-ta.
-NOM vase-ACC break-PAST
'Taro broke the vase.'

(b) Ziroo-ga mondai-o gutaika-sase-ta.
-NOM problem-ACC crystalize-CAUS-PAST
'Jiro crystalized the problem.'

If an adverb appears with the accusative marker *o* in a clause involving a transitive verb, the examples become ungrammatical, as shown in (15) and (16) below.

(15) *Transitives*

(a) Taroo-ga zibun-no heya-de / *-o (hon-o) yon-da.
-NOM self-GEN room-in / *-ACC (book-ACC) read-PAST
'Taro read a book/books in his room.'

(b) Satosi-ga daidokoro-de / *-o (ringo-o) tabe-ta.
-NOM kitchen-in / *-ACC (apple-ACC) eat-PAST
'Satosi ate an apple/apples in the kitchen.'

(c) Ziroo-ga Kinokuniya-de / *-o (hon-o) kat-ta.
-NOM -at / *-ACC (book-ACC) buy-PAST
'Jiro bought a book/books at Kinokuniya.'

(16) *Causative-Transitives*

(a) Taroo-ga ima-de / *-o (kabin-o) kowasi-ta.
-NOM living.room-in / *-ACC (vase-ACC) break-PAST
'Taro broke the vase.'

(b) Ziroo-ga kenkyuusitu-de / *-o (mondai-o) gutaika-sase-ta.
-NOM office-in / *-ACC (problem-ACC) crystalize-CAUS-PAST
'Jiro crystalized the problem in the office.'

3.3 Constituency[11]

The following examples in (17) and (18) show that a verb and an accusative adverb can form a constituent, illustrating that the accusative adverb is the element closest to the verb.[12]

(17) [Bill-o wara-i]-sae Mary-ga si-ta.
-ACC laugh -even -NOM do-PAST
'Mary even laughed at Bill.'

(18) [Taiheiyoo -o oyog-i]-sae John-ga si-ta.
Pacific.Ocean-ACC swim -even -NOM do-PAST
'John even swam in the Pacific Ocean.'

In both (17) and (18), the fronted phrase contains an *o*-marked adverb and a verb. The grammaticality of these examples patterns with the case of fronting of an argument *o*-phrase with a verb, shown below in (19).

(19) [hon-o yom-i]-sae Mary-ga si-ta.
book-ACC read -even -NOM do-PAST
'Mary even read a book.'

In Japanese, it is not possible to prepose a (transitive) verb alone, leaving an internal argument marked by *o in situ*. This is illustrated by the following example.

(20) *[yom-i]-sae Mary-ga hon-o si-ta.
read -even -NOM book-ACC do-PAST
Lit.: 'Mary even read a book.'

Interestingly, accusative adverbs pattern with an argument *o*-phrase in this respect. If a verb alone is preposed and an *o*-marked adverb is left *in situ*, the resulting structure is ungrammatical.

(21) *[wara-i]-sae Mary-ga Bill-o si-ta.
laugh -even -NOM -ACC do-PAST
Lit.: 'Mary even laughed at Bill.'

(22) *[oyog-i]-sae John-ga Taiheiyoo-o si-ta.
swim -even -NOM Pacific.Ocean-ACC do-PAST
Lit.: 'John even swam in the Pacific Ocean.'

In contrast, a canonical adverb marked by a postposition *de* can be left *in situ* in an example where a verb is fronted, as shown below in (23).

(23) (a) [yom-i]-sae Mary-ga syokuinsitu-**de** si-ta.
read -even -NOM teachers'. room-in do-PAST
'Mary even read (something) in the teachers' room.'

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[11] I thank Sze-Wing Tang for helpful discussion related to this section.

[12] The *-i* after the verb stem in examples (17) and (18) is the inflectional ending of *renyoo-kei*, 'adverbial form', which is ignored in the gloss.

(b) [wara-i]-sae Mary-ga syokuinsitu-**de** si-ta.
laugh -even -NOM teachers'. room-in do-PAST
'Mary even laughed in the teachers' room.'

(c) [oyog-i]-sae John-ga Taiheiyoo-**de** si-ta.
swim -even -NOM Pacific.Ocean-in do-PAST
'John even swam in the Pacific Ocean.'

In (23a), the internal argument of the verb *yom-* 'read' can be understood to be realized as a null pronominal, since Japanese freely allows *pro* in both subject and object positions of a tensed clause. In all the examples in (23), fronting a verb with a *de*-marked adjunct *in situ* does not lead to ungrammaticality. If we assume the following structure in (24) for a verbal phrase in Japanese, the grammaticality of the examples in (23), in contrast to the ungrammatical examples (20–22), can be accounted for.[13]

(24) ... [$_{VP_1}$ NP-*de* [$_{VP_2}$ object DP V]] ... [only the relevant portion is shown]

If the fronted part in (23) is VP_2 (with the object DP realized as a *pro*), then the grammaticality of the examples in (23) is expected, since VP-fronting can involve either VP_1 or VP_2. On the other hand, the ungrammatical examples in (20–22) involve the fronting of V alone, which is only a part of VP_2. Since the moved element is not a phrase, in these cases the resulting structure is ungrammatical. The ungrammaticality of (21) and (22) patterns with the ungrammaticality of the example in (20) with an argument *o*-phrase left *in situ*. Furthermore, (21) and (22) contrast with the grammatical examples in (23), where an adverb phrase is left *in situ*. These characteristics of the examples in (21) and (22) suggest that an *o*-marked adverb parallels arguments in this respect.

To summarize, in this section we have shown that (i) an *o*-marked adverb forms a constituent with a verb, and (ii) *o*-adverbs pattern with arguments and do not behave as canonical adverbs (marked by a postposition) in structures involving VP-fronting.

3.4 The absence of CED (Constraint on Extraction Domain) effects

The next set of examples positively shows the "argumenthood" of accusative adverbs. As example (25), taken from Saito and Fukui 1998, shows, in general, scrambling out of an adjunct phrase yields a weak CED effect.

(25) ?Nani$_i$-o [John-ga [$_{PP}$ Mary-ga t_i kat-ta kara] okotteru] no.
what-ACC -NOM -NOM buy-PAST since angry Q
'What$_i$ is John angry because Mary bought t_i (about)?' (Saito and Fukui 1998:463)

Bearing this point in mind, let us examine the cases where a phrase is scrambled out of an accusative adverbial clause. The examples in (26) through (28) have a clause marked by *o* occurring with an unergative verb.

(26) (a) Mary-ga [[Bill-ga banana-o nodo-ni tumarase-ta] no]-o warat-ta.
-NOM -NOM -ACC throat-at stuck-PAST Comp-ACC laugh-PAST
'Mary laughed at Bill('s) choking [his throat] on bananas.'

(b) ??Bill$_i$-ga Mary-ga [[t_i banana-o nodo-ni tumarase-ta] no]-o warat-ta.

(c) Banana$_i$-o Mary-ga [[Bill-ga t_i nodo-ni tumarase-ta] no]-o warat-ta.

(d) Nodo$_i$-ni Mary-ga [[Bill-ga banana-o t_i tumarase-ta] no]-o warat-ta.

(27) (a) Sion-ga [[kokyoo-ga sensoo-de metuboosi-ta] no]-o nai-ta.
-NOM homeland-NOM war-by ruin-PAST Comp-ACC cried-PAST
'Sion cried over/lamented the fact that his homeland was ruined.'

[13] I leave it open whether VP_1 and VP_2 in (24) are two projections each headed by a distinct category or a projection of a single category consisting of two segments.

(b) ??Kokyoo$_i$-ga Sion-ga [[t_i sensoo-de metuboo-si-ta] no]-o nai-ta.

(c) Sensoo$_i$-de Sion-ga [[kokyoo$_i$-ga t_i metuboo-si-ta] no]-o nai-ta.

(28) (a) Yuuko-ga [[Taroo-ga kinoo okane-o mituke-ta] undoozyoo]-o hasit-ta.
-NOM -NOM yesterday money-ACC find-PAST playground-ACC run-PAST
'Yuko ran on/in the playground where Taro found some money yesterday.'

(b) ??Taroo$_i$-ga Yuuko-ga [[kinoo t_i okane-o mituke-ta] undoozyoo]-o hasit-ta.

(c) (?)Okane$_i$-o Yuuko-ga [[Taroo-ga kinoo t_i mituke-ta] undoozyoo]-o hasit-ta.

(d) (?)Kinoo$_i$ Yuuko-ga [[Taroo-ga t_i okane-o mituke-ta] undoozyoo]-o hasit-ta.

If we scramble a phrase out of this accusative-marked adverbial clause, except for the case of subject-phrase extraction (the *b* examples of (26–28)) which is not acceptable on independent grounds, there is no CED effect comparable to the one observed in (25).[14] Crucially, if we replace *o* with the postposition *de* and have a 'true' adverbial clause in the examples in (26–28), extracting a non-subject phrase out of the adverbial clause becomes harder.[15] This clearly shows that the accusative phrase occurring with an unergative verb has the status of argument rather than adjunct.

3.5 The structural position of accusative adverbs

The last set of examples shows that the accusative-marked phrases are less adverbial if there is an additional adverb in the same clause, which suggests a lower position for such phrases in base generation. If a locative PP appears in addition to an accusative adverb in an example with an unergative verb, as in (29), when the locative phrase is an R-expression, it can bind a genitive pronominal in the accusative-marked adverbial phrase.[16]

(29) (a) Yuuko-ga Tokyo Doomu$_i$-de sono$_i$ niwa-o arui-ta.
-NOM -at its garden-ACC walk-PAST
'Yuko walked the garden at Tokyo Dome.'

(b) Hirosi-ga Taroo$_i$-no ie-de kare$_i$-no ie-no niwa-no ike-o oyoi-da.
-NOM -GEN house-at his-GEN house-GEN garden-GEN pond-ACC swim-PAST
'Horoshi swam in a pond in the garden of Taro$_i$'s house at his$_i$ house.'

However, when a pronominal is in the locative phrase, it cannot be bound by an accusative adverb, as the ungrammaticality of the examples in (30) shows.

(30) (a) *Yuuko-ga soko$_i$-de Tokyo Doomu$_i$-no niwa-o arui-ta.
-NOM there-at -GEN garden-ACC walk-PAST
Intended meaning: 'Yuko walked the garden of Tokyo Dome$_i$ there$_i$.'

(b) *Hirosi-ga kare$_i$-no ie-de Taroo$_i$-no ie-no niwa-no ike-o oyoi-da.
-NOM his-GEN house-at -GEN house-GEN garden-GEN pond-ACC swim-PAST
Intended meaning: 'Horoshi swam in a pond in the garden of Taro's house at Taro's house.'

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[14] See Saito 1985 for a detailed discussion on the unacceptability of examples involving scrambling of subject phrases.

[15] I thank Jim Huang and Sze-Wing Tang for drawing my attention to the contrast between extraction out of an *o*-marked phrase and extraction out of a *de*-marked phrase.

[16] As Kazue Takeda has pointed out to me (personal communication), for some speakers, certain combinations of an accusative adverb and an unergative verb are not acceptable. For example, for some speakers, *puuru-o oyog-u* 'swim (in a) pool' is not acceptable. However, even for such speakers, *ike-o oyog-u* 'swim (in the) pond' or *kawa-o oyog-u* 'swim (in the) river' is perfectly acceptable. I leave open for future research why there is such ideo-dialectal variation as to the acceptability of a combination of an *o*-adverb and an unergative verb, suggesting that degrees of grammaticality may be relevant.

The contrast between (29) and (30) indicates that a locative PP is base-generated in a position higher than an accusative adverb.

3.6 Summary

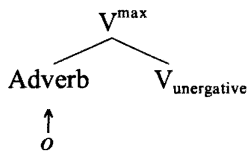
To summarize, in this section we examined the properties of accusative adverbs in Japanese, which only occur with unergatives (cf. §3.2). They are followed by the accusative case-marker; they are an immediate sister of a verb and thus lower than any other adverbs in the clause (cf. §3.3, §3.5); the absence of CED effects shows that they have an argument status rather than that of an adjunct (cf. §3.4). In the next section, a claim regarding how they are licensed will be introduced.[17]

4.0 Proposal

In section 2, we saw some inadequacies in the pure-featural licensing approach. One of the problems mentioned was that such a view presupposes the existence of a number of phonetically null elements, for which sufficient empirical justification is lacking. This was a problem for both English-type languages and agglutinative languages such as Japanese and Korean. Thus the theory must eventually be modified so as to accommodate the facts in both types of languages without having recourse to any *ad hoc* mechanisms and unjustified assumptions. However, proposing such a comprehensive theory is an immense task, beyond the scope of this paper. Rather than undertake this task, in this paper I show a way to accommodate the observed facts of Japanese into a theory of grammar—a way that goes beyond current theories of adverb licensing.[18]

Based on the facts discussed in section 3, I claim that accusative adverbs are simply *licensed by merger to V*. In other words, an adverb can be licensed by the configuration shown below in (31).

(31)



The basic assumption is that the particle *o* is attached to the immediate sister of a verb. If a verb is transitive and can assign an internal θ-role, *o* is attached to the internal argument, assuming that the merger of arguments takes place prior to that of non-arguments (cf. Lebeaux 1988). If a verb lacks an internal θ-role, like the unergatives, then a non-argument can be merged to the verb as its immediate sister, so an adverb can be marked by *o*. Since an *o*-marked phrase is usually an argument, the *o*-marked adverb in a clause containing an unergative verb shows properties of an argument.[19]

This proposal is free from the difficulties of the existing theories of adverb licensing reviewed in section 2. Since our claim is that adverbs can be licensed by being merged to a lexical category, there is no need to introduce a host of inadequately justified functional categories in the theory of grammar. As for the existence of 'accusative

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[17] As for semantic properties of accusative adverbs, as pointed out to me by Jim Huang, examples involving an accusative adverb typically bear a generic reading. Also, the difference between (i) and (ii) below can be attributed to the fact that an accusative adverb tends to be understood as a "patient" or "the object" of the action denoted by the verb, even if the verb does not have the internal theme/patient θ-role to assign.

(i)	John-ga	umi-de	oyoi-da.	'John swam in the sea.'
	-NOM	sea-at	swim-PAST	
(ii)	John-ga	umi-o	oyoi-da.	'John swam (in) the sea [with the interpretation that
	-NOM	sea-ACC	swim-PAST	the sea was the object of John's swimming].'

Though the contrast is subtle, there is a difference in the meaning of the two examples. To put this in a different way, (i) can be interpreted as 'John did swimming in the sea', while the meaning of (ii) is 'John did sea-swimming'. I will leave these interesting semantic aspects of accusative adverbs for future investigation.

[18] I thank Kazue Takeda for discussion that helped clarify this issue.

[19] Kurafuji (1997) argues that the accusative *wh*-adjunct phrase *nani-o* 'what-ACC' is licensed by feature-checking. However, such a view is problematic, since, as convincingly argued in Fukui and Takano (1998), Japanese *V* does not have the property to trigger feature-checking.

adverbs' in Japanese, I suggest that this is due to the following factors. First, it has been claimed (Fukui 1986, among others) that Japanese lacks functional categories (for detailed discussion, see Fukui 1986 *et seqq.*). Following Fukui's view on the non-existence of functional categories, since the language does not have functional categories, it cannot use functional categories to license adverbs in the first place. However, in order to be appropriately interpreted at the relevant level, adverbs do need to be licensed in some way. For independent reasons, the language uses particles for case-marking, and the language makes use of this already available device for licensing adverbs as a 'last-resort', the licensing of adverbs being achieved simply by merging an adverb with a verb, just as in the case of ordinary arguments.[20]

5.0 Implications

Having made my principal claim, I would like to turn to some implications of the approach taken here; one relating to the case system in Japanese, and the other to a restrictive theory of parameters.

5.1 The case system in Japanese

In addition to the fact that our theory enables us to account for the occurrence of accusative adverbs in Japanese, it also lends support to one of the three major existing theories concerning the case system in Japanese. There are three main approaches to case in Japanese. One theory, exemplified by Kuroda (1965), among others, claims that a noun phrase is case-marked configurationally. For example, a noun phrase in the domain of V is attached by *o*; the first noun phrase in a clause is attached by *ga*, and so on. Another group (Saito 1982 and Fukui and Takano 1998, among others) has claimed that Japanese case is an instance of Inherent Case. Under this hypothesis, accusative case, for example, is assigned to a noun phrase with a specific θ-role, such as theme or patient. The third claim states that case-licensing in Japanese takes place in the same way as in English and European languages, via feature-checking by a functional head; such a view is extensively advocated in Watanabe (1993) and in Koizumi (1995), among others.

If we assume the absence of functional categories in Japanese, we can discard the third view immediately. The existence of *o*-marked adverbs clearly suggests the inadequacy of the second view, so given the data that we have looked at, the first view (i.e., à la Kuroda 1965) seems to be the most viable option.

5.2 Toward a restrictive theory of parameters

Secondly, given our theory, the difference in adverb licensing can be attributed to the existence or non-existence of functional categories, which may be subject to parametric variations; Japanese turns an adverb into an argument since it lacks relevant functional categories that can license one. In this sense, our proposal is in conformity with the Functional Parametrization Hypothesis (cf. Borer 1984, Fukui 1988, 1995), which restricts the number of possible parameters, thereby contributing to a restrictive theory of parameters.

6.0 Concluding Remarks

In this paper, basic properties of accusative adverbs in Japanese which occur on the periphery of existing theory were discussed. With a view to achieving a comprehensive theory of adverb licensing, it was suggested that an alternate means was necessary for adverb licensing in Japanese, which lacks certain functional categories existing in the lexicon of English. I have argued that adverbs in a language can be licensed by simply being merged to a verb, without having recourse to any functional head.

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[20] For a claim that the particle case system is the alternative to the case mechanism and thus a 'last-resort' strategy, see Fukui and Takano (1998).

To be more precise, this way of licensing is only necessary for adverbs that consist of a nominal phrase (see footnote 7 for a rough classification of adverbs in Japanese), since adverbs consisting of an adjective do not require case-checking/licensing. An account for adverbs involving an adjective requires investigation of the syntactic and semantic properties of modifiers, which is beyond the scope of this paper.

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RESPONSE TO URA (1994), *VARIETIES OF RAISING AND THE FEATURE-BASED BARE PHRASE STRUCTURE THEORY*

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1. Introduction and Overview

A widely held view concerning NP movement is that a noun phrase (NP) cannot move to a higher subject position across another distinct intervening subject NP. This restriction, known as a *Ban on Superraising* or illicit NP-movement, is exemplified in (1).

(1) (a) It seems that [John] is believed [**t**] to be a Democrat.[1]

(b) John seems [**t**] to be believed [**t**] to be a Democrat.

(c) *[John] seems that it is believed [**t**] to be a Democrat.

Sentence (1a) is an instance of one-step NP-movement and (1b) is an instance of successive-cyclic NP-movement. (1c) is ruled out in violation of the Ban on Superraising although the resulting A-chain satisfies a Case requirement.

Lasnik's (1985) binding approach, Rizzi's (1990) chain-theoretic approach, and more recently, Chomsky's (1995) derivational approach all argue for a ban on superraising. Chomsky's Minimal Link Condition (MLC) requires that an element which undergoes movement in the course of derivation be the closest one to the target position. Hence, any intervening distinct NP always invokes a violation of the MLC for another NP that attempts to cross over it unless head movement expands the checking domain. However, Chomsky leaves open the question of whether superraising is ever allowed, citing Ura's (1994) work on a correlation between multiple specifiers (in languages that allow multiple specifier positions) and apparent cases of superraising. In contrast, the analysis of superraising in Rizzi (1990) disallows any possibility of superraising, even if multiple specifiers are assumed.

As is well attested, superraising is impossible in all Germanic and Romance languages. The empirical issue, then, is this: Do natural languages never have superraising? Ura (1994) claims to falsify current syntactic accounts of the Ban on Superraising. He claims that languages such as Arabic, Chinese, Indonesian, Persian, and Japanese do exhibit superraising.

If not disproved, Ura's reported cases of superraising pose a serious challenge to the standard account of the Ban on Superraising. However, we have conducted field research with native informants of several of the languages discussed by Ura and, in each case, his analysis has turned out to be inaccurate. Since we are able to show that none of Ura's examples in these languages are genuine cases of superraising, the universal Ban on Superraising in their respect can still be upheld. Confirming the existence of superraising is clearly important, since even a few solid cases would necessitate radical rethinking of the current theory of locality and movement. Our findings so far suggest the need for further investigation before superraising can be accepted.

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[1] Abbreviations in this paper are as follows:

ACC	accusative	ASP	aspect	BENE	benefactive
COMP	complementizer	CP	complement phrase	F	feminine
IP	inflectional phrase	M	masculine	MLC	Minimal Link Condition
NOM	nominative	NP	noun phrase	PASS, PSS	passive
PRO	pronoun	SG	singular	SUBJ	subjunctive
RMC	Relativized Minimality Condition	**t**	trace (origination of moved NP)	TRANS	transitive

Ura provides an analysis of how superraising could be possible. He claims that in languages such as Indonesian and Arabic, there is an extra specifier position in the non-finite clause which can be used as an escape hatch to make superraising possible. Let us look at the structure in (2).

(2) $[_{IP}$ John$_i$ seems $[_{CP}$ that $[_{IP_1}$ $\mathbf{t}_i$ $[_{IP_2}$ it is believed $[_{IP_3}$ $\mathbf{t}_i$ to be a Democrat]]]]

The extra specifier (IP_1 in (2)) is held to serve as an escape hatch for superraising. This relies crucially on Chomsky's definition of equidistance. (In (2), IP_1 and IP_2 are equidistant from IP_3.)

In this paper we will examine four of the eight languages cited in Ura's paper. They are Indonesian, Arabic, Persian and Mandarin Chinese. We will show that, contrary to his claim, these languages do not permit superraising.

2. Indonesian

Let us start with Ura's example of Indonesian in (3).

(3)	Mereka	meng-angap	[bahwa	saja	beri-kan	surat	itu	kepada	Tini].
	they	TRANS-believe	COMP	I	give-BENE	letter	the	to	Tini

'They believe that I gave the letter to Tini.'

In (4), which has the same meaning as (3), the object of the embedded clause, *Tini*, is moved to the subject position of the matrix clause.

(4)	Tini$_i$	di-anggap	[bahwa	saja	beri-Ø	surat	itu	$\mathbf{t}_i$].
	Tini	PASS-believe	COMP	I	give	letter	the	

Lit., 'Tini$_i$ is believed that I gave $\mathbf{t}_i$ the letter.' [same meaning as (3)]

Our Indonesian informant judged (4) to be ungrammatical. Such a judgement is, in fact, predicted by Rizzi (1990) and Chomsky (1995) since the movement of *Tini* in (4) violates both the Relativized Minimality Condition (RMC) and the Minimal Link Condition. However, let us consider the possibility that some speakers accept (4) and try to determine what its structure would be. We will first establish that *di-anggap*, 'believe' as it is shown in (4–5), is a raising predicate.

(5) (a)	Itu	di-anggap	(bahwa)	Mary	mem-ukul	John.
	it	PASS-believe	(that)	Mary	TRANS-hit	John

'It is believed that Mary hit John.'

(b)	Mary	di-anggap	mem-ukul	John.
	Mary	PASS-believe	TRANS-hit	John

'Mary is believed to have hit John.'

(c)	John	di-anggap	di-pukul	oleh	Mary.
	John	PASS-believe	PASS-hit	by	Mary

'John is believed to have been hit by Mary.'

Examples (5a–c) are all semantically equivalent. This suggests that *di-anggap* is indeed a raising predicate. In all these sentences, *Mary* and *John* bear the same theta-relations, while *di-anggap* assigns no external theta-role.

It is important not to confuse the use of *di-anggap* in (5) above with that shown in (6a). In (6a), the surface subject, *John*, has undergone pseudopassivization. Example (6b) has the same underlying structure as (6a), but in this case the internal DP argument of *di-anggap*, John, has remained *in situ*. The ungrammaticality of (6c) shows that the relationship between the surface subject and the object of *kiss* is not derived via movement.

(6) (a) John$_i$ di-anggap bahwa Mary cium dia$_{i/*j}$.
John PASS-believe that Mary kissed him
'It is believed of John$_i$ that Mary kissed him$_{i/*j}$.'

(b) Itu di-anggap tentang John$_i$ bahwa Mary cium dia$_{i/*j}$.
it PASS-believe about John that Mary kissed him
'It is believed of John$_i$ that Mary kissed him$_{i/*j}$.' [same meaning as (6a)]

(c) *John di-anggap tentang John bahwa Mary cium.
John PASS-believe about John that Mary kissed
'It is believed of John that Mary kissed (him).'

Now compare (6c) to Ura's example (4). It appears that his informant allows the goal argument of *give* to be implicit. Furthermore, in order for the sentence to be interpretable, the matrix subject, *Tini*, which is the internal argument of *di-anggap*, must be understood as being coreferential with the implicit argument of *give*. This is demonstrated by the coreference facts in (6a) and (b).

Supporting evidence for the pseudopassivization structure we are proposing here comes from the minimal pair in (7). (7b) has the same meaning as (7a), despite the difference in the main verb. (7b) is ungrammatical because, unlike *beritahukan* in (7a), the main verb of (7b), *jelaskan,* does not subcategorize for an *about*-phrase. The verb *beritahukan* in (7a) has roughly the argument structure of *inform* in English, whereas *jelaskan* in (7b) has that of *explain*.

(7) (a) Tini$_i$ diberitahukan kepada saya bahwa dia$_i$ sakit.
Tini$_i$ PASS.explain$_1$ to me COMP she$_i$ sick
'It was explained to me about Tini that she was sick.'

(b) *Tini$_i$ dijelaskan kepada saya bahwa dia$_i$ sakit.
Tini$_i$ PASS.explain$_2$ to me COMP she$_i$ sick
'It was explained to me about Tini that she was sick.' [same meaning as (7a)]

To summarize, because Ura's Indonesian example can be accounted for as a pseudopassivization structure, it is unnecessary to posit superraising based on this data.

3. Arabic

Moving on to Arabic, Ura's examples of Moroccan Arabic are listed under (8).

(8) (a) Ttshab-li [belli shaf-ha muhend mmi fsefru]
seemed-3SG.to.1SG COMP saw-3SG.F Mohand mother.1SG in.Sefrou
'It seemed to me that Mohand saw my mother in Sefrou.'

(b) Ttshab-et-li mmi$_k$ [belli shaf-ha muhend $\mathbf{t}_k$ fsefru]
seemed-F-3SG.to.1SG mother.1SG COMP saw-3SG.F Mohand in.Sefrou
Lit., 'My mother$_k$ seemed to me that Mohand saw $\mathbf{t}_k$ in Sefrou.' [same meaning as (8a)]

Ura claims that the Moroccan Arabic example (8b) shows superraising. However, according to our informant this sentence is ungrammatical. In fact, we were unable even to find examples of regular subject-to-subject raising in Moroccan Arabic; our informant rejected all potential candidates. This suggested to us that raising predicates in Moroccan Arabic select only CP and not a bare nonfinite IP. For this reason, we concentrated on the Cairene dialect of Arabic, which did have pairs like (8a) and (b). One of these is shown in (9).

(9) (a) You-takad en Mohamed shaf-Ø om-my.
PSS-believe.3SG that Mohamed see-3SG.M mother-my
'It is believed that Mohamed saw my mother.'

(b) Om-my you-takad en Mohamed shaf-Ø **haa**.
mother-my PSS-believe.3SG that Mohamed see-3SG.M PRO.3SG.F
'My mother is believed that Mohamed saw (her).'

The main verb in (9), *you-takad* 'be believed', behaves like a raising predicate in Cairene Arabic, and consequently, (9a) and (b) are synonymous. The most important feature of (9b) is the pronoun *haa*, which comes after the verb *shaf*. This element is referred to in the Arabic literature as a 'returning' or resumptive pronoun. Fassi Fehri (1993) argues that this resumptive pronoun incorporates into verbs and prepositions. It appears in contexts where resumptive pronouns are expected, that is, in A-bar constructions as illustrated in (10):

(10) N-nisaa?-u laa y-ubaalii ?ahad-un bi-**haa**. (Fassi Fehri 1993)
the-woman not 3-care one-NOM about-her
'As for the woman, nobody cares about her.'

Crucially, *-haa* never appears in positions where Case is not assigned, such as the object of the passivized verb in (11):

(11) *Om-my et-shaf-tet-**haa**
Mother-my PSS-see-3SG.F-3SG.F
'My mother was seen.'

This is no surprise, since resumptive pronouns are known never to appear in constructions involving only A-movement. Therefore, we assume the apparent case of superraising in (9b), where *-haa* appears as the object of 'see', is actually an example of topicalization. An example structurally similar to (9b) appears in (12), again demonstrating the resumptive strategy in a topicalization structure:

(12) Om-my you-takad en Mohamed shaf-Ø asdequa?a-**haa**
mother-my PSS-believe.3SG that Mohamed see-3SG.M friends-her
'My mother it is believed that Mohamed saw her friends.'

Here *haa* is understood as coreferential with 'my mother'; *haa* is no longer attached to the verb *shaf* because an overt DP object has taken its place. In addition to that, example (12) establishes that *haa* can be related to the matrix subject *ommy* without movement occurring.

To sum up, Ura's examples give the *impression* that *haa* is simply an object marker whose appearance is independent of whether the object is topicalized, as in (9b). This is misleading; a proper analysis of this construction reveals that *neither* superraising *nor* any other kind of A-movement is involved.

We will now consider a couple of languages where our informants simply disagreed with the grammaticality judgments given by Ura.

4. Persian

The first such example is Persian. Here, Ura claims that (13b) is derived from (13a):

(13) (a) In bæ?id æst [ke æli ketab-ra be Hæsan, be-dæh-æd].
It unlikely is COMP Ali book-ACC to Hasan SUBJ-give-3SG
'It is unlikely that Ali gives Hasan the book.'

(b) Hæsan$_i$ bæʔid æst [ke æli ketab-ra t_i be-dæh-æd].
Hasan unlikely is COMP Ali book-ACC SUBJ-give-3SG
Lit., 'Hasan$_i$ it is unlikely that Ali gives t_i the book.' [same meaning as (13a)]

However, our Persian informant found (13b) strongly ungrammatical, indicating that superraising does not exist in Persian. Ura also gives examples of topicalization in Persian, this is shown in (14a) and (b):

(14) (a) *Hæsan$_i$ in bæʔid æst [ke æli ketab-ra t_i be-dæh-æd].
Hasan it unlikely is COMP Ali book-ACC SUBJ-give-3SG.
'Hasan$_i$, it is unlikely that Ali gives t_i the book.'

(b) Hæsan$_i$, in bæʔid æst [ke æli ketab-ra **be** t_i be-dæh-æd].
Hasan it unlikely is COMP Ali book-ACC to SUBJ-give-3SG.
'Hasan$_i$, it is unlikely that Ali gives the book to t_i.' [Ura's informant's judgment]

The only difference between (14a) and (b) is the presence of the preposition *be* in (14b). Our informant had the reverse grammatical judgments for (14a) and (b): our informant found, contrary to the judgement of Ura's informant, example (14a) to be grammatical and (14b) ungrammatical. (14b) is apparently ruled out due to a prohibition on preposition stranding.

5. Mandarin Chinese

The last language we are examining here is Mandarin Chinese. Ura's examples are shown in (15). According to Ura, (15b) has the same meaning as (15a).

(15) (a) Keneng [Zhangsan reng-le nei kuai rou gei ta].
Possible Zhangsan toss-ASP that piece meat to he
'It is possible that Zhangsan has tossed that piece of meat to him.'

(b) Ta$_i$ keneng [Zhangsan reng-le nei kuai rou t_i]
he possible Zhangsan toss-ASP that piece meat
Lit., 'He$_i$ is possible that Zhangsan has tossed t_i that piece of meat.'

The status of *keneng* 'possible' shown in (15a–b) as a raising predicate is still highly controversial. This may just be an adverb, in which case it means 'possibly'. But assuming that movement does occur, we feel that the apparent cases of superraising in Mandarin are actually topicalization.

Ura's example (15b) is a case of movement of the indirect object. However, the judgements of our native speaker (including one of us) show that (15b) is strongly ungrammatical. Interestingly, it appears that any sort of movement of the indirect object from the embedded clause is disallowed, as it is shown in (16), which has a non-raising predicate.

(16) *Leetsu$_i$ [Zhangsan chiau Wangwu chi shing t_i]
Leetsu Zhangsan ask Wangwu send letter
Lit., 'Leetsu, Zhangsan asks Wangwu to send the letter.'

Notice that the movement of indirect object is also not possible when the preposition is moved with the NP indirect object. This is shown in (17).

(17) *Gei Leetsu$_i$ [Zhangsan chiau [Wangwu chi shing t_i]]
to Leetsu Zhangsan ask Wangwu send letter
'To Leetsu, Zhangsan asks Wangwu to send the letter.'

Here we see that, while the preposition *gei* 'to' is moved together with the NP indirect object, the sentence is still ungrammatical.

If (15b) does involve topicalization, we predict that it should not be possible to front an indefinite NP. There is a general semantic restriction on topicalization requiring that the fronted element be definite. Unfortunately, Ura did not provide examples of superraising with indefinite subjects in Chinese, or for that matter, any of the languages he discussed in his paper, therefore we cannot test this prediction at present.

6. Conclusion

In conclusion, if Ura is correct and superraising does exist, then this will pose a serious challenge to the standard account of the ban on superraising. However, we have looked at four of the languages Ura discussed and, in each case, we have been able to show that Ura's examples are not, in fact, genuine cases of superraising.

We believe that confirming the existence of superraising is clearly important, since even a few solid cases would necessitate radical rethinking of the current theory of locality and movement. Our findings so far suggest the need for further investigation before superraising can be accepted.

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INTERLANGUAGE WITHIN OPTIMALITY THEORY: THE ACQUISITION OF SPANISH VOICED STOP SPIRANTIZATION*

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1.0 Introduction

When speakers learn a second language, they begin with an initial state, the grammar of their first language (L1). Their goal, or final state, is the grammar of the second language (L2). Interlanguage (IL) is the intermediate or developing state between the first language and the acquisition of the second language (Archibald and Libben 1995). This paper examines the characterization of a learner's interlanguage within the framework of Optimality Theory (OT) (Prince and Smolensky 1993). The learner in this case will be a speaker whose first language is English and who is learning Spanish as a second language. The process of acquiring voiced stop spirantization in Spanish and the influences of the learner's L1 and of universals will all be expressed in terms of the ranking of violable constraints. It will be shown that this process of acquiring voiced stop spirantization is the result of the gradual promotion of the phonotactic constraint which prevents /b/ from occurring postvocalically in Spanish.

1.1 Spirantization of voiced stops in Spanish

Standard dialects of Latin American Spanish include in their phonemic inventories the voiced stops /b d g/. Voiced stop spirantization is an obligatory process whereby /b d g/ are pronounced as the spirants /β ð ɣ/ postvocalically (Stockwell and Bowen 1965, Zampini 1997). In the case of the bilabial voiced stop, certain alternations occur. The voiced stop occurs word initially and the voiced bilabial fricative occurs postvocalically.

(1)	boa	[bóa]	boba	[bóβa]
	salía	[salía]	saliva	[salíβa]
	pulicaría	[pulikaría]	publicaría	[puβlikaría]

(Stockwell & Bowen 1965:48)

This paper will examine how the learner proceeds from his/her initial state in English through an interlanguage state in order to attempt to acquire the rule of spirantization in Spanish. The changes will be characterized in terms of changes in the ranking of violable constraints.

2.0 Interlanguage

When second language learners enter into the process of acquiring a second language, they are not simply acquiring items that are different from their first language. They are trying to make sense out of the new linguistic information being presented to them. Learning an L2 involves the creative process of building a grammatical system which has a structurally intermediate and distinct status between that of the initial state, the L1 grammar, and that of the desired state, the L2 grammar. This separate developing state is known as an interlanguage (Brown 1994:203, Archibald and Libben 1995:134).

2.1 Influence of L1

In this model of language acquisition, both the L1 and the L2 influence the learner's interlanguage. In this paper, one area of investigation will concentrate on the effects of the LI. The influence of the learner's L1 phonology is apparent when the learner uses L2 vocabulary but speaks using L1 phonological rules, resulting in accented speech. For example, Spanish speakers learning English retain a rule of *e* epenthesis in word initial /s/ + stop clusters. In Spanish, the word for 'write' is *escribe*, pronounced [eskríβe]. When a Spanish speaker is first learning English, and encounters a word such as *scribble,* it will be pronounced as something like [eskríβl] with an epenthetic [e] inserted as in Spanish. The Spanish learner has retained the epenthesis rule from L1 and

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applied it in the use of the L2. This interference from the L1 is known as *transfer* (Archibald & Libben 1995:147, Lombardi 1998:1).

The transfer effect can also be observed in the acquisition of the voiced spirants by English speakers learning Spanish. English speakers in the process of learning that /b/ → [β] post-vocalically begin by using the sounds from their L1 in that environment. In learning how to pronounce *saber* [saβer], 'know', the learners will pronounce either [saber] or [saver]. Both /b/ and /v/ are in the consonant inventory of English and may occur in postvocalic position. In Spanish, [b] is prohibited postvocalically. In addition, /v/ is not in the consonant inventory of Spanish. It is likely that the learners are using the sounds from their L1 in the speech production of the L2.

2.2 Influence of Universal Grammar and markedness

In generative grammar, first language learners are assumed to be innately equipped to learn language. In its initial state, the language faculty that we are born with is referred to as Universal Grammar (UG) (Archibald and Libben 1995:161). Within UG exist innate principles which limit the possible structures in human language. In this way, a child is constrained as to the number of hypotheses that can be made about the structure of its language. In addition, a set of parameters is made available by UG and as a child acquires its language, certain parameters are set to reflect the structure of that language and to distinguish it from other languages.

> The description of grammars in terms of parameter settings makes an explicit and organic connection between developmental factors in language acquisition and distributional, typological properties of languages. (Broselow 1988:201)

As with children learning their first language, interlanguage grammars do not violate the principles which govern natural languages (Broselow 1988:203). In particular, constraints on markedness are obeyed, where less marked structures are acquired before more marked structures (Archibald and Libben 1995:167–80). For example, children acquire stops, which are relatively unmarked, before they acquire fricatives, which are considered more marked (Lombardi 1998:3). This pattern is also exhibited in the order of the acquisition of voiced spirants by English learners of Spanish. The learners begin by pronouncing /b/ as [b], the least marked case, in the postvocalic environment. As acquisition proceeds, they are observed to change the pronunciation to [v], which is slightly more marked than [b]. The target pronunciation is [β], the most marked segment of the set.

We will now see how these observations about interlanguage are expressed within OT.

3.0 An Optimality Theoretic account of transfer and universals in Interlanguage

3.1 An overview of Optimality Theory

Optimality Theory proposes a Universal Grammar which consists of a universal set of violable *con*straints on language, CON. There are two functions: GEN(erate), which creates a set of potential outputs, and EVAL(uate), which selects the optimal candidate from the set created by GEN. The grammar of a language includes basic forms for morphemes, from which inputs are built, and a language-specific ranking for the constraints in CON (Archangeli 1997:16).

Language variation is expressed in terms of different constraint rankings for each language. We can say that for the English learner of Spanish, his/her L1 (English) will have one constraint ranking and his/her L2 (Spanish) will have a different ranking. Similarly, then, the learner's interlanguage will also have a unique constraint ranking since an interlanguage is considered to be a unique grammatical system.

Universals are present in the model as the violable constraints. They are universal because they are common to all languages, but can be ranked in different ways to reflect different grammars. Universally, the voiced bilabial fricative [β] is more marked than the voiced stop [b]. In all languages, [β] will always be higher ranked than [b] in terms of markedness. This ranking is a harmonic, or invariant, ranking. However, in Spanish, [β] is permitted in the inventory to avoid violating a higher ranked constraint which prohibits voiced stops following a vowel.

In English, though, [β] is not permitted because the constraint prohibiting it is ranked higher than the constraint prohibiting the voiced stop. The different rankings of the constraint prohibiting the voiced stop is an example of a variable ranking of a constraint (Pulleyblank 1997:69).

Transfer, as noted above in 2.1, is an instance of interference from the grammar of the L1 on the learner's developing L2 system. In Optimality Theory terms, this means that the learner is still using the constraint ranking of the L1 to produce the L2 (Lombardi 1998).

3.2 A learner's interlanguage in OT

This section of the paper will demonstrate how a learner's interlanguage system is expressed within Optimality Theory. In particular, the influences of transfer and universals, normally viewed as two separate phenomena in the field of second language acquisition, will be shown to be simply a matter of constraint rankings. The IL of an English speaker learning Latin American Spanish will be expressed in terms of changing constraint rankings. The target constraint ranking of Spanish will be shown first. This will be followed by the rankings for the stages of IL that the learner is proceeding through as he/she acquires the process of voiced stop spirantization in Spanish.

Recall that in Spanish voiced stop spirantization is an obligatory process whereby /b d g/ are pronounced as the spirants [β ð ɣ] postvocalically. The voiced bilabial stop occurs word initially and the voiced bilabial fricative occurs postvocalically. The occurrence of the voiced bilabial stop in initial position reflects a harmonic ranking in which the unmarked sound emerges. The fact that [β] is more marked than [b] can be expressed as in (2).

(2) b/β Ranking: *β >> *b .

In the following tableau, this ranking allows [b] to emerge in initial position.[1]

(3)

/bamos/	*b	*β	Ident-Manner
☛ bamos	*		
βamos		*!	*

In post-vocalic position, however, [b] is forbidden and the more marked [β] emerges. The positional restriction preventing [b] postvocalically can be expressed as *V $_{\text{voiced-stop}}$. The tableau in (4) illustrates how [β] emerges in the optimal candidate.

(4)

/hablamos/	*V $_{\text{voiced-stop}}$	*β	*b	Ident$_{\text{manner}}$
☛ aβlamos		*		*
ablamos	*!		*	

This ranking, which reflects the grammar of the native Spanish speaker, also happens to be the target of the English speaker who wishes to acquire the Spanish phonological system.

[1] The desired output, given any constraint ranking, will always be a possible result, according to the OT concept of 'the richness of the base', given even a different input. If the input in Tableau (i) was /βamos/, the desired output, /bamos/, would still be derived, as is seen in the tableau:

(i)

/βamos/	*β	*b	Ident$_{\text{manner}}$
☛ bamos		*	
βamos	*!		*

A native English speaker, on the other hand, begins learning Spanish with only the English phonological system as the initial state. The relevant facts are as follows:

(5) (a) In North American English, [b] occurs syllable initially, syllable finally, intervocalically, and in initial and final clusters (Celce-Murcia *et al.* 1996). There is no prohibition on [b] appearing postvocalically.

(b) The allophone [β] is not in the English consonant inventory.

In the case of a word such as *hablamos*, the learner would retain the postvocalic [b] as a voiced stop. In this grammar, the harmonic ranking *β >> *b is higher-ranked than the positional restriction on postvocalic voiced stops. The unmarked /b/ emerges as the optimal candidate.

(6)

/hablamos/	*β	*b	*V voiced-stop	$Ident_{manner}$
☛ ablamos		*	*	
aβlamos	*!			*

At some point during acquisition, the learner may stop producing [b] and begin producing [v] in the postvocalic environment (Stockwell & Bowen 1965:47, Zampini 1997:227). At this stage of interlanguage, *hablamos* is produced as [avlamos]. The learner has recognized that the voiced stop is not permitted postvocalically, thereby promoting the ranking of *V voiced-stop above that of *b. Although the feature [continuant] is recognized as desirable postvocalically, the learner is still unable to produce the highly marked [β], which remains ranked above *V voiced-stop.

In order to satisfy the need for a segment with a positive value for [continuant], the learner approximates the voiced bilabial fricative with a sound found in his/her L1, [v]. Although [v] is a more marked sound than [b], it is permitted because the optimal candidate obeys the more highly ranked constraint *V voiced-stop, as is shown in (7).

(7)

/hablamos /	*β	*V voiced-stop	*v	*b	$Ident_{manner}$
☛ avlamos			*		*
ablamos		*!		*	
aβlamos	*!				

To summarize, items (8–10) represent the stages of acquisition that the learner has proceeded through in terms of constraint re-ranking.

(8) English L1 and and early IL stage: *β >> *b >> ***V voiced-stop** >> $Ident_{manner}$

(9) Interlanguage: *β >> ***V voiced-stop** >> *v >> *b >> $Ident_{manner}$

(10) Target language–Spanish: ***V voiced-stop** >> *β >> *b >> $Ident_{manner}$

We can observe how the phonotactic constraint, *V voiced-stop, gradually gets promoted as the learner acquires the phonology of Spanish.

4.0 Discussion

Although this example shows only two stages of interlanguage, it is possible to imagine that for other

structures, there may be several stages in the developing interlanguage, resulting in a separate constraint ranking for each stage. As the learner acquires more of the structure of the target language, the constraint rankings will more closely resemble the ranking of the target. In a proposal by Tesar (1998), learners are said to use a hypothesized grammar to guess what the structure of an observed overt form is in order to modify their own grammar. As they receive more overt evidence, learners use a repetitive strategy to continually modify their own grammar. Learning occurs when they converge on the correct grammar.

Although Tesar's proposal is made in terms of child language acquisition, the process of acquisition as expressed in Optimality Theoretic terms is very similar for both first and second language learners. Acquisition in both cases is a result of revising existing constraint rankings in order to converge on a ranking which reflects the correct grammar of the target language.[2]

Tesar refers to this process as *constraint demotion*, whereby the learner's current ranking loses out to the ranking in the target grammar. In the case of the voiced stop spirantization in Spanish, there is the demotion of the constraint ***b** as the learner acquires the phonological rules of Spanish. However, there is also *constraint promotion*, whereby in the same process, the constraint ***V** $_{\text{voiced-stop}}$ gets promoted above ***b** and other constraints.

If the learner discussed in **3.2** above had only been able to produce [avlamos], but never [aβlamos], we would say that his/her pronunciation had become fossilized. In terms of OT, we can say that the learner has only been able to acquire a certain level of constraint ranking within the interlanguage. The problem is that while OT can describe the process, it is unclear how the theory can explain why the learner has stopped at that particular constraint ranking.

The constraint rankings are also able to express in one mechanism two separate influences on an interlanguage. Separate theories have been developed to explain the influence of the learner's L1 and to explain the influence of universals. Contrastive Analysis (CA) was developed to explain the influence of the L1, and the Markedness Differential Hypothesis (MDH) was used to explain the influence of universals (Brown 1994:193,202; Archibald and Libben 1995:138,169).

Contrastive Analysis claims that interference from the learner's L1 is the main barrier in the acquisition of the second language. To learn a second language means overcoming the differences between the L1 and the L2 (Brown 1994:193). One of the problems with CA is that many errors that were predicted did not occur and many errors occurred that were not predicted. This is because in CA it is assumed that the L1 is the only source of error (Archibald and Libben 1995:143). MDH, on the other hand, was proposed to help explain why some of the differences between the L1 and the L2 cause errors, while others do not. This theory says that the areas most difficult for the learner will be those that are both different from and more marked than the L1. In terms of phonology, sounds in the L2 that are universally more marked are more likely to cause problems for the learner. This shows the influence of principles of universal grammar on the learning of an L2 (Archibald and Libben 1995:169–71, Brown 1994:202).

In OT, the constraint rankings themselves express the influence of the L1 by showing that the learner is using a ranking that is the same or similar to that of his/her L1 to produce the optimal candidate. The influence of universals is expressed in the constraints themselves, which are all part of Universal Grammar. These separate influences on interlanguage are nicely collapsed within OT as statements of constraints or as ranking of constraints.

5.0 Conclusion

This paper has shown that the interlanguage grammar of a second language learner and the influences of both the L1 and universals on an interlanguage can all be expressed in terms of violable constraints and the ranking of those constraints within the framework of Optimality Theory. This one theory is able to describe these phenomena from different theories of second language acquisition using its existing mechanisms. Optimality Theory has been shown to have a descriptive advantage.

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[2] Although this is beyond the immediate scope of this paper, some consideration needs to be given to the common occurrence of fossilization and non-native accent. Fossilization is the relatively permanent incorporation of incorrect linguistic structures into a learner's second language competence (Brown 1994:217). In terms of acquiring the phonological system of the L2, this results in a non-native accent.

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APPLICATIVES IN SALISHAN LANGUAGES: EVIDENCE FOR TWO BASIC TYPES*

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1. Introduction

Salishan languages are well known for their polysynthetic properties. The verb in Salishan languages consists of a stem as a base and a variety of affixes and clitics. Among those elements that are suffixed to the verb stem, the applicatives mark the thematic role of the direct object on the verb. Applicatives increase the verb's semantic valence and can increase the syntactic valence as well. When they attach to intransitive verbs, they form transitive constructions. The following examples are from Halkomelem:[1]

Halkomelem (Gerdts: p.c.)

(1)	*ni?*	*nem̓*	*kʷθə*	*swiẇləs.*			'The boy went.'
	AUX	go	DET	boy			
(2)	*ni?*	*nə?əm̓-nəs-əs*	*kʷθə*	*swiẇləs*	*kʷθə*	*John.*	'The boy went up to John.'
	AUX	go-DIR+TR-3.ERG	DET	boy	DET		

Sentence (1) is an intransitive sentence, having only one argument. The 'boy' is the subject, and has the thematic role of theme. Sentence (2) is a transitive sentence with an applicative morpheme *-nəs* suffixed on the verb, followed by a third person ergative suffix. The subject is, again, the theme of the motion verb: the 'boy'. 'John' is the grammatical object, and its thematic role is goal. Halkomelem *-nəs* typically attaches to motion verbs, and signals that the direct object has the thematic role of goal.

Applicatives also form semantically ditransitive verbs from transitive verbs:

Halkomelem (Gerdts: p.c.)

(3)	*ni?*	*ləkʷ-át-əs*	*kʷθə*	*sc̓ešt.*				'She broke the stick.'
	AUX	break-TR-3.ERG	DET	stick				
(4)	*ni?*	*ləkʷ-**ɬc**-t-əs*	*tθə*	*swiẇləs*	*?ə*	*kʷθə*	*sc̓ešt.*	'She broke the stick for the boy.'
	AUX	break-BEN-TR-3.ERG	DET	boy	OBL	DET	stick	

Sentence (3) is a transitive sentence, having two arguments. The third person subject is represented as an ergative suffix following a transitive marker that is also suffixed to the verb. The direct object 'stick' appears without any oblique marker, and bears the thematic role of theme. Sentence (4) is also a transitive sentence, having two arguments and an oblique object; however, the direct object 'boy' bears a thematic role other than theme—in this case, benefactive. The adjunct 'stick', which is the direct object of the verb 'break' without the applicative *-ɬc* attached, also bears the thematic role of theme in (4), but it is realized as an oblique phrase. Halkomelem *-ɬc* indicates that the direct object is a benefactive.

Information about applicatives is available for many Salishan languages. However, the classification of the applicative suffixes is not yet clear. This paper describes a comparative study of applicatives in eighteen Salishan languages. There are from two to six different applicatives in each of the languages in the study, as shown in Table 1.

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[1] Abbreviations in this paper are as follows:

AUX	auxiliary	BEN	benefactive	DET	determiner
ERG	ergative	OBL	oblique	p.c.	personal communication
TR	transitive				

Subgroup	Language	Number of applicatives	Applicative
Bella Coola	Bella Coola	2	*-amk, -m*
Central Salish	Sliammon-Comox	3	*-ʔəm, -mi, -ni*
	Sechelt	3	*-ém, -mí, -ni*
	Squamish	3	*-ši, -minʔ, -ni*
	Halkomelem	4	*-as, -łc, -meʔ, -nəs*
	Saanich	3	*-si, -ŋiy, -nəs*
	Clallam	3	*-sí, -ŋə, -nəs*
	Lushootseed	4	*-yi, -bi, -di, -c/-s*
Tillamook	Tillamook	3	*-ši, -əwi, -əs*
Tsamosan	Upper Chehalis	6	*-ši, -tmi, -tuxʷt, -mis/-mn, -ni, -tas/-ts*
Northern Interior Salish	Lillooet	2	*-xi, -min/-miṅ*
	Thompson	2	*-xi, -mi*
	Shuswap	2	*-x(í), -m(í)*
Southern Interior Salish	Okanagan	4	*-xi, -ł, -túł, -min*
	Columbian	4	*-xi, -ł, -túł, -mi*
	Coeur d'Alene	4	*-ši, -ł, -túł, -mi*
	Spokane	3	*-ši, -ł, -mi*
	Kalispel	3	*-ši, -ł, -mi*

TABLE 1. Applicative number and forms by language.

A total of twelve different applicative forms were found for this paper:[2] **-xi* (*-ši, -si, -yi*), **-VmV* (*-ʔəm, -ém, -tmi*), *-as, -łc, -ł, -tułt, -txʷt, *-mi* (*-min, -minʔ, -mis, -meʔ, -bi/-i, -əwi, -ŋiy, -ŋə*), **-ni* (*-di*), **-nəs* (*-c/-s, -əs, -tas/-ts*), *-amk, -m*. The proto-forms were reconstructed by Kinkade (1998), and the forms in parentheses are reflexes. None of the Salishan languages have all twelve applicatives. Rather, each language has at least two and at most six applicatives. The question arises, however, of the direction in which the applicatives have changed: have applicatives expanded from two to six, or have they merged from twelve to two?

In exploring this question, I first outline a classification of applicative suffixes based on the type of verb with which they are associated, and on the thematic role of the direct object (Section 2). Then, I illustrate the two basic concepts expressed by applicatives (Section 3), and I explore the split between these two concepts (Sections 4 and 5). Finally, I outline the distribution of applicatives in Salishan languages and, on the basis of the foregoing discussion, draw my conclusion regarding the original number of applicatives in Salishan languages (Section 6).

2. Classification of applicatives

Applicatives are referred to in the Salishan literature by many different terms, such as transitivizer, indirective, redirective, relational, relative, substitutive, purposive, benefactive, possessive, and dative. I classify applicatives by the type of verb with which the applicatives associate and the thematic role of the direct object. The verb types are motion, psychological event, speech act, and transfer. Examples are as follows:

	Example	*Verb Gloss*	*Language*	*Reference*
Motion				
(5)	*nəʔém-**nəs**-əs*	'go to'	(Halkomelem)	(Gerdts 1988:134)
(6)	*kʷənəŋàt-**nəs**-áŋəs*	'ran after'	(Saanich)	(Montler 1986:168)

[2] All applicative forms are shown here without the control transitive morpheme **-nt* where separable.

Psychological Event

(7)	*lháyel-**mít***	'ashamed of'	(Sechelt)	(Beaumont 1985:108)
(8)	*sv́ləš-əš(-**s**)-wə́š-š*	'angry at'	(Tillamook)	(Egesdal and Thompson 1998:257)

Speech Act

(9)	*q^{w}ay-**mi**-θi*	'scold'	(Sliammon)	(Watanabe 1996:53)
(10)	*v́yáʔš-**n**-n̓, sv́yáʔš-**ni**-t-n*	'tell'	(Upper Chehalis)	(Kinkade 1991:170)

Transfer

(11)	*k°u'λn-**nit***	'borrow from'	(Squamish)	(Kuipers 1967:79)
(12)	*qáda-**di**-d*	'steal from'	(Lushootseed)	(Bates, Hess and Hilbert 1994)
(13)	*ƛ̓iq-**xit***	'bring'	(Lillooet)	(van Eijk 1997:115)
(14)	*(n)/né-**x**-c*	'give, hand over'	(Thompson)	(Thompson and Thompson 1996:877)

The thematic roles of applied objects are theme, goal of motion, dative (goal of transfer), goal of psychological event, source of motion (starting point), source of transfer, source of psychological event (stimulus or cause), benefactive, malefactive, possessive, location, and instrument. Examples are as follows:

Theme

(15)	*/k̓^{w}ə́ƛ'-**c**/*	'miss'	(Lushootseed)	(Hess 1967:17)
(16)	*nuyamł-**amk**-is*	'sing'	(Bella Coola)	(Davis and Saunders 1997:50)

Motion Goal

(17)	*v́ʔənʔé-**nəs**-əŋ*	'come at'	(Saanich)	(Montler 1986:168)
(18)	*my**min**s*	'approach'	(Shuswap)	(Kuipers 1992:50)

Dative (Transfer Goal)

(19)	*ʔám-**əs**-t-əs*	'give'	(Halkomelem)	(Gerdts 1988:90)
(20)	*k^{w}iʔ**x**tis*	'show'	(Thompson)	(Thompson and Thompson 1980)

Psychological Goal

(21)	*səsiʔ**ŋ**istál̓x^{w}*	'scare'	(Saanich)	(Montler 1986:174)

Motion Source

(22)	*łag-a-θut-**mi**-θ-as*	'walk; run out, away from'	(Sliammon)	(Watanabe 1996)

Transfer Source

(23)	*čəw'u-**ni**-θ-as*	'steal from'	(Sliammon)	(Watanabe 1996)
(24)	*kw'ímels-**nit***	'borrow from'	(Sechelt)	(Beaumont 1985:102)

Psychological Source (Stimulus)

(25)	*lháyel-**mít***	'ashamed of'	(Sechelt)	(Beaumont 1985:108)
(26)	*ch'ás<u>x</u>em-**mít***	'afraid of'	(Sechelt)	(Beaumont 1985:102)

Benefactive

(27)	*q'^{w}ə́l-**əłc**-t-əs*	'bake for'	(Halkomelem)	(Gerdts 1988:90)
(28)	*/łíč̓-**i**-d/*	'cut for'	(Lushootseed)	(Hess 1967:43)

Malefactive

(29)	*ƛ̓px*^{w}*-a***ʔam***-θ-as*	'break	(Sliammon)	(Watanabe 1996)
(30)	*ʔúq*^{w}*e***ʔxcms**	'drink'	(Thompson)	(Thompson and Thompson 1980)

Possessor

(31)	*łəw-***ʔəm***-θ-as*	'take my...'	(Sliammon)	(Watanabe 1996)
(32)	*k*^{w}*u a-ks-txʷ̓-***əł***-t-ím*	'take care of my...'	(Okanagan)	(N.Mattina 1993)

Location

(33)	*kíis-***b***-i-d*	'stand up beside'	(Lushootseed)	(Hess 1967:29)
(34)	*√yús-***mn***, s√yús-***mis***-n*	'fix, work on, work at'	(Upper Chehalis)	(Kinkade 1991:176)

Instrument

(35)	*tx-***amk***-is*	'use ... to cut with'	(Bella Coola)	(Davis and Saunders 1997:55)

Based on the semantic analysis of the data, I conclude that there were two applicatives in Proto-Salish and that these were supplemented or replaced in the various daughter languages. Nevertheless, the original semantic distinction between the two types holds.

3. Analysis of two basic types of applicative

According to the classification based on the type of verb and the thematic role of the applied object, we see that we can divide applicatives into two groups. One type of applicative attaches to motion verbs, psychological events, and speech act verbs, and also marks the verb for transfer source and location. The other type marks the verb for dative, benefactive, malefactive, and possessive. All the applicatives fall into two major categories, redirective and relational, which are illustrated below.

In the redirective construction, the applied object, that is, the direct object in the applicative construction, is redirected to non-theme nominal. The applied objects of redirectives typically share the property of dative (transfer goal), benefactive, malefactive, and possessive. I have adopted the cover term 'redirective' for this type of applicative following Kinkade (1980:33).

There are eight distinctive forms of redirectives in Salishan languages: **-xi*, **-VmV*, *-as*, *-łc*, *-ł*, *-túłt*, *-tx*^{w}*t*, and *-amk*. In Northern Interior Salish and Central Salish, with the exception of Halkomelem, there is only one redirective. The most widespread redirective is **-xi*. In the following examples in Northern Interior Salish, **-xi* marks the verb for benefactive (36), dative (37), and possessive (38):

Thompson (Thompson and Thompson 1980)

(36) *q*^{w}*in***xícn** *//q*^{w}*in-***xi***-t-si-en//* 'I spoke for you.'

Lillooet (van Eijk 1997:115)

(37) *ƛ̓íq-***xit** 'to bring something to somebody'

Shuswap (Kuipers 1992:49)

(38) *pet-***xt***-s tə xk*^{w}*tustn-s* 'he has [OBJECT]'s (parent's) eyes'

In Sliammon-Comox and Sechelt, there is no reflex of **-xi*. Instead, **-VmV* is used to mark a verb for benefactive (39, 41) and malefactive (40) direct objects:

Sliammon (Watanabe 1996)

(39) *ƛ̓əs-***ʔəm***-θi t*^{θ}*əm ʔə tə čuy'* 'I'll punch the kid for you.'

(40) *mək*^{w}*-***ʔəm***-θ-as ʔə tə t*^{θ} *ʔiłtən* 'Somebody ate my food on me.'
(i.e., Somebody stole my food from my plate)

Sechelt (Beaumont 1985:104)

(41) *xwúyum-**ém**t-ts-á-chálap-skwa?* 'Will you (pl.) sell it for me?'

The second type of applicative is the relational construction. In the relational construction, a verb makes a relation to a new entity, and increases the valency as a result. The applied object usually has properties of goal or direction of motion, goal of psychological event, source, indirect cause of a psychological event (stimuli or causal), indirect object of a speech act, or location. This label is from Thompson and Thompson (1992:73).

There are five distinct relational forms in Salishan languages: **-mi*, **-ni*, **-nəs*, *-amk*, *-m*. The most widespread relational is **-mi*. In Northern and Southern Interior Salish, there is only one relational: **-mi*. It attaches to verbs of motion (42), psychological events (43), and Speech act verbs (44):

Shuswap (Kuipers 1992:50)

(42) *ṫəkmins* 'go towards'

Thompson (Thompson and Thompson 1992:74)

(43) *ċéx-**mn̓**-s* 'he is ashamed of her'

Lillooet (van Eijk 1997:114)

(44) *sqʷál̓-**min̓*** 'to report on somebody'

We see then that there are two main types of applicatives in Salishan languages – redirectives and relationals. When a Salishan language has only two applicatives, it will have one of each type. For example, the Northern Interior Salish languages (Lillooet, Thompson, Shuswap) have one redirective and one relational. My claim is that these two types underlie the applicative systems in other Salishan languages as well.[3]

4. The split of the redirective

As seen in the previous section, Northern Interior Salish languages have the basic type of redirective: **-xi*. Three Central Salish languages (Sliammon-Comox, Sechelt, Halkomelem) do not have reflexes of the redirective **-xi*. Instead, **-VmV* is used in Sliammon-Comox and Sechelt. Halkomelem has two forms, *-as* for dative (45) and *-ɬc* for benefactive (46):

Halkomelem (Gerdts 1988:90)

(45) *ni ʔám-**əs**-t-əs kʷθə sqʷəméyʔ ʔə kʷθə sθ'ámʔ* 'He gave the dog the bone.'

(46) *ni q̓ʷə́l-**əɬc**-t-əs ɬə słéniʔ ʔə kʷθə səplíl* 'He baked the bread for the woman.'

Gerdts and Hinkson (1996) claim that these applicative markers are actually lexical suffixes in Halkomelem: *-as* 'face' and *-ɬc* 'belly'.

Southern Interior Salish languages also have more than one redirective form. They have reflexes of **-xi*, but they also have other redirectives. The redirective *-ɬ* appears in all Southern Interior Salish languages, and the redirective *-túɬ* appears in Okanagan, Columbian, and Coeur d'Alene, but not in Spokane/Kalispel. Examples of the suffixes follow:

Okanagan

(47) *kʷu q̓ʷə́l̓íw-**xt** iʔ t síyaʔ* 'Pick berries for me.' (N.Mattina 1993 (12))

(48) *kʷu qʷəlqʷílɬts isqʷsíʔ iʔ k'əl scənq'aʔílsc.* 'He talked to my son about his business.'

(49) *kʷu qʷəlqʷəltúɬts iʔ scənq'aʔílsc.* 'He talked to me about his business.' (A.Mattina 1994 (11, 12))

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[3] Bella Coola seems to contradict this claim, although it has two applicatives. One of them, *-amk*, seems to have the property of both redirective and relational; *-amk* does not correlate in form or function with any applicative in other Salishan languages.

Coeur d'Alene (Doak 1997:153, 145, 157)

(50) *čɛʕʷ**šitn* 'I prayed for him.'

(51) *kʷ**íɬtm** xʷɛ sťímčɛʔs* 'His daughter was taken from him.'

(52) *cxʷuy**túɬ**tm* 'They brought something to him for him.'

Columbian (Kinkade 1980:33)

(53) *táw-**x**-t-s* 'He bought it for him.'

(54) *táq-**ɬ**-n* 'I bought it from him.'

(55) *kʷ**ɬ**ən-**túɬ**-n* 'I loaned it to him.'

Spokane (Carlson 1980:24)

(56) *ʔíɬištən ɬuʔ Albert ɬuʔ t sqéltč.* 'I ate some meat for Albert.'

(57) *xʷíčštən.* 'I gave it to him.'

(58) *ʔíɬiɬtən ɬuʔ Albert sqéltčs.* 'I ate Albert's meat.'

Kalispel (Vogt 1940:34)

(59) *yeskúpštəm* 'I am pushing something (indefinite) for him (definite).'

(60) *yeskúpɬtəm* 'I am pushing it (definite) for him (definite), or I am pushing his...'

The suffix **-xi* is used to mark a verb for benefactive in general (47, 50, 56, 59), though Kinkade (1998) defines the direct object for **-xi* as dative in Columbian (53). The suffix *-ɬ* adds a possessor (48, 51, 54, 58, 60), while *-túɬ* adds a dative direct object (49, 52, 55). Spokane/Kalispel uses **-xi* to mark dative instead of *-túɬ* (57).

Upper Chehalis has three redirective forms: **-xi*, **-VmV*, and *-tuxʷt/-txʷt*. The semantic differences among them are not clear from the English glosses, but **-xi* marks for dative (61), **-VmV* marks for dative and benefactive (62), and *-tuxʷt/-txʷt* marks for possessor (63) (Kinkade 1998).

Upper Chehalis (Kinkade 1991:34, 15)

(61) *√čaɬ-**š**-n,* *s√čaɬ-**ši**-t-n* 'give, give away to'

(62) *√ʔuná-**tmi**-xʷ,* *s√ʔuná-**tmi**-y-n* 'ask something for someone'

(63) *√ʔuná-**tuxʷt,*** *s√ʔuná-**txʷt**-n* 'ask someone for something'

In Northern Interior and Central Salish, there is only one redirective, with the exception of Halkomelem which has two redirectives. In Southern Interior Salish, three redirectives are found: **-xi*, *-ɬ*, and *-túɬ*, except in Spokane/Kalispel where *-túɬ* is missing. Kinkade (personal communication) remarks that this may be an accidental gap. The suffix *-ɬ* marks the applied object for possessor in general, and *-túɬ* marks for dative. Upper Chehalis has three redirectives: **-xi*, **-VmV*, and *-tuxʷt/-txʷt*. It is interesting to see that Upper Chehalis has **-VmV*, which is also found in Sliammon-Comox and Sechelt.

It seems that the concept of redirective has split roughly as shown in Table 2:

	Benefactive	Dative	Possessor
Northern Interior Salish	**-xi*	**-xi*	**-xi*
Spokane/Kalispel	**-xi*	**-xi*	*-ɬ*
Other Southern Interior Salish	**-xi*	*-túɬ*	*-ɬ*
Upper Chehalis	**-VmV*	**-xi, *-VmV*	*-tuxʷt/-txʷt*
Halkomelem	*-ɬc*	*-as*	*Ø*

TABLE 2. Split of the redirective.

I conclude from these facts that **-xi* is the Proto-Salish redirective and its use probably paralleled its use in Northern Interior Salish. It marks the verb for benefactive, dative, and possessor. It was supplemented or replaced by innovative redirectives in various sub-groups.

5. The split of the relational

All eighteen languages in the study except Bella Coola have some reflex of **-mi*. Northern and Southern Interior Salish have only the one relational. However, the other languages (Central Salish, Tillamook, Upper Chehalis) have, in addition, reflexes of either or both of two other relationals: **-ni* and **-nəs*. In Central Salish, either **-ni* or **-nəs* is present beside **-mi*, except in Lushootseed where there are three relationals: **-mi*, **-ni*, and **-nəs*. A central feature of **-ni* in Sliammon-Comox, Sechelt, Squamish, and Lushootseed is that it attaches to a transfer verb, thereby marking a transfer source as direct object (64, 65, 66, 69). The suffix **-ni* also associates with psychological event (67) and speech act (68) verbs, although its occurrence is limited in every language but Squamish.

Sliammon (Watanabe 1996)

(64) *čəw'u-**ni**-θ-as ʔə tə t$^{\theta}$ tala* 'He stole money from me.'

Sechelt (Beaumont 1985:102)

(65) *chélʔúlh-**nit*** 'steal something from someone'

Squamish (Kuipers 1967:79)

(66) *k°u'λn-**nit*** 'borrow from'

(67) *t'a'i̯aq'-**nit*** 'get angry at'

(68) *tx°-tə'ta-**nit*** 'talk about'

Lushootseed (Bates, Hess and Hilbert 1994:172)

(69) *qáda-**di**-d* 'steal from someone'

The suffix **-nəs* usually attaches to motion verbs (70, 71, 72, 73). It associates with psychological events (74) and speech act verbs (75) in Lushootseed.

Clallam (Montler 1996:262)

(70) *k^{w}ənəŋút**nəs** cn* 'I ran after it.'

Saanich (Montler 1986:168, 33)

(71) *k^{w}ənəŋàt-**nəs**-áŋəs sx^{w}* 'You ran after me.'

Halkomelem (Gerdts 1988:90)

(72) *ʔi yə-ʔéʔwəʔ-**nəs**-əs łə słéniʔ* 'He's coming toward the woman.'

Lushootseed (Bates, Hess and Hilbert 1994:221, 250, 48)

(73) *lətəláwis tə spàʔc* 'He's running after the bear.'

(74) *ʔəsx^{w}ák̓^{w}isəx^{w} čəd* 'I'm tired of it (because it is dull or fatiguing).'

(75) *təʔəx^{w}cúucs tsiʔəʔ bədàʔs* 'Therefore, he told his daughter.'

In Tillamook, **-nəs* behaves slightly differently. It attaches to psychological events (76) and speech act verbs (77):

Tillamook (Egesdal and Thompson 1998:257)

(76) *de cv́ləš-eš(-**s**)-wáš-š* 'Are you angry at me?'

(77) *g^{w}ə v́g^{w}ələx̣-**əs**-wíɬ-yəɬ* 'We will speak with you folks.'

No examples of **-nəs* are attested with motion verbs.

In Upper Chehalis, **-mi* usually attaches to motion verbs (78), while **-ni* occurs with psychological events (79) and speech act verbs (80). It also occurs with transfer verbs; however, the direct object is the theme and not the source of transfer. The suffix **-nəs* is found with only two stems in Kinkade (1991). One of them is psychological event, and the direct object is a psychological source (81).

Upper Chehalis (Kinkade 1991:149, 168, 170, 113)

(78) *v́t̓ú-**mn**,* *sv́t̓ú-**mis**-n* 'come to, come for'

(79) *v́x̣^{w}íy-**n**-n,* *sv́x̣^{w}íy-**ni**-t-n* 'threaten someone'

(80) *v́yáʔš-**n**-n',* *sv́yáʔš-**ni**-t-n* 'tell something (the story) to someone'

(81) *v́q^{w}án-**ts**,* *sv́q^{w}án-**tas**-n* 'afraid of'

The suffix **-mi* is found in all eighteen languages, and **-ni* and/or **-nəs* share the concept of relational with **-mi* in Central Salish, Tillamook, and Upper Chehalis. The rough split of the concept relational is shown in Table 3:

	Motion	Psychological	Speech act	Transfer (Source)
Northern Interior Salish	**-mi*	**-mi*	**-mi*	Ø
Southern Interior Salish	**-mi*	**-mi*	**-mi*	Ø
Other Central Salish	**-mi, *-nəs*	**-mi, *-ni*	**-mi, *-ni*	**-ni*
Lushootseed	**-nəs*	**-mi, *-nəs*	**-nəs*	**-ni*
Tillamook	**-mi*	**-mi, *-nəs*	**-nəs*	Ø
Upper Chehalis	**-mi*	**-ni, *-nəs*	**-ni*	Ø

TABLE 3. Split of the relational.

No examples of **-mi*, which marks the transfer source for its applied object, are found in Northern Interior Salish, Southern Interior Salish, Tillamook, or Upper Chehalis. Thus, this concept seems to be an innovation in Central Salish. Note that (a) **-mi* is the most widespread relational form; (b) **-mi* attaches to motion, psychological, and speech act verbs in Northern, Southern, and Central Salish; and (c) a new concept seems to have emerged.

6. Conclusion

According to the analysis provided in the previous sections, the twelve applicatives in Salishan languages can be divided into two basic categories, redirective and relational, as shown in Table 4.

Northern Interior Salish has the general pattern of one redirective applicative and one relational applicative. In Southern Interior Salish, the redirective is split into three, while retaining one relational. In Central Salish, the relational is split into two (except in Lushootseed) while one redirective is retained (except in Halkomelem). Tillamook has the same pattern as Central Salish, although *-əs* behaves slightly differently from other reflexes of **-nəs* in Central Salish. Upper Chehalis is a combination of Southern Interior and Central Salish with respect to the pattern of the applicative split. It has three redirective applicatives as in Southern Interior Salish, and three relational applicatives as in Lushootseed.

In conclusion, I claim that Proto-Salish had two types of applicatives: the redirective **-xi* and the relational **-mi*. These were supplemented or replaced by innovative applicatives in various sub-groups. As we have seen in the case of Upper Chehalis, the distribution of applicatives in Salishan languages is a geographical as well as a genetic development.

Subgroup	Language	Redirective #: Relational #	Redirective	Relational
Northern Interior Salish	Lillooet	1:1	**-xi*	**-mi*
	Thompson	1:1	**-xi*	**-mi*
	Shuswap	1:1	**-xi*	**-mi*
Southern Interior Salish	Okanagan	3:1	**-xi, -ɬ, -túɬ*	**-mi*
	Columbian	3:1	**-xi, -ɬ, -túɬ*	**-mi*
	Coeur d'Alene	3:1	**-xi, -ɬ, -túɬ*	**-mi*
	Spokane	2:1	**-xi, -ɬ*	**-mi*
	Kalispel	2:1	**-xi, -ɬ*	**-mi*
Central Salish	Sliammon-Comox	1:2	**-VmV*	**-mi, *-ni*
	Sechelt	1:2	**-VmV*	**-mi, *-ni*
	Squamish	1:2	**-xi*	**-mi, *-ni*
	Clallam	1:2	**-xi*	**-mi, *-nəs*
	Saanich	1:2	**-xi*	**-mi, *-nəs*
	Halkomelem	2:2	*-as, -ɬc*	**-mi, *-nəs*
	Lushootseed	1:3	**-xi*	**-mi, *-ni, *-nəs*
Tillamook	Tillamook	1:2	**-xi*	**-mi, *-nəs*
Tsamosan	Upper Chehalis	3:3	**-xi, *-VmV, -tux^{w}t/-tx^{w}t*	**-mi, *-ni, *-nəs*

TABLE 4. Distribution of applicatives

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A PHONOLOGICAL/THEORETICAL EVALUATION OF THE KOREAN ALPHABET

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1.0 Introduction

The Korean Alphabet (*Han'gŭl*) has been described as "perhaps the most scientific system of writing in general use in any country" (Reischauer and Fairbank 1960:435), or as "the world's best alphabet" (Vos 1964:31). Indeed, Sampson (1985:144) goes so far as to say that it "must unquestionably rank as one of the great intellectual achievements of humankind"![1] *Han'gŭl* has a systematic internal structure that appears to specify the phonetic/phonological-feature composition of segments within a syllabic 'block' framework. Recent attempts have been made to parallel the constituents of *Han'gŭl* with the distinctive features of Jakobson's acoustically based system (Kim 1997). In more traditional analyses, beginning with the *Hunmin chŏng'ŭm* (Sejong 1946 [1446]), the vowel-classes have been interpreted as being associated with Oriental metaphysical terms such as *yin* and *yang*, representing the female and male principles respectively, further correlated with the two First Elements—Earth and Heaven—in relation to which Man stands in some 'neutral' function (Kim-Renaud 1997). This paper concentrates on the representation of the so-called vocalic components of the modern version of the *Han'gŭl* syllabic 'blocks' and examines the internal structure of the graphic representation. What emerges is an interpretation in terms of an arithmetic that generates a particular representational geometry reflecting a linear hierarchy of vocalic aperture/resonance properties within the basic 'CV(C)' structure. Such an interpretation shows clearly that underlying *Han'gŭl* is an extremely sophisticated phonetic/phonological theory.

> Die ersten Phonetiker waren die Erfinder der Schrift, die Westsemiten im Gebiete des heutigen Syrien, welche um das Jahr 1500 v. Chr. die Konsonantenschrift erfanden, ...
>
> —M. Schubiger (1970:5)

1.1 An example of writing analysis of the English abecedarium

That writing systems are interpretable as evidence of theorising, is well known. As Schubiger suggests, some intrinsic phonetic/phonological structure may be assumed, which, when extrapolated, is then available for theoretical analysis. We *cannot* take the following (Crystal 1987:177) as establishing some universal principle:

> First it is emphasised that writing and speech are different and equal manifestations of language. Writing should not be seen as merely 'transcribed speech', because its formal characteristics, and its strategies of production and comprehension, are quite unlike those encountered in speech.

There is no *a priori* reason to assume that any writing system (in any sense) is not, in some sense, 'transcribed speech', and therefore different in nature. Furthermore, *contra* Sampson (1985:20), we are, as linguists, as much interested in the physical appearance of writing systems as in their structure, for there is no clear reason to assume their non-unified relationship. We again make no *a priori* assumption that a system of writing is not, in some sense and to some degree, through the role of time and space, 'visible speech', and that the connection between the graphic representation and the speech represented is arbitrary. Finally, it does *not* follow that any traditional way of describing any writing system *necessarily* reflects the phonetic/phonological structure, or linguistic theory, underlying the writing system under consideration.

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[1] This should imply that *Han'gŭl* is demonstrably equivalent intellectually to, for instance, Mendel's Ratio, Mendeleyev's Periodic Table, Einstein's Specific and/or General Theory of Relativity, Bohr's discovery of the structure of the atom, or Gellman's theory of quarks. No such equivalence has been demonstrated. Even showing that Sejong's *Han'gŭl* is 'equivalent' to Jakobson's distinctive feature system (e.g., Kim 1997) would not achieve such a result!

It is important to distinguish initially between an alphabet and an abecedarium (ABC). The latter is a *recitation* of the elements (letters or glyphs) of the alphabet (the *system* of writing). In Korean, the abecedarium has the sequence of syllables *ka - na - ta - ra - ma - pa - sa - a -*, etc. While an examination of this does reveal a pattern of phonetic/phonological classification, this is not the focus of this paper, which concentrates rather on the *graphic* form of the Korean alphabet (*Han'gŭl*), and on the phonetic/phonological theoretic and descriptive principles underlying that graphic form. Both alphabets and abecedaria, however, can reflect the sound patterns of a language, but in different ways. At first sight, the ABC of the English alphabet appears to be a completely arbitrary mnemonic device, with no phonetic/phonological significance. However, a simple examination of the linear order of the 26 letters reveals a consonant (C)–vowel (V) pattern worthy of further examination, as revealed in Table 1 (Roberts 1964).

Alphabetic Symbol	Phonetic Description	V	C
a	low vowel	1	
b	voiced bilabial stop		
c	voiceless velar stop, alveolar fricative		3
d	voiced alveolar stop		
e	front mid (palatal) vowel	1	
f	voiceless labial fricative		
g	voiced velar stop		3
h	voiceless glottal fricative		
i	front high (palatal) vowel	1	
j	voiced palatal affricate		
k	voiceless velar stop		
l	alveolar lateral approximate		5
m	bilabial nasal		
n	alveolar nasal		
o	back mid (velar) vowel	1	
p	voiceless bilabial stop		
q	voiceless velar stop		
r	alveolar rhotic approximate		5
s	voiceless alveolar fricative		
t	voiceless alveolar stop		
u	back high (velar) vowel	1	
v	voiced labiodental fricative		
w	bilabial approximate		
x	voiceless velar stop + alveolar fricative		5
y	palatal approximate		
z	voiced alveolar fricative		

TABLE 1. English alphabet C–V patterns

From Table 1, it can be seen that the distribution of the vowel letters in the above list is: **a**, (3 Cs,) **e**, (3 Cs,) **i**, (5 Cs,) **o**, (5 Cs,) **u**, (5 Cs,) i.e., vowels appear in the series at odd numbered places, 1 (a), 5 (e), 9 (i), 15 (o), 21 (u), separated/followed respectively by 3, 3, 5, 5, and 5 consonants. The order of the vowels progresses sequentially as follows: most open, mid, high front, mid back (lowest), high back. If we classify **a** as mid-open, **e** and **i** as *front* mid and close respectively, and **o** and **u** as *back* mid and close respectively, we can deduce various vowel diagrams and internal relations such as the following possibilities in Figure 1 (a–d):

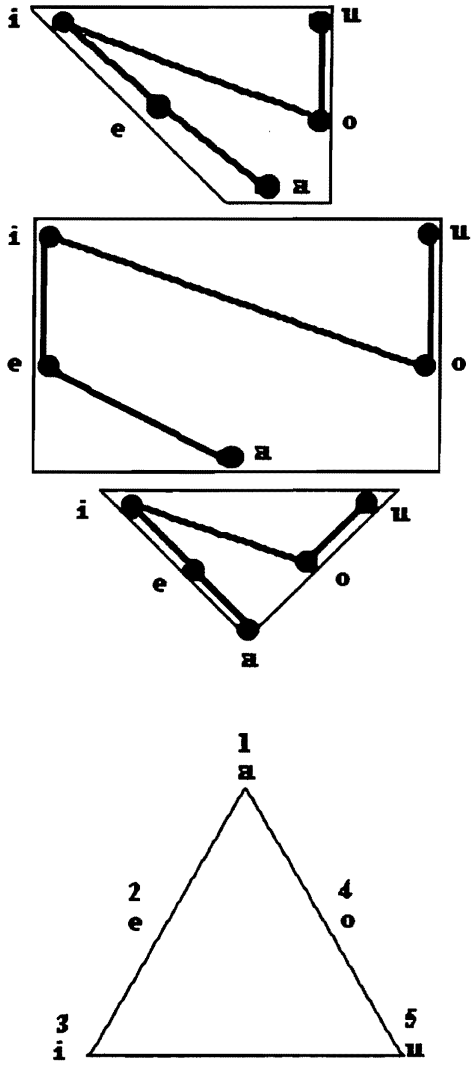

FIGURE 1 (a–d). Placement of vowel letters on four forms of a simple vowel diagram

The English abecedarium can also reflect a vowel parameter or linear scale such as in Figure 2:

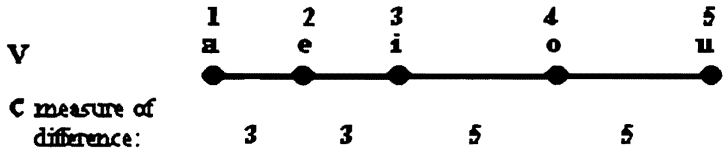

FIGURE 2. Placement of vowel letters on a linear scale

As far as the consonants are concerned, there is also plenty of evidence to suggest that place and manner of articulation are reflected in the ABC, generally in the order bilabial, velar, dental. These are listed in Table 2. On the various obvious 'gaps', see Miller (1994).

Group	I	II	III	IV	V	VI	VII
	Labial$_1$	Palatal	Velar	Dental$_1$	Glottal	Labial$_2$	Dental$_2$
i.	b		c	d			
ii.	f		g		h		
iii.		j	k	l		m	n
iv.	p		q	r			s, t
v.	v, w		x	y			z

TABLE 2. Degree of consonantal organisation in English ABC

Since the English-Roman alphabet/abecedarium is not the focus of this paper, let it suffice to refer to the brilliant work of Watt (1987, 1989, 1994), Faber (1992) and Miller (1994) for demonstrations of the phonetic/phonological system and ancient tradition of linguistic theory underlying the semitic, roman, futhark, and other abecedaria.

2.0 The *Han'gŭl*

For the rest of this paper, we focus on the Korean alphabet, and in particular on the so-called vocalic sections of the syllabic 'blocks'. History records that the *Han'gŭl* was invented by King Sejong (1397–1450) in 1443. Its form and principles were written up with the help of scholars of the Chiphyŏjŏn (Academy of Worthies), and was promulgated in 1446 in a two-part text called the *Hunmin chŏng'ŭm* (*'The correct sounds for the instruction of the people'*). The principles of pronunciation were explained in the *Hunmin chŏng'ŭm haerye* (*'Explanation and examples of the correct sounds for the instruction of the people'*) and those used in the design of the letters of the *Han'gŭl* in the *Hunmin chŏng'ŭm chejahae* (*'Explanation of the designing of the letters'*). We have already mentioned accolades accorded the *Han'gŭl* as a most unique linguistic script. Certainly the *Hunmin chŏng'ŭm* does not, however, call for such exalted opinions. (See also editions of Kang [1974] and Yi [1975].) This treatise on the *Han'gŭl* is probably best compared to the so-called *Cours de linguistique générale* of Ferdinand de Saussure. This book was compiled by students (particularly Charles Bally and Albert Sechehaye) from notes taken by other students at Saussure's lectures. A comparison of the *Cours* with Saussure's own *Mémoire* shows such a huge difference in brilliance and clarity of exposition between the former and the latter that it would be very easy to conclude that Saussure had nothing at all to do with the *Cours*! It is perfectly possible that this same academic trick was played on Sejong ("inventor of the *Han'gŭl*") by the state officials and advisors, who, much influenced by Chinese tradition and philosophy, probably wrote the *Hunmin chŏng'ŭm* themselves.

Typologically, *Han'gŭl* (in its modern form and use) is an alphabet of twenty-four basic and sixteen compound letters representing nineteen consonants and twenty-one vocalic elements. The system looks somewhat complex because, instead of the letters organised serially (linearly), they are grouped into syllables of the form CV(C), shaped like blocks. There is absolutely no doubt that the *Han'gŭl* has a systematic internal structure, one which not only provides principled bases of sound representation but also reflects a highly revealing and sophisticated degree of linguistic theoropoesis. The physical shapes of the elements or letter components in the C part of the block clearly reflect in various ways the articulation of speech elements, i.e., they are phonopictograms, partially stylised face-diagrams of articulations. The V parts of the block, on the other hand, consist solely of horizontal and vertical lines, together with, according to traditional analyses, a dot (or little circle). In modern *Han'gŭl*, a short vertical or horizontal line substitutes for this dot. It is on these vocalic parts of the block that we will concentrate the rest of this paper. We are interested in understanding the phonetic/phonological, descriptive and theoretic functions of the forms ㅡ, ㅣ, and ㆍ as graphic elements.

While we are aware that sound-change can cause various degrees of 'mismatch' between sound patterns and their graphic representation, we operate on the assumption that general regularity of sound change will maintain the relative relation between sound and graphic to a sufficient degree for the principles of the relationship to be extrapolated at any time. The theoretical principles involved are the absolutes of unificationism and universalism. Thus the general, naïve preoccupation of linguists with redundancy (which we equate with the adoption of relativism) is avoided. We therefore make no appeal to the sound changes that have taken place in Korean since the middle of the 15th century, and operate with the *Han'gŭl* as a representation of modern Korean.

3.0 The *Han'gŭl* vowel representation

Traditionally, the *Han'gŭl* system consists of three basic vowel graphic components, as in Table 3 (Kim-Renaud 1997:172–3, Kim 1997:147).

Basic letters		Explanation of Shape
|	i	Man; standing
ㅡ	ɨ	Earth; level
•	ʌ	Heaven; round

TABLE 3. Basic three letters of the *Hunmin chŏng'ŭm*

These schematic signs were combined to produce a variety of symbols, as shown in Table 4. Each of these is made up of a horizontal or vertical line to which is added in four cases a distinguishing mark—originally a dot close to the line. The *Han'gŭl* system provides seven basic vowel graphs.

Consider the following statements from the *Hunmin chŏng'ŭm haerye,* as listed in Table 4:

•	< ʌ >	depicts the (round) heaven: the tongue is retracted, and its voice is deep.
ㅡ	< ɨ >	depicts the (flat) earth: the tongue is slightly retracted, and its voice is neither deep nor shallow.
|	< i >	depicts a (standing) man: the tongue is not retracted, and its voice is shallow.
ㅗ	< o >	is the same as •, but the mouth is contracted/rounded.
ㅏ	< a >	is the same as •, but the mouth is stretched/spread.
ㅜ	< u >	is the same as ㅡ, but the mouth is contracted/rounded.
ㅓ	< ə >	is the same as ㅡ, but the mouth is stretched/spread.

TABLE 4. Description of seven basic vowels (*Humin chŏng'ŭm haerye*)

On the basis of this, Kim (1997) classifies *Han'gŭl* vowels as using five phonetic distinctive features: [back], [front], [grave], [acute], and [round].

The vowel system of Modern Korean can be described in terms of eight segments.

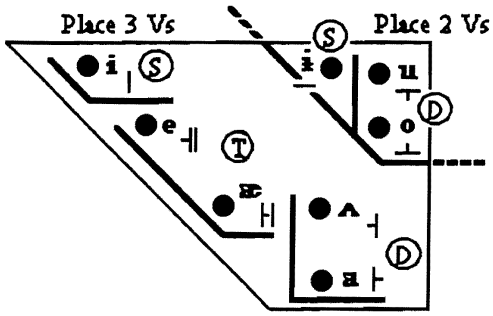

FIGURE 3. Eight *Han'gŭl* vowels currently in use—
Ⓢ: Singlets Ⓓ: Doublets Ⓣ: Triplets

4.0 The analysis of *Han'gŭl* vowels

4.1 The structure of the Korean syllable.

The syllabic block consists of three syllabic parts ordered in four places, reflecting a recursion of the basic phonological elements, or particles. We see this clearly in Figure 4.

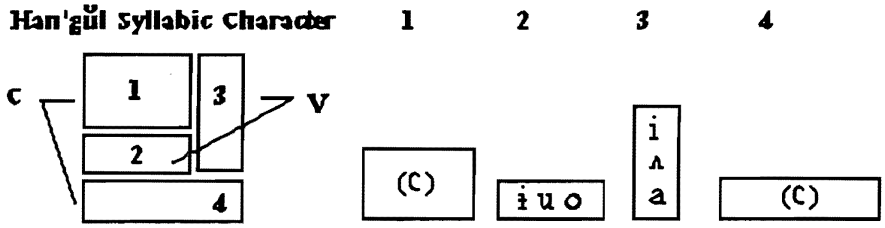

FIGURE 4. *Han'gŭl* syllable structure as an ordered series of places

We interpret the vowel representation as essentially based on a simple binary opposition within the vocalic parts of the *Han'gŭl* syllabic block.

GRAPHIC:	▮	▬
PHONOLOGICAL VALUE:	i	ɨ

TABLE 5. Identification of the primary binary opposition

4.2 The close front and back vowels

These are general phonetic/phonological properties which, when they occur as singlets, have the following two possible features:

(1) ▮ is positioned **to the right of** Place 1 in the structure of the *Han'gŭl* character, i.e. occupying Place 3. By itself, it is phonetically equivalent to [i]—front, high, high/close, and 'shallow'.

(2) ▬ is positioned **under** Place 1 in the structure of the *Han'gŭl* character, i.e. occupying Place 2. By itself, it is phonetically equivalent to [ɨ]—back, low, high/close, and 'deep'.

Note that the property *front* is equivalent to 'high and close'—the more front the sound, the relatively higher and closer in the vocal tract it is. It also correlates with rounding/lip protrusion, since this is also a fronting gesture. The property *back*, on the other hand, is equivalent to 'low and open'—the more back the sound, the lower and more relatively open in the vocal tract it is. This should be clear from the fact that the articulatory vocal tract is not and does not behave like an orthogonal structure, but rather like a hinge—the jamb being the maxilla, and the swivel the mandible, as in Figure 5.

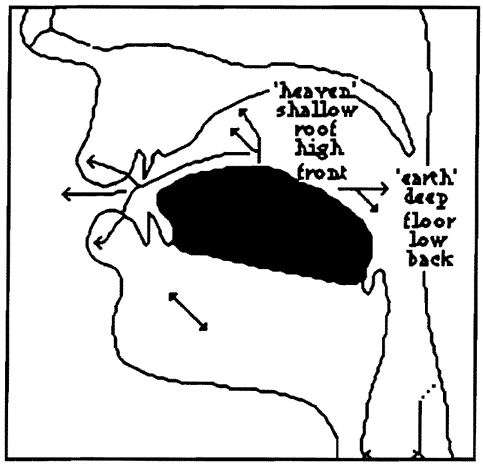

FIGURE 5. The articulatory tract as a non-orthogonal structure

4.3 The back close and mid vowels

Looking at Place 2, given the ㅡ *vs.* ㅣ contrast, we may dispense with the • graphic and interpret ㅗ ([o]) in Place 2, as the vertical line (the basic graphic in Place 3) placed above the horizontal line (the basic graphic in Place 2)—that is, as [i] + [ɨ]. This is interpreted as follows: (a) ㅣ is front/high/close; it has the effect of rounding [ɨ]; (b) ㅡ as [ɨ], lowers ㅣ ([i]). The combined effect in general phonetic terms results in a back, rounded, mid vowel [o]. When ㅣ occurs below ㅡ, the two effects are the rounding of [ɨ] and the raising or rather maintaining of the height of ㅣ ([i]). The combined effect now results in a back, rounded, high vowel ㅜ, [u]. This analysis gives a consistent graphic-to-sound analysis of the (modern) Korean vowels [i ɨ u o].

4.4 The central/low vowels

The central and low vowels are [ʌ] and [a] in Place 3, ㅓ and ㅏ respectively. These are graphic doublets in *Han'gŭl*, consisting of two strokes, ㅡ and ㅣ. They are to be interpreted as follows. ㅡ is back/low/open. Here, it has the effect of backing and lowering ㅣ [i]. By virtue of ㅡ being *to the left* of ㅣ, the effect is one of ㅡ lowering ㅣ. The combined effect is a back, rounded, mid central vowel [ʌ]. When ㅡ occurs *to the right* of ㅣ, the effect is that of lowering [i] *still further*. The combined effect is a central-to-back, low, unrounded [a]. Thus, placement of ㅡ to the left of ㅣ in Place 3 has an effect equivalent to the placement of ㅣ below ㅡ in Place 2 (relatively high vowel); the placement of ㅡ to the right of ㅣ in Place 3 has an effect equivalent to the placement of ㅣ above ㅡ or Place 2, *viz.* relatively lowering the vowel. This analysis now gives a consistent graphic-to-sound analysis of the (modern) Korean vowels [i ɨ u o ʌ a].

4.5 The front mid vowels

The front mid (higher) and mid (lower) vowels are [e] and [æ] in Place 3, ㅔ and ㅐ respectively. It is assumed in this paper that there is still a phonological distinction between these two vowels. The vowels [e] and [æ] are graphic triplets in *Han'gŭl*, consisting of three strokes, one ㅡ and two ㅣ ㅣ in different sequences. As *Han'gŭl* triplets, they consist of a doublet and a singlet. [e] is the equivalent of [ʌ] ㅓ + [i] ㅣ ([ʌi]), while [æ] is the equivalent of [a] ㅏ + [i] ㅣ ([ai]). The addition of ㅣ to the right of the doublets has the effect of fronting the vowels. This analysis is consistent with the historically and morphophonemically well-attested relation between non-high mid vowels and diphthongs. We now give a consistent graphic-to-sound analysis of the set of (modern) monophthongal Korean vowels [i ɨ u o ʌ a e æ] in Table 6:

Place 2	**Singlets**	**Doublets**	**Triplets**	
	ɨ	u	yu	
		o	yo	*etc.*
Place 3	**Singlets**	**Doublets**	**Triplets**	
	i	ʌ	e ye	
		a	æ yæ	

TABLE 6. (Modern) Korean monophthongal vowels

4.6 The Korean diphthongs

In Korean there are the following diphthongs: [ye yæ yu yo ya yʌ] respectively /ㅖ, ㅒ, ㅠ, ㅛ, ㅑ, ㅕ/ in *Han'gŭl*. They are clearly graphic triplets in *Han'gŭl*, involving a doubling of the 'modifier' lines ㅡ or ㅣ. Thus, adding another ㅡ to [e] parallel with the one already there for [e] adds a y-glide—i.e., a raising—before it, creating the rising diphthong [ye]; similarly for [yæ yu yo ya yʌ]. There is a clear, consistent correlation between the patterning of the graphics and the variant context-determined phonetic properties of ㅡ and ㅣ.

5.0 Conclusion.

Clearly, the Korean vowel system (including the diphthongs) can be very elegantly explained in terms of the recursive application of two properties (*i* ㅣ and *i* ㅡ) whose phonetic correlates, or exponents, vary in a principled manner with regard to Place, and with order within a Place. Equally clearly, the *i* alphabetic structure is both based on and reflective of such an elegantly simple and phonologically economical theory, applied in the description and representation of the Korean language. It is also clear that the distinction between ㅡ and ㅣ represents a reduction of the C:V dichotomy, which is redundant in *Han'gŭl*. It then follows as a consequence that our interpretation can be applied to an accounting of the consonants and their *Han'gŭl* representations (which are graphically stylised from ㅡ and ㅣ into specific articulatory glyphs), as well as to the /wV/ diphthongs, [wi we wæ wa wʌ], respectively /ㅜㅣ, ㅗㅣ ㅞ, ㅝ, ㅗㅏ, ㅟ/, and the /ɨi/ diphthong,[2] [ŭi], or /ㅡㅣ/ in *Han'gŭl*.

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[2] No offglide diphthong exists in Modern Korean except in the /ɨi/ sequence (doublet).

PARALLELS BETWEEN SINGING AND PHONETIC TERMINOLOGY

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1.0 Introduction

The interdisciplinary study of the human voice involves differing and often inconsistent terminology. Researchers from a variety of backgrounds—medicine, psychology, speech science, articulatory phonetics, theatre , music, and engineering acoustics—use a range of terms which often describe similar phonetic events, sounds and postures. The purpose of this paper is to highlight some of the terms common to the North American schools of singing and describe them using the auditory labels commonly used in the British school of phonetics.

2.0 Registers and registration

The most basic terms in singing deal with registers and registration: chest voice, head voice, falsetto, and flageolet. Ingo Titze, a voice scientist from University of Iowa, describes ***registers*** as "perceptually distinct regions of vocal quality as pitch or loudness is changed" (1994:335). In the world of singing, if a voice quality, such as chest voice, occurs for a certain pitch range, then this would be called the ***chest register***. Some singing pedagogues believe there is only one blended register, neither chest or head. Others believe in two or more. Many have elaborate charts with registration events and registers noted for each fach[1]. Pedagogues who teach registers believe that in order for singers to ascend in pitch they must change register. Most singing pedagogues describes the process of "gradual register transition" (Miller 1986) as vocal ***registration***. Titze (1994) states that there are two theories about registration. The first involves the coordination between the cricothyroid muscles and the thyroarytenoid muscles. For example, singers gradually relax the thyroarytenoid (TA) muscles as the cricothyroid muscles (CT) gradually increase activation. The thyroid cartilage tilts forward, stretching the vocal folds, thereby increasing tension, for a smooth ascent of pitch.

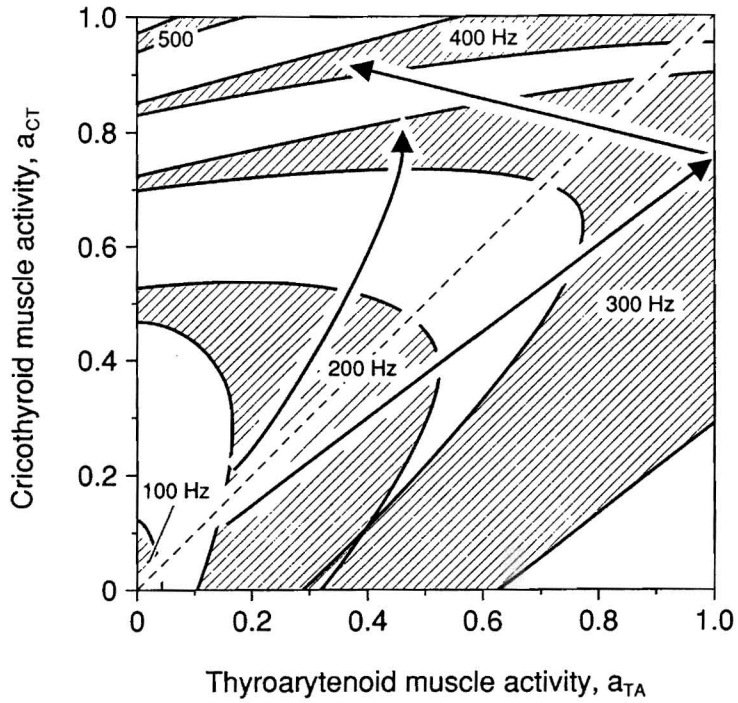


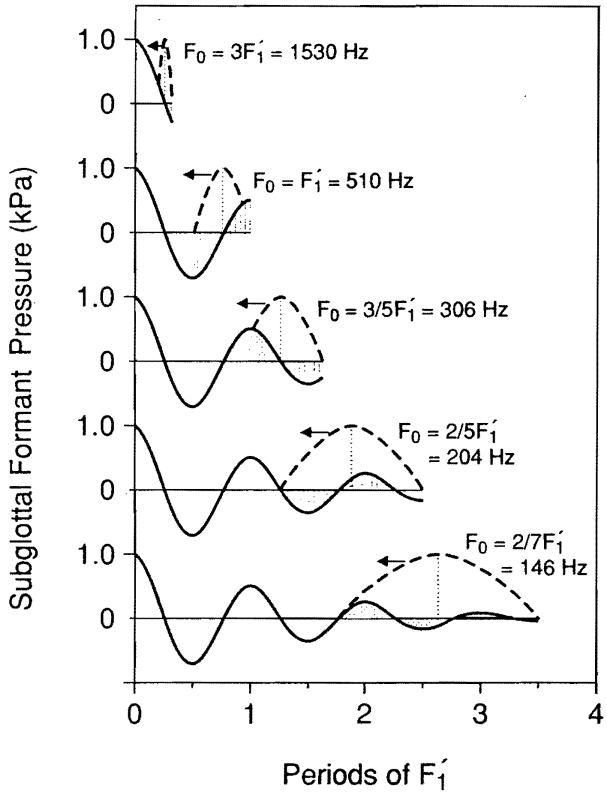
Figure 1 shows a graph that plots the activation of the cricothyroid against the thyroarytenoid muscles.

FIGURE 1.

A muscle activation plot (MAP), showing abrupt register transition in the two straight arrows and gradual transition in the curved arrow. (The hatched areas represent bands of constant F_0. From Titze 1994:270.)

[1] A standard term used to designate vocal category according to voice type, and also body and personality characteristics (Ware 1998:278).

The shaded sections of Figure 1 show a wide variety of combinations of muscular activation that can produce the same pitch. The straight arrows show that when the TA muscles reach a point where they can no longer withstand the tension applied by the CT muscles, the TA muscles release all of a sudden to produce the appropriate pitch. This would be perceived as a *registration event* or *yodel.* The yodel is not encouraged in classical singing; however, in folk and popular singing, it is often a prized technique.



The second theory involves the subglottal acoustic waves that set up an interference pattern with the glottal wave (Austin 1992; Titze 1983, 1988; Van den Berg 1960). "Acoustic pressures below the vocal folds can be phased in such a way that they contribute, constructively or destructively, to the intraglottal driving pressures of the vocal folds" (Titze 1994:263).

Such places of acoustic interference may correspond to what singers call *passagi, register breaks* or *registration events.*

FIGURE 2.

Phase relationships between the pressure waveform of the first subglottal formant (F_1', solid lines) and the glottal area waveform (dashed lines) for the periodically increasing fundamental frequency, F_0. (From Titze 1994:266.)[2]

3.0 Voice quality and phonation type

Registers are not commonly discussed in acoustic phonetics. However, the voice qualities associated with these registers are referred to extensively. The labels are different than in singing, but the qualities described are similar.

3.1 Modal voice and 'chest'

In the British school of phonetics, Laver refers to a voice quality and phonation type called ***modal voice.*** He describes modal voice as the "neutral mode of phonation having moderate adductive tension and moderate medial compression, with moderate longitudinal tension" (1980:111). He states that this phonation type "essentially corresponds to chest voice" (1980:110), but he says that it could be differentiated into two sub-types *chest voice* and *head voice.* Miller (1986) refers to a similar voice quality as chest voice (*voce di petto*). He says that in women, it "is characterized by a certain masculinity, because its execution is similar to the production of the male chest voice: heavy action from the thyroarytenoid muscles; wider amplitude of vibration; thicker and shorter folds." However, he does not quote his source. He mentions that sympathetic resonant vibrations are felt in the chest and body, especially in the trachea and bronchi and the larger bones of the rib cage. The term ***chest voice*** also refers to a phonation type in singing, which is characterized by a thick vocal fold with a vibratory pattern that involves first contact of the lower edges of the fold alternating with contact of the upper edges of the fold as seen in Figure 3.

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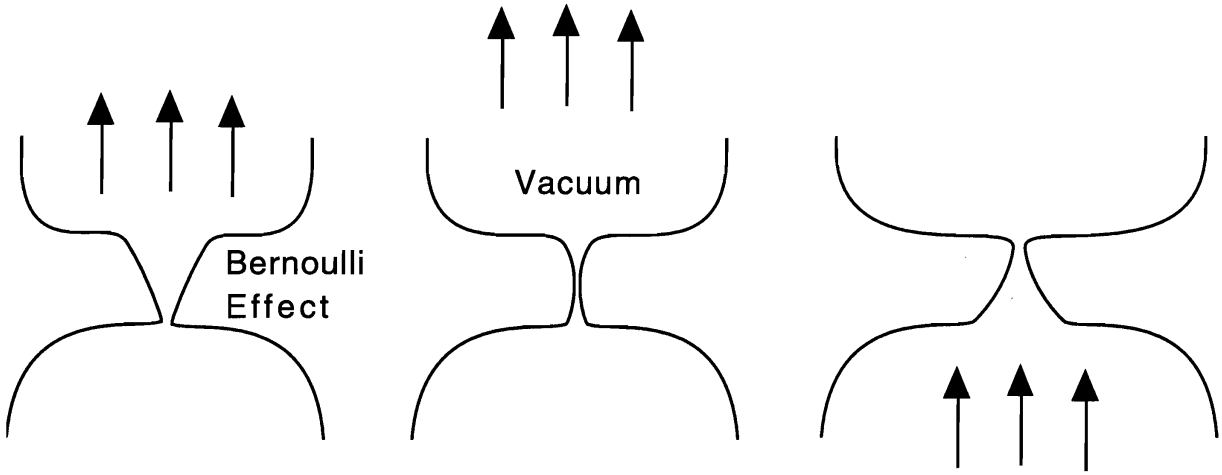
[2] Figures 1 and 2 are equivalent to Figures 10.11 and 10.9 in Titze 1994:270,266, respectfully. Dr. Titze has kindly granted the author permission to reproduce them for this paper.



Air pressure drops as air moves through the constriction of the vocal folds (Bernoulli effect). This causes vocal folds to begin to close.

Air flow is stopped at the folds but air column above the folds continues to move. This creates a suction that closes the folds the rest of the way.

Air pressure increases below the vocal folds pushing them apart. The cycle repeats.

FIGURE 3. Modal vocal fold vibratory patterns.

This vibratory pattern produces a complex glottal wave in the mucosal layer of the vocal fold. Titze (1994:261) describes this phonation type as follows: "[I]t is suspected that the bottom of the vocal fold is adducted more in modal register than in falsetto .... The thyroarytenoid (TA) muscle ... bulges the vocal fold medially below the level of the vocal processes. This creates a thicker and deeper vibrating structure. ... [T]he entire cover (including the ligament) is lax, and the TA muscle is used to regulate the effective tension of the vocal fold." Often the vocal fold adjustment is referred to as ***modal***.

Already, the term ***chest*** has been used to describe a register (chest register), a voice quality (chest voice), a phonation type (chest voice) and a vocal fold adjustment (chest); this term may relate closely to the term ***modal*** such as in Laver's voice quality (modal voice) and phonation type (modal), as well as Titze's vocal fold adjustment (modal).

3.2 Falsetto

In phonetics, there are two voice qualities that arise from the vocal fold thickness and subsequent mode of vibration: modal voice and ***falsetto*** (Laver 1980). In singing, students are encouraged to thin the vocal folds gradually over the pitch range. This may involve an infinite continuum of vocal fold thicknesses, controlled by the gradual activation of the CT muscles, along with a gradual relaxation of the TA muscles. At some given point along this continuum, the body of the vocal fold stops vibrating and only the ligament vibrates (Laver 1980, Titze 1994). However, the nature of the vocal folds' changing shape is still under investigation. Titze is currently investigating vocal fold movement using computer modelling techniques. The phonetic auditory label for the voice quality produced when only the ligament is vibrating is falsetto. Laver (1980:118) states that the vertical cross-section of the edges becomes thin and the glottis remains slightly apart. The vocalis muscle is relaxed and only the thin margins of the vocal folds participate in phonatory vibration. In singing, the term falsetto is reserved for describing the top register of a male voice. Vennard (1967) observed two possible mechanisms for producing it. The first method was similar to the phonetic definition. The second involved partially damping the vocal folds, thereby increasing the compression of the arytenoid cartilages and utilizing only the anterior part of the fold for vibration. Male singers who make a career of singing in falsetto belong to a voice type called ***countertenor***. Vennard's observations have, to date, never been substatiated by other researchers, so it is still unclear which mechanism is most commonly employed by professional countertenors. The closest female counterpart to falsetto in the singing terminology is the voice quality produced in the ***whistle*** or ***flageolet*** register which Vennard

describes as employing the same damping mechanism as for the male singer using falsetto. However, if the physiological description for the phonetic term falsetto is used for singing, then at some point the female singer may also use only the ligament for vibration. This practice may correspond to female ***head voice*** (***voce di testo***) above the ***secondo passaggio*** (register change). Would this pure head voice then be falsetto in phonetic terms? Not according to Richard Miller, who says that "the term falsetto should be reserved to designate the imitation of female vocal quality by the male voice" (Miller 1986:133).

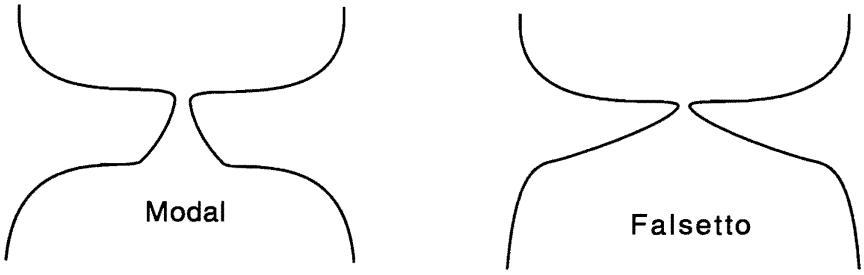


FIGURE 4. Modal voice and falsetto.

3.3 Mixed registration

Miller (1986) indicates that the range of chest voice (voce di petto) for a soprano is G_3–E*flat*$_4$ and that the range of head voice (voce di testo) is G_5–C_6, leaving over one octave without a designation. Singers negotiate this area using a ***mixed registration***. In voice science, this has been labelled ***middle*** or ***mixed voice*** (Titze 1994), or in singing, ***voce mista*** (Miller 1986). Titze indicates that this mixed voice could be called head voice, which could explain why Laver describes modal voice as chest or head—he may be including voce mista. Miller, on the other hand, represents the vocal fold variations within this register with the terms ***chest mix*** and ***head mix.*** These terms denote the relative thickness of the vocal folds and the corresponding sensations in the body. Chest mix would indicate relatively thick vocal folds and sympathetic vibrations felt in the chest. Head mix would indicate relatively thin vocal folds with sympathetic vibrations felt in the head. To complicate matters, singing teachers sometimes use qualifiers. For example, a teacher might say, "She sang that note in ***open chest.***" This usage would correspond to Laver's modal voice. The teacher might then say, "Try not to use such a ***heavy mechanism***." This instruction would direct the student to thin the vocal folds. Would this correspond to Laver's sub-type modal voice II (head voice)?

In order to correspond directly to Miller's labels, Laver's sub-types would require sub-subtypes: modal voice (open chest), modal voice IIa (chest mix), and modal voice IIb (head mix). These auditory qualities are distinguishable, and have been used as descriptive terms by voice teachers over the centuries. However, many pitches can be sung with a variety of mixes which could not be captured even by expanding Laver's labelling scheme. Vennard offers three generalizations,

> one as to pitch, one as to intensity, and a third as to quality. First, to develop the widest possible range without a break, the adjustment must be heavy in the lower part of the voice, and the balance should shift smoothly toward the lighter production as the scale is ascended. Second, on any given pitch, the softer it is, the lighter must be the production without breathiness; and the louder, the heavier. Third, to produce "rich" timbre the adjustment should be heavy; to produce "sweet" timbre, it should be light. We have seen that the differences in timbre are differences in degrees of regularity and irregularity in the pattern of each vibration. (1967:77)

Perhaps Vennard uses *heavy* to describe the chest mix and *light* to describe the head mix. In Classical singing, a lighter mechanism is usually preferred, although heavier mixes are used by mature "dramatic" singers. Such variations would account for Titze's statement that mixed voice can also be called head voice, which in turn corresponds to Miller's term, head mix. In popular singing, the Broadway Belt style setting of Ethel Merman or Barbara Streisand would use a heavier mechanism than the corresponding Classical style setting for the same pitch. However, this does not mean that the singer will 'lock' the folds at one thickness. Many pedagogues believe that Belters gradually thin the vocal folds with ascending pitch, but not to the degree seen in Classical voice. More research is needed to confirm this theory. Estill *et al.* (1996) indicate that Belt voice uses modal adjustment, but

that Opera also uses modal adjustment. This may be because the opera quality described is the mature dramatic sound, and the lyric and lieder singer quality which uses a falsetto adjustment Estill *et al.* call Sob (1996:243).

3.4 Flageolet or whistle

The top register in the female voice is called the ***flageolet register***. Miller (1986) states that the flageolet voice has a high rate of longitudinal tension in the vocal ligaments, considerable damping of the posterior portion of the vocal folds, limited vibrating mass of the vocal folds, with high subglottic pressure and airflow rate. Miller, again, does not state his source. Flageolet register is used extensively by soubrette and coloratura voices. In female voices, the vocal folds may eventually stop vibrating as pitch increases, causing the tone created by either a chink between the arytenoid cartilages or a fine (approximately 1 mm) slit between the folds. This produces a whistle-like sound and the associated register is termed ***whistle register***. The voice qualities associated with these registers are ***flageolet*** or ***whistle***. There do not appear to be corresponding phonetic terms for these voice qualities; however, if falsetto can be proven to be either of two types, ***undamped falsetto*** or ***damped falsetto***, then the phonetic terminology may be brought into line with that used for singing. It is unclear how whistle quality would relate to phonetic terminology; Vennard even questions its use in singing. "[I]n rare cases true whistle does occur through an opening between the arytenoid cartilages (the mutational chink) but this is not very loud, and is not useful for singing. We may ignore it" (Vennard 1967:67). It is unclear which type of mechanism a pop singer such as Mariah Carey uses for her extreme upper register and how it relates to the operatic coloratura in her upper register. The mechanism may be damped falsetto, undamped falsetto or true whistle. More research is needed in this area.

3.5 Creak or fry

Thus far, only two of the four descriptive phonetic auditory labels for voice quality settings have been discussed: modal and falsetto. The two other simple phonation types are ***creak*** and ***whisper***. The term creak is never found in singing terminology; most often this phonation type is referred to as *fry*. Classical singing never utilizes this phonation type, considering it a pathology to be overcome in training the voice to coordinate the onset of phonation. However, in pop voice it is widely used as a means of artistic expression, especially as an onset effect at the beginning of a phrase. As with modal and falsetto, creak can be used in reference to registration or phonation. Creak register is also known as ***pulse register***. Titze (1994) describes pulse register as the perceptual result of subharmonic or chaotic patterns in the glottal waveform if the frequency of the wave is below about 70Hz. He calls it a register with perceived temporal gaps. Other terms for creak are ***glottal fry*** and ***vocal fry***. Creak phonation may also occur with modal voice, yielding ***creaky voice*** or, with falsetto, yielding ***creaky falsetto.*** Usually in pop songs the onset will start with creak, then move through creaky voice to modal voice or whispery voice, usually accompanied by a ***scoop***, where the voice starts with a glissando up to the appropriate pitch.

3.6 Whisper

The fourth simple phonation type is ***whisper***. Titze (1994) describes whisper as the sound created by turbulent glottal airflow in the absence of vocal fold vibration. Laver (1980:121) describes the glottal configuration as "a triangular opening of the cartilaginous glottis, comprising about a third of the full length of the glottis." Whisper may be combined with modal voice or falsetto to form ***whispery voice*** or ***whispery falsetto***. Whisper is rarely used in Classical singing; however, there are occasional occurrences in twentieth century art music. In the pop idiom, it is common to mix air into the sound to add another colour to the artist's palette. Pop singers refer to this as ***air mix*** (Popeil 1998). Whether this quality corresponds to whispery voice or to another phonetic auditory label, ***breathy voice***, depends on the supralaryngeal settings that accompany the sound. For example, in Country style the high laryngeal position and pharyngeal constriction produces a sound which corresponds more closely to ***whispery voice***. However, the Rhythm and Blues style involves a low laryngeal position and an expanded pharyngeal space, which produces a sound corresponding more closely to ***breathy voice***.

3.7 Harshness

In popular singing, many of the compound laryngeal settings are used. The sounds made by the singing voice are as diverse as those produced with by the speaking voice. They would not all be taught in a voice studio, however. For example, the phonation type ***harsh voice*** is considered a pathology in all singing styles. Harsh voice is described by Laver (1980:127) as phonation with aperiodic vibration. The acoustic characteristics of harsh voice include irregularity of the glottal wave-form (jitter) and spectral noise. Titze (1994) attributes these features to a constricted glottis and insufficient air flow, resulting in "a ghastly sound" (Titze 1995). In some styles, such as Heavy Metal, a rough, rasping sound may be desirable. But generally the voice teacher's job is to improve the

quality of a voice. Most voice teachers would prefer to have singing students use signal processing to degenerate the sound quality rather than practice ways of producing harsh voice. It is, however, useful for a singing teacher to be able to identify this auditory quality and prescribe ways to help encourage periodic vibration without any excessive medial compression of the vocal folds. Perhaps for this reason, the term should be included in the singing terminology; singing pedagogues generally use the term ***pressing*** to describe excessive medial compression that results in a harsh timbre.

4.0 Conclusion

This paper has discussed some of the similarities and differences between singing and phonetic terminology, focussing on the four descriptive auditory labels of *model, falsetto, creak* and *whisper* as well as a few compound labels, such as *harsh voice, breathy voice* and *whispery voice*. Readers familiar with Laver's phonetic auditory labels will realize that there are many more labels with possible correlates in singing terminology. Perhaps a universal terminology would be helpful to those who study the human voice in its many capacities; such terminology may serve to reduce the confusion in an already challenging interdisciplinary subject area.

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