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WORKING PAPERS OF THE LINGUISTICS CIRCLE

Foreword

A Case of Was-w in Hessian: New Evidence against Scope-Marking

Chris Bodenbender..... 1

Chinese Ba Construction in HPSG

Man Gao..... 11

An OT Analysis of Chinese Abbreviatory Compounds

Man Gao..... 25

Dialects in a Dead Pidgin: A Preliminary Exploration of Variation in Chinook Jargon

Barbara P. Harris..... 35

Dogrib Co-occurrence Restrictions: The Disappearance of [u]

Aliki Marinakis 43

The Role of Narrative in Dispute Resolution

Heather Steel 57

Vowel Devoicing in Tokyo Japanese

Mihoko Teshigawara 71

The Subject Agreement Clitic in Heiltsuk

Ryan Waldie 87



FOREWORD

The Department of Linguistics of the University of Victoria is pleased to present Volume 16 of the *Working Papers of the Linguistics Circle of the University of Victoria (WPLC)*. The articles in this issue represent current research on language and linguistics at the University of Victoria.

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A CASE OF WAS-W IN HESSIAN: NEW EVIDENCE AGAINST SCOPE-MARKING

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1.0 INTRODUCTION

This study investigates the was-w construction in the German dialect Hessian (HE). It builds on previous research done on was-w constructions in High German by Kathol (1999) and Hinrichs and Nakazawa (2000) in the framework of Head-driven Phrase Structure Grammar (HPSG).

Extractions out of embedded clauses occur frequently in High German (HG). The example in (1) shows the contrast between a declarative sentence and a sentence with the extraction of the object-PP (*mit jemand* - Engl.: 'with someone') of the embedded clause. The purpose of the extraction is to form a question asking for the object, as in (1 c). To ask for the object, the object-PP is substituted with the corresponding wh-expression (*mit wem* - 'with who'). (1 b) shows the non-wh question with the statement of (1 a) as the embedded clause. (1 c) is the extraction construction, i.e. the matrix question contains the wh-extraction from the embedded clause.

- (1) a. *statement*
Jakob hat mit jemand geredet.
Jakob has with someone talked
"Jakob has talked to someone."
- b. *question with embedded clause*
Glaubst du [dass Jakob mit jemand geredet hat]?
believe you that Jakob with someone talked has
"Do you believe that Jakob has talked to someone?"
- c. *matrix question which includes extraction out of embedded clause*
Mit wem glaubst du [dass Jakob geredet hat]? (Kathol 1999: 357)
with who believe you that Jakob talked has
"Who do you believe Jakob talked to?"

However, German speakers give preference to (2) over (1c). In (2) the wh-phrase *mit wem* is only fronted within the embedded clause, with the accompanying interrogative pronoun *was* ('what') in the immediately superordinate clause. Hence, (2) is an instance of was-w.

- (2) Was glaubst du [mit wem Jakob geredet hat]? (Kathol 1999: 358)
what believe you with who Jakob talked has
"Who do you think Jakob talked with?"

The construction in (2) is often referred to as *partial wh-movement* as the *mit wem* is moved to the front in the form of *was*, while at the same time also remaining at its original position. The interrogative pronoun *was* functions like a "dummy" wh-word and in the partial extraction can stand for any other wh-expression, such as *wem* ('who'-DAT), *wen* ('who(m)')-ACC), *wer* ('who'-NOM), *wie* ('how'), *wo* ('where'), *wann* ('when'), *was* ('what'), *wieso/weshalb/warum* ('why'). Hence, the term was-w refers to a question construction in which an embedded wh-expression (Kathol 1999) or the whole interrogative phrase (Hinrichs and Nakazawa (H&N) 2000) is partially extracted to the front of the matrix question in the form of *was*.

This study shows that HE allows was-w constructions to be licensed by the predicate *wisse* ('to know'), which, according to H&N, HG does not. Furthermore, it shows that it is not just the embedded wh-expression but the entire interrogative phrase that is partially extracted to the front, thus providing further evidence against a scope-marking approach and supporting H&N's indirect analysis.

In §2 the paper presents the HE data, which is discussed in §3 in light of Kathol's scope-marking analysis. Evidence against a scope-marking approach leads to an H&N-based indirect analysis of the data in §4. In §5 I summarize the main findings of this paper.

2.0 WAS-W IN HESSIAN

Hessian is the name of a variety of the Franconian dialects spoken in the German state of Hessen but also in the area of Rheinhessen, which formerly belonged to Hessen but after 1945 was amalgamated with other lands to form the new state of Rheinland Pfalz.

In HE, as in HG, *wh*-expressions (underlined) occur in non-embedded questions (3a), embedded questions (3b), and embedded interrogative clauses (3c).

(3) a. *non-embedded question*

Wo mache mer hie? (Uderzo 1999: 7)
 where make we to
 "Where do we go?"

b. *embedded question*

Koennte Sie uns vielleicht sage, wo mer was zum anziehe fuer den Klaane da
 could you us maybe tell where we what to wear for the little-one there
 finne koenne? (Uderzo 1999: 22)
 find can
 "Could you maybe tell us where we can find something to wear for the little one?"

c. *embedded interrogative clause*

...un wisse gar net, wo es hingehet. (Uderzo 1999: 7)
 and know totally not where it go-there does
 "...and don't even know where we are heading to."

HE also allows *was-w* constructions, like the one in (4c) which is based on (4b). The question in (4b) is related to the corresponding statement in (4a), in which the becoming of the wine is indicated as *guud* ('good'). To form a question out of (4a), the adverb *guud* is replaced by the *wh*-word for manner, *wie*, which is fronted. To retain verb-second structure, the auxiliary verb *duht* ('does') is fronted to the position behind *wie*.

(4) a. *statement*

Der Wein, der neue, duht sich guud arte.
 the wine the new-one does itself good grow
 "The new wine is coming along well."

b. *non-embedded question*

Wie duht sich der Wein, der neue, arte?
 how does itself the wine the new-one grow
 "How is the new wine coming?"

c. *was-w*

Was kammer wisse, wie der Wein, der neue, sich duht arte? (Witte 1974: 119)
 what can-we know how the wine the new-one itself does grow
 "Can we know how the new wine will become?" (implying that we cannot)

It is difficult to translate the sentence in (4c) into English, because its meaning is not really a question but a statement: 'We cannot know how the new wine will become.' The surface structure of the sentence is a question, but a question that implies that there is no answer, therefore expressing the impossibility of knowing the future.

This sentence is grammatical in HE. However, a similar construction in HG is ungrammatical, as (5) shows.

- (5) * Was hat Hans gewusst, wer kommen soll. (H&N 2000: 152)
 what has Hans known who come should
 "Could Hans have known who should come?"

Hence, the verb *wisse(n)*¹ ('to know') behaves differently in HE and HG with respect to licensing *was-w*. High German does not allow the interpretation of the sentence as a statement of impossibility. Rather, the mismatch between the predicate that requires something to be known and the fact that this something is asked for, and therefore not known, makes the sentence ungrammatical.

How the grammaticality of the HE sentence in (4c) can be accounted for is shown in the remaining parts of this paper. The analysis of this HE *was-w* sentence as a scope-marking construction is problematic as the following section shows. However, HE *was-w* also challenges the indirect analysis, in which certain classes of predicates license *was-w* constructions, but *wissen* is not included in these classes.

3.0 WAS-W AS SCOPE-MARKING

According to Kathol (1999), it is only the *wh*-expression of the embedded interrogative clause that is partially extracted to the matrix question, such as *wer* ('who') in (6b). In comparison, (6a) shows a full extraction.

- (6) a. *full extraction*
Wer denkst du hat das getrunken?
 who think you has that drunk
 "Who do you think drank that?"
- b. *was-w*
Was denkst du wer das getrunken hat?
 what think you who that drunk has
 "Who do you think drank that?"

Kathol calls these constructions (*wh*) scope-marking constructions, since the *was*-element is viewed as a scope marker. The *was* indicates the syntactic domain that receives a question interpretation in the semantics, i.e. it flags everything that follows as part of the question. Hence, Kathol assumes that the semantic interpretations of both sentences in (6) are identical. However, the same is not true for the HE *was-w* data, which is listed again in (7b). In comparison, (7a) shows the corresponding full extraction of the *wh*-expression *wie*.

- (7) a. *full extraction*
Wie kammer wisse, dass der Wein, der neue, sich duht arte?
 how can-we know that the wine the new-one itself does grow
 "How can we know that the new wine will come along?"
- b. *was-w*
 Was kammer wisse, wie der Wein, der neue, sich duht arte? (Witte 1974: 119)
 what can-we know how the wine the new-one itself does grow
 "Can we know how the new wine will become?" (implying that we cannot)

The meaning of the two sentences is quite different. In (7a), *wie* refers to the knowing but not the growing, i.e. asking 'how can you know this,' while in (7b) *wie* only has scope over the growing (scope is indicated by underlining). Therefore, unlike the sentences in (6), the sentences in (7) do not result in the same semantic interpretation. This provides evidence against a scope-marking analysis of *was-w* in HE, as *was* is not a copy of *wie* but rather stands for the answer of the embedded question. *Was kammer wisse* asks IF we know the answer to the embedded question that *was* stands for but does not ask for the answer itself.

Similar evidence against the scope-marking idea comes from Dayal (1996) and (H&N 2000). Dayal also argues that the *was* of the *was-w* construction is associated not just with the embedded *wh*-word (*wen*) but with the embedded clause as a whole. The HG data in (8) illustrates this point. In (8a) to (8c) the underlined phrase is the

¹ In HE, many infinitive verb forms drop the verb-final "n" that is so characteristic for infinitive verb forms in HG. Thus, HG *wissen* becomes HE *wisse*.

object of *behauptet* ('claimed'), but in (8c) the underlined phrase is the object of *wissen/gewusst* ('to know/known') as well.

(8) a. *statement*

Er hat es *behauptet*, ohne es wirklich zu wissen.
 he has it claimed without it really to know
 "He has claimed it without really knowing it."

b. *was-w with 'behaupten'*

Was hat er *behauptet*, wen sie liebt?
 what has he claimed who she loves
 "Who did he claim that she loves?"

c. *was-w with 'behaupten' and 'wissen'*

Was hat er, ohne wirklich zu *wissen*, *behauptet*, wen sie liebt? (Dayal 1996)
 what has he without really to know claimed who she loves
 "Who did he claim that she loves without him really knowing it?"

The interesting thing about (8c) is that both *behauptet* and *wissen* take the same complement *was*. While it can be assumed that in (8b) *was* stands for the loved one, i.e. the person *wen*, the same cannot be said about (8c), since *wissen* cannot take a direct object that refers to a person. Hence, *was* stands not just for the wh-word *wen* but for the whole argument *wen sie liebt*. This speaks against the idea of *was* as partial extraction of *wen* with scope-marking function. H&N bring forth further evidence, which is provided in (9) (H&N 2000: 150).

- (9) a. Was Hans sagt, wen er *verdaechtigt*, das habe ich ueberprueft.
 b. Was Hans sagt, wen er *verdaechtigt*, *den habe ich ueberprueft.
 what Hans says who he suspects (a) that/(b) him have I evaluated
 "I evaluated what Hans says about the person whom he suspects."

In (9a), *was* stands for *das*, which stands for the whole argument *wen er verdaechtigt*. In (9b), *was* stands for *den*, which refers to *wen*, i.e. the suspicious person. In the sentences, this difference has been indicated through underlining the argument that is referred to.

Following from the grammaticality, in this sentence, again, *was* stands for the whole argument and not just for the wh-expression. This leads to the conclusion that the *was-w* construction is not a scope-marking construction as assumed by Kathol.

The new HE evidence discussed in this paper and the evidence from Dayal (1996) and H&N (2000) seem to suggest an indirect dependency (Dayal 1994) between *was* and the embedded wh-expression. This leads to an indirect, i.e. non-scope-marking, analysis of the *was-w* construction.

4.0 INDIRECT ANALYSIS

4.1 Verbs that license *was-w* constructions

Turning away from the scope-marking focus of previous analyses, H&N (2000) investigate the predicates that license *was-w* constructions in HG and the type coercion necessary to account for the apparent mismatch between the syntactic form of the embedded question and its semantic function.

Following Ginzburg and Sag (2001), H&N distinguish four classes of predicates that take either wh-sentential complements (+WH) or non-wh-sentential complements (-WH). The table in (10) is a modification of a table provided by H&N (2000: 154). It gives sample verbs of English for each, states whether the predicates take +WH or -WH complements, lists if they license *was-w* constructions in HG, and indicates examples.

(10) Predicate classification

Resolutive Predicates (RP)	Factive Predicates (FP)	Question Predicates (QEP)	True/False Predicates (TFP)
tell guess predict	reveal know discover	ask wonder investigate	believe deny prove
+WH & -WH	+WH & -WH	+WH	-WH
was-w	do not license was-w	do not license was-w	was-w
example: (11)	example: (12)	example: (14)	example: (13)

In HG, the set of was-w licensing predicates includes some (RP, see (11)) but not all (FP, see (12)) verbs that allow both +WH and -WH complements outside of this construction.

(11) RP (H&N 2000: 151)

a. +WH complements

Hans hat entschieden/berichtet/sich vorgestellt, wer kommen soll.

Hans has decided/reported/imagined who come should

b. -WH complements

Hans hat entschieden/berichtet/sich vorgestellt, dass Peter kommen soll.

Hans has decided/reported/imagined that Peter come should

c. was-w

Was hat Hans entschieden/berichtet/sich vorgestellt, wer kommen soll?

What has Hans decided/reported/imagined who come should

(12) FP (H&N 2000: 152)

a. +WH complements

Hans hat gewusst/vergessen/sich erinnert/erraten, wer kommen soll.

Hans has known/forgotten/remembered/guessed who come should

b. -WH complements

Hans hat gewusst/vergessen/sich erinnert/erraten, dass Peter kommen soll.

Hans has known/forgotten/remembered/guessed that Peter come should

c. was-w

*Was hat Hans gewusst/vergessen/sich erinnert/erraten, wer kommen soll?

What has Hans known/forgotten/remembered/guessed who come should

TFP are the class of verbs that appear most frequently in was-w constructions, but outside of these constructions they only allow -WH complements as shown in (13).

(13) TFP (H&N 2000: 151)

a. +WH complements

*Hans hat gesagt/geglaubt, wer kommt.

Hans has said/believed, who comes

b. -WH complements

Hans hat gesagt/geglaubt, dass Peter kommt.

Hans has said/believed that Peter comes

c. was-w

Was hat Hans gesagt/geglaubt, wer kommt?

What has Hans said/believed who comes

In contrast, verbs that only license +WH complements but not -WH complements do not license was-w. These are QEP and they pattern as illustrated in (14).

(14) QEP (H&N 2000: 151)

a. +WH complements

Hans hat nachgeforscht/gefragt, wer kommt.

Hans has investigated/asked, who comes

b. *-WH complements*

*Hans hat nachgeforscht/gefragt, dass Peter kommt.
Hans has investigated/asked that Peter comes

c. *was-w*

*Was hat Hans nachgeforscht/gefragt, wer kommt?
What has Hans investigated/asked who comes

H&N investigated the difference between these four classes to establish why RP and TFP allow *was-w* constructions, while FP and QEP do not. They point out that RP and FP have fact-denoting arguments that are taken to provide the answer to the question of the embedded +WH complement. The difference between (15) and (16) illustrates this. (15) shows that in conjunction with an FP, Jean only discovered the question, not the answer, while in (16), in conjunction with a QEP, Jean's action aims towards the content of the question, i.e. the answer.

(15) *FP* (H&N 2000: 153)
Jean discovered an interesting question.
The question was who left yesterday.
It does *not* follow that: Jean discovered who left yesterday.

(16) *QEP* (H&N 2000: 153)
Jean asked an interesting question.
The question was who left yesterday.
Hence: Jean asked who left yesterday.

Although the substitution test in (15) shows that FP and RP involve fact-denoting arguments, the grammaticality of (12 a) and (15) shows that they do allow +WH complements nonetheless. Thus, to link answer and question in (12 a), the question *wer kommen soll* is forced into a fact that resolves the question. This allows the *wh*-interrogative *wer* to appear in the fact-denoting argument position of the FP. This forcing is called "type coercion" and its implementation in HPSG is discussed in section 4.2.

What follows from this is that RP and FP behave differently from QEP. In their paper, H&N then go on to discuss what distinguishes RP from FP, to establish RP and TFP as a natural *was-w* licensing class. However, as the following discussion of the HE data shows, this is unnecessary for HE. In this dialect, RP, TFP and FP license *was-w* constructions. Hence, excluding QEP, as shown, is sufficient.

(17) Was kammer wisse, wie der Wein, der neue, sich duht arte? (Witte 1974:119)
what can-we know how the wine the new-one itself does grow
"Can we know how the new wine will become?" (implying that we cannot)

The grammaticality of *was-w* in (17) with the FP *wisse* ('to know') in HE indicates that there is evidence in this dialect that FP license *was-w*. As in (15), but unlike (16), it does not follow from the sentence in (17) that we know how the wine will become.

The challenge that this data poses for H&N's indirect analysis is to include FP as *was-w* licensing for HE. However, that is not much of a challenge, since HE behaves more generally than HG by allowing all verbs that license declarative complements to also license *was-w*. Hence, there is evidence that in this dialect RP, TFP and FP form a natural *was-w* licensing class.

For both RP and FP to take +WH complements it is necessary to apply type coercion of questions to facts, i.e. facts resolved (for FP) and unresolved² (for RP). The implementation of type coercion in HPSG is discussed in the following section.

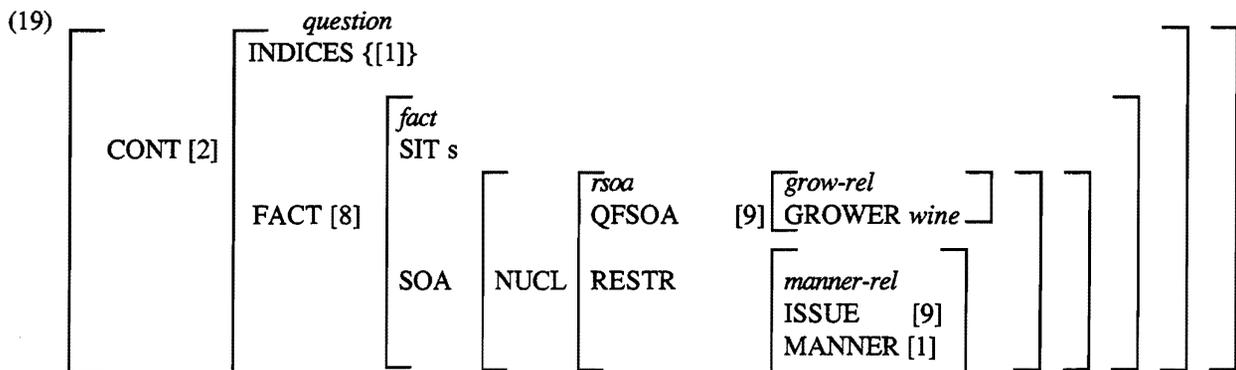
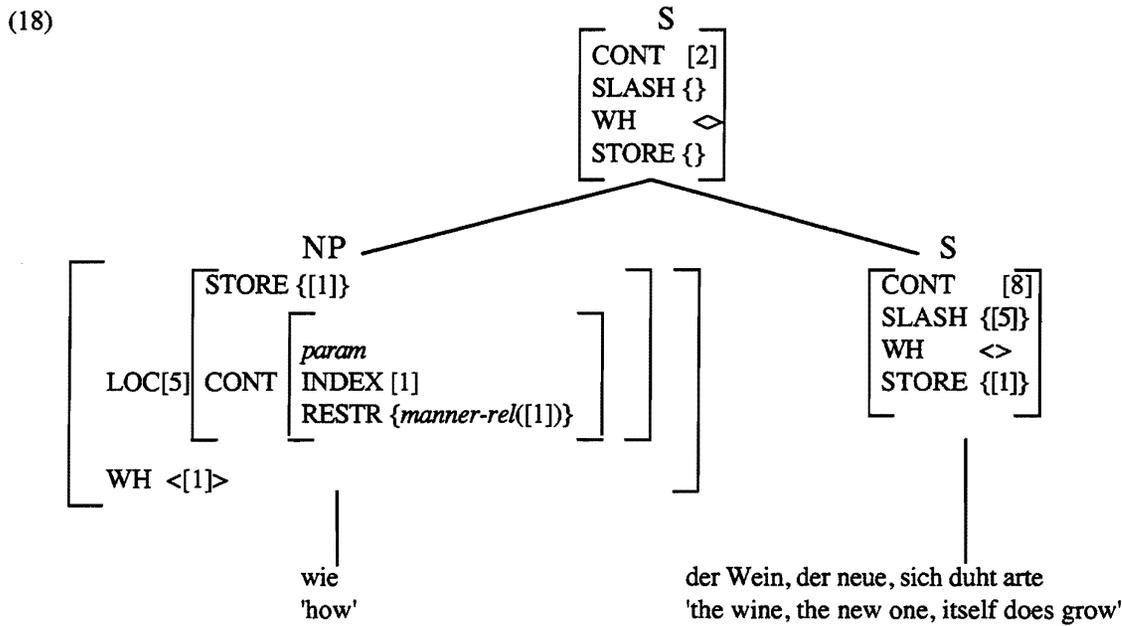
² H&N call these 'propositions.'

4.2 Type-coercing the denotation of the embedded interrogative

The sentence in (17) contains the embedded interrogative *wie der Wein, der neue, sich duht arte*. The embedded interrogative can be derived syntactically as shown in (18). The semantic representation of the interrogative phrase is given in (19).

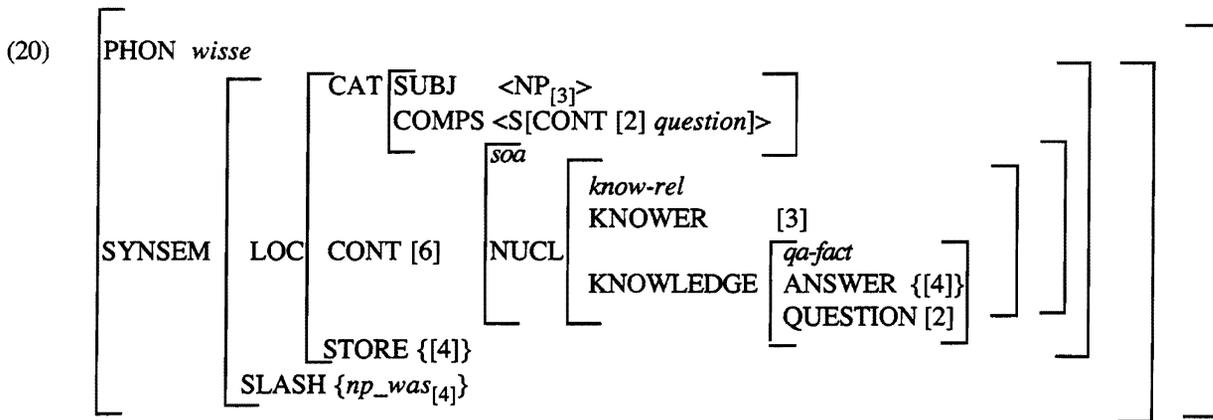
In (18), STORE serves as the scope indicator of the wh-index. It differs from SLASH in that SLASH allows the wh-expression to be extracted and bound off at a higher level, while STORE is only a placeholder for the index to indicate scope.

In (19) it can be seen that "embedded interrogatives are assigned denotations of type *question*" (H&N 2000: 157), containing the features INDICES and FACT. This is different from H&N as in their case the embedded interrogative is assumed to be a proposition. Hence, they use the feature PROP instead of FACT. Furthermore, in H&N the question was aiming at a person, while here it is aiming at an adverbial of manner. Accordingly, the semantic representation in (19) incorporates a restriction on the verb *arte* ('to grow') in the form of the adverbial of manner. Following Kasper (1994), *rsoa* stands for "restricted state of affairs" and has the features QFSOA, which stands for "quantifier-free state of affairs," and RESTR.



In the was-w constructions the embedded complement syntactically has all the properties of an embedded interrogative, while semantically it seems to have the properties of a fact, as discussed in section 4.1 above. This is where type coercion comes into play.

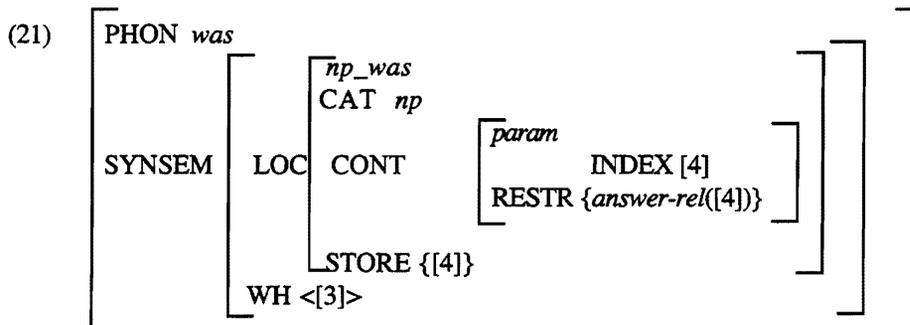
(20) shows the lexical entry for a *wisse* ('to know') that licenses was-w. From H&N's discussion it follows that there are at least two lexical entries for these verbs, one for when they occur in non-was-w constructions and one for was-w.



This lexical entry for *wisse* shows that the KNOWLEDGE of *wisse* in a was-w construction is of type *qa-fact* (short for *question-answer fact*) instead of *question* as in (20). This is a deviation from H&N's HG analysis, since in their analysis they introduced the type *qa-proposition*. However, as a distinction between resolved facts and unresolved facts, i.e. propositions, proves to be unnecessary in HE, I introduce *qa-fact* as a subtype of a factive supertype.

In (20), the *qa-fact* contains the link to the question *wie der Wein, der neue, sich duht arte* as well as to the answer *was*. Thus, QUESTION connects to the embedded interrogative (19), which is of type *question*. This is the type coercion, the question is resolved into a fact, because *wisse* takes the *qa-fact* that contains the *question*.

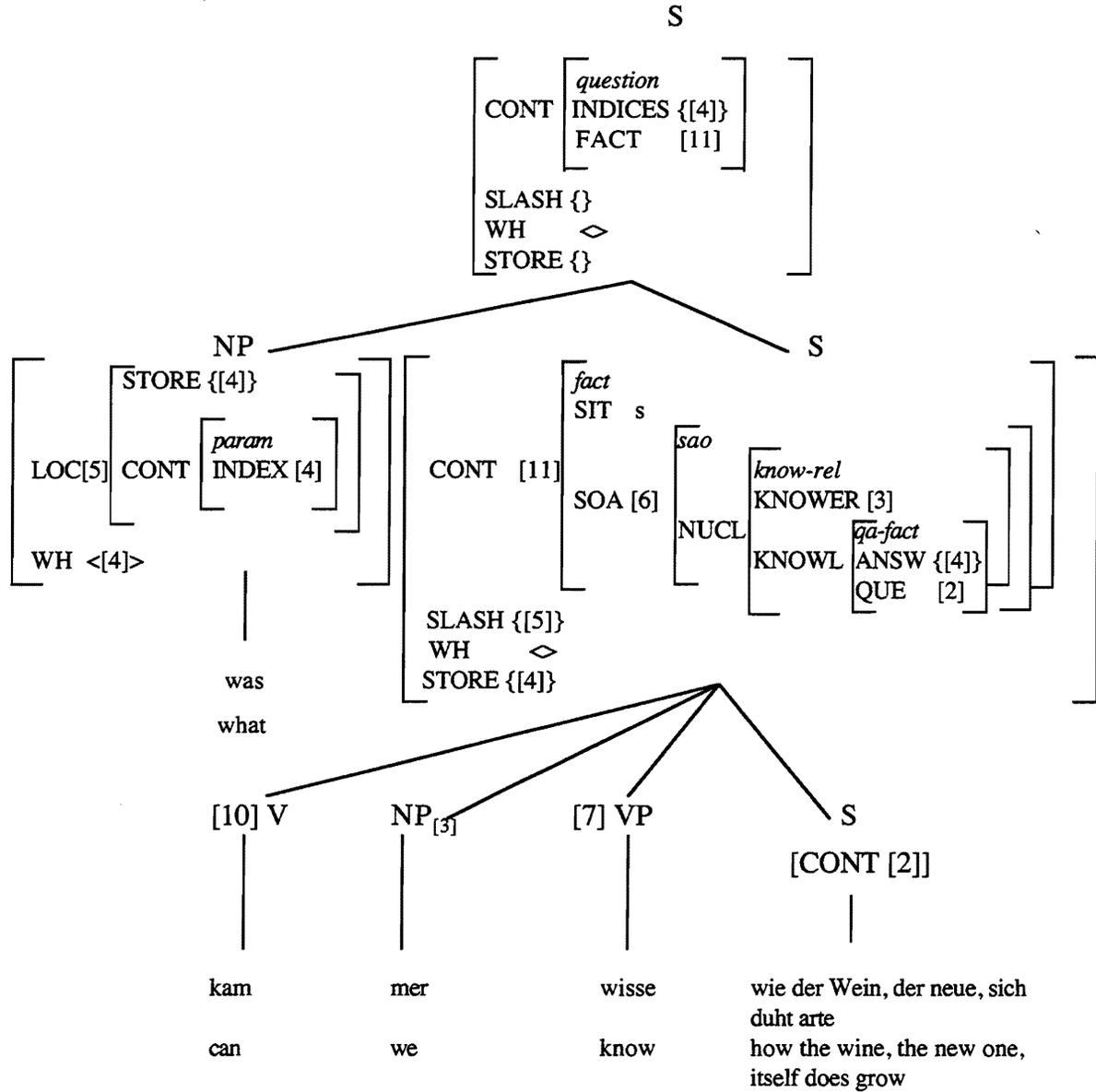
The lexical entry for *was* of the was-w construction is given in (21)³. According to H&N, the *was* of a was-w construction has a special type of local value *np_was* and its CONT | INDEX value is restricted to being an answer (H&N 2000: 158).



How (20) and (21) combine for the question *Was kammer wisse, wie der Wein, der neue, sich duht arte?* is shown in (22).

³ Taken from H&N (2000: 158), but replacing the tag [1] with the more appropriate tag [4].

(22)



This section shows that with a few adaptations, H&N's indirect analysis can properly account for the HE *was-w* data.

5.0 CONCLUSION

This paper used data from the German dialect Hessian to the discussion of *was-w* constructions in German. Since the data could not be analyzed with a scope-marking approach, but were unproblematic for the indirect analysis, this study provided further evidence for the indirect analysis of *was-w* constructions (H&N 2000), as opposed to scope-marking (Kathol 1999).

Additionally, this study discusses a difference between HG and HE in the classes of predicates that license *was-w*. In HE, factive predicates, such as *wisse*, are also *was-w* licensing, while in HG they are not.

REFERENCES

- Dayal, V. S. 1994. Scope marking: In defence of indirect dependency. In *Papers on wh-scope marking*. Arbeitspapiere des SFB 340 Nr. 76, pp. 107-130.
- Ginzburg, J. and I. A. Sag. 2001. *Interrogative investigations: The form, meaning and use of English interrogatives*. Stanford: CSLI Publications.
- Hinrichs, E. W. and T. Nakazawa. 2001. The was-w construction in German: A case study in type coercion. In D. Flickinger and A. Kathol (eds.) *Proceedings of the 7th international HPSG conference*. Stanford: CSLI Publications, pp. 147-165.
- Kasper, R. 1994. Adjuncts in the Mittelfeld. In J. Nerbonne, K. Netter and C. Pollard (eds.) *German in Head-Driven Phrase Structure Grammar*. Stanford: CSLI Publications, pp. 39-69.
- Kathol, A. 1999. The scope-marking construction in German. In G. Webelhuth, J-P. Koenig and A. Kathol (eds.) *Lexical and constructional aspects of linguistic explanation*. Stanford: CSLI Publications, pp 357-371.
- Uderzo, Albert. 1999. *Asterix babbelt Hessisch 2 - Ruff un Runner*. Translated into Hessian by Juergen Leber. Stuttgart: Les Editions Albert Rene/Gosciny-Uderzo/Ehapa Verlag Stuttgart.
- Witte, Hedwig. 1974. *Hessisch, wie es nicht im Wörterbuch steht*. Frankfurt: Societäts-Verlag.

CHINESE BA CONSTRUCTION IN HPSG

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1. INTRODUCTION

The *ba* construction in Chinese is one of the most controversial issues in Chinese linguistics. Therefore, there is little agreement on a proper analysis of this construction. The most fundamental question regarding this construction is the status of *ba*, whether it is a verb, a preposition or merely a case marker. In this paper, I am not going to address this issue; rather my focus will be at the sentence structure level and specifically on the valency of the main verb in the *ba* construction under the framework of Head-Driven Phrase Structure Grammar (hereafter HPSG). The aim of this analysis is to provide some insights into the complex syntactic situation and the open question on the status of *ba*.

The discussion is composed of two parts: section 2 deals with the fundamental properties of the *ba* construction and some previous analyses that are relevant to my HPSG analysis, presented in section 3. This analysis proposes one principle and two lexical rules to account for the valency structure of both the word *ba* and the verb that follows it. In addition, this analysis accounts for the complicated syntactic structure of the *ba* construction by the combination between these three rules and the GAP principle and the Head-filler rule (Sag & Wasow 1999). I summarize the paper in section 4.

2. DESCRIPTIONS AND ARGUMENTS

2.1. The properties of *ba*-construction

The Chinese *ba* construction has been labeled differently by various linguists. The first and most popular name, by L. Wang (1954), Chao (1968), Li and Thompson (1981) and Tiee (1986), is 'disposal structure'. What they mean by this term is that *ba* has a meaning close to 'disposal', if we assume that the *ba* construction has the form 'X *ba* Y Z', then it gives us the meaning of X 'disposes' of Y in the way described by Z (Tsao 1986), e.g.

- (1) *Wo ba fangzi shao-le.*
I *ba* house burned-perf.
'I burned the house.'
- (2) *Zhangsan ba Lisi ganzou-le.*
Zhangsan *ba* Lisi drive away-perf.
'Zhangsan drove away Lisi.'

To put this sentence into a closer translation to the intention behind sentence (1): 'I put/caused the house into a situation in which it was burned.' Other linguists refer to this construction as the 'executive construction' (Hashimoto 1971), 'accusative construction' (Teng 1975), 'ergative construction' (Frei 1956), or simply '*ba* construction'. But they all try to express the idea that the *ba* sentence "states how a person is handled, manipulated, or dealt with; how something is disposed of; or how an affair is conducted." (Y.-C. Li 1974)

The reason we call this sentence structure in Chinese a *ba* sentence lies in the fact that *ba* is playing a significant role in the construction; it takes an NP after it and requires a following VP at the end of the sentence, otherwise it is ungrammatical.

- (3) **Wo ba fangzi.* / **Wo ba shao-le.* / **Wo ba shao-le fangzi.*
 1st pers.sg. *ba* house / 1st pers.sg. *ba* burn-perf. / 1st pers.sg. *ba* burn-perf house

So the representation of this structure is:

- (4) NP1 *ba* NP2 VP

I am going to use NP1 to refer to the NP preceding *ba*, and NP2 to the NP following *ba* in the rest of this paper.

There are some constraints at the end of the *ba* sentence. First, stative verbs cannot appear in the *ba* construction, such as *you* 'have', *xiang* 'miss' and *zhidao* 'know', but they are not prohibited from the corresponding non-*ba* sentences (Zou 1993):

- (5) a. **Wo ba shu you-le.*
 1st pers.sg. *ba* book have-perf.
 b. *Wo you shu.*
 1st pers.sg. have book
 'I have books.'

Secondly, some perception and psychological verbs cannot be used in the *ba* construction, such as *ai* 'love', *xihuan* 'like', *kanjian* 'see':

- (6) a. **Ta ba Zhangsan ai-le.*
 3rd pers.sg. *ba* Zhangsan love-perf.
 b. *Ta ai Zhangsan*
 3rd pers.sg. love Zhangsan
 'He/she loves Zhangsan.'

Finally, a perfective aspect marker *-le*, a durative aspect marker *-zhe*, or a directional or resultative adverb such as *wan* 'end' is usually required to follow the verb, otherwise it may cause ungrammaticality, e.g.:

- (7) a. **Wo ba fangzi shao.*
 1st pers.sg. *ba* house burn
 'I burned the house.'
 b. *Wo ba fangzi shao-le.*
 1st pers.sg. *ba* house burn-perf.
 'I burned the house.'

However, more concern is put on the relation between NP2 and the V (head of VP) in the *ba* construction. Although the NP2 can be the object of the verb, it is not necessarily so. In sentence (1), *fangzi* 'house' is the object of the verb *shao* 'burn', but some relations are also possible in *ba*-construction, e.g.:

- (8) *Wo ba juzi bo-le pi.*
 1st pers.sg. *ba* orange peel-perf peel(n.)
 'I peeled the skin off the orange.'

The NP2 in sentence (6) is not the object of the verb *bo* 'peel', rather it is the possessor of the actual object, *pi* 'peel (n.)'. We will come back to this in the next part, as this possessive relation is one focus of my analysis.

Lastly, all sentences with *ba* have a counterpart without *ba* (Sybesma, 1999), e.g.:

- (9) a. *Wangwu ba ta muqin ganzou-le.*
 Wangwu *ba* 3rd pers.sg. mother drive-away-perf.

‘Wangwu drove his mother away.’

- b. *Wangwu ganzou-le ta muqin.*
 Wangwu drive-away-perf 3rd pers.sg. mother
 ‘Wangwu drove his mother away.’

These two sentences share similar meanings, though some linguists argue that there is some difference between them. However, this difference lies in the sense of ‘disposal’ in the *ba* construction.

So far, we have examined the basic properties of *ba* construction, I am going to first present two relevant analyses on the projection that *ba* is heading and the syntactic structure of the *ba* sentence, and then make assumptions for the following HPSG analysis.

2.2. *Ba* Phrase

Zou (1993) develops his theory with the assumption that there is a deep structure (D-structure) for the *ba* construction. His deep structure is represented as:

- (10) [IP *Wo* [*BaP* [*ba ba*] [ASPP *-le*] [VP *qiang* [NP *ta*]]]]
 I *ba* -perf rob him.

He treats *ba* as a functional category heading its own projection *ba*-phrase, and it selects an aspect phrase (ASPP) or a directional/resultative particle phrase (PARP) as its complement. Thus, the VP is the complement of the head of the ASPP phrase. In the D-structure, the verb *qiang* ‘rob’ assigns a θ -role to the NP *ta* ‘him’ which then moves to the specifier position of ASPP to get case from *ba*. The verb *qiang* ‘rob’ is raised to the position of ASP, amalgamating with the aspect marker *-le*. Under this analysis, the surface structure of *ba*-sentence is derived from a D-structure by NP movement and verb-raising. The problem with this analysis is the treatment of VP and the ASP phrase. The head of the ASPP, according to Zou, is the perfective (aspect) marker *-le*, which is only a suffix indicating aspect. Its complement, the verb, plays a more important semantic role in this sentence. I do not see the necessity of treating the VP as the complement of ASPP and then raising it from the original position. Therefore, the D-structure that he proposes is also problematic. In my analysis, the *ba* construction does not have any D-structure, since every *ba* sentence has its non-*ba* counterpart, the non-*ba* sentence is an ideal reference to how the *ba* construction is formed.

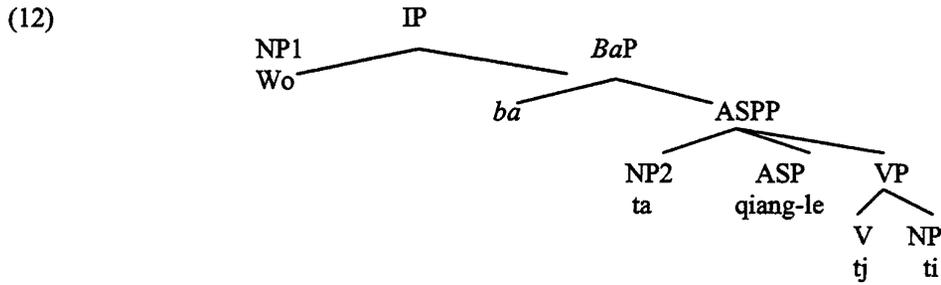
However, Zou’s analysis provides me with a helpful clue in how to treat the projection headed by *ba* in my analysis. Zou treats *ba* as the head heading its own *ba*-phrase, which is a neutral way of treating it. Since I am not going to deal with the status of *ba* and will leave it an open question, I will treat *ba* as Zou does.

Based on the above discussion, I propose that *ba* heads its own projection, the *ba*-phrase, and selects an NP and a VP as its complements.

2.3. The syntactic structure

Based on the assumption that *ba* is heading a *ba* phrase, and making use of the NP movement and verb-raising, Zou (1993) presents the syntactic structure of *ba*-sentence in this way:

- (11) [IP *Wo* [*BaP* [*ba ba*] [ASPP *tai* [ASP *qiangj-le*] [VP *tj* [NP *ti*]]]]]
 I *ba* 3rd pers.sg. rob-perf.



The tree structure in (12) shows that *ba* only takes one complement ASPP, and NP2 is the specifier of the head ASP, while VP is the complement. This structure has two problems: 1). It does not capture the properties of *ba* which requires a following NP and then a VP; 2). The combination of NP, ASP and VP is not a constituent by standard constituency tests.

(13) * *Wo ba [ta qiang-le] you [ni qiang-le].*
 1st pers.sg. *ba* 3rd pers.sg. rob-perf and 2nd pers.sg. rob-perf.

(14) *Wo [ba ta qiang-le] you [ba ni qiang-le].*
 1st pers.sg. *ba* 3rd pers.sg. rob-perf and *ba* 2nd pers.sg. rob-perf.
 'I not only robbed him, but also robbed you.'

The coordination test in (14) shows that [*ba ta qiang-le*] is a constituent in the sentence, whereas the ungrammaticality of (13) provides evidence that [*ta qiang-le*] is not a constituent, under the assumption that only like constituents can be coordinated.

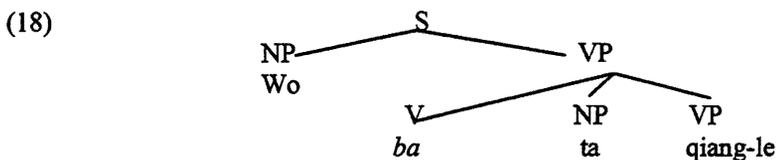
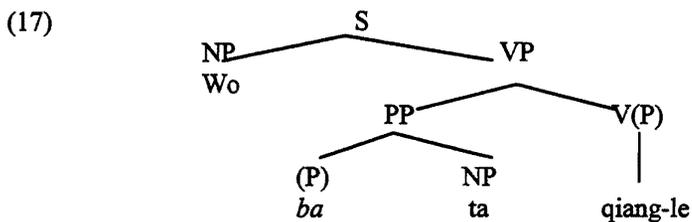
The question test is another constituency test:

(15) A: *Ni zuo shen-me?* 'What are you doing?'
 B: **Ta qiang-le.*

(16) A: *Ni zuo shen-me?* 'What are you doing?'
 B: *Ba ta qiang-le.* 'Robbed him.'

The fact that (15) cannot pass the question test, while (16) can, again proves that [*ta qiang-le*] is not a constituent as it cannot stand alone. Therefore, the syntactic structure in (12) is not appropriate for the *ba* construction.

Bender (2000) also has a brief discussion on the structure of *ba* sentences. She discusses two different structures and argues for (18).



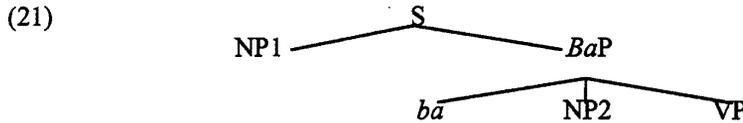
Although the structure in (17) also treats [*ba ta qiang-le*] as one constituent, which I have just proved with the constituency tests is a valid constituent, it treats [*ba ta*] as a constituent as well. However, the fact that [*ba ta*] cannot pass either of the constituency tests shows that it is not a constituent. Therefore, the structure in (17) is problematic.

- (19) a. **Wo [ba ni] he [ba ta] qiang-le.*
 1st.pers.sg. *ba* 2nd pers.sg. and *ba* 3rd pers.sg. rob-perf
 b. *Wo ba [ni] he [ta] qiang-le.*
 1st.pers.sg. *ba* 2nd pers.sg. and 3rd pers.sg. rob-perf
 'I robbed you and him.'

- (20) A: *Ni qiang-le shei?* 'Who did you rob?'
 B: **Ba ta. / Ta.* 'Him.'

In my analysis that follows, I use the structure in (18), but with modifications of the labels of the constituent in the tree.

Based on the above discussion, I assume that in the *ba* sentence, *ba*, NP2 and VP form one projection, the *ba*-phrase, and NP2 and VP are complements of the head *ba*. This assumption leads to the following structure:



3. HPSG ANALYSIS

The *ba*-construction in Chinese has been dealt with under a wide range of frameworks, such as GB (He 1996) and LFG (Bender 2000). But how is it to be accounted in the framework of HPSG? In this part, I am going to apply the HPSG theory (Sag & Wasow 1999) by using the relevant features, rules and principles to the Chinese *ba* construction.

3.1. Subject raising

According to M.Q.Wang (1987), the *ba* construction is 'a highly transitive construction', where 'transitivity' is defined as 'the carrying over of an activity from an agent to a patient.' This 'transitivity' aspect makes the *ba* sentence distinctive from its non-*ba* counterpart, thus the word *ba* bears the 'transitivity' character of carrying over an activity from NP1 to NP2. Being the specifier of the *ba* phrase, NP1 is also the syntactic subject of the embedded VP of the *ba* phrase.

- (22) a. *Wo ba ta qiang-le.*
 1stpers.sg. *ba* 3rdpers.sg. rob-perf.
 'I robbed him.'
 b. *Wo qiang-le ta.*
 1stpers.sg. rob-perf 3rdpers.sg.
 'I robbed him.'

Comparing the *ba* sentence and the non-*ba* counterpart (22a) and (22b), we will find that the NP1 is acting both as the specifier of the matrix sentence and of the embedded VP of *ba*-construction, i.e. *ba* and its VP complement share the same NP in their SPR list. In addition, *ba* cannot pose any restrictions on NP1; it is the head of the embedded VP that selects the subject in both sentences.

Subject-raising and subject-control words are the two classes of words that share the property of subject sharing between the head of the matrix clause and its complement. The distinction between them is

whether the subject is playing a semantic role in the head of the matrix clause. As to the *ba* construction under discussion, I argue that *ba* is the subject-control word with the passive test.

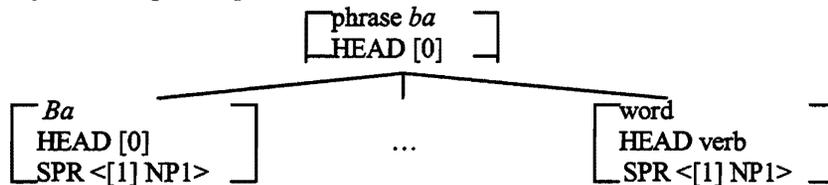
- (23) a. **Ta ba wo bei qiang-le.*
 3rd pers.sg. *ba* 1st pers.sg. by(pass.) rob-perf.
 b. *Ta ba wo qiang-le.*
 3rd pers.sg. *ba* 1st pers.sg. rob-perf.
 'He robbed me.'
 c. *Ta qiang-le wo.*
 3rd pers.sg. rob-perf 1st pers.sg.
 'He robbed me.'

The fact that (23a) is ungrammatical and (22a) contrasts (23b) shows that *ba* is a subject-control word. In addition, *ba* is representing a relation of 'disposal' as discussed in section 2. The subject, although selected by the embedded verb, is assigned to the DISPOSER role in the *ba* construction. I will not elaborate this topic further since the discussion of the semantic relations in *ba* construction is beyond the scope of this paper.

We now turn to the question of how NP1 is assigned the position of specifier of *ba* although it is actually selected by the embedded verb.

The tree structure of the *ba* sentence in (21) shows that NP1 is raised to a higher level than VP in the *ba* construction but not in the non-*ba* counterpart. I propose a principle that accounts for the raising of the subject NP1 in the *ba* construction:

(24) Subject Raising Principle:



The Subject Raising Principle in (24) shows the NP1 that is originally from the SPR list of the embedded verb is raised to the SPR list of *ba* – the head of the matrix clause in a *ba* construction, thus both *ba* and its VP complement have NP1 as the subject. The term subject refers to the single element in the SPR list. Tsao (1986) argues that NP1 in *ba* sentences is a topic but not a subject with some examples that may seem problematic at the first glance:

- (25) *Na chang qiu ba women kan-de-lei-si le.*
 That Class. ball-game *ba* 1stper.pl. see-Part.-tire-dead Part.
 'That ball game, we watched it until we were tired to death.' (Tsao 1986)

The NP1 *Na chang qiu* 'The ball game' is not the subject of the verb *kan* 'watch', he argues, *women* 'we' is selected as the subject by the verb instead. I agree with him in the sense of semantics that 'the ball game' is actually the topic, and *women* 'we' should be subject, however, it is perfectly grammatical to say:

- (26) *Na chang qiu kan-de women lei-si le.*
 That Class. ball-game see-Part. 1stper.pl. tire-dead Part.
 'That ball game, we watched it until we were tired to death.'

Sentence (26) is the non-*ba* counterpart of (25), and the fact that *Na chang qiu* 'that ball game' is in the subject position of (26) indicates that syntactically it is the subject in the non-*ba* counterpart and also in the *ba*-sentence.

3.2. Extraction

The relation between NP2 and the embedded verbal complex is more complicated than that between NP1 and the embedded VP I have just discussed. We will start with sentences with a simple structure.

- (27) a. *Gou ba ta yao-le.*
 Dog *ba* 3rdpers.sg. bite-perf.
 'Dog bite him.'
- b. *Gou yao-le ta.*
 Dog bite-perf 3rdpers.sg.
 'Dog bite him.'

We can tell from sentence (27b) that NP2 *ta* 'he', is the object of the verb *yao* 'bite'. Since *ba* cannot be stranded, it requires a following NP, *ta* to be extracted from the COMPS list of the verb *yao* 'bite' to a higher position – the COMPS list of *ba*. Therefore, we can form one lexical rule licensing the object extraction in this case.

(28) Object Extraction Lexical Rule



When the object is extracted from the COMPS list of the verb, the verb is missing a complement encoded by the feature GAP. According to the GAP principle: the GAP values of all the daughters in a headed structure must add up to be the GAP value of the mother, unless the rule sanctioning the structure is the Head-Filler Rule (Sag & Wasow 1999). The GAP value [2] in 28 will be carried up by the GAP principle to the upper level until it gets terminated by the Head-filler rule when the GAP meets its filler.

But what if the verb has more than one NP in its COMPS list? Which one gets extracted by the Object Extraction Lexical Rule in the *ba* construction?

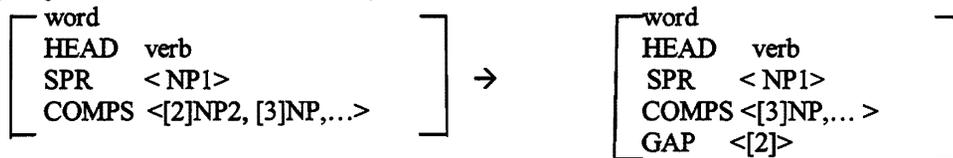
- (29) a. *Ta ba na-xie shu song-ge wo.*
 3rdpers.sg. *ba* those books give-to 1stpers.sg.
 'He gives those books to me.'
- b. *Ta song na-xie shu ge wo.*
 3rdpers.sg. gives those books to 1stpers.sg.
 'He gives those books to me.'
- (30) a. **Ta ba wo song-ge na-xie shu.*
 3rdpers.sg. *ba* 1stpers.sg. give-to those books
 * 'He gives me to the books.'
- b. *Ta song-ge wo na-xie shu.*
 3rdpers.sg. gives 1stpers.sg. those books
 'He gives me those books.'

It seems from the above example that the first NP in the COMPS list is the one that gets extracted, because the extraction of the second NP *wo* 'I' would cause ungrammaticality. But which one is the non-*ba* counterpart of the grammatical *ba* sentence (29a), is it (29b) or (30b) as they share the similar meaning? It is widely agreed that *ba*-construction is one of the topicalization structures, according to Tsao (1986) both NP1 and NP2 are topics. NP2 is topicalized in the preverbal position in (29a). Here, *na-xie shu* 'those books' is the topic that attracts more attention than the NP in the postverbal position *wo* 'I'. Comparing sentence (29b) and (30b), *na-xie shu* 'those books' is more salient than *wo* 'I' in (29b) while vice versa in (30b). Thus, I assume (29b) is the non-*ba* counterpart of (29a) because they are more semantically similar than (29a) and (30b), although these three sentences mean the same thing.

- (31) a. *Wo ba shu fang-zai shu-jia shang.*
 1stpers.sg. *ba* book put-on book-shelf above
 'I put the book on the bookshelf.'
 b. *Wo ba shu-jia fang-man-le shu.*
 1stpers.sg. *ba* book-shelf put-full-Perf. book
 'I filled the book-shelf with books.'
- (32) a. *Wo fang shu zai shu-jia shang.*
 1stpers.sg. put book on book-shelf above
 'I put the book on the bookshelf.'
 b. *Wo fang-man-le shu-jia shu.*
 1stpers.sg. put-full-Perf. book-shelf book
 'I filled the book-shelf with books.'

The *ba* sentences and their counterparts in (31) and (32) provides further evidence that the first NP in the COMPS list of the verb is extracted. Sentences 32a is the non-*ba* counterpart of 31a, in which *shu* 'book' is the first NP in the COMPS list of the verb *fang* 'put', it gets extracted in the NP2 position in (31a). Similarly in (32b), *shu-jia* 'bookshelf' is the first NP and gets extracted to the NP2 position in (31b). The revised version of the extraction rule specifies that the first NP in the COMPS list of the verb is extracted in the *ba* construction:

(33) Object Extraction Lexical Rule (Revised Version)



The COMPS list of a verb can be more complicated than a list with more than one NPs; it can have an NP with some inner structure, e.g.:

- (34) *Wo mai-le san-tou zhu.*
 1stpers.sg. sell-Perf. three-Class pig
 'I sold three pigs.'

The first and only NP in the COMPS list of the verb *mai* 'buy' is *san-tou zhu* 'three (Classifier) pigs', which is different from any NP in the COMPS list we have examined, e.g. *shu* 'book'. This NP is composed of a quantifier (or Class. Phrase) *san-tou* 'three-Class.' and an NP *zhu* 'pigs'. There are two *ba* sentences corresponding to the same non-*ba* sentence of (34).

- (35) a. *Wo ba san-tou zhu mai-le.*
 1stpers.sg. *ba* three-Class pig sell-Perf.
 'I sold three pigs.'
 b. *Wo ba zhu mai-le san-tou.*
 1stpers.sg. *ba* pig sell-Perf. three-Class
 'I sold three pigs.'

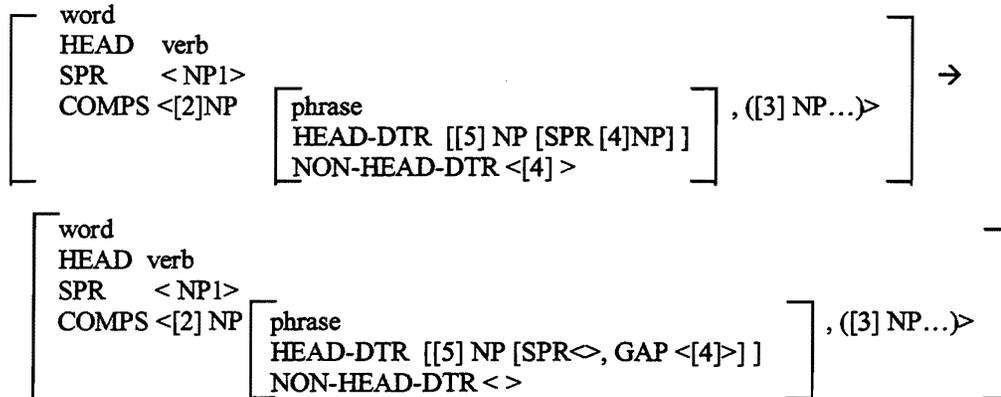
The revised version of the Extraction Lexical Rule only licenses (35a), since the NP as a whole is removed from the COMPS list. But the fact that (35b) is also grammatical shows that the extraction rule can look into the deeper structure than the valence list of the main verb—the valence structure of the verbal valent NP. If the valent NP of the main verb contains another NP, the embedded NP can be extracted instead of the superordinate one. With the Object Extraction Lexical Rule licensing the extraction of the first NP (completely) from the COMPS list of the verb, e.g. (35a), we need another extraction rule licensing the extraction of the valent NP of the first NP on the COMPS list of the main verb, e.g. (35b), in which *zhu* 'pig' is the head and the only NP of the phrase *san-tou zhu* 'three pigs'. But what if the first NP on the COMPS list has more than one NP in its inner structure? Is it the head daughter that gets extracted?

Let us examine some other examples before coming to an answer to this question. The inner structure of the valent NP on the COMPS list analyzed above is the combination of the quantifier and the head noun. The examples we are going to examine involve valent NP with possessive relations.

- (36) a. *Wo bo-le juzi pi.*
 1stpers.sg. peel-Perf. orange peel
 'I peeled the orange('s) peel.'
 b. *Wo ba juzi pi bo-le.*
 1stpers.sg. *ba* orange peel peel-Perf.
 'I peeled the orange('s) peel.'
 c. *Wo ba juzi bo-le pi.*
 1stpers.sg. *ba* orange peel-Perf peel.
 'I peeled the orange.'
 d. **Wo ba pi bo-le juzi.*
 1stpers.sg. *ba* peel peel-Perf orange.

The *ba* sentence in (36b) is licensed by the rule stated in (33) as the first NP on the COMPS list of the verb *bo-le* 'peel' in (36a) is extracted. The NP is a possessive phrase, in which *juzi* 'orange' is the possessor and *pi* 'peel' is the possessed and also the head daughter of the larger NP. If we assume that it is the head daughter that gets extracted, then this will result in ungrammaticality in (36d). Therefore, the status of the head daughter is not the key factor for the extraction, but the syntactically first available NP. In the NP *juzi pi* 'orange('s) peel', *juzi* is the specifier of *pi*, thus is preceding the head daughter and therefore is the first NP available for extraction, whereas the phrase *san-tou zhu* 'three pigs' in (34), though *san-tou* is preceding the head daughter *zhu*, it is a CIP (classifier phrase) rather than an NP and thus the first available NP *zhu* is extracted. The specification of this extraction rule is:

(37) Extraction Lexical Rule II. (Revised Version)



The structure of Chinese NPs is regular in the sense that the head daughter is always right-sided. Therefore, the extraction rule always checks the specifier (or modifier in other cases) of the head daughter first to see if there is any available NP that can be extracted, and if not, then turns to the head daughter. One of the most 'popular' sentences in various analyses of the *ba* construction also shows the validity of the rule stated in (37).

- (38) a. *Wo ba ta sha-le fuqin.* (Li 1990)
 1stpers.sg. *ba* 3rdpers.sg. kill-Perf father
 'I killed his father(he was affected by the killing).'
 b. *Wo sha-le ta fuqin.*
 1stpers.sg. kill-Perf. 3rdpers.sg. father
 'I killed his father.'

The Extraction Rule in (37) results in the *ba* sentence (38a), since *ta* ‘his’ is the first available NP in the bigger phrase *ta fuqin* ‘his father’. Of course it is always grammatical to extract the higher level NP as a whole: *Wo ba ta fuqin sha-le*. ‘I killed his father.’

There are two different ways of expressing the possessive relation in Chinese NPs. One is what we have examined that consists of two NPs with which the possessor is the specifier of the head daughter—the possessed. The other more common way is with the particle *-de*, which is in this sense similar to genitive ‘s in English. So the phrase ‘my father’, in Chinese is either *wo fuqin* ‘I father’ or *wo-de fuqin* ‘my father’. But if the latter appears in the non-*ba* sentence instead of the former in (38b), the *ba* sentence is different correspondingly.

- (39) a. *Wo sha-le ta-de fuqin.*
 1stpers.sg. kill-Perf. 3rd pers.sg.Gen. father
 ‘I killed his father.’
 b. **Wo ba ta-de sha-le fuqin.*
 1stpers.sg. *ba* 3rd pers.sg.Gen. kill-Perf. father
 c. *Wo ba ta-de fuqin sha-le.*
 1stpers.sg. *ba* 3rd pers.sg.Gen. father kill-Perf.
 ‘I killed his father.’

The rule in (37) seems problematic since it cannot predict the ungrammaticality of (39b). However, I am not going to elaborate this issue further in this paper, but my intuitive explanation is: the phrase *wo-de* ‘my’ is not a noun phrase because of the particle *-de* which represents the possessive relationship. In addition, the classifier phrase (CIP hereafter) *san-tou* ‘three’ can be stranded, whereas *wo-de* ‘my’ is a phrase that cannot be stranded in Chinese, which rules out another possible *ba* sentence candidate: ‘*Wo ba fuqin sha-le ta-de*.’

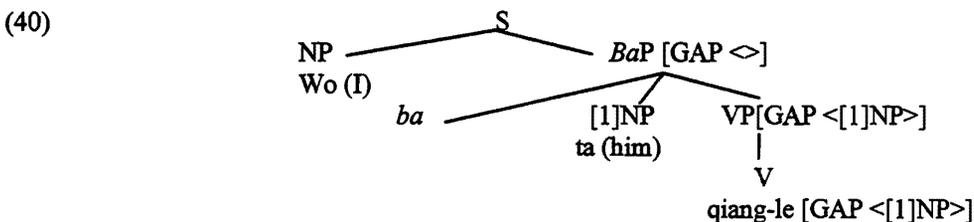
Going through the data in other analyses of the *ba*-sentence, I find that only lower level NPs can be extracted from the NPs with quantifier (classifier phrase) or possessive relation, as discussed above.

3.3. The GAP and the whole picture of *ba*-construction

GAP is a feature used in HPSG to encode the fact that a phrase is missing a certain kind of element (Sag & Wasow 1999). I have discussed the GAP feature briefly in the above section. Since an element, an NP in this case, is extracted from either the COMPS list of the main verb or a deeper level to a higher position, an NP is missing and we have to use the feature GAP indicating the missing NP. The GAP principle allows the GAP information to be propagated upward through the tree structure (Sag & Wasow 1999), until the GAP value is charged off by the Head-filler rule when it meets its filler.

In this part, I am going to apply the GAP principle and the Head-filler rule to the *ba*-construction and see if they match. I will start with a *ba* sentence with simpler structure.

- (22) a. *Wo ba ta qiang-le.*
 1stpers.sg. *ba* 3rdpers.sg. rob-perf.
 ‘I robbed him.’

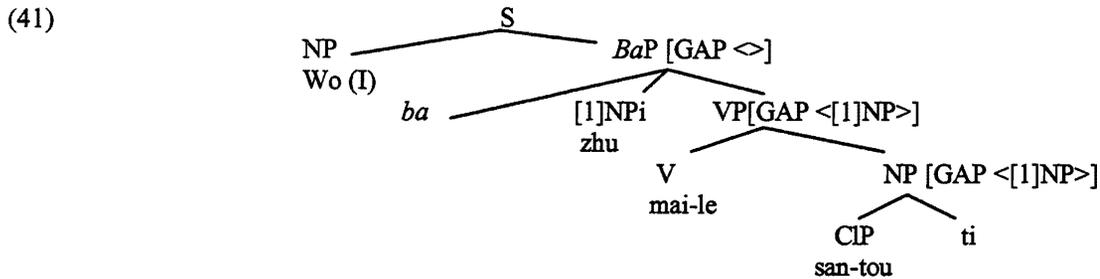


The GAP principle and the Head-Filler Rule work well with the *ba* sentence in 22. The GAP originating from the verb *qiang-le* ‘rob’ is carried up by the GAP principle to the VP level, where it meets

its filler *ta* 'him' and then gets emptied by the Head-Filler Rule. As a result, the GAP feature at the upper level *BaP* is empty. The same applies to *ba* sentences whose complement VP has the GAP feature with the first NP complement missing, and this GAP feature is charged off at the *BaP* level after it meets the filler.

What is more interesting is the case when Extraction Rule II applies, i.e. the NP from the deeper level is extracted instead of the NP in the COMPS list of the main verb. Consider the sentence we have discussed:

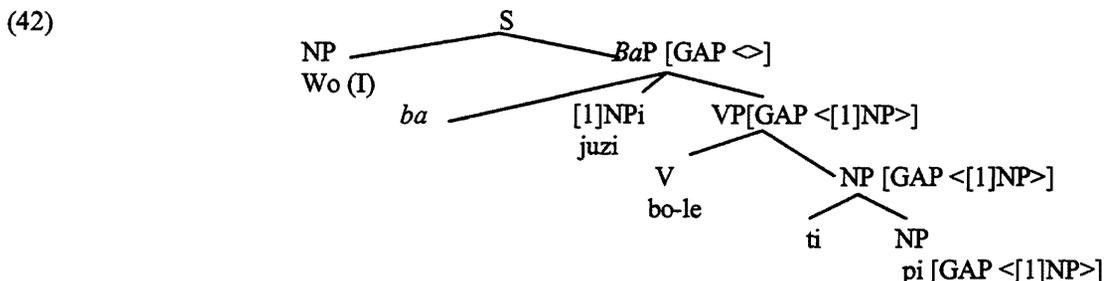
- (35) b. *Wo ba zhu mai-le san-tou.*
 1stpers.sg. *ba* pig sell-Perf. three-Class
 'I sold three pigs.'



The interesting thing about this sentence is that the head daughter is missing rather than the complement, which is what HPSG theory has not yet dealt with, according to my knowledge. If we assume that the GAP feature also accounts for the missing head daughter of a phrase, then the GAP originates from the bigger phrase whose head daughter is missing. It is then carried up by the GAP principle and charged off when it meets the filler.

The same applies to a sentence in which the specifier of the valent NP on the COMPS list of the main verb is extracted.

- (36) c. *Wo ba juzi bo-le pi.*
 1stpers.sg. *ba* orange peel-Perf peel.
 'I peeled the orange.'

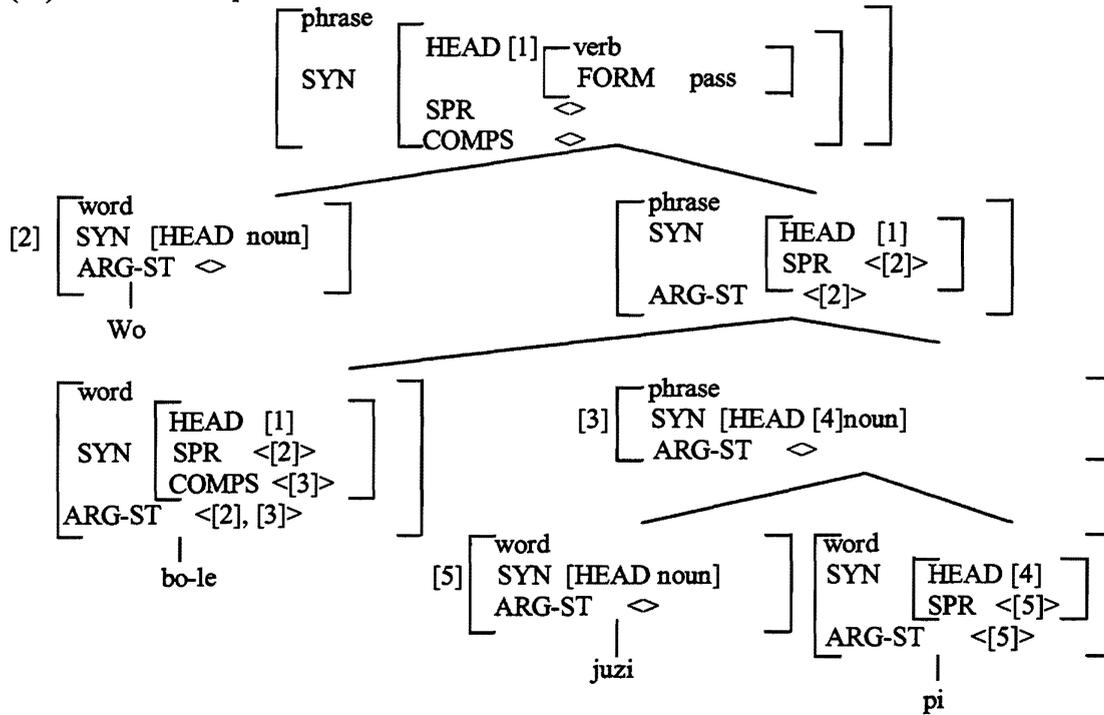


The only difference between (41) and (42) is that the head daughter is not missing in (42). Instead, it is the specifier of the head daughter *juzi* 'orange' that is missing. The GAP feature then originates from the head daughter *pi* 'peel' since its specifier is missing. The GAP gets charged off again at the *BaP* level.

We are now able to see the whole picture of how the Subject Raising Principle, the Object Extraction Lexical Rule and the Extraction Rule II are applied in a *ba* sentence, and how the GAP Principle and the Head-Filler Rule work in the *ba* sentence. It is also a good wrap-up of the discussion on the Chinese *ba* construction presented in this paper.

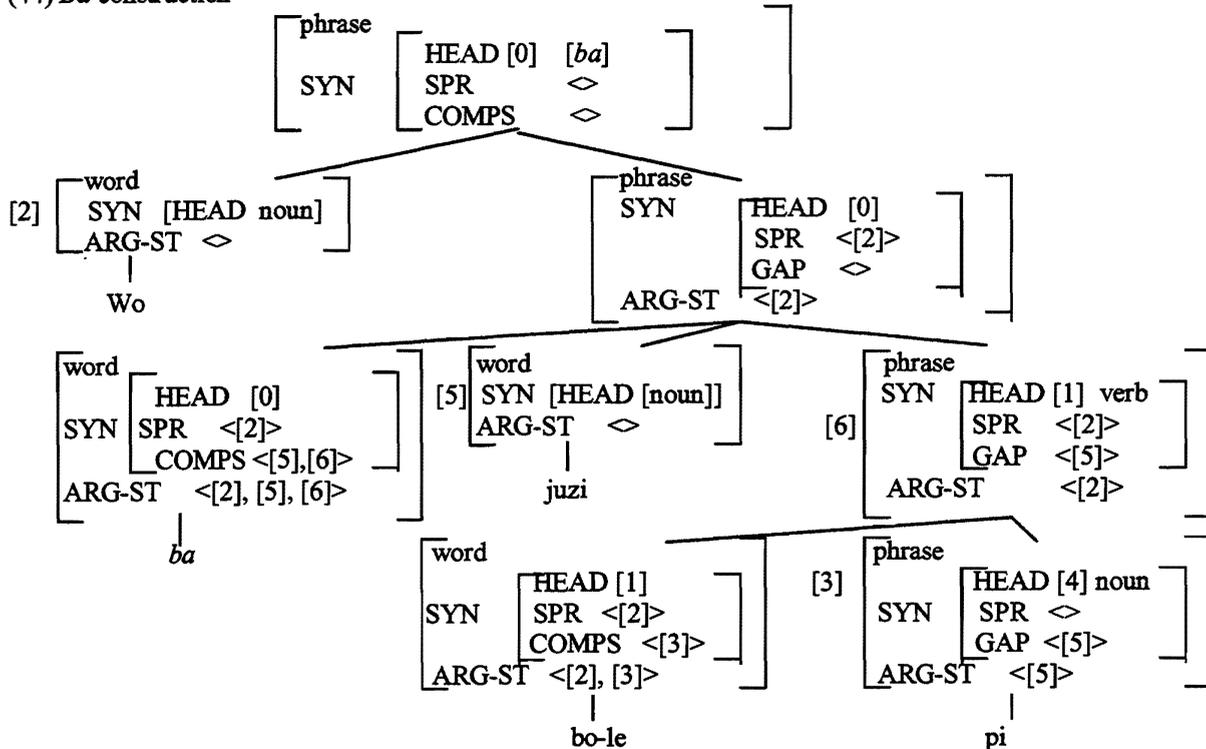
- (36) a. *Wo bo-le juzi pi.*
 1stpers.sg. peel-Perf. orange peel
 'I peeled the orange('s) peel.'

(43) Non-*ba* counterpart



(36) c. *Wo ba juzi bo-le pi.*
 1stpers.sg. *ba* orange peel-Perf peel.
 'I peeled the orange.'

(44) *Ba* construction



4. CONCLUSION

This analysis of Chinese *ba*-sentences focuses on the NP movements in the *ba* construction under the framework of HPSG. The Subject Raising Principle, the Object Extraction Lexical Rule and the Extraction Lexical Rule II are the rules that were formed in this paper to account for the phenomena found in the Chinese *ba* sentence, and they work well with the GAP Principle and the Head-Filler Rule proposed by Sag and Wasow (1999).

Although this is a preliminary study on the *ba* construction, it shows that the HPSG theory can account for the *ba* construction with the established features, lexical rules and AVM. This paper contributes to the study of the Chinese *ba* construction by introducing the HPSG theory to account for it.

REFERENCES

- Bender, Emily (2000) The syntax of Mandarin *ba*: Reconsidering the verbal analysis. *Journal of East Asian Linguistics*. 9 (2): 105-145.
- Chao, Yuan-ren (1968) *A Grammar of Spoken Chinese*. Berkeley: University of California Press.
- Frei, Henri (1956) The Ergative Construction in Chinese: Theory of Pekinese *pa*. *Gengo Kenkyu* 31: 22-50 (part I); 32: 83-115 (part II).
- Hashimoto, Anne Yue (1971) Mandarin Syntactic Structures. *Unicorn* 8: 1-146.
- He, Yuanjian (1996) *An Introduction to Government-binding Theory in Chinese Syntax*. New York: The Edwin Mellen Press.
- Li, Charles and Sandra Thompson (1981) *Mandarin Chinese: A Functional Reference Grammar*. Los Angeles: University of California Press.
- Li, Yen-hui Audrey (1990) *Order and Constituency in Mandarin Chinese*. Boston: Kluwer Academic Publishers.
- Li, Ying-che (1974) What does 'Disposal' Mean? Features of the Verb and Noun in Chinese. *Journal of Chinese Linguistics* 2: 200-218.
- Sag, Ivan, and Wasow, Thomas (1999) *Syntactic Theory: A Formal Introduction*. Stanford: Center for the study of Language and Information Publications.
- Sybesma, Rint (1999) *The Mandarin VP*. Kluwer: Dordrecht.
- Teng, S.H. (1975) *A Semantic Study of Transitivity Relations in Chinese*. Taipei: Student Books.
- Tiee, H.H.Y. (1986) *A Reference Grammar of Chinese Sentences*. Tucson: University of Arizona Press.
- Tsao, Feng-fu (1986) A Topic-Comment Approach to the *ba* Construction. *Journal of Chinese Linguistics* 15: 1-55.
- Wang, L. (1954) *Zhongguo Yufa Lilun [Theory of Chinese Grammar]*. Peking: Zhonghua Shuju.
- Wang, M.Q. (1987) *Transitivity and the ba-construction in Mandarin*. Doctoral Dissertation, Boston University.
- Zou, Ke (1993) The Syntax of the Chinese *ba* Construction. *Linguistics* 31: 715-736.



AN OT ANALYSIS OF CHINESE ABBREVIATORY COMPOUNDS

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1. INTRODUCTION

The abbreviatory compound is a very common type of word formation in Chinese. Like abbreviations or acronyms in other languages, Chinese abbreviatory compounds are the abbreviations or shortened forms of long words or phrases; unlike those abbreviations and acronyms in languages like English, they are compounds in Chinese, and they are not formed in the way of first letter concatenation like *UN* for *United Nations*, or the cropping of long words like *Mass.* for *Massachusetts*. Chinese abbreviations are composed of the individual morpheme from the original form, and have essentially the same meaning of the original form but with shorter form, e.g.

- | | | | | |
|-----|--|--|-----|---|
| (1) | <i>bian-fang</i>
frontier-protect
'frontier' | <i>jian-cha</i>
inspect-examine
'inspect(ion)' | --> | <i>bian-jian</i>
frontier-inspect
'frontier-inspect(ion)' |
|-----|--|--|-----|---|

The chosen morphemes are in bold in the input (same for all the following examples). In this example, *bian-jian* is the abbreviatory compound. It is formed by two morphemes from the original form. It is claimed that the abbreviations are predominantly formed by taking the first morpheme of each word in the original form (Packard, 2000), like in (1). But it is common to form the abbreviatory compounds in Chinese like (2) and (3) too.

- | | | | | |
|-----|---|--|-----|---|
| (2) | <i>chang-tu</i>
long-path
'long distance' | <i>dian-hua</i>
electricity-speech
'telephone' | --> | <i>chang-hua</i>
long-speech
'long-distance call' |
| (3) | <i>lao-shi</i>
old-teacher
'teacher' | <i>xue-sheng</i>
study-person
'student' | --> | <i>shi-sheng</i>
teacher-person
'teacher and student' |

The abbreviation in example (2) is formed by taking the first morpheme of the first compound *chang* of *chang-tu*, and the second morpheme of the second compound *hua* of *dian-hua*; while in (3) it is formed by taking the second morpheme of each compound in the original form. All possible combinations are found, and there are six different ways of abbreviation according to Jin (1999), including truncating one of the compounds in the original form like *Qing-hua* for *Qing-hua da-xue* 'Qing-hua University'.

However, there are few attempts to look for the rules of how these abbreviatory compounds are formed since it seems that there is no pattern at all. In this paper, I am going to explore the formation of the Chinese abbreviatory compounds in the framework of Optimality Theory (Prince & Smolensky 1993, OT hereafter).

The structure of the paper is as follows: part 2 talks about the assumptions and theoretical background on which the analysis is based; part 3 analyzes the data by introducing relevant constraints in OT and modifying them on the basis of some morphological principles for this analysis; part 4 summarizes this paper.

2. THE ASSUMPTIONS AND THEORETICAL BACKGROUND

Most phrases in Chinese can be abbreviated in some way, and so can some sentences. The length of these abbreviations is from 2 to 7 or more morphemes. However, the focus of this paper is on the abbreviatory compounds with two morphemes which makes up 70.9% of the total 1066 abbreviatory compounds found in Chinese (Jin, 1999). In addition, most of the two-morpheme abbreviatory compounds are originating from four-morpheme phrases (consisting of two compounds with two morphemes each). Considering that this is a small-scale study, my data contains 169 abbreviatory compounds that all originate from four-morpheme phrases.

Of all the compounds in the original forms in my corpus, there are three types of compounds: the endocentric, exocentric and co-ordinate compounds. The endocentric compounds are the compounds which have a head (Fabb 1998). In Chinese, the head of a compound may be defined canonically, by its position within the compound (Packard 2000). The canonical head in Chinese is defined by Packard (2000) as follows: the function of the form class of the word, following the headedness Principle: verbs have their canonical head on the left and nouns have their canonical head on the right. For example, the head of *xue-xiao* study-school 'school' is *xiao*, which is on the right of the noun; while the head of the verb *tiao-wu* jump-dance 'dance' is *tiao*, on the left side. This is a straightforward way to determine the head of nominal and verbal compounds in Chinese.

There are also some compounds that do not have a head. The exocentric compounds in Chinese are composed of morphemes that cannot be the head of the compound. For example, with *wei-sheng* protect-live 'hygiene', both morphemes *wei* and *sheng* have their own meanings, but neither of them is directly related to the meaning 'hygiene' as a word.

The co-ordinate compounds consist of components that both share head-like characteristics (Fabb 1998). For example, *jian-cha*, check-examine 'check up' is a word with both morphemes as the head, since both components have a similar meaning to the compound.

With all the above three types of compounds found in the original form, the puzzle we want to solve in this analysis is if there are any rules to determine which morpheme is preserved in the abbreviatory compounds, and whether they have any interactions if there are more than one rules. I am going to analyze it under the framework of OT, which I anticipate would provide a satisfying answer.

Optimality Theory (Prince & Smolensky 1993) proposes an input and an output and a formal relation between the two. OT's viewpoint of language, and in fact every grammar, is a system of conflicting forces (Kager 1999). Markedness and Faithfulness are the two major forces engaged in a fundamental conflict in every grammar. These 'forces' are embodied by constraints (Kager 1999). Thus OT is a theory of constraint interaction. Constraints in OT are violable and they are ranked differently to form the conflict-regulating mechanism specific to every grammar. The formal model of OT consists of three parts. Gen (the Generator) first creates a number of candidates; then Eval (the Evaluator) selects the optimal candidate from all these candidates by the ranking of constraints (Universal Con). The best candidate of a grammar is the least costly violation of the constraints (Kager 1999). A conflict shows in the formation of Chinese abbreviatory compounds since, for some compounds, the first morpheme is chosen in the abbreviation, while the last is chosen for other compounds. Thus OT holds the promise of regulating this conflict with a ranking of a set of constraints.

3. MORPHOLOGICAL CONSTRAINTS IN OT

In analyzing the truncative plurals in Koasati, Horwood (2001) advocates another type of constraint other than Faith and Markedness we discussed above; the anti-faithfulness constraints were added to the inventory of CON. An anti-faithfulness constraint proposed by Alderete (1999) is defined as the logical negation of a faithfulness constraint. Taking; for example, a constraint immediately applicable to the problem at hand, consider \neg Max, negatively quantified from Max (McCarthy & Prince 1999): (Horwood 2001)

① \neg Max-Cat: ('Delete at least one *Cat*')

It is not the case that every element of type *Cat* in S1 has a correspondent element of type *Cat* in S2.

(Horwood 2001)

This anti-faithfulness constraint is also applicable to the Chinese abbreviatory compounds, with the more specific element type- morpheme in this case:

①' \neg Max-Morpheme: It is not the case that every morpheme in the input has a corresponding morpheme in the output. ('Delete at least one morpheme.')

\neg Max-Morpheme captures the characteristics of Chinese abbreviatory compounds that they are shorter than the original form. \neg Max will penalize any candidate whose output is identical to input; if a morpheme of the

corresponding input (the original form) is not present in the output (the abbreviatory compound), the constraint will be satisfied. According to Horwood (2001), where \neg Max dominates all related Max constraints in a grammar, subtraction will occur. Therefore, this constraint should outrank any Max constraints in this analysis of abbreviation in Chinese.

To illustrate the \neg Max-Morpheme constraint for Chinese abbreviatory compounds, let's look at tableau 1:

<i>bian-fang jian-cha</i>	\neg Max-Morpheme
a. <i>bian-fang jian-cha</i>	*!*
b. φ <i>bian-jian</i>	

Table 1.

Candidate (a) is exactly the same as the input *bian-fang jian-cha*, thus it violates \neg Max-Morpheme. Since there are two compounds in the input, and both of them remain unchanged in candidate (a), the \neg Max-Morpheme constraint is violated twice, each by one compound. For candidate (b), on the other hand, the morphemes *fang* and *cha* are missing, it is the optimal candidate as it does not incur any violation of \neg Max-Morpheme.

However, in order to limit the distance between input and output, we need a faithfulness constraint to 'restrict the shape variability of lexical items' (Kager 1999). The second constraint is:

② Max-IO: Every segment of the input has a correspondent in the output. (McCarthy & Prince 1995, 1999)

The segment in the Max-IO constraint proposed by McCarthy and Prince originally refers to the phonological segment. However, since this is an analysis of morphological phenomenon and, like the \neg Max-Morpheme constraint, the segment in this analysis refers to the morphological segment, i.e. the morpheme.

②' Max-IO: Every morpheme of the input has a correspondent in the output.

This constraint keeps the abbreviation of the input to two morphemes in the output. Thus, input with only one morpheme or none at all is ruled out by this constraint.

<i>chen-shi jian-she</i>	\neg Max-Morpheme	Max-IO
a. <i>chen-shi jian-she</i>	*!*	
b. φ <i>chen-jian</i>		**
c. <i>chen</i>		***!

Table 2.

The deletion of one morpheme in the output incurs one violation of Max-IO. Because the abbreviatory compounds under analysis are all composed of two morphemes, the optimal candidate should violate this constraint twice. Candidate (a) in the tableau above does not incur any violation of Max-IO at all, but it violates \neg Max-Morpheme which is ranked higher than the Max constraint, so it is ruled out. Although candidate (c) does not incur any violation of \neg Max-Morpheme, it violates Max three times by deleting three morphemes. Candidate *chen-jian* is then the optimal output with the fewest violations of Max.

According to the classifications of the compounds I discussed earlier, the two compounds in the input *chen-shi jian-she* are co-ordinate ones:

(4) *chen-shi jian-she* --> *chen-jian*
 town-city build-establish
 'city' 'construction' 'city construction'

The first morpheme in these two co-ordinate compounds is chosen for the abbreviated form in this example, and this is the case for most co-ordinate words in Chinese. Statistics based on my database show that 90.0% of the co-ordinate compounds are abbreviated in this way (103 out of 115). Thus we may come up with another constraint based on the fact that most co-ordinate compounds keep their left-most morpheme in the abbreviated form:

- (8) *xue-yuan* *xue-xiao* --> *yuan-xiao*
 study-college study-school 'college' 'school' 'college and school'

It seems that the head is the morpheme preserved in the abbreviatory compound. Therefore, there must be another faithfulness constraint based on the concept of the morphological head to single out the optimal candidate, the constraint is:

- ④ Faith-head: The input head is preserved in the output.

This constraint is in conflict with Anchor-L when we apply it to the compound nouns since the head is on the right side. In order to predict the correct output, the Faith-head constraint must outrank the Anchor-L constraint:

<i>xue-yuan xue-xiao</i>	–Max-Morpheme	Faith-head	Anchor-L	Max-IO
a. <i>xue-yuan xue-xiao</i>	*!*			
b. <i>xue-xiao</i>		*!	*	**
c. <i>xue-xue</i>		*!*		**
d. <i>yuan-xiao</i>			**	**
e. <i>yuan-xue</i>		*!	*	**

Table 5.

In this tableau, although candidate (d) *yuan-xiao* incurs the most violations of Anchor-L, the fact that it incurs no violation of Faith-head (with both heads *yuan* and *xiao* kept in the output) makes it optimal. Candidates (b), (c), and (e) are ruled out because they violate the Faith-head constraint that is higher than Anchor-L.

As for the compound verbs with a head, there is no conflict between the Faith-head and the Anchor-L constraint, because both are on the left, any candidate that obeys the former also obeys the latter, and vice versa.

- (9) *tiao-jie* *kong-zhi* --> *tiao-kong*
 adjust-item control-restrict adjust-control
 'adjust' 'control' 'adjust and control'

<i>tiao-jie kong-zhi</i>	–Max-Morpheme	Faith-head	Anchor-L	Max-IO
a. <i>tiao-jie kong-zhi</i>	*!*			
b. <i>jie-kong</i>		*!*	*	**
c. <i>jie-zhi</i>		*!*	**	**
d. <i>tiao-kong</i>		*		**
e. <i>tiao-zhi</i>		*	*!	**

Table 6.

In the example above, *tiao-jie* is the headed verb and *kong-zhi* is a co-ordinate compound. Candidate (a) is ruled out because it violates –Max-Morpheme that ranks higher than the Max-IO constraint. Both candidate (b) and (c) violate Faith-head twice, making them the non-optimal candidates. Their first violation of the Faith-head is because the head of the verb *tiao* is not preserved in the output, while their second violation is because either of the morphemes in a co-ordinate word is considered the head, so the Faith-head constraint must be violated if either one is deleted. Candidate (d) violates Faith-head once but (e) violates both Faith-head and Anchor-L, so that candidate (d) is the optimal one.

However, for over half of the headed nouns (about 70%), the non-head is chosen in the abbreviatory compounds rather than the head. Similarly, 6 out of 8 headed verbs in my corpus have their non-head morpheme preserved in the abbreviation. Thus the constraints that we have discussed so far cannot predict the correct abbreviatory forms for over half of the headed compounds. Let's examine some examples to see why the non-head morpheme is chosen:

- | | | | | |
|------|--|--|-----|---|
| (10) | <u><i>nong-ye</i></u>
agriculture-industry
'agriculture' | <u><i>xue-xiao</i></u>
science-study
'science' | --> | <i>nong-xiao</i>

'school of agriculture' |
| (11) | <u><i>shang-ye</i></u>
business-industry
'business' | <u><i>xue-xiao</i></u>
science-study
'science' | --> | <i>shang-xiao</i>

'school of business' |

All the compounds in (10) and (11) are headed nouns. According to the definition of canonical head, *ye* and *xiao* are the head in the corresponding compounds since they are at the rightmost position of the nouns. The head *xiao* is chosen according to the Faith-head constraint, but the head *ye* in *nong-ye* and *shang-ye* is not chosen. There must be some other constraint on the selection for the headed compounds, and it must be ranked higher than the Faith-head constraint to override it. Let's first assume that the head *ye* is chosen in both examples. The result would be that the same abbreviation is derived from two different original forms, and of course with different meaning. If **ye-xiao* is used for both phrases, ambiguity will arise as the reader or hearer would not know to which original form it corresponds. In other words, this does not provide any information about the specific industry that the school is involved in at all.

Similarly for the headed verbs, the choice of the head (which is the leftmost morpheme for the verb) will also result in ambiguity.

- | | | | | |
|------|---|---|-----|---|
| (12) | <u><i>jie-yue</i></u>
save-restrict
'economize' | <u><i>yong-dian</i></u>
use-electricity
'electricity' | --> | <i>jie-dian</i>
save-electricity
'economize on electricity' |
| (13) | <u><i>jie-yue</i></u>
save-restrict
'economize' | <u><i>yong-shui</i></u>
use-water
'water' | --> | <i>jie-dian</i>
save-water
'economize on water' |

If the head *yong* of both verbs in (12) and (13) is chosen, we will not know what we are economizing on (*jie-yue*), so ambiguity arises. Therefore, we need another constraint to ban the outputs that will cause ambiguity.

⊙ *Ambiguity: Avoid ambiguity.

This constraint is tricky in regard to how we determine which output violates *Ambiguity. If the output containing the head of the compound violates *Ambiguity as discussed in (10) to (13):

- | | | | | |
|------|--|--|-----|---|
| (10) | <u><i>nong-ye</i></u>
agriculture-industry
'agriculture' | <u><i>xue-xiao</i></u>
science-study
'science' | --> | <i>nong-xiao</i> / <i>*ye-xiao</i>

'school of agriculture' |
|------|--|--|-----|---|

What about those optimal output containing the head of compound discussed in (8) and (9)?

- | | | | | |
|-----|--|--|-----|--|
| (8) | <u><i>xue-yuan</i></u>
study-college
'college' | <u><i>xue-xiao</i></u>
study-school
'school' | --> | <i>yuan-xiao</i> / <i>*xue-xue</i>

'college and school' |
|-----|--|--|-----|--|

The choice of the head *ye* in **ye-xiao* violates *Ambiguity so it is not optimal, but the choice of the head *yuan* and *xiao* in *yuan-xiao* does not, so it is optimal. How can we know whether the choice of the head violates *Ambiguity?

One way of doing this is to see whether the canonical head matches the semantic head. If yes, the choice of the head will cause ambiguity. According to Packard (2000), the semantic head is that part of the word which is a more general instance of what the entire word means, often defined in terms of the 'IS A' relation, e.g., *ye* is both the semantic head and the canonical head for *nong-ye* agriculture-industry 'agriculture', which is a kind of industry. In other words, if the canonical head is a more general term, it is also the semantic head, and the choice of the head

will result in ambiguity so it violates *Ambiguity; whereas if it is not, the choice of canonical head will not result in ambiguity thus preserved in the abbreviation. Therefore, any output with the head *ye* 'industry' will cause ambiguity as it is a more general term.

- (10) *nong-ye* *xue-xiao* --> *nong-xiao*
 agriculture-industry science-study
 'agriculture' 'science' 'school of agriculture'

<i>nong-ye xue-xiao</i>	—Max-Morpheme	*Ambiguity	Faith-head	Anchor-L	Max-IO
a. <i>nong-ye xue-xiao</i>	*!*				
b. <i>nong-xue</i>			**!		**
c. <i>nong-xiao</i>			*	*	**
d. <i>ye-xue</i>		*!	*	*	**
e. <i>ye-xiao</i>		*!		**	**

Table 7.

Candidate (b) violates Faith-head twice and the second violation makes it fatal. In spite of the fact that candidate (c) violates Faith-head once, it is the optimal output given that the *Ambiguity constraint is ranked higher than the Faith-head constraint. And the other two candidates incur violations of *Ambiguity with the head *ye* preserved.

The fundamental difference between the canonical and semantic head of a headed compound is that the former has a stable position (right for nouns and left for verbs), while the latter does not have a fixed position. According to Packard (2000), the structural head (the canonical head) often matches with the semantic head, but there are cases in which they differ. One example is the word *xue-xiao* study-school 'school', in which the canonical head is on the right, but the semantic head is on the left (since a school is more generally understood as a kind of place to 'study' compared with *xue-yuan* study-college 'college'). This can be further proved by the statistics based on my data that 70% of the headed nouns have a match between the canonical head and the semantic head as the non-head morpheme chosen in the abbreviation, e.g. (the morpheme in black is both the canonical and semantic head):

- (14) *wen-xue* / *guang-xue* / *ke-xue* ...
 writing-study light-study science-study
 'study of literature' 'optics' 'study of science'

Furthermore, the reason that ambiguity will arise with the head preserved in the abbreviatory compound is because there is more than one word with the same head.

- (15) *da-xue* / *zhong-xue* / *xiao-xue*
 big-study middle-study small-study
 'university' 'middle school' 'elementary school'

The three compounds in (15) have the same structure and have the same head *xue*, thus, the choice of *xue* in abbreviation is very likely to cause ambiguity. It is also the case for headed verbs like in example (12) and (13), *yong-dian* use-electricity, *yong-shui* use-water, *yong-you* use-oil, etc. Because they are words with the same structure, the choice of the head *yong* that they all have will be ambiguous in abbreviations.

- (12) *jie-yue* *yong-dian* --> *jie-dian*
 save-restrict use-electricity save-electricity
 'economize' 'electricity' 'economize on electricity'

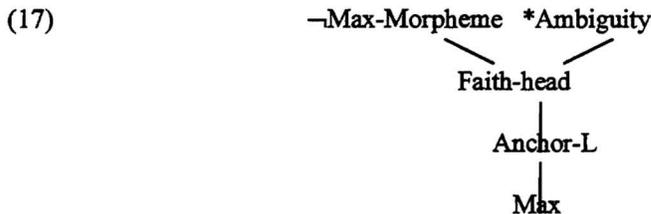
<i>jie-yue yong-dian</i>	¬Max-Morpheme	*Ambiguity	Faith-head	Anchor-L	Max-IO
a. <i>jie-yue yong-dian</i>	*!*				
b. <i>jie-yong</i>		*!	*		**
c. <i>jie-dian</i>			*	*	**
d. <i>yue-yong</i>		*!	*	*	**
e. <i>yue-dian</i>			*	**!	**

Table 8.

Although *yong* is the canonical head on the left, *dian* is chosen in the abbreviation. Candidate (b) and (d) incur a violation of *Ambiguity since the head *yong* that will cause ambiguity is preserved. Candidate (c) and (e) incur one violation of the Faith-head constraint ranking lower than the *Ambiguity constraint. Since candidate (e) violates Anchor-L twice, while (c) only violates it once, (e) is not the optimal candidate.

In summary, we have accounted for how the Chinese abbreviatory compounds are formed in the framework of OT by using five constraints based on morphological principles. The ranking of all these five constraints are:

(16) ¬Max-Morpheme, *Ambiguity >> Faith-head >> Anchor-L, Max



Though there are some exceptions that our OT analysis is unable to account for, this analysis provides a straightforward explanation for the majority of the abbreviatory compounds in my corpus.

4. CONCLUSION

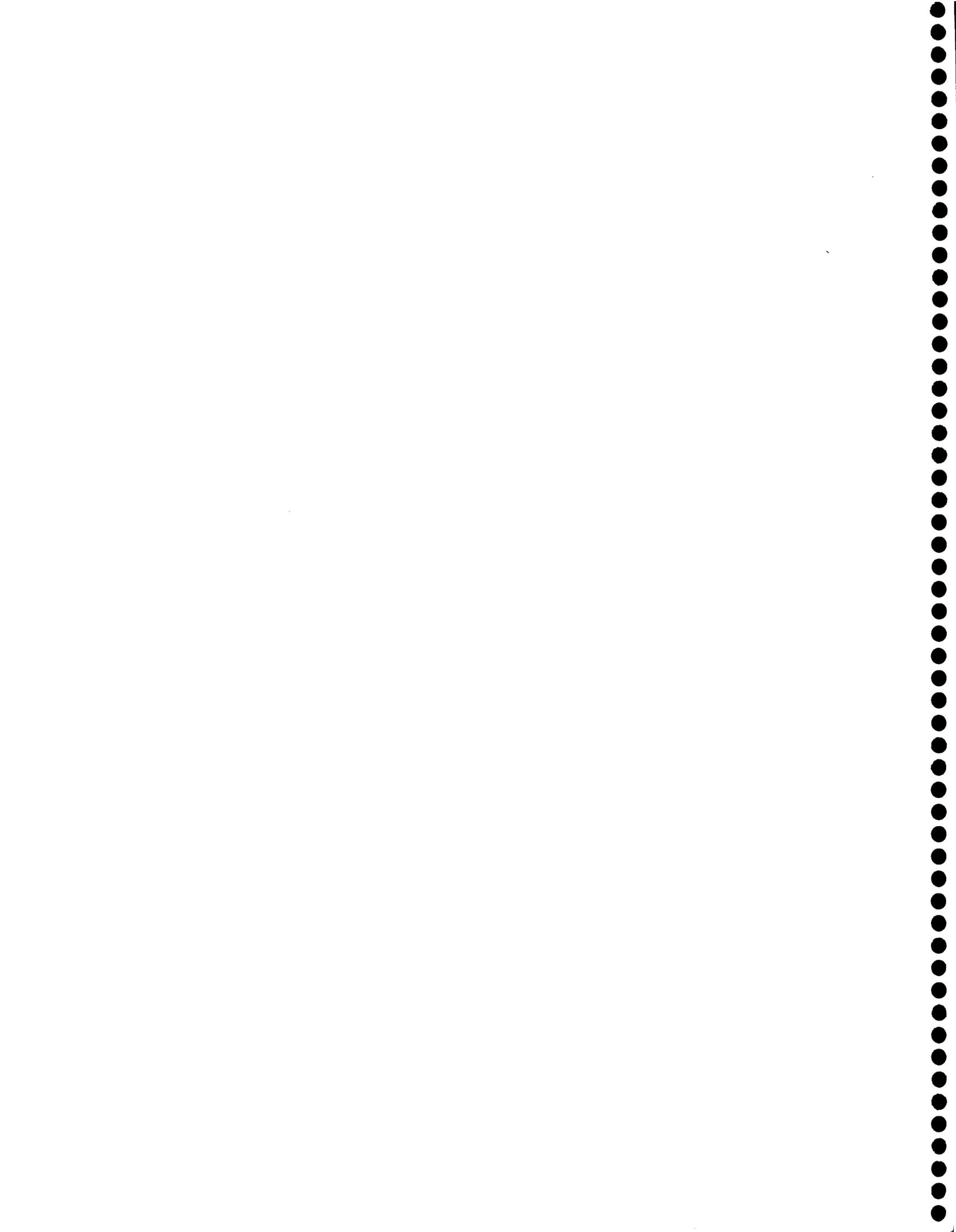
This paper is a study of the formation of Chinese abbreviatory compounds based on the framework of Optimality Theory. A number of constraints in morphology play a very important role in determining the choice of the morphemes kept in the abbreviation. The ranking of those constraints can explain the majority of the data from the database of 169 abbreviatory compounds, which is indeed a clear analysis for this morphological phenomenon in the Chinese language.

This analysis successfully combines the framework of OT with morphological notions (e.g. morpheme and head), and principles like the Headedness Principle and Avoid ambiguity, together with a set of established constraints and the rankings among them, which provides evidence that OT can extend to areas other than phonology and syntax.

REFERENCES

- Alderete, John (1999) *Morphologically governed accent in Optimality Theory*. Doctoral dissertation, UMASS, Amherst. ROA-309.
- Fabb, Nigel (1998) Compounding. In Spencer, Andrew and Arnold Zwicky (eds), *The Handbook of Morphology*. Blackwell Publishers.
- Horwood, Graham (2001) *Anti-faithfulness and Subtractive Morphology*. UBC. ROA-466.

- Jin, Zhenguo (1999) *Dangdai Hanyu Suolueyu de Shehui Wenhua Jiazhi*. M.A. Thesis, Beijing Language and Culture University.
- Kager, Rene (1999) *Optimality Theory*. Cambridge University Press.
- McCarthy, John J. & Alan S. Prince (1995) Faithfulness and Reduplicative Identity. In Jill N. Beckman, Laura Walsh Dickey and Suzanne Urbanczyk (eds.), *Papers in Optimality Theory*. 249-384. University of Massachusetts, Amherst.
- McCarthy, John J. & Alan S. Prince (1999) Faithfulness and Identity in Prosodic Morphology. In Rene Kager, Harry van der Hulst and Wim Zonneveld (eds.), *The Prosody Morphology Interface*. 218-309. Cambridge University Press.
- Packard, Jerome L. (2000) *The Morphology of Chinese*. Cambridge University Press.
- Tang, Ting-chi (1994) More on the Relation Between Word-Syntax and Sentence-Syntax in Chinese Case Study in Compound nouns. In Jose Camacho and Lina Choueiri (eds.), *NACCL 6*, Vol1. 195-248. University of Southern California.
- Wei, Dongya, etc. (1997) *Chinese-English Dictionary (Revised Edition)*. Foreign Language Teaching and Research Press.



**DIALECTS IN A DEAD PIDGIN:
A PRELIMINARY EXPLORATION OF VARIATION IN CHINOOK JARGON¹**

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Chinook Jargon (CJ) is not as dead as it is reputed to be. It still lives in the speech of many British Columbians (even though most speakers probably don't realize that the words they are using, like "skookum," "tyee," or "tillicum," are in fact of Jargon origin), and in place names, street names and business names in the Pacific Northwest as a whole. In the American parts of this area, a healthy interest in CJ is both maintained and evoked in various specific geographical areas, the upper part of Puget Sound for one, and in the place where the annual rendezvous of the "pioneer people" is held. Some adults are learning it for the first time as part of their cultural heritage; others who learned it as children still use it to some extent today, albeit for quite specific special purposes, and still others, like the "pioneers," are dabbling in it, apparently just because it's a "fun thing to do."²

Nearly all these modern users of "Chinook Jargon as a Second Language" are doing so from dictionaries and textbooks without the benefit of pronunciation drills or native speaker example that the learning of a second language would normally provide. (A possible exception to this is the Grand Ronde programme.) Since the social context is also missing, there tends to be little variation of any kind, so that much of what is found today is a kind of modern standardized variety or "book Chinook" based on the 19th century dictionaries. The Grand Ronde programme and its proponents are trying to insist that their form is the "proper" one and would like to make it the standard for the whole Pacific Northwest area, refusing to take into account that the Grand Ronde form has always been considered by scholars as somewhat different, possibly closer to the Chinookan languages of the Columbia River area, and ignoring the fact that there is always variation in a pidgin or trade language, not only from one region to another, but even among speakers of different linguistic backgrounds living in the same region.

But it is with the older, i.e. 19th century and early 20th century, forms of the language that this paper is concerned. Any language as widespread as was Chinook Jargon is bound to have variation. The use of the Jargon spanned several thousand miles (Northern California to Alaska and the Pacific Coast to the Rocky Mountains) and was based on variables such as ethnicity, location, and purpose, so it is not surprising to find that it was used not only in a variety of linguistic registers but also in a variety of linguistic manifestations. The problem is how to get at this variation. The few living people who remember CJ as a viable tongue will say things like, "Well, we say so-and-so, but down [up, over] there, they said thus-and-such." Fine, but where does one go from there?

Travel books are a good place to start. I could fill up the rest of the space allotted for this paper citing quotations that comment on the differences found in the Jargon from one area to another, but that would be pointless.

Dictionaries and glossaries? Yes, indeed, especially Shaw (1909), who not only has the most complete lexicon of all the dictionaries available, but who also quotes Eels (1893) and his other sources on the subject of variation. The orthography varies considerably among and sometimes even within most of the lexicographical documents that I have examined, and this may or may not indicate phonological variation. Often these spelling variations seem to have been just different representations of the same phonemes, but whether or not this is true is almost impossible to determine. However, my research has revealed both lexical and phonological differences from the two ends of the CJ areal spectrum, that is, from about mid-Oregon (the written material from southern Oregon

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² Since this paper was first written, I have learned that in Grand Ronde, OR, CJ is being taught as a second language in the reservation school, and indeed a whole programme has been instituted to encourage its use among all the Native Americans who live there.

and northern California is scarce) to southern Alaska, and between coastal and inland varieties (the east-west dimension is particularly well-documented). Because various dictionaries were written for various purposes, they also reveal registral difference, especially in the lexicon.

I have therefore chosen, in order to demonstrate some of the variation in Chinook Jargon, to use four dictionaries from four geographical areas, showing at least two different registers.

The primary source is Shaw (1909), published in Seattle. Because this dictionary is based on a number of preceding ones (Gibbs 1863, Eels 1893, etc.) and includes their commentaries on the Jargon and its structure, I have used it as the one against which the others are compared. It is certainly among the most exhaustive and comprehensive of all the available lexicons, glossaries, etc., and according to "El Comanchero" (W.S. Phillips), a turn-of-the-19th-to-20th-century Northwest author who was a fluent speaker of CJ, "the most nearly correct [*sic*] treatise bearing on the Jargon that I have ever seen."

The other three are perhaps more correctly termed "glossaries," although one, (LeJeune 1924) is part of a whole language manual for learning Chinook Jargon. Closest geographically to Shaw is Hibben (1908) from Victoria, but it is largely a version of Gibbs (1863) and therefore probably more typical of Oregon. Hibben published his dictionary every year from 1877 to 1931, and there are remarkably few differences among the different editions. Both Shaw and Hibben have English-Chinook sections as well as Chinook-English, though in Hibben's case, there is not a complete correspondence; that is to say, words that are in the Chinook-English section cannot always be found in the English-Chinook, which must have made life rather difficult for the users - it is certainly frustrating for the researcher!

The two remaining glossaries are removed in register as well as in distance. From Grand Ronde, Oregon, in 1985 comes a book celebrating the 125th anniversary of the arrival from Belgium of later-to-be Msgr. Adrien-Joseph Croquet, generally anglicized by his parishioners and everyone else who knew him as "Father Crockett." This book contains a catechism as well as a number of prayers in the Jargon, from which the author, Fr. Martinus Cawley, has extracted a "Vocabulary of the Chinook Jargon, Prayers, Hymns and Catechism." The vocabulary is based on the work of Demers, Blanchet and Saintonge, the last-named working from Yakima, WA, published in 1871. (Eels, quoted in Shaw, p. xiv, makes the comment that this dictionary was "intended more for use by the Catholics than by the public"; one can only assume that he means "Catholic priests"!). While far from complete, this little glossary is quite adequate to show some of the differences we will be looking at. Fr. Cawley has also included some useful comments about registral differences.

The fourth work used in this study is "Chinook Rudiments" (1924) by Fr. Jean-Marie Raphael LeJeune, published in Kamloops B.C. in 1924, apparently as a special edition of the Kamloops Wawa, a periodical usually thought to have ceased publication a year previously. This is an especially useful, although occasionally frustrating, work, as LeJeune not only lists all the common words, but divides them according to their most common syntactic use, comments on their etymologies when he knows them, and gives tips as to their usage. The frustration comes in trying to find exactly what one is looking for, as the glossary part is not set out in an ordinary alphabetical list, by rather by categories such as "The 163 original words" or "Chinook words more or less used but not included in the above list." There are also lists of what he calls "Hudson's Bay French words" and "English words." The latter list is very long (over 200 words), and he comments on the former that the words are "hardly ever used now." One then discovers, in reading the practice exercises, that they are indeed used, but in their Jargon form, not in the original French listed by LeJeune. The same applies to some, though by no means all, of the English words.

The time of these lexicons covers a span of about fifty years, from Crockett in the 1870s to LeJeune in the 1920s. This brings to light another type of variation: there are noticeably many more English words in LeJeune's vocabulary than in the others. Chinook Jargon was, by this time, undergoing relexification, and by the 1940s, in the available records we have of actual spoken or written utterances, it looks more like a "pidgin English" than the Chinookan and Nootkan-based trade jargon it started out as. That this process began soon after the turn of the century is evidenced by Shaw, who quotes Eels as saying that in 1904 there were 570 words of English origin in the Jargon (this seems somewhat excessive to me; even in 1924, LeJeune lists only 233) and that "many words of French and Indian origin have been dropped. The English words are used both by Indians and whites when they talk Chinook, and so have become part of the language" (Shaw, xii).

Let us now look more closely at the several types of variation. I should like to begin by noting some of the comments contained within those references I have used -- except Hibben, who makes no comments at all. His is definitely a "do-it-yourself" work, probably because, having copied it from Gibbs, he had no original comments to make.

First of all, variation in register. In chronological order, we must begin with Fr. Crockett in the middle of Oregon (though the voice is actually Fr. Cawley's, talking about Fr. Crockett and his work). Enlarging on the fact that he has reduced to 180 words Saintonge's list (the edition from which Crockett was working, and which Boas (1933) considered "the most scientific in the spelling," also remarking that it was "entirely independent of all the others"), Cawley says:

In the full list, one sees immediately that the Jargon, made for use among frontier men, did not shrink from "street-language" terms for such basics as animal excrement. In the council hall, one could speak elegantly in Jargon, and there is always dignity in the translations provided in government documents, but Jargon was not "high-brow" in everyday usage. This fact needs to be borne in mind if the reader is not to be misled by the special diction used in our own translation.

Shaw does not make many comments himself, but quotes others such as Eels and Gibbs at length. None of these others, however, pays much, if any, attention to differences of register. Shaw himself does note, apropos of words of Canadian French origin in the lexicon, "When the Hudson's Bay Company removed from Oregon and Washington these Canadians also largely left, so a large share of these words of French origin have been dropped" (xii). He goes on to say of French lexical items (which he distinguishes from Canadian French), "About thirty words are now in use [down from 153 in 1894], and these will soon be dropped, as they are seldom used, except by the old folks." So we have evidence of an age register, as well as of the contextual registers referred to by Cawley. Shaw (xvi) does quote Eels as saying, "The environment always affects the language," although it is probably not quite fair to cite this as evidence of register, as Eels was discussing the number of unusual words in Judge Swan's (1857) word list, and so probably intended the remark to refer to local lexical variation.

The most obvious example of registral variation to be found in these four sources is between the two priestly glossaries on the one hand, and the two general-use dictionaries on the other. Although Fr. LeJeune's vocabulary is general on the whole, it does include many religious terms that are found neither in Shaw nor in Hibben. Cawley, in his adaptation of Fr. Saintonge's dictionary, has eliminated all of the common words except those found in the prayers and the catechism, but has also included all the religious terms that would have been used by the missionaries and their flocks. While these differ in some minor details from those of LeJeune, they are in most respects the same.

As in most dialect work, it is the regional differences in lexicon and phonology that are the most eye- and ear-catching. Fr. Cawley, whose comments on the whole tend to the sociolinguistic, remarks, "Pronunciation seems to have differed a good deal from place to place." Fr. LeJeune was interested in teaching his parishioners to read and write the Jargon through the use of Duployan shorthand and thence to pronounce it to some sort of standard. (He used Duployan as a sort of phonemic system, which he interpreted through English - by 1924 there were probably not too many French speakers in the Kamloops area.) He does remark, however, in his 'Preface,' "...such modifications were made in pronunciation as suited tongues accustomed to different sounds." This of course refers to a type of variation in the Jargon that is already well-known, that native French speakers probably kept their nasalized vowels, non-rhotic English speakers still left out the /r/s, and speakers of the various indigenous languages kept their glottalized obstruents and lateral fricatives. And yet we also know that there was a good deal of compromise in the interests of comprehension, the modifications of which LeJeune speaks. Thus in any given area, some pronunciations would depend upon what were the native languages spoken there and who were the European settlers.

Because, except for the odd comment provided by Shaw from his authorities, we have to rely on the spelling for the pronunciation, dealing with "regional accents" in CJ presents problems. In the first place, one has to assume that the author was consistent in his orthography (most of them give pronunciation keys, although these are not always complete). Secondly, spelling is often influenced by the native language of the author. For example, words that seem to begin with [h] in the English dictionaries are spelled without <h> by Fathers Crockett (remember, he was really "Croquet") and LeJeune. Thus where the others have *hyak* 'fast, quick,' *hyas* 'large,

great,' and **hyiu** 'much, many,' the two French-speaking priests have [ajak], [ajas] and [aju], with slight differences in spelling such as <i> ~ <y>. But even they are not totally consistent, either within themselves or taken together. Fr. Crockett (or was it really Saintonge?) gives the negative **halo** as <helo>, indicating that [h] was present, while Fr. LeJeune has <elo>. Thus:

[h]/#_	vs.	[0]/#_
Shaw		Crockett & LeJeune
hyak 'fast, quick'		aiak ayak
hyas 'large, great'		aias ayaz
hyiu 'much, many'		aiu ayoo
halo NEG		helo elo

LeJeune also apparently follows the French rule (though not consistently) of unstressed vowel deletion, as in **muckamuck** 'food' and **huloima** 'different,' which he perceives as <makmak> and <h'loima>. Crockett, on the other hand, has <mokamok> and <holoima>:

Shaw		Crockett & LeJeune	
		(spelling same as transcription)	
muckamuck	[makəmæk]	[mokamok]	[makmak]
huloima	[huloimə]	[holoima]	[hloma]
sapolil	[saepolil] 'wheat, flour'	[sapolil]	[saplel]
tenas	[tɛnəs] 'small, child'	[tanaz]	[tanaz]
snass	[snaes] 'rain'	no entry	[snaz]

Fr. Cawley states, "The vowels, of course, [as in Saintonge's spelling] are pronounced as in Italian," thus giving quite different pronunciations from Shaw's as can be seen from the transcriptions above, especially in the first three words.

There is some evidence also from LeJeune's orthography that he sometimes has [z] in final position where the others have [s], as in the examples above **tanaz** for **tenas** and **snaz** for **snass**, and in **gliz** for **gleas** 'fat, grease.' But sometimes final [s] becomes [sh], as in **kaltash** for **cultus** 'bad, useless,' while at other times the reverse is true, as when Shaw's and Hibben's **kloshe** 'good, beautiful, etc.' is LeJeune's **tloos** (and note the orthographical representation of the lateral fricative which in the "English" renditions becomes [kl]). Cawley's final sibilants are "standard," if one may use that term here, as seen in **tenas** in the chart above, as well as by his spellings **kaltas** (**cultus**) and **tlush** (**kloshe**) (though note the initial lateral fricative here as in LeJeune). It is also quite possible that the pronunciations given by LeJeune simply follow local pronunciation (Dale Kincaid, p.c.). This is just one of many things that need further investigation.

Yet another notable feature that occurs, mainly in Crockett's list but occasionally also in LeJeune's, is the rendering of barred lambda as [tl] versus the [kl] of the dictionaries written by native speakers of English. I have commented briefly on this above, but further examples are:

Shaw		Crockett & LeJeune	
klahowya	[all purpose salutation]	tlaHowiam	klahoyiam
klaska	III PL	tlaska	klaska
kliminawhit	'to tell a lie'	tlemnawhit	tlemeno

Thomason (1983) has remarked that Bishop Demers' orthography indicates that the French heard allophonic differences that seem to have escaped the English (this agrees with Boas' comment on Saintonge cited earlier, and is certainly true of Saintonge as represented by Cawley). The English have never been noted for their ability to cope with foreign languages!

It seems that stress, as well, varied from place to place. LeJeune makes no overt comment about stress in general, but he does mark it on words of more than one syllable. Shaw treats stress the same way. Cawley, on the other hand, does not mark stress, but states, "Most words of two syllables have accent on the second," which leaves one wondering about polysyllabic words like **konamokst** 'both' and **nawitka** 'yes, indeed, to be sure,' which are,

according to Shaw, stressed on the first and second syllables respectively; LeJeune stresses them the other way around. LeJeune also stresses his *ayak*, *ayaz* and *ayoo* on the first syllable, while Shaw stresses the corresponding *hyak*, *hyas* and *hyiu* on the second. (Interestingly, normal English stress patterns seem to have taken over where *hyak* is used in the name of the “Hyak Anvil Battery” of New Westminster, B.C. and the New Westminster girls’ basketball team, where as far as I have ever heard, the stress is on the first syllable.

As one last piece of evidence for the great variation of pronunciations possible for one item over the area of CJ, let us consider the Jargon words for “devil,” where the variations in spelling as given by Shaw certainly indicate, for the most part, variation in the phonetic realization of two French etymons, *diable* without the article, and *le diable* with. From the first, we find *dahblo* (or is it somehow < Sp. *diablo*?), *diaub/dieaub/deob* and *derb*, as well as *yaub* with deletion of the initial consonant and from the second, *lejaub* (Shaw’s headword for the entry), *leiom/lejaum* and *leiop*.

The last major type of variation that I wish to discuss is lexical. Neither Hibben nor Cawley makes much mention of regional variation in lexicon, but Shaw has many such notes, and Fr. LeJeune has a complete section of vocabulary headed “Words used in other districts.” He says that his first knowledge of Chinook Jargon came to him from “flying sheets” given to him by Bishop Durien so that he could study the Jargon on his journey from LeHavre to New York, across the continent to San Francisco and thence to Kamloops in 1879. It is likely from the date that these lists were based on Demers, and would therefore contain many items peculiar to the Oregon Territory and possibly the coastal area. Further on, LeJeune comments of this list, “Some of these words are not used up the country [where he was], while the [*sic*] are in the lower and coast districts.” He has included most of these words in the second part of his vocabulary, “Chinook words more or less used, not included in the above list.” When comparing LeJeune’s list of words used outside the interior of B.C. with Shaw (who has included etymologies), it becomes apparent that many of the words are borrowed from Chinook and neighbouring languages. It is therefore hardly surprising that they either had not made their way up into the Interior, or had been replaced with local words. That LeJeune quickly adapted to the variety of the Jargon used where he was now living is evidenced by the fact that in his word lists he includes several lexical items not to be found in the other dictionaries. For examples of these categories, see Appendix A.

As a final demonstration of the several kinds of variation, I would draw your attention to Appendix B, which contains two versions of the Lord’s Prayer in CJ, one the usual one (at least in my part of the world, i.e., B.C. and the state of Washington), the other, the one given in the Father Crockett memorial. The interlinear translations here are mine, though both sources do give their own more or less literal translations. I have also given the King James Bible/Book of Common Prayer version and a French version, the one I learned many years ago, as these were probably the main sources for the Jargon translations by Protestant, Anglican, or Roman Catholic missionaries.

One last comment as to the present use of Chinook Jargon. Apart from the New Westminster organizations mentioned above, the canoe used by the RCMP in 1997’s “vision quest” was called “Skookum Kalitan” or ‘brave/strong arrow’; the former Vancouver basketball team, the Grizzlies, had as part of their logo the phrase *Hyas chetwoot*, which really means ‘great black bear.’ (Shaw’s word for grizzly is *siam*, but that might have caused confusion.) And just look around you for street names, business names, topographical names. Chinook Jargon is alive and surviving in British Columbia!

REFERENCES

A. Dictionaries

Cawley, Martinus, O.C.S.O. (1985). *Father Crockett of Grand Ronde, 1860-1985: Adrien-Joseph Croquet “Saint of Oregon.” 1818-1902.* A life in Honor of the 125th Anniversary of his Arrival. Lafayette, OR: Trappist Abbey.

Demers, Blanchet, and St Onge [*sic*]. (1871) *Dictionary, Catechism, Prayers and Hymns.* Montreal: n.p.

Eels, Myron (1893). “Manuscript Dictionary of the Chinook Jargon,” 5 vols. folio. Skokomish: Union City.

Gibbs, George (1863). A Dictionary of the Chinook Jargon. New York: Cramoisy Press.

[Hibben, T.N.] (1908). Dictionary of the Chinook Jargon or Indian Trade Language of the North Pacific Coast. Victoria, B.C.: T.N. Hibben & Co.

LeJeune, Father Jean-Marie Raphael (1924). Chinook Rudiments. Kamloops, B.C. [apparently a special edition of the Kamloops Wawa].

Shaw, George C. (1909). The Chinook Jargon and How to Use It. Seattle: Rainier Publishing Co., Inc.

B. Miscellaneous

Boas, Franz (1933). Note on the Chinook Jargon, Language 9: 208-213.

Swan, James G. (1857). The Northwest Coast (or Three Years' Residence in Washington Territory). Fairfield: Ye Galleon Press.

Thomason, Sarah Grey (1983). Chinook Jargon in Areal and Historical Context, Language 59: 820-870.

APPENDIX A. LEXICAL VARIATION

I. Some of LeJeune's "words used in other districts" with Shaw's etymologies and comments:

amo't 'strawberry' [amota (Chinookan family) - in list of words "of only local use"]

cheet-woot 'black bear' [chetwoot (Salish) - same list]

kwana'is 'whale' [Hibben gives ehkoli; Shaw has no words for whale in the main vocabulary, just in the English-Chinook list, where he gives variations on both these words with no comment.

II. Some words in LeJeune not found elsewhere (with the "common" word):

ayaz 'all' [this seems to be the equivalent of hyas 'large, great' in Shaw; the "common" word is konaway.]

bear 'bear' [the common word is chetwoot 'black bear' the most numerous variety in the Pacific Northwest area]

Canada man 'Canadian' [nobody else bothers to distinguish us from "Boston men"]

haha 'awful, divine, perfect, glory, etc.' [Shaw gives kahkwa saghalie tyee 'like God']

spa'kram 'flower' [the common expression is kloshe tupso 'beautiful plant']

APPENDIX B. THE LORD'S PRAYER

[“H” = Hibben, “C” = Crockett/Cawley, KJV = King James Version, F= French]

H **Nesika papa klaksta mitlite kopa saghalie**

I pl. father who stays PREP above

C **Nsaika Papa, SeHali mika mitlite**

I pl. father above II sg stay

KJV "Our Father, who art in Heaven,

F -Notre Père, qui êtes aux cieux

H **kloshe kopa nesika tumtum mika nem**

good PREP I pl. heart II sg name

C **tlush pus kanewa telikom komtoks maika nem**

good if all people know II sg name

KJV hallowed be Thy name,

F que Votre nom soit sanctifié,

H **kloshe mika tyee kopa konaway tillicum**

good II sg chief PREP all people

C **tlush pus aiak nsaika nanich kopa maika**

good if forthwith I pl. look PREP II sg

KJV Thy kingdom come

F que Votre règne arrive,

H **kloshe mika tumtum kopa illahie kahkwa kopa saghalie**

good II sg will PREP earth as PREP above

C **Okuk tlaska kopa saHali, tlaska komtoks maika wawa pi tlush kakwa nsaika kopa**

those III pl. PREP above III pl. know II sg word and good as I pl. PREP

elehi

earth

KJV Thy will be done on earth as it is in Heaven.

F que Votre volonté soit faite sur la terre comme aux cieux.

H **Potlatch konaway sun nesaika muckamuck**

give every day I pl food

C **Okuk san, pi kanewe san potlach nsaika mokamok**

This day and every day give I pl food

KJV Give us this day our daily bread

F Donnez-nous aujourd'hui notre pain quotidien

H **Spose nesika mamook masachie wake mika hyas solleks**

If I pl do evil NEG II sg very angry

C **Pi tlush maika kopet komtoks nsaika mesache**

And good IIsg stop know I pl evil

KJV And forgive us our trespasses

F Et pardonnez-nous nos offenses

H **pe spose klaska masachie kopa nesaika, wake nesaika solleks kopa klaska**

and if III pl evil PREP I pl NEG I pl angry PREP III pl

C **spos tlaksta mamook kata nsaika**

if someone do something I pl

KJV as we forgive those who trespass against us.

F comme nous pardonnons ceux qui nous ont offensés.

H [line not there]

C **pi mamuk skukom nsaika tomtom pus wek nsaika mamuk mesache**

and make great I pl heart, will for NEG I pl do evil

KJV And lead us not into temptation,

F Et ne nous induisez point en tentation,

H Mahsh siah kopa nesaika konaway masachie. Kloshe kahkwe.

move far PREP I pl all evil. Good so.

C Pe mamuk tlak nsaika kopa masache. Tlk³ [tlusk kakwa].

And make broken I pl PREP evil. Good so.

KJV but deliver us from evil. Amen."⁴

F mail délivrez nous du mal. Ainsi soit-il.-

³ All the prayers in Cawley end with this abbreviation.

⁴ The doxology, "For thine is the kingdom..." is not used in the Roman Catholic church; both versions occur in the Anglican services; none of the CJ versions have it - many of the early missionaries were either RC or C of E.

DOGRIB CO-OCCURRENCE RESTRICTIONS: THE DISAPPEARANCE OF [u]

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INTRODUCTION

Of the four Northeastern Athapaskan languages, Slave, Hare, Chipewyan, and Dogrib, Dogrib is the most innovative in its phonology (Saxon, personal communications, 2001). Although it maintains a large consonant inventory like the other languages, Dogrib has eliminated all codas, except [h]. It has also eliminated the round back vowel [u] from its vowel inventory. It is the disappearance of this particular segment, and the contexts in which the reflex sounds occur in Dogrib syllables that is the focus of this paper. These co-occurrence restrictions will be examined through a comparison of derived forms of Dogrib stems with Chipewyan and Slave cognates¹.

Using a general framework of Optimality Theory, this paper proposes the existence of a high-ranking constraint that prevents the realization of the historically high dorsal vowel in Dogrib. This high-ranking constraint motivates a series of identity and markedness constraints which ensure the underlying vowel as either [i] or [o], depending on the features of the preceding consonants. This paper also makes the suggestion that a general constraint against high, dorsal, continuant segments may extend to the consonant inventory of the language as well, since there is a tendency for a stem initial high dorsal consonant, [ɣ] to be realized as [y] in a coronal environment and as a [w] preceding [o].

The first section of this paper outlines the assumptions I will make in my analysis and provides some phonological background concerning Dogrib. The second section will introduce the high-ranking constraint that prevents the realization of [u] in Dogrib. The realization of [*u] as [i] in the environment of a preceding coronal consonant will be discussed in section three, and section four will discuss the realization of [*u] as [o] in a dorsal context. I will consolidate the constraints into three main constraints in the fifth section of this paper, and finally, the other co-occurrence restrictions discussed in this paper, concerning the voiced velar fricative [ɣ], will be briefly explored in section six.

1. ASSUMPTIONS AND BACKGROUND

This discussion of the historical change in the co-occurrence restrictions of Dogrib syllables follows from Lynda Ackroyd's work on Proto-Northeastern Athapaskan (PNEA). According to her 1976 paper, Dogrib merged [*ə] with [*o] from the PNEA period, and shifted [*u] to [i] (29). Dogrib's sound inventory therefore includes the following vowels:

¹ The forms used in this paper will be cited as follows: The source of the Dogrib forms come from Saxon, & Siemens (eds), 1996, *Tłı̄chə Yatı̄ Enı̄htı̄·è : A Dogrib Dictionary*, and will have a page reference for that text cited. The only exceptions come from field notes compiled by Dr. Leslie Saxon 1979-1984, and will be cited (Saxon, f.n.). The Chipewyan forms, unless otherwise specified, come from the Elford & Elford, 1998, *Chipewyan Dictionary* and will be cited with a page reference. The source of the Slave forms are taken from Howard, 1990, *South Slave Topical Dictionary* and, again, will be cited with a page number unless otherwise specified.

i
e o
a

Dogrib shares many of its phonological rules and historical changes with the dialects of Slave, such as the historical neutralizing of coda consonants to [h], and a tendency to avoid high velar consonants preceding the high coronal vowel [i]. The sequence [gi], for example, is not found in stems in either language (Saxon, personal communications, 2001). If Dogrib is the most innovative of the Northeastern Athapaskan languages, then Chipewyan is the most conservative. Chipewyan separated from the Northeastern language group before Dogrib and Slave separated from each other, and so Dogrib is more closely related to the dialects of Slave than to the language of Chipewyan (ibid). Chipewyan retains the greatest contrast of coda consonants as well as the full six vowel inventory of PNEA (Ackroyd, 53). When possible, I will use internally reconstructed forms based on the proto-PNEA segments Ackroyd has established. But for the most part, I assume for the sake of this paper that the cognate Chipewyan forms are the closest to the historical forms, and will use those forms as representations of the underlying vowels.

I also assume, following Clements and Hume 1995, that the feature, [coronal], applies to front vowels as well as coronal consonants, and the feature, [dorsal], characterizes back vowels as well as dorsal consonants such as velars. I assume all velar consonants in the Dogrib inventory have a dorsal feature, and the palatal sound [y] is both coronal and dorsal, as will be developed in section five. The alveo-palatals, unlike the palatal sonorant [y], pattern more closely with their alveolar counterparts, and so I assume they do not have a dorsal feature. I base this assumption on a widespread variation between alveo-palatal and alveolar articulations in Dogrib in the historically identifiable alveo-palatal segment (Saxon, personal communications, 2001). Many contemporary Dogrib speakers are replacing the alveo-palatal series with alveolar, which are less particularly complex (ibid). For example, the following alternations appear frequently in the Dogrib dictionary: j~dz, zh~z, sh~z, ch~ts, ch'~ts'. The words below are examples of the variation:

jihcho (55) ~ **dzitso** (23) 'big mitts'
gozhīi (47) ~ **gozīi** (47) 'breathing, breath'
shàà (90) ~ **sàà** (92) 'knot'
gocho (39) ~ **gotso** (46) 'ancestors'
ch'o (8) ~ **ts'o** (106) 'porcupine'

This shift indicates a merging of the two series and this merging supports the way they pattern together in respect to the data in this paper.²

Consonants aside, this paper will make use of just three distinctive features to distinguish the four Dogrib vowels from each other and from the forbidden [*u]:

	High	Coronal	Dorsal
i	√	√	
e		√	
a			
o			√
*u	√		√

² I therefore only include the older, alveo-palatal sound in my data lists within this paper.

The feature [labial] is not included in the distinctive features chart since it is redundant, and will be treated as an enhancing feature only. The feature dorsal suffices to distinguish the round vowels from the non-round vowels. Note too, that the vowel [a] does not share any of the features [high], [coronal], and [dorsal]. This paper follows the assumption that central vocoids are phonetically placeless (Clements & Hume, 1995).

2. THE DISAPPEARANCE OF [u]

The phonology of Dogrib does not include a high dorsal vowel, despite the historical existence of such a form. As mentioned above, Ackroyd documented a shift in Dogrib from this older vowel, found in the closely related languages, to its coronal counterpart [i]. But Ackroyd does not mention the other less common reflex of [*u], which is [o]. This reflex is also regular and will be discussed further in Section IV. For the sake of this section, however, I argue that both these reflexes are the result of a high-ranking constraint that does not allow the realization of [*u] in all of its features. This repression of [*u] in all of its features may be formalized as a constraint such as that below in (1).

(1) No dorsal, high vowels: *u

This historical constraint is context free and successfully prevents [u] from occurring in the Dogrib language. An unrelated language of the Salish family, Saanich, can be provided as cross-linguistic evidence for such a specific constraint as *u, since it too has a historical constraint against such a high, dorsal segment (Montler, 18).

Below in (2) are some examples of forms³ which historically would have contained an [u] in Dogrib, but no longer realize this vowel in all of its features⁴:

(2)				
<i>Dogrib</i>	<i>Slave</i> ⁵	<i>Chipewyan</i>		<i>*PNEA</i> ⁶
degho 'snore' (15)	ts'edeghu 'snore' (Howard, 250)	- ɣu 'growl' (Li, 135)		*- ɣu
naeko 'vomit' (226)	nats'edekuh 'vomit' (Howard, 285)	naku 'he vomited' (336)		*- ku ⁷
ts'eht'ih 'scale (fish)' (Saxon, f.n.)	ts'eht'u 'scale (a fish)' (Howard, 443)			*- t'u
tie ~ tiwe 'fish' (165)	tue 'fish' (152)	tuε 'fish' (24)		*- luε

Again, this data indicates that although [u] has been retained in Slave and Chipewyan, this vowel has changed into two different vowels, [i] and [o]. The constraint introduced in (1) accounts for why [*u] is not realized, but it does not answer the other question raised by the data in (2), which is the question this paper will explore: Why are there two possible realizations for the historical vowel? The following two sections provide a possible explanation.

³ This paper examines only the stems, so they are bolded when necessary to distinguish them.

⁴ The Dogrib and Slave spelling conventions are consistently based on the Roman alphabet. For the most part, the Chipewyan script is as well, although there is a distinction made between [e] from [*e] and [ε] from [*ε]. Please note, however, that stems from Li's stem list, 1932, are based on the phonetic pronunciation.

⁵ All of the Slave forms provided are of the dialect of South Slavey, which is the dialect most distinct from Dogrib.

⁶ These forms are based in Ackroyd's analysis and reconstruction of PNEA (53).

⁷ This form, as well as [*t'u] 'scale (a fish)' may or may not contain a coda.

3. THE CORONAL INFLUENCE

The context free constraint introduced above interacts with several context sensitive constraints in order to select the correct vowel to replace the forbidden [*u]. The first constraint generated by the grammar is awareness constraint that discourages dorsal vowels in the environment of coronal consonants. Such a context sensitive markedness constraint may account for the data in (3), which demonstrates how a historical [u] is realized as an [i] when preceded by a consonant with the place feature coronal.

(3) <i>Dogrib</i>	<i>Slave</i>	<i>Chipewyan</i>
ti 'lake, water' (228)	tu 'water' (9)	tu 'lake, water' (37)
deji 'mosquito' (198)		dejuli ⁸ 'mosquito' (43)
sidi 'funny' (168)		súdi 'funny' (27)
gots'òqhjī 'spruce cones' (214)		ɛl najúɛ 'spruce cones' (63)
tɬ'i 'string' (216)	tɬ·uh 'string' (10)	tɬ·ulazɛ 'string' (65)
nàyeht'i 'punch' (200)	náts·enet·uh 'hit with fist' (Howard, 443)	nánest·us 'I punched him' (250)
nàyeeli 'sew' (207)	eɬetahnéédluh 'be sewn together' (Howard, 334)	
nàich·ih 'ripped' (Saxon, f.n.)	edech·uh 'be torn, tear' (Howard, 85)	
gozhī 'clothes' (153)	zhú 'clothes' (59)	yú 'clothes' (13)

The above data shows how coronal, non-dorsal consonants influence the realization of the underlying vowel. As mentioned in the first section of this paper, alveo-palatals behave like alveolars in that their influence blocks the dorsal feature of [u] from being realized. This shared behaviour is evident in the data in (3). I offer a more formal representation of this influence by formulating the context sensitive markedness constraint*[coronal][dorsal] in (4):

(4) A coronal consonant cannot be followed by a dorsal vowel: *[coronal][dorsal]

This constraint encourages the least marked situation to occur. The elimination of the [u] forces a change of features in the vowel, and the language selects a realization of the vowel which is as unmarked as possible, since a sequence of two coronal segments is less marked than a sequence of a coronal followed by a dorsal segment.

This markedness constraint, therefore, works together with the markedness constraint in (1), and helps explain the realization of the [u] input as an output of [i]. But the constraint in (4) is not prominent enough in the phonology of the language to prevent all occurrences of a coronal consonant followed by a dorsal vowel. There are words that occur in Dogrib that violate the constraint in (4), such as the forms below in (5).

⁸ Dogrib has lost many final syllables in stems, as well as codas, where Chipewyan has retained them.

(5)	Dogrib	Slave	Chipewyan
a.	gocho 'ancestors' (140)	secho 'my parents' (21)	
b.	cho 'rain' (202)	cho 'rain' (108)	cha 'rain'(53) ⁹
c.	tto 'grass' (172)	tto 'grass' (100)	ttoogh 'grass' (29) ¹⁰
d.	toò 'paddle' (195)	toh ~ tohé 'paddle' (75)	toth 'paddle' (47)
e.	na?edlò 'laugh' (183)	naets'edlò 'laugh' (40)	nasdlógh 'I laugh' (208)

The vowels of these words maintain their dorsal feature because they remain faithful to the features of the underlying vowel, which the cognate forms indicated to be [o] in the examples in (5). This realization of the dorsal vowels following the coronal consonants in the above examples indicated that the faithfulness constraints which protect the place of articulation of input vowels may be more highly ranked than the markedness constraint in (4). The Dogrib cognates in (5) do not violate the faithfulness constraint in (6) because their vocalic input identity corresponds with the output identity.

(6) **If an input segment is [dorsal] then its output segment correspondent is [dorsal]:**
Ident IO [dorsal]

This constraint conflicts with the markedness constraint in (4) and so it is violated by the forms in (3) but satisfied by all the forms in the data in (5). In less formal terms, the forms in (5) are not motivated to change by the constraint against [u], so they are satisfied to remain in their somewhat marked sequences.

As a continuation of the data presented in (5), the data below in (7) present more coronal consonants followed by dorsal vowels.

(7)	Dogrib	Slave	Chipewyan	*PNEA
	done ~ do 'person' (196)	dene 'person' (18)	dene 'person' (49)	*dene
	too 'night, darkness' (192)	tedhe 'night' (112)	tedhe 'night' (45)	*teðe

These dorsal realizations would violate both constraints introduced in this section so far, but, like the data in (5), the constraint against the dorsal high vowel is not relevant to these forms. Therefore the vowels of these forms are not motivated to change further.

Historically, these two examples in (7) differ from the previous examples in (5) because the output dorsal vowel is derived from a [*ə], not [*u]. The constraint in (6) would be irrelevant to this data because there is no dorsal quality in the input vowel to license the dorsal feature of the output vowel. The output vowel in the forms in (7), then suggests that the historical process which changed [*ə] to [*o] in Dogrib stems (Ackroyd, 29) must have taken place before these two conflicting markedness and faithfulness constraints became highly ranked. This historical change is not under examination in this paper, but its occurrence and effects indicate how much of the irregularity of modern forms may be explained through a diachronic rather than synchronic examination of the phonology of a language such as Dogrib.

The interaction of the two constraints introduced in this section thus far do account for the data in (3) as well as that in (5). The identity constraint ensures as many features of the input vowel are retained as possible,

⁹ The nasalization of the low vowel [a] often raises the quality slightly and results in [o] in Dogrib, and a similar process may explain this vowel difference in the Chipewyan cognate.

¹⁰ The dorsal coda forms in (5c) and (5e) may have historically exerted influence over the quality of the stem vowels, but forms such as that in d. with a coronal coda undermines this possibility.

while the markedness constraint ensures that the realization is as unmarked as possible within the environment in which it occurs. For a formal tableau of the interactions of these constraints with examples from the data in (3) see Appendix I A.¹¹

Having established an interacting faithfulness and markedness constraint regarding the interaction of coronal consonants and dorsal vowels, the data in (5) and that in (3) where their respective input remains or becomes [i] can be accounted for. The next section will introduce parallel constraints in order to explain in which environments the historically high dorsal vowel retains its dorsal place rather than its height.

4. THE DORSAL INFLUENCE

The data presented in this section exemplify how the corresponding output of [u] is not always [i]. The words below in (8) have stems which suggest that if the stem initial segment is dorsal, the dorsality of the vowel will be maintained, and the [*u] will be realized as [o].¹²

(8) <i>Dogrib</i>	<i>Slave</i>	<i>Chipeywan</i>
yegho ‘scrape hide’ (206)	ts’eghuh ‘scrape, scratch’ (Howard, 250)	-xúl ‘to scrape’ (Li, 135)
naeko ‘vomit’ (226)	nats’edekuh ‘vomit’ (Howard, 285)	naku ‘he vomited’ (336)
degħo ‘snore’ (212)	ts’edegħu ‘snore’ (39)	-xú ‘growl’ (Li, 135)
gòo ‘worm’ (231)	gu ‘earthworm’ (98)	gu ‘worm’ (76)
goghò ‘pig’ (197)	gughú ‘pig’ (86)	guhús ‘pig’ (49)
eghòò, goghòò ‘tooth’ (223)	goghú ‘tooth’ (38)	eghú ‘tooth’ (67)
tsà ekòo ‘2 year old beaver’ (102)		ekúi ‘younger beaver’ (5)

The forms above in (8), wherein the underlying vowel is realized as [o], are far less common than those in (3) wherein the vowel is realized as [i]. Despite their relative infrequency, they must be accounted for with a context sensitive constraint which discourages the sequence of a high, dorsal consonant followed by a coronal vowel. A formalization of this constraint, such as the one above in (9) cannot be ranked more highly than a faithfulness constraint, such as that in (10).

- (10) **If an input segment is [coronal] then its output segment correspondent is [coronal]:**
Ident IO [coronal]

If these markedness constraints were given precedence in the language over the identity constraints like that in (10) coronal vowels would never occur in dorsal environments. But as the data below in (11) indicates, coronal vowels do sometimes follow dorsal consonants.

¹¹ The tableaux included in the appendices are not included in the body of the paper because the complications and technicalities of determining the rankings obscure the main argument of the paper. Optimality Theory is therefore only used as a general framework of the paper.

¹² There is an exception to this pattern for which I have no explanation. The stems for ‘fish eggs’: Slave [k’uḗ] (102) and Chipewyan [k’úne] (58) contain [u], yet the cognate stem in Dogrib is realized as [k’ii] (165)

(11)	<i>Dogrib</i>	<i>Slave</i>	<i>Chipewyan</i>
a.	k'i 'birch' (145)	k'i 'birch' (97)	k'i 'birch' (57)
b.	k'jaŋie ~ k'ɛɛŋie 'saskatoon berry' (206)	k'jŋie 'saskatoon berry' (100)	k'hiŋie ~ k'hjie 'saskatoon berry' (57)
c.	tsakèè ~ tsakŋi 'beaver lodge' (144)		tsákine 'beaver lodge' (5)
d.	gokè 'foot' (166)	goké 'foot' (35)	ke 'foot' (26)

The data in (11) are evidence for the constraining force which ensures the features of the input vowel will be maintained wherever possible. If a vowel with the input of a coronal place feature follows a dorsal consonant, it will retain its coronality in the output, despite the constraint against the opposing place features of consecutive consonants and vowel sequences. The input quality is maintained because without the motivation of the markedness constraint against [u] pushing the vowel to change, the markedness constraints are less relevant than the faithfulness constraints.

The faithfulness constraint in (10) can therefore explain why coronal vowels maintain their place features when preceded by a dorsal consonant. But no constraint so far has addressed the feature [high]. Like the faithfulness constraints surrounding the place features [coronal] and [dorsal], an identity constraint is needed to retain a connection between the input [u] and the output [i] in forms such as those above in (11) as well as those in (3), in Section II. In order for the constraints in (9) and (10) to remain relevant to the problem of the realization of [u] in the most harmonic, yet faithful, way possible, they must interact with one more faithfulness constraint which has the function of maintaining the place feature [high]. Such a constraint as that in (12) ensures the place feature [high] is maintained whenever possible when [u], or any high vowel is the input vowel.

- (12) **If an input segment is [high] then its output segment correspondent is [high]:**
Ident IO [high]

As an individual constraint, Ident IO [high] will promote the realization of [u] as [i] and therefore helps to account for the earlier data presented in Section II, as well as that in (11).

This constraint also acts in co-operation with the other identity constraints introduced so far. Together, all three conflict with the markedness constraints against coronal-dorsal, or dorsal-coronal sequences. Please see Appendix I B for a formal tableau demonstrating the ranking of the constraints introduced thus far.

5. COMBINING CONSTRAINTS

A reassessment of the constraints proposed thus far may simplify my present analysis. Rather than presenting six different constraints to account for the data presented so far, I suggest there are just three prominent tendencies in the language acting together that effect these various co-occurrence restrictions relevant to the disappearance of [u].

The first tendency, of course, is that which avoids realizing high dorsal vowels, the original constraint introduced in Section II, restated below:

- (1) **No dorsal, high vowels: *u**

The second tendency is one which preserves the place features of the segment undergoing change. If all three faithfulness constraints protecting the dorsal, coronal, high features of this input vowel could be combined into one faithfulness constraint it would be formalized into a cover constraint like that in (14) which would represent this second tendency.

(14) **Correspondents in input and output must have identical place features:
Ident IO (Place)** (Kager, 132)

This constraint covers all three place features under examination in this paper and is far less redundant. It represents a general faithfulness tendency.

The third tendency is to prevent marked sequences such as dorsal consonants preceding coronal vowels, and promote unmarked sequences in which the onset and rhyme of a stem share at least one place feature. In order to represent such a general anti-markedness tendency, the context sensitive markedness constraints can be consolidated, and therefore simplified, in a similar manner. I therefore propose the formalized cover constraint in (15), which eliminates the redundancy of the two markedness constraints *[coronal][dorsal] and *[dorsal][coronal].

(15) **A vocalic segment must share a place of articulation with its preceding segment:
Same Place**

As previously stated, these two cover constraints in (14) and (15), representing two general tendencies, are motivated by the first tendency—an overriding intolerance of the high, dorsal vowel, [***u**]. Once motivated, they interact to ensure the output vowel is as close to its former realizations as possible, in the most harmonic way possible. For a formal representation of how the three consolidated constraints are sufficient in accounting for the correct forms in the data sets provided so far and how they are ranked in relation to each other, see Appendix II.

The next section provides a brief discussion of how these tendencies extend to consonants as well.

6. CORONAL AND DORSAL INFLUENCE ON [ɣ]

The three general tendencies established in the previous section are not necessarily limited to the realization of the vowel with the features high and dorsal. They also extend to the consonantal counterpart of [u]. The velar fricative [ɣ] shares the features high, dorsal, continuant and voice with the vowel [u]. The constraints established to account for the behaviour of the vowel, may therefore also be able to account for the behaviour of [ɣ].

This velar fricative [ɣ] does still appear in the Dogrib language, but its distribution and the variation in its pronunciation suggests it may be disappearing under the pressure of a similar constraining tendency. The highly-ranked constraint [***u**] may therefore be undergoing a change: it is beginning to extend to all high, dorsal continuant, voiced segments. Like [u], [ɣ] is often realized as a high, vocalic segment in a coronal environment and a dorsal vocalic segment in a dorsal environment. But rather than being triggered by the consonant, like the processes discussed in the previous sections, this change to the consonant is triggered by the features of the following vowel.

The data below in (16) demonstrates how a stem initial [ɣ], represented in the orthography as [gh], becomes a palatal glide [y] before a coronal vowel.

(16) <i>Dogrib</i>	<i>Slave</i>	<i>Chipewyan</i>
naeghɨ ~ naeyɨ 'melt' (Saxon, f.n.)	naaghɨ 'melt' (Howard, 243)	nalghɨ 'it's being melted' (225)
eghe ~ eye 'drum' (160)	eyeli 'drum' (69)	hélgheli 'drum' (20)
eye 'itchy' (180)	egheh 'itch' (Howard, 242)	ts'eghethi 'itch' (35)
eghè ~ eyè 'eggs' (161)	eyéhtth'eę 'eggs' (71)	eghézé 'eggs, testicles' (21)
dèèyeh 'calm down' (149)	dìghéh 'calm down' (Howard, 242)	déghel 'it became calm' (102)

A segment such as [y] is like other palatal sounds in that it has both coronal and dorsal features (Gussenhoven & Jacobs, 1998). According to the markedness constraint, **Same Place**, in (15), the place feature [coronal] is what makes [y] a less marked candidate to precede a coronal vowel than a non-coronal segment like the velar fricative [ɣ].¹³ Since [y] has all three high, coronal and dorsal features the constraint in (14) is satisfied. The only place feature the high glide does not share with the input segment [ɣ] is the feature coronal, but since this feature belongs to the output segment and not the input segment, it does not violate identity.

If the realization of [ɣ] as [y] can be considered parallel to the realization of [u] as [i], the variation¹⁴ of [ɣ] to the dorsal, round approximate [w] might also be considered parallel to the realization of [u] as [o]. The next data, below in (17), are spelt with a [gh], but the pronunciation of this segment in these words resembles that of the approximant [w] (Saxon, 1990).

(17) *Dogrib*

- a. **goghò** 'teeth' (41)
- b. **goghò** 'age' (139)
- c. **goghoh** 'thigh' (41)
- d. **ewohkwò** ~ **eghohkwò** 'meat from the thigh and buttocks of a caribou' (37)

As would be expected, it is the dorsal vowel [o] which triggers the change to the dorsal approximant. The labial feature may be relevant in this sequence as well, since both [o] and [w] share the feature [labial] as well as the feature [dorsal]. Another aspect of the environment that may affect this lenition of [ɣ] to [w] is stress. For example, the form in (17d) is a compound wherein the second element **-kwò** is the head. The stem that changes to **-who**, then, is the unstressed element, less likely to retain a marked articulation such as [ɣ]. This phenomenon, and the behaviour of [y] calls for further study and analysis, but for the purpose of this paper the ways this segment alternates offers support to the analysis of the reflexes of [u], and the three general tendencies at work which determine how the vowel is realized.

CONCLUSION

What marks the greatest difference between the variations of [ɣ] and of [u] is that the constraint against [u] is active and highly ranked, and so always motivates the other two cover constraints. The segment [ɣ], however, is often still realized in Dogrib, despite the alternations that do occur, which suggests the constraint is still in flux. The phonology of the language is still undergoing a process based in historical change. Formal tableaux are not offered to support the last section of this paper due to the difficulty of ranking constraints within Optimality Theory when the constraining tendencies in question have not yet stabilized. Two appendices do, however, provide tableaux for the analysis of the vowel.

The main discussion of this paper centred on the three major constraining tendencies, the first of which motivates the other two. Because the language has a constraint against high dorsal elements identity constraints and markedness constraints must act on the input in order to ensure the output is as faithful and as unmarked as possible. One result of this interaction is the realization of this historical vowel [u] as [i] when following a coronal

¹³ It may be possible that the approximate nature of [y] would allow its articulation to be somewhat less fixed, and therefore more able to favour the coronal element over the dorsal element of articulation when in a coronal environment such as that in (16).

¹⁴ I use the term 'variation' to describe [ɣ] to [w] rather than 'alternation' because the change has not yet become stabilized, although it does not occur in the specific environment of a following coronal vowel.

consonant and [o] when following a dorsal consonant. The other result is the maintenance of the input features of all vowels that do not have an input of [u].

REFERENCES

- Ackroyd, Linda. 1976. Proto-Northeastern Athapaskan: Stem initial consonants and vowels. University of Toronto. ms.
- Clements, G.N. and Elizabeth Hume. 1995. Internal Organization of Speech Sounds. *The Handbook of Phonological Theory*. John A. Goldsmith (ed). Basil Blackwell Ltd: Cambridge USA. 243-306.
- Cook, Eung-Do. 1993. Chilcotin flattening and auto segmental phonology. *Lingua* 91. 149-174.
- Elford, Leon W. and Marjorie Elford. 1998. *Chipewyan Dictionary*. Northern Canada Mission Distributors. Prince Albert.
- Gussenhoven and Haike Jacobs. 1998. *Understanding Phonology*. Oxford University Press: New York.
- Howard, Philip G. (ed). 1990. *A Dictionary of the Verbs of South Slavey*. Department of Culture and Communications. Government of the NWT. Yellowknife, NWT.
- Kager, Rene. 1999. *Optimality Theory*. Cambridge University Press: Cambridge.
- Li, Fang-Kuei. 1932. A list of Chipewyan Stems. *International Journal of American Linguistics*. Vo.7. 122-151.
- Montler, Timothy. 1986. An outline of the Morphology and Phonology of Saanich, North Straits Salish. *Occasional papers in Linguistics*. No. 4
- Rice, Keren. 1989. *A Grammar of Slave*. Mouton de Gruyter: New York.
- South Slave Topical Dictionary*. 2nd Ed. 1993. Teaching and Learning Centre. Dehcho Divisional Board of Education. Fort Simpson, NWT.
- Saxon, Leslie. 1990. Dogrib Technical Report. Dene Standardization Project. Department of Culture and Communications. Government of the NWT.
- Saxon, Leslie, [n.d.] field notes, 1979-1984.
- Saxon, Leslie and Mary Siemens (eds). 1996. *Tł̨ichq̨ Yat̨į En̨ih̨t̨'ę̀ : A Dogrib Dictionary*. Dogrib Divisional Board of Education. Dettah, Rae-Edzo, Rae Lakes, Snare Lake, Wha Ti.

APPENDIX I

As previously stated in a footnote, the tableaux included in the appendices are not included in the body of the paper because of the complications and technicalities of determining rankings obscure the main argument of the paper. However, the following tableaux attempt to represent a more formal account of the constraint interaction discussed in the body of the paper.

A)

The tableaux below used the form *t̨'ò* 'grass' from the data set in (5) to demonstrate that the identity constraint must be ranked more highly than the markedness constraint in order to produce the correct output:

i.)

t†·o	Ident IO dorsal	*[coronal] [dorsal]
⇒ a. t†·o		*
b. t†·i	*!	
c. t†·e	*!	
d. t†·a	*!	

In i) above, the optimal candidate was the only one that satisfied the identity constraint.

For the purpose of the next tableau, the crucial ranking of faithfulness constraints over markedness constraints extends to the forms in the data in (3), like the word *t†·i* 'string', with one major difference. The constraint *u motivates the other constraints and therefore outranks them. This tableau makes use of all the identity constraints introduced in the second, third and fourth sections of the paper and the markedness constraint which militates against the dorsal vowel following a coronal consonant, which is acting as a tie breaker between candidates a. and b. below:

ii.)

t†·u	*u	Ident IO [coronal]	Ident IO [dorsal]	Ident IO [high]	*[coronal][dorsal]
⇒a. t†·i			*		
b. t†·o				*	*!
c. t†·u	*!				*
d. t†·e		*	*!		
e. t†·a			*	*!	

B)

The two elements in this section act in support of the argument made in the fourth section of this paper. They indicate how data from (8), like the form for 'worm', *gòo*, as well as data from (11) like the form *k·i* 'birch' can be formally accounted for with the constraints introduced so far. These forms indicate the crucial ranking between the following:

Context Free Markedness Constraint >> Faithfulness Constraint >> Context Sensitive Constraint

i.)

gù + V	*u	Ident IO [coronal]	Ident IO [dorsal]	Ident IO [high]	*[dorsal][coronal]
⇒ a. gòò				*	
b. gèe			*!	*	*
c. gii			*!		*
d. gàa			*!	*	
e. gùu	*!		*		

Note: this V added to the stem *gù* is a nominalizing suffix common in Dogrib.

ii.)

k'i	*u	Ident IO [coronal]	Ident IO [dorsal]	Ident IO [high]	*[dorsal][coronal]
⇒ a. k'i					*
b. k'o		*	*!	*	*
c. k'e			*	*!	*
d. k'u	*!	*	*		*
e. k'a		*	*!		

Appendix II

The following tableaux demonstrate the interactions of the three cover constraints with a form from each data set presented in the body of the paper. The three constraints are re-identified below:

- 1.) The constraint against a high, dorsal, vocalic segment **u*.
- 2.) The cover constraint **Ident IO (Place)**, which militates against a change in the place features dorsal, high and coronal.
- 3.) The cover constraint **Same Place** militates against a sequence of a consonant and vowel that do not share a place of articulation.

The tableau in (i) demonstrates how these constraints interact to produce forms like *ti* 'lake, water' from data set (3).

i.)

tu	*u	Ident IO (Place)	Same Place
⇒ a. ti		*	
b. to		*	*!
c. te		**!	
d. ta		**!	*
e. tu	*!		*

Although the tableau in (ii) does not prove a crucial ranking between **Ident IO Place** and **Same Place**, the following tableau in (iii) indicates that the ranking must indeed be crucial in order for the optimal candidate, *nà?dlò* 'laugh' to surface.

ii.)

-dlò	*u	Ident IO (Place)	Same Place
⇒ a. -dlò			*
b. -dli		*!	
c. -dlù	*!	*	
d. -dlè		*!	
e. -dlà		*!	

Candidates b-e. only violate Ident IO (Place) once each because an [o] is only defined with its dorsal feature in this paper.

The following tableau is an example of the of how the constraints account for data from (8), like *nats'eko* 'vomit':

iii.)

-ku	*u	Ident IO (Place)	Same Place
a. -ki		*!	*
b. -ku	*!		
c. -ke		**!	*
⇒ d. -ko		*	
e. -ka		**!	

This final tableau demonstrates the same three cover constraints in the last environment that [$*u$] fails to surface in which is under examination in this paper. A term from the data set, (11) like *tsàkèè* ~ *tsàkīī* 'beaver lodge', where there is more variation in the vowel quality would not be easy to account for with this ordering of constraints. However, the following term from data set (11), *k'i* 'birch', whose input vowel has the same features as its output vowel can be accounted for as the tableau in (iv) shows, despite its marked sequence of a dorsal consonant and coronal vowel.

iv.)

-k'i	*u	Ident IO (Place)	Same Place
⇒ a. -k'i			*
b. -k'u	*!	*	
c. -k'o		**!	
d. -k'e		*!	*
e. -k'a		**!	

THE ROLE OF NARRATIVE IN DISPUTE RESOLUTION

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During a 1975 land claim hearing, a Native trapper from Northern Canada was asked to raise his right hand and to swear to "tell the whole truth and nothing but the truth." He replied, "I cannot do that but I will tell you what I know."

(Duryea and Potts, 1993)

1.0 INTRODUCTION

Narrative is both a mode of reasoning and a mode of representation. People can *perceive* the world narratively and people can *describe* the world narratively. According to Jerome Bruner (1996), narrative reasoning is one of the two basic and universal human cognition modes. The other mode is the logico-scientific. The logico-scientific mode looks for universal truth conditions, whereas the narrative mode looks for particular connections between events. Explanation in the narrative mode is contextually embedded, whereas the logico-scientific explanation is extracted from spatial and temporal events. Litigation is grounded in logico-scientific reasoning and uses narrative primarily as a means of reaching a logico-scientific conclusion. Alternative Dispute Resolution (ADR), on the other hand, may use logico-scientific reasoning in its exploration of events, but it relies primarily on narrative reasoning to arrive at a resolution to which all parties can agree.

This paper will look at the narrative mode and the way in which it is employed as a discourse style in dispute resolution settings (specifically mediation settings) as a way of conveying personal experience. Based on previous research in the area of narrative and on three case studies, the paper will analyze the components of narrative and how these components fit together to create an overall structure. The analysis, therefore, will be both formal and functional in that it will examine the potential patterns of narrative, isolating some of the structural units, and will also explore why narratives are such a common and natural form of expression and the value that they hold in dispute resolution.

2.0 NARRATIVE

There are many different approaches to resolving conflict, and each employs language differently. The style of discourse permitted or encouraged by a particular approach reflects the underlying beliefs and goals of those who use it. Methods like avoidance, violence or non-violent direct action make little to no use of language. On the other hand, litigation uses language to a great degree as both tool and weapon. It does not, however, value the narrative aspect of language to the same extent that dispute resolution methods like mediation, arbitration and negotiation do. Because there are varying definitions of what makes a narrative a narrative, we will first look at how I am defining 'narrative' here before moving on to look at how it is used.

2.1 What is narrative?

A *narrative*, in its most restrictive sense, refers only to verbally narrated texts. In its widest possible sense - and the sense I am using here - it is anything that tells or presents a story (e.g., ballads, poetry, fables, drawing, written text or oral discourse). In a mediation session a narrative will most likely take the form of an oral account of events. However, it could conceivably occur in other forms, such as a pictorial narrative if, for example, the mediator asks the disputants to draw their perspective of the events, or a disputant might choose to tell an analogous story or a cultural folktale. The frequency with which narrative occurs and the variety of forms it takes will be influenced by several factors including: the disputant's personal discourse style; the disputants' relationship; the particular conflict situation; the mediator; and the approach s/he follows.

2.2 The history of narrative research

Narrative has been approached from many angles. The term grew out of literary discussion and was first made into a formal study by Tzvetan Todorov in 1969. *Narratology* was defined as, "the theory of the structures of narrative. To investigate a structure, one dissects (segments, factors) an object into its component parts, and then goes on to describe the various relations that exist between these parts" (Todorov, 1969). Narratology examines recurrent elements, themes, and patterns to try to establish a set of universals that determine the makeup of a story. The ultimate goal of such analysis is to move from a taxonomy of elements to an understanding of how these elements are arranged in actual narratives.

More recently, it has received academic recognition as a crucial element of many other disciplines besides English literature. Clinical and counselling psychology research has looked at the role that narrative plays in client-therapist interaction (see for example, Dreier, 2000). Educators are interested in children's and adolescents' development and use of narrative (see for example, Denhiere, 1978). Narrative policy analysis has emerged in the field of political science (see for example, Roe, 1989). Sociologists and anthropologists have examined narrative use across classes and cultures (see for example, Hymes, 1981; Briggs, 1996). Of course, many of these disciplines overlap with the branch of linguistics known as discourse analysis, where narrative has been examined from psycholinguistic, sociolinguistic, anthropological and other perspectives. Linguistic investigation has ventured into a variety of situations including doctor-patient interactions (e.g., Eisenberg, 1981) and courtroom procedure (e.g., O'Barr & Conley, 1996; Loftus & Palmer, 1974). This foundation of narrative research provides a useful parallel for the present paper.

Unlike other areas of linguistics (e.g., phonology, syntax, semantics), there are no unified theories of narrative. Each researcher seems to conceptualize narrative in her/his own unique framework, using her/his own unique terms. Perhaps this is because this area does not lend itself well to scientific, structured accounts. Being so dynamic and malleable, it is hard to pin the narrative act down to any strict rules or patterns. Yet it is possible to document reoccurring patterns in a qualitative fashion in order to describe what a narrative *could* look like - as opposed to how it *should* look. This is precisely what this paper aims to do.

3.0 HOW NARRATIVE IS USED IN MEDIATION

Mediation has only become a formally accepted practice in North America over the last several decades; however, similar practices have been an integral part of other cultures for much longer. Research in the area is still in its formative stages. Narrative use in mediation has recently become a hot topic in the mediation literature (e.g., Duryea and Potts: 1993, Hale: 1998, Cobb: 1993) but, with notable exceptions, mediation discourse is a relatively neglected area in the field of linguistics. Because conflict and narrative have been treated in isolation by linguists, the knowledge on which I draw is a combined product of narrative research from the field of mediation and narrative studies done in linguistics and literature. This is then applied to my own observations of the recorded data.

3.1 Types of Mediation

Narrative is used in different ways depending on the type of mediation. Mediation which falls under the shadow of the law and is performed by lawyers tends not to focus so much on the narrative aspect of a disputant's discourse as on the facts the disputant conveys through discourse. Negotiation methods such as Fisher and Ury's (1981) *principled negotiation* are somewhat less restrictive regarding narrative freedom. As one moves towards more therapeutic mediation styles, such as *transformative mediation* (Bush and Folger:1994) and *restorative justice*, the constraints on narrative expression decrease. The mediation sessions from which I collected my data involve a mediation style closest to the transformative approach. Here the goal is to have disputants better understand each other's perspective so that they may rebuild, or at least restructure, damaged relationships. Often what happens is that underlying stories which harbour deep-rooted conflicts emerge out of the initiating conflict story.

3.2 Characteristics of Mediation Discourse (Compared with Adjudication)

In order to describe the discourse style of mediation it is helpful to situate it in a comparative context with litigation, or courtroom, discourse style with which most people are familiar. By comparing it with what it is not we can have a clearer idea of what it is.

Mediation

- equality
- mediator facilitated discourse
- parties encouraged to express themselves naturally
- a naturally evolving discourse directed at establishing a mutually constructed truth
- creative ritual

Litigation

- hierarchy
- lawyer controlled discourse
- parties directed to follow specific discourse rules
- a calculated discourse aimed at uncovering a factual truth
- established ritual

3.3 Narrative theory

The mediation process itself has been described as essentially a storytelling process consisting of Plot, Character, and Theme (Cobb: 1993). What links these components together is the dynamic of the narrative. Stories best reflect reality when they are linked to other participants' stories and so the role of the mediator in such a model is to help the disputants to link their stories. This may require re-framing the story by identifying a common 'theme' for a new narrative that both parties can agree on. The critical factor is not the content of the story, but rather the process that the story ignites in both the teller and the listener. Rather than conceptualizing the story as a rational, linear progression, narrative approaches consider its multi-dimensional aspects. Characters in the story each possess an interior, a history, a unique perception of the chronology, and even a unique sense of the injury. Therefore, no two parties will possess identical stories.

To make sense out of sometimes conflicting and contradictory social experiences, narrative theory presents a two-level model: *story* and *discourse*. Story refers to content, discourse to the means by which that content is communicated. The surface story may be surprisingly similar for all parties: a house burglarized, property destroyed, items taken, anger felt. The deeper story, the discourse, will be unique to each person telling the story, depending upon the meaning of "house," "property," "anger," for each teller. Allowing the full story to be told, and engaging it fully by listening to each person's version, acknowledges that qualitative difference. Much of how people think about themselves is contained in their stories.

The creation of such accounts is motivated by people's needs for meaning. Baumeister and Newman (1994) have outlined the following needs which motivate people's stories:

- 1) the need to see events as causally linked
- 2) the need to affirm one's sense of moral right and wrong
- 3) the need for a belief in personal efficacy
- 4) the need to defuse potential threats to self-worth

Procedures that dictate our stories to us may not be as successful as those that allow us to write our own endings and, especially, to add our unique, personal contributions along the way. For example, in the aftermath of a home invasion, telling the story of the senseless destruction of a family heirloom may not "fit" a narrative dictated by the needs of a prosecutor or the rules of criminal procedure when presented in open court, but it may become vitally important as a means of reconstructing events on the victim's own terms.

3.3.1 Narrative as Discourse

Although narrative, as a source of entertainment or moral education, has an honourable history, it has depreciated as a form of knowledge in Western society, in contrast to other forms of discourse regarded as scholarly, scientific or technical. Bernstein (1971) presented the dichotomy of *elaborated* and *restricted* codes. The *elaborated* orientation is connected with such things as independence of context, objectification of experience, explicitness, and analysis of experience. *Restricted* orientation, on the other hand, is more implicit, context-dependent, and takes pre-established meaning for granted. According to Bernstein, coding orientation differences emphasize a distinction between middle-class (*elaborated*) and working class (*restricted*) speech, giving the former a clear social advantage. Following this reasoning, it is easy to see why certain forms of narrative would not be valued as an appropriate discourse style in objective, fact-driven situations such as legal disputes. However, narrative discourse allows for certain information to be conveyed or understood in a way which may not occur in legal discourse.

3.3.2 Attribution Bias Theory

Social conflicts always involve some misunderstanding. Disputants communicate by what they say (or do not say) and by how they behave toward one another. Most communicative interaction involves 'faulty' communication but conflict seems to increase it even more because the disputants are so focused on their own needs that they often will fail to read or will misread the other's cues.

As humans we have a natural instinct to impose order and control on our environment. Since people do not walk around with labels describing what they are doing and why, we must attribute meaning to others' actions in order to determine how those actions fit into our world. For example, if we come across someone who does not make eye contact when speaking, we may refer to our personal organization system of the world and assume that it means that this person is shifty and untrustworthy, however, this may not be the case at all. The sharing of narratives in the mediation session makes it more likely that biases will be detected and discussed.

4.0 THE CASE STUDIES

My data involves three mock mediation sessions that were taped in 1991 as part of a local television program¹ designed to educate the public about the mediation process. Because of confidentiality agreements between mediators and clients, observing or recording real mediation sessions is difficult. These mock sessions used real mediators and were based on real conflicts. The sessions were not scripted and so allow for a natural discourse development reflective of what one would find in an authentic mediation session.

The sessions were all co-mediated by one male and one female mediator. The program does not show all three sessions in their entirety because it is only a one-hour broadcast. Instead, it shows a lengthy excerpt (10 - 20 minutes) from each session which is sufficient to establish the context for the narratives. Each excerpt captures a different stage in the process, allowing for a variety of narrative goals (e.g., narratives that describe the conflict, narratives that describe underlying issues, and narratives aimed at resolution). Mediation sessions generally go through the following broad phases: (1) describing the conflict from both sides; (2) discussing the underlying issues and associated feelings of each party. At this point the parties are encouraged to develop an understanding of the other's perspective; and (3) problem solving. Although it would be ideal to be able to track the progress of the overall narrative construction, this provides enough detail to glean patterns in narrative formation. Session A provides by far the most interesting study of narrative as it captures the exchanging and understanding phase as well as the description phase of mediation. This is where narrative plays its most crucial role.

The following tables give a brief overview of each of the three sessions in order to provide a context and speaker profile.

Session A

Disputants	Relationship	Initiating Conflict	Underlying Issues	Stage of the Process
John - middle aged, Caucasian male Bob - middle aged, Caucasian male	neighbours	A tree planted by Bob on his property has grown to the point that it hangs over into John's property. It is shading John's garden and attracting wasps.	Bob had a close friendship with the previous neighbour and is disappointed that he doesn't have a similar relationship with John. John has the impression that Bob doesn't like him.	Mediators have already laid down the ground rules. The excerpt begins with disputants describing the conflict from each side. It ends just as they are about to begin problem solving.

¹*Perspectives* (1991), Roger's Cablevision.

Session B

Disputants	Relationship	Initiating Conflict	Underlying Issues	Stage of the Process
Marty - teenaged, Caucasian male	son	Marty took the car without asking permission, causing Ingrid to miss an appointment. He has shown previous instances of lack of responsibility.	Marty wants more freedom but Ingrid feels he does not show enough responsibility for this. Ingrid feels taken for granted.	The issues have been laid out already and the disputants are now discussing how they feel about them. It ends just as they are about to begin problem solving.
Ingrid - middle aged, Caucasian female	mother			

Session C

Disputants	Relationship	Initiating Conflict	Underlying Issues	Stage of the Process
Helen - middle aged Caucasian female	client	Helen hired Mark to replace her kitchen. Because of delays in the shipping of material, the tiling will not be completed on time. Helen thought the agreement was a contract but it was only an estimate.	Helen suspects that Mark is not an honest person.	The disputants have already discussed the issues and the connected feelings. Now they are working on creating a new agreement.
Mark -middle aged Caucasian male	contractor			

5.0 INTERTEXTUAL PATTERNS OF NARRATIVE

Using these case studies as illustrations, we will go on to look at some aspects of narrative structure. Roman Jakobson (1971 [1957]) pointed out the interesting fact that narrative discourse simultaneously represents *narrative event* (i.e., the actual storytelling situation) and *narrated event* (i.e., the actions being described). In terms of mediation, these two events would correspond to the *session* and the *conflict* respectively. In order to connect these events that are separated in time and/or space, one has to extract discourse from one setting and insert it into another. One way in which this is accomplished is through syntactic restructuring.

5.1 Syntactic aspects

Direct and indirect speech are an obvious way of bringing past events into present discourse. This occurs frequently in the case studies. When, for example, John says:

(1) *Then he says he's gonna sue me...*

his use of indirect speech allows him to convey information as though it were fact and, furthermore, to bring this fact into the present situation by using the historical present. Direct quotations are also effective here. Narrators often change their voice characteristics when reporting emotionally charged speech, allowing the words to convey greater meaning; for example, by increasing volume and/or pitch. When John says the above quote, his pitch rises to reflect his shock at Bob's reaction.

Another way of linking narrative and narrated event is through tense/aspect categories. There is a large linguistic literature on the topic of the representation of time in language (e.g., Dowty, 1986; Ter Meulen, 1995; Croft, 1998; and Goldberg, 1999). Temporal representation involves a translation of words and sentences into a flow of events which parallels real life events. Listeners make use of what Dowty (1986) refers to as the *iconicity assumption*. That is, they assume that the order in which events are reported in language matches the chronological order in which they occurred. However, narrators often deviate from the chronological order of events for stylistic purposes. In these instances, the iconicity assumption is no longer valid and listeners must instead rely on language cues such as verb tense, time adverbs (e.g., soon) and time adverbials (e.g., an hour later) to determine the order of events.

Verb aspect is the language cue used to classify events with respect to duration and completion status. An event may convey a perfective aspect, meaning that it started and finished within the narrative timeline (e.g., *He ate the peas after much prodding.*); or it may convey an imperfective aspect if the event was not completed within the narrative timeline (e.g., *He was still eating the peas when we went to bed.*). Usually the perfective is used to denote telic situations (i.e., situations which have some natural endpoint), whereas the imperfective denotes atelic situations (i.e., situations with no certain endpoint). The narrator's choice of aspect can create the effect of either placing the listener(s) outside the situation (perfective) or placing them inside the situation (imperfective). It can also give the listener a sense for the time it takes to perceive the described event (Dowty, 1986), thereby creating a more vicarious experience for the listener. For example, (a) *he jumped on the bed* and (b) *he was jumping on the bed* illustrate two quite different experiences of duration. With (a) the narrator is able to convey the instantaneousness of what was perceived.

Tense and aspect also play a role in foregrounding and backgrounding particular items within events. One of the ways in which the narrator lets the listener know which information is most relevant in his/her story is through the choice of tense and aspect. Present-tense perfective verbs generally indicate foregrounded information while non-present-tense imperfective verbs indicate backgrounded information, though there are exceptions (see Fleischman, 1990). Briggs (1996) discusses how, in Warao disputes, the imperfective places actions in the background, while the perfective foregrounds actions. This allows for cause-and-effect explanations to be presented to the listeners. In Bob's statement:

(2) *He was out there chopping the tree to death and so I came out.*

the first statement is in the imperfective, thus setting the scene which caused Bob to come out. Bob's perfective phrase is then foregrounded and thus appears more salient.

Textual cohesion is created by linking indexical signs to temporal phrases. Bob's use of *so* in (2) conveys that the tree was chopped before he came out. It also reinforces the cause-and-effect perspective revealed through imperfective and perfective aspectual markers. Because the narrator provides temporal deictics (e.g., *when, next, later* etc.), he has more flexibility with the narrative tense. In an isolated utterance we require a direct relationship between tense and temporal reference in order to know where on the temporal axis to place the event. However, when the utterance is found within a discursive context we understand the time sequence relative to previous utterances.

The disputants frequently use a present tense (mostly simple, but sometimes continuous) in their narratives even though they are describing a past situation. For example, in John's opening narrative he uses present tenses to relate the events leading up to the conflict:

(3) *The fruit drops on the ground and, and it attracts the wasps a...and I, I got kids and they're playing out there all the time.*

He could have said:

(4) *The fruit was dropping on the ground and it was attracting the wasps and I've got kids and they play out there all the time.*

This aspectually motivated choice of tenses incorporates the listeners into the story, thereby linking narrative and narrated event. It creates a sense of habitualness in the actions. Hypothetical sentence (4) would be used if John wished to explain the circumstances as a cause-and-effect situation. It would need to be followed by a perfective statement indicating the effect it had on John. Instead, the present tense is used here in a series of parallel constructions intended to give a description of the state of events which, from context, the listeners understand to be temporally bound to a situation arising in the past.

Past tenses are often used in the sessions to emphasize critical actions. Set apart by a contrastive present tense background, John's tense shift to the past in (5) highlights what he sees as a salient event.

(5) *He jus' started laying into me cause I was cutting back the tree.*

Because they are used most often for effect, past tenses occur less frequently than the present.

5.1.1 Person

As one might expect in the telling of a personal narrative, narration occurs most naturally in the 1st person. For example,

- (6a) *I think the bottom line is communication. Y'know, ever since he's moved in there we've never had, y'know, much... well, I don't know, maybe I'm just too used to Frank livin' next door.*

The account, then, comes across as a subjective, uni-dimensional one. The teller is focusing on the events purely as he sees them, ignoring other possible perspectives. This is a necessary part of sharing stories as it allows disputants to get their story out and at least feel listened to. Sometimes mediators will encourage the disputants to play with the person narration in order to help them see other perspectives. In Session A and B (and possibly in C, although it is not contained in the excerpt) the mediator asks the disputants to retell the most important parts of the other disputant's story. This pushes the teller to use a 3rd person narration:

- (6b) *He's sayin', I guess, that uhhh, that he wants to at least be asked, or, or, let know about what's happening, y'know, in terms of if I'm gonna cut the tree or if I'm gonna do something with something that also affects him, then he wants to know about it and so...*

In doing so, the account takes on a more objective appearance, thereby impelling the teller to focus on other perspectives besides his own. The mediator may take this one step further by requesting that the teller relate this account directly to the other disputant, causing the focus to be on the 2nd person:

- (6c) *... maybe I do stuff on my side of the line that, that affects you. And I know that you'd like to know about that.*

This is not so natural for the disputants and, particularly in Session B, they have to be reminded to speak directly to the other person rather than to the mediator. It is a useful technique in that it combines the emotional and subjective view with the impersonalized and objective one, resulting in a more empathetic and personal understanding. However, it is effective only when a disputant is retelling the other's story; focusing on the 2nd person when telling a story from one's own perspective results in a blaming account and often spurs on an angry reaction.

We see, then, that the person in which narration is expressed strongly influences how the disputants think about and understand the stories. A particular person-narration, taken at the appropriate time can have very positive effects in building a mutual story. Taken at the wrong time, however, it can be a setback.

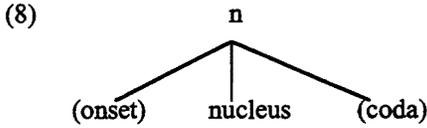
6.0 THE ARCHITECTURE OF A NARRATIVE

Although it may at first appear as simple and straightforward, a narrative is actually a very complex structure. Labov and Waletzky (1967) gave the following basic paradigm of a fully formed oral narrative:

- (7)
1. *Abstract*: What, in a nutshell, is this story about?
 2. *Orientation*: Who, when, where, what?
 3. *Complicating action*: Then what happened?
 4. *Evaluation*: So what? How is this interesting?
 5. *Result or resolution*: What finally happened?
 6. *Coda*: That's it. I've finished and am bringing us back to our present situation.

While this provides a neat framework for an 'ideal' oral narrative, most narratives occurring in daily speech are somewhat messier. Speakers are not always given uninterrupted storytelling status and so narratives tend to be fragmented with many digressions. In oral discourse like the kind found in mediation sessions, this kind of self-contained narrative is rare. In the case studies, only the opening narratives tend to resemble the model in (7) and even they have interruptions and digressions. In these narratives, the teller is given 'official' storytelling rights by the mediator, who asks her/him to describe the conflict. Although important points get raised in initial narrative and they are given in a sequential order, they do not tell the 'whole' story. These initial stories get built upon and expanded by both disputants throughout the session.

So, instead of neat, freestanding structures, what we find are smaller narratives serving as the building blocks for larger narrative structures. We can talk about narrative structure as being parallel in some ways to that of English syllabic structure². This notion allows for more structural freedom than Labov and Waletzky's early model because we are dealing with a very basic structure whose precise content and shape can be determined by context. At its most basic then, a narrative will consist of an obligatory nucleus with an optional onset and coda:



The onset and coda margins may be dropped either intentionally, to allow the interlocutor to continue the dialogue, or unintentionally by interrupting or being interrupted. This is common in the mini-narratives (n) that are used to build the meta-narrative (N). The only time an onset seems to be required is when it heads the initial narrative, as it provides an introduction to what will eventually become a meta-narrative. We see this in John's opening narrative:

(9) **I guess... it all started...a few days back when, uh, y'know, there's this tree that overhangs our property.**

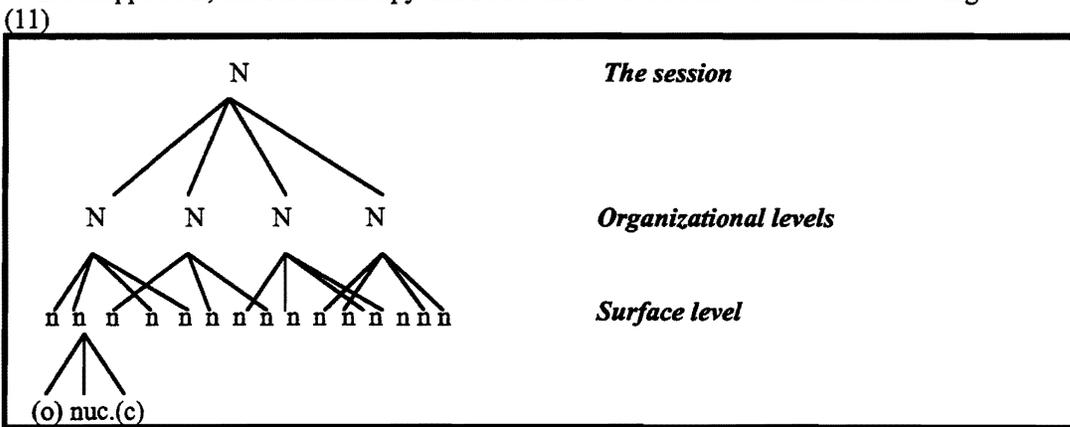
In bold we see the onset. This is followed by *y'know* which serves to draw the listeners into the story making them almost part of the events. From here, the narrative flows into the *orientation* stage where the setting is described. We will simply call this the nucleus, as not every narrative will have this orientation stage. John finishes his narrative off with:

(10) *So that's I guess why I'm here.*

Bob is then given a turn to relate his story which, in addition to describing his version of the events, tends to focus on 'correcting' aspects of John's story. This is also the case in the other two sessions. The disputant who is given the second turn does not simply tell his/her own story, but rather tries to link the story to the previous one.

Disputants take turns contributing to the meta-narrative. These contributions will not necessarily occur sequentially. As the session progresses, the disputants may be working on several meta-narratives at once. Although there is always some sort of logical link between the mini-narratives, the speakers may move back and forth between topics, working on alternate meta-narratives. Because of this multi-tasking, it may take the disputants the entire session to complete a narrative.

When mapped out, this results in a pyramid structure which could look like the following:



²Toolan (1988) proposes this idea and I have expanded on it here.

On the surface level of the discourse (i.e., what we actually hear), we have an exchange of mini-narratives contributed by each of the disputants. Each of these mini-narratives consists of a structure as illustrated in (8). Aspects of the microstructure, as discussed in section 4, will vary depending on the speaker's goal within the mini-narrative. There will also be interruptions by the mediator throughout the surface level (not depicted in 11). At a deeper level of processing, the surface level constituents will be organized into meta-narratives, each with a particular theme. The mediation session itself consists of a uniting of these meta-narratives. In this dialogue in Session C we can see how the participants work together to organize the mini-narratives they brought up earlier on in the session:

(12)

M1: Well, I'm just wondering which issue that you people would like to see, um, we take a look at first.
 Helen: For me, timing.
 Mark: Yeah, and price.
 M1: How's that... Yeah? 'kay.
 Mark: That's O.K. 'cause it all comes in, y'know, the same heading, y'know, the timing and the price.
 M1: 'Kay.
 Mark: Pretty well.
 M2: So they're tied together in your - both- in your, your mind. The timing and the price
 Mark: Well
 M2: They . . . they're tied together.
 Mark: Yeah. As far as I'm concerned 'cause, y'know, I'm I'm... a certain type of construction takes a certain amount of time. aaah. And a certain price. Same thing with materials. Uegh. You've gotta have, y'know, if you know what you're, what you're getting. Aaah. There's a certain shipping time involved. And, and there's a certain price involved
 M2: Okay
 Mark: So, yeah, as far as I'm concerned the two are tied together.

The issues of 'timing' and 'price' which were previously raised as isolated issues are linked by Mark into one meta-narrative. This is an example of overt organization. Much of the meta-narrative organization is done at a subliminal level rather than through co-constructed discourse.

Van Dijk (1980) uses this kind of hierarchical model to conceptualize various forms of discourse. In his model, microstructures create macropropositions which are part of macrostructures. These macrostructures are organized by - and at the same time build - a superstructure. This superstructure is governed by *function*. Depending on the particular function of the discourse, certain constraints will be placed on the macrostructures.

Following Van Dijk's argument, the function of a mediation session, namely to resolve a problem, will determine the content of the meta-narratives. In the following dialogue from Session A, the disputants are trying to build a mutual story which will allow them to agree on what action to take in order to solve the problem. Bob insists on including the fact that it is the shadow from the tree, and not the tree itself, which hangs over John's garden as this will have consequences in the actual solving of the problem:

(13)

"The tree and the garden"

John: The tree overhangs our yard and it's shading my garden.

Bob: There's no garden there at all. There's just a lawn.

~~~~~ mediator interrupts ~~~~~

John: Like I was saying. It overhangs our property, shades my garden.

~~~~~ time elapsed, other topics discussed ~~~~~

Bob: The tree, for one thing, it doesn't overhang into his garden ...

~~~~~ time elapsed, other topics discussed ~~~~~

John: The garden is not right under the tree. Okay. But

Bob: Oh, good.

John: But the shade that that tree causes by those branches sticking overhead - it catches the garden. The garden is off to the back of that tree. The sun comes in - best sun of the day - comes through there. And those branches that were overhanging my property - they're the ones that were cutting the sun off

Bob: Did you not see me out there trimming it?

M2: Hold on. Hold on. At the moment we're trying to make sure that you've heard the original points that John brought up. And, uh, the question of the garden was the one that really stuck in

your mind

Bob: Okay I would now Alright Oh, I remember another one that he brought up that I did clarify earlier on about the wasps.

By the end, Bob is satisfied with the revision and proposes another story on which he would like them to work.

## 7.0 WHY IS NARRATIVE EXPRESSION SO IMPORTANT?

As humans it is important for us to be able to tell our stories in order to make sense of the world around us and also so that others can better understand us. After traumatic events, retelling the story becomes part of the healing process. Research into victim-offender mediation programs consistently finds a generalized reduction in fear and anxiety among participating victims, both fear of being revictimized by the particular offender as well as more free floating anxiety (Umbreit, 1995). Victim-impact panel participants showed improved psychological functioning as a result of submitting impact statements to court (Davis and Smith, 1994).

The mediation sessions used for these case studies did not involve traumatic events; however, in these situations narrative played a crucial role in the problem-solving process. It allowed for an integration of an inner world of thought and feeling with an outer world of observable actions and states of affairs.

### 7.1 The next step

What is interesting in mediation is that when the participants in the session collaborate in building their stories, they are at the same time co-creating a memory which will serve for future stories of the same events in different settings. This can be studied in greater depth by looking at other types of dispute resolution discourse and comparing their effectiveness with narrative discourse approaches. According to van Dijk (1980), recall of discourse information diminishes after long periods. Information that has the highest structural value will be less likely to be forgotten because of its high position in the structure and its links to other knowledge. This information

will be stored in the long-term memory, either as episodic or semantic data. Although it is primarily meta-narratives that are recalled, surface structures and semantic details may sometimes also be recalled if they are salient to the listener. For example, one may remember that a speaker used a particularly striking word or phrase in a narrative in addition to recalling the gist of the meta-narrative. The actual process of creating narrative is, therefore, crucial in determining what information about an event gets recalled.

As mentioned in the introduction, narrative is used both for reasoning and for representation. What happens, then, when someone other than the narrator has control over shaping the narrative? This is often the case in courtrooms, where strict rules of relevancy and procedure dictate what gets said and how. People in marginalized groups are often prohibited from sharing their stories in the way that they want simply because these stories do not fit into the framework of the court's predetermined idea of relevancy. Research into the comparison of narrative use in courtroom and mediation settings is a future step which should be taken in looking at applications of narrative in dispute resolution.

## 8.0 CONCLUSION

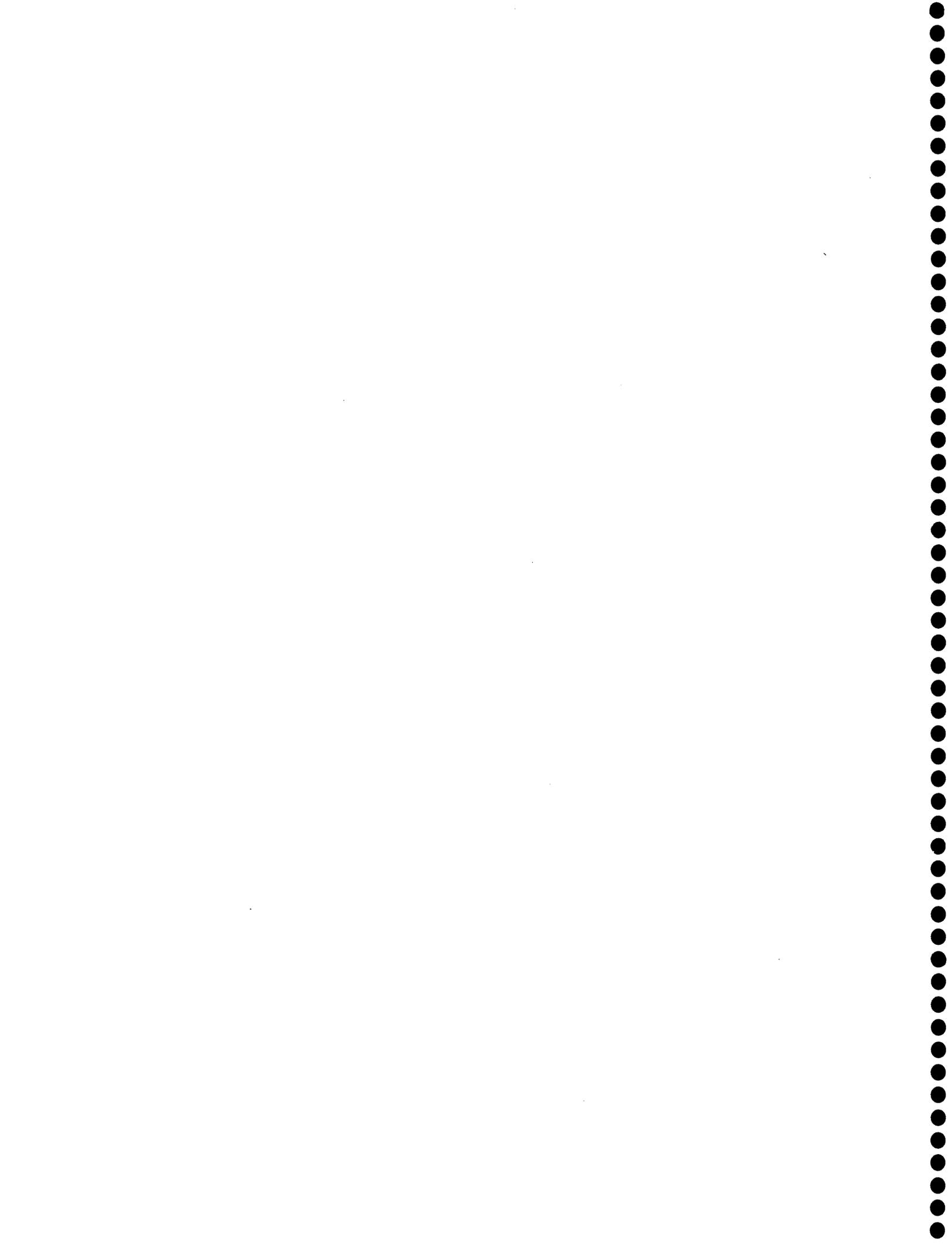
Because stories do not just describe reality, but also create a social reality, it is important to look at more than just the formal features of narrative. We have seen that, in mediation settings, narratives do not follow predictable, unbroken patterns. Instead, they tend to consist of many small pieces which disputants and mediators piece together to form meta-narratives. These greater structures will serve as an important tool in finding a solution that both parties can agree on.

## REFERENCES

- Baumeister and Newman (1994). Self-regulation of Cognition Inference and Decision Processes. *Personality and Social Psychology Bulletin* 20, 3-19.
- Bernstein, B. (1971). *Class, Codes and Control, Vol. 1: Theoretical Studies Towards a Sociology of Language*. London: Routledge & Kegan Paul.
- Bernstein, B. (1973). *Class, Codes and Control, Vol. 2: Applied Studies Towards a Sociology of Language*. London: Routledge & Kegan Paul.
- Briggs, C. (1996). Conflict, language ideologies, and privileged arenas of discursive authority in Warao dispute mediation. In Charles Briggs (ed.), *Disorderly Discourse: Narrative, Conflict and Inequality*, 204-242. New York: Oxford University Press.
- Bruner, J. (1996). Group narrative as a cultural context of autobiography. In D. Rubin (ed.), *Remembering our Past: Studies in Autobiographical Memory*. Cambridge: Cambridge University Press.
- Bush, R. and J. Folger (1994). *The Promise of Mediation*. San Francisco: Jossey-Bass.
- Cobb, S. (1993). Empowerment and mediation: A narrative perspective. *Negotiation Journal* 9 (3), 245-255.
- Coste, D. (1989). *Narrative as Communication*. Minneapolis: U of Minnesota Press.
- Croft, W. (1998) The Structure of Events and the Structure of Language. In M. Tomasello (Ed.), *The New Psychology of Language*, 67-92. Mahway, NJ: Lawrence Erlbaum Associates.
- Davis, G. and C. Smith (1994). Victim Impact Statements and Victim Satisfaction. *Journal of Criminal Justice*, 22, 1-12.
- Denhière, G. (1978). *Le Rappel d'un Récit par des Enfants de 6 à 12 Ans*. Université de Paris VIII, Laboratoire de Psychologie.

- van Dijk, T. A. (1980). *Macrostructures. An Interdisciplinary Study of Global Structures in Discourse, Interaction, and Cognition*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Dreier, O. (2000). Psychotherapy in Clients' Trajectories across Contexts. In Mattingly & Garro (eds.), *Narrative and the Cultural Construction of Illness and Healing*. L.A.: University of California Press.
- Dowty, D. R. (1986). The Effects of Aspectual Class on the Temporal Structure of Discourse: Semantics or Pragmatics? *Linguistics and Philosophy* 9, 37 – 61.
- Duryea, M. and J. Potts (1993). Story and Legend: Powerful Tools for Conflict Resolution. *Mediation Quarterly* 10 (4), 387-395.
- Eisenberg, L. (1981). The Physician as Interpreter: Ascribing Meaning to the Illness Experience. *Comprehensive Psychiatry* 22, 239-48.
- Fairclough, N. (1995). *Critical Discourse Analysis: The Critical Study of Language*. New York: Longman.
- Farb, Peter (1981). *Word Play: What Happens When People Talk*. New York: Knopf.
- Fisher, R. and W. Ury (1981). *Getting to Yes. Negotiating Agreement without Giving In*. New York: Penquin Books.
- Fleischman, S. (1990). *Tense and Narrativity*. Austin, TX: UT Press.
- Goldberg, A. (1999). The Emergence of the Semantics of Argument Structure Constructions. In MacWhinney, B. (Ed.), *The Emergence of Language*, 197-212. Mahwah, NJ: Lawrence Erlbaum Associates.
- Hale, K. (1998). The Language of Cooperation: Negotiation Frames. *Mediation Quarterly* 16 (2), 147-162.
- Heider, F. (1958). *Psychology of Interpersonal Relations*. New York: Wiley.
- Hymes, D. (1974). *Foundations of Sociolinguistics: An Ethnographic Approach*. Philadelphia: U of Pennsylvania Press.
- (1981). *"In vain I tried to tell you": Essays in Native American Ethnopoetics*. Philadelphia: University of Pennsylvania Press.
- Labov, W. & J. Waletzky (1967). Narrative Analysis. Oral Versions of Personal Experience. In J. Helm (ed.), *Essays on the Verbal and Visual Arts*. Seattle: University of Washington Press.
- Loftus, E.F. & J.C. Palmer (1974). Reconstruction of Automobile Accident: An Example of the Interaction Between Language and Memory. *Journal of Verbal Learning and Verbal Behavior*, 13, 585-589.
- Mandler, J. M. (1986). On the Comprehension of Temporal Order. *Language and Cognitive Processes*, 1, 309-320.
- O'Barr, W. & J. Conley (1996). Ideological Dissonance in the American Legal System. In Charles Briggs (ed.), *Disorderly Discourse: Narrative, Conflict and Inequality*. New York: Oxford University Press.
- Parker, I. (1992). *Discourse Dynamics. Critical Analysis for Social and Individual Psychology*. New York: Routledge.
- Roe, E. (1989). Narrative Analysis for the Policy Analyst: A Case Study of the 1980-1982 Medfly Controversy in California. *Journal of Policy Analysis and Management* 8 (2), 251-273.
- Roger's Cablevision (1991). *Perspectives*. (video)

- Todorov, T. (1969). *Grammaire du Décameron*. Mouton: The Hague.
- Toolan, M. (1988). *Narrative: A Critical Linguistic Introduction*. New York: Routledge.
- Ter Meulen, A. G. B. (1995). *Representing Time in Natural Language: The Dynamic Interpretation of Tense and Aspect*. Cambridge, MA: MIT Press.
- Umbreit, M. (1995). The Development and Impact of Victim-Offender Mediation in the U.S. *Mediation Quarterly*, 12(3), 263-276.
- Werth, P. (1999). *Text Worlds: Representing Conceptual Space in Discourse*. New York: Longman.



# VOWEL DEVOICING IN TOKYO JAPANESE

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## 1. INTRODUCTION

Japanese is frequently cited as an example of a language with voiceless vowels (Jaeger, 1978; Vance, 1987). First, let us look at examples of vowel devoicing in Japanese, which represent a range of issues addressed in this paper:

- |               |                |                    |
|---------------|----------------|--------------------|
| (1) a. /sika/ | ‘deer’         | [ɕika]             |
| b. /hukahuka/ | ‘soft’         | [ɸukaɸuka]         |
| c. /kasi/     | ‘lyrics’       | [kaɕi]             |
| d. /kika/     | ‘vaporization’ | [k̟ika] or [k̟iká] |
| e. /síhai/    | ‘domination’   | [ɕihai] or [ɕihái] |

As a first approximation, we can say that in Japanese the high vowels /i, u/ devoice when they occur between two voiceless consonants ([1a] and [1b]). In addition, high vowels devoice word-finally as in (1c), and we can observe free variation in certain contexts ([1d] and [1e]) where accent (indicated by an acute accent) and vowel devoicing interact. The examples (1a) to (1e) are all from Standard Japanese (henceforth Tokyo Japanese). In this paper, I will attempt to provide a unified phonological analysis of these data.

As a starting point, let us look at how Japanese vowel devoicing has been represented in previous phonological studies. Some early studies (e.g., McCawley, 1968: 127) represented Japanese vowel devoicing by using [-voice] approximately as in (2), and considered it as an assimilation process in the feature [voice]:

- (2) V [+high] → [-voice] / [-voice] \_\_ [-voice]

There were also some researchers who considered that high vowels to be deleted rather than devoiced (e.g., Ohso, 1973: 13). To my knowledge, no study has investigated phonetic motivations for vowel devoicing.

Recently two major studies were published on Japanese vowel devoicing. Tsuchida (1997) and Varden (1998) investigated vowel devoicing in Tokyo Japanese in depth, using Optimality Theory (Prince and Smolensky, 1993) and Feature Geometry, respectively. What is shared by these two studies is that both Tsuchida (1997) and Varden (1998) assume that Japanese voiceless vowels are specified as [spread glottis]<sup>1</sup> (henceforth [s.g.]) instead of [-voice], based on previous researchers' (e.g., Hirose, 1971) and Tsuchida's observations with a fiberoptic and electromyography (see Tsuchida [1997] for previous literature using a fiberoptic and electromyography). Although these two studies differ in details, generally speaking, we can approximately say that vowel devoicing process is represented as either the

<sup>1</sup> Since Tsuchida (1997) assumes that laryngeal features are privative, her specification of voiceless vowels is [spread glottis], as opposed to Varden's (1998) [+spread glottis].

surfacing of the feature [s.g.] (Tsuchida, 1997) or the spreading of [s.g.] to the voiceless vowel (Varden, 1998).<sup>2</sup> Henceforth, let us call this approach the “spread-glottis approach”, in reference to its specification of high vowels for [s.g.]. However, since Japanese lacks a phonological contrast between aspirated and unaspirated consonants, it seems arbitrary to specify voiceless vowels as [s.g.]. Aside from the observation of glottal openings, no phonetic grounding is provided to motivate the [s.g.] specification for voiceless vowels in either Tsuchida (1997) or Varden (1998). In addition, the specification of voiceless vowels as [s.g.] rather than as [-voice] may make it more difficult to generalize the vowel devoicing phenomenon as one of phonological assimilations for pronunciation ease such as sequential voicing and accent shift in compounds. As shown in Teshigawara (2001), there is little motivation for the spread-glottis approach to explaining vowel devoicing. (See Teshigawara [2001] for a detailed discussion of problems with the spread-glottis approach.)

In this paper, an alternative analysis for vowel devoicing in Tokyo Japanese will be proposed by using the feature [-voice] in the framework of Optimality Theory (Prince and Smolensky, 1993). I will draw on Jaeger’s (1978) aerodynamic account for high vowel devoicing and other aerodynamic accounts drawn from other researchers’ phonetic studies in proposing markedness constraints used in the analysis. In the next section, the basic facts about vowel devoicing in Tokyo Japanese will be introduced. In Section 3, I will propose an alternative phonological analysis for vowel devoicing in Tokyo Japanese, using Optimality Theory (henceforth OT). It will be shown that the aerodynamically motivated constraints can successfully predict correct outputs not only in the canonical devoicing context, but also in word-final position and in the case of accented vowels. Conclusions follow in Section 4.

## 2. BASIC FACTS ABOUT VOWEL DEVOICING IN TOKYO JAPANESE

Japanese has five vowels, /i, e, a, o, u/, and each of the five vowels has two distinctive lengths, i.e., short and long. No long vowel devoices under any circumstances in any Japanese dialect, which is consistent with Greenberg’s (1969) observation that voiceless long vowels are more marked than voiceless short vowels. Among the short vowels, two high vowels /i, u/ are devoiced when preceded and followed by voiceless obstruents, as can be seen in the following examples from Tokyo Japanese.<sup>3</sup>

|               |           |             |             |          |                   |
|---------------|-----------|-------------|-------------|----------|-------------------|
| (3) a. /sika/ | ‘deer’    | [ʃika]      | cf. /siika/ | ‘poetry’ | [ʃiika] * [ʃiika] |
| b. /kikon/    | ‘married’ | [kikon]     |             |          |                   |
| c. /hukahuka/ | ‘soft’    | [ɸukaɸu ka] |             |          |                   |
| d. /sukii/    | ‘ski’     | [sukii]     |             |          |                   |

In each of the four examples (3a) to (3d), the high vowel between two voiceless consonants is devoiced.

In addition to high vowels, K. Sakuma mentions that the non-high vowels, i.e., /e, a, o/ also devoice occasionally, as shown in italics in such words as /haha/ ‘mother’, /kakari/ ‘to hang’ and /koko/ ‘here’ (Sakuma, 1929: 231–232, cited in Vance, 1987: 48–49). However, it is also noted that non-high vowel devoicing occurs far less often

<sup>2</sup> In Tsuchida’s (1997) analysis, all high vowels are specified for [s.g.], and only those that are flanked by two voiceless consonants devoice except for those in some “inhibitory” contexts. In Varden (1998), high vowels flanked by two voiceless consonants receive [+spread glottis] from the preceding consonant.

<sup>3</sup> Throughout this paper, [u] is used for phonetic transcription of /u/ instead of [ɯ]. [ʃ, ʒ] are used to indicate allophones of /s, z/ preceding /i/, and [ç, ʧ] are used for allophones of /h/ preceding /i, u/ respectively. /t, d/ become affricates preceding /i, u/, thus [tʃ, dʒ] appear before an /i/ and [ts, dz] appear before an /u/.

than high vowel devoicing. (See e.g., Venditti and van Santen [1998] for actual devoicing rates of non-high vowels.) Thus, it seems reasonable to say that high vowels devoice in Tokyo Japanese.

Although it has been noted that a high vowel preceded by a voiceless consonant and followed by a voiced consonant can devoice in fast speech (e.g., Beckman, 1994), the devoicing rate in such non-canonical environments is not comparable to that in a canonical environment, i.e., between voiceless consonants. N. Yoshida and Y. Sagisaka (1990, cited in Yoshida, 1998 and 1999) point out that devoiced high vowels preceded by a voiceless consonant and followed by a voiced consonant made up only 4% of devoiced vowels in their data. Thus, it seems legitimate to claim that in Japanese, high vowels devoice between voiceless consonants.

### 3. ANALYSIS

#### 3.1 Analysis of Basic Facts

Let us analyze the basic facts about vowel devoicing in Tokyo Japanese using OT. To begin with, the fact that high vowels devoice between voiceless consonants is captured by the following context-sensitive markedness constraint:

##### (4) HVD (HIGH VOWEL DEVOICING) (preliminary version)

\* $\underset{\text{C}}{\text{C}} \text{V}_{[+\text{high}]} \underset{\text{C}}{\text{C}}$

No voiced high vowel between voiceless consonants.

This constraint is phonetically grounded. Jaeger (1978) examined the Stanford Phonology Archive, which consists of information on the phonological systems of 221 languages, and found 44 languages with voiceless vowels. Of these 44 languages, 24 devoice only part of their vowel system: of these 24, 20 either devoice only high vowels or preferentially high vowels. Japanese is cited as an example of the latter group. Jaeger observed that the tendency to devoice high vowels is aerodynamically grounded. The relatively narrow oral cavity necessary to produce high vowels (compared to non-high vowels) produces a high supraglottal air pressure. When the supraglottal air pressure becomes too high, the vocal fold closure, which is essential for vocal fold vibration (i.e., voicing), cannot be sustained; therefore, the vocal folds open up, and voicing stops. In addition, the following cross-linguistic perceptual evidence may suggest that acoustic evidence of the influence of vowels on preceding consonants is greater when the vowel is high rather than non-high, thus making voiceless high vowels auditorily less marked than voiceless non-high vowels. In Woleaian, a language where five short vowels (except for the low vowel [a]) devoice before pauses, it is noted that voiceless high vowels, i.e., [i, ɨ, u] are easier to auditorily differentiate than voiceless non-high vowels (Sohn, 1975: 20). Thus, we may assume that it is easier for listeners to retrieve acoustic cues for high devoiced vowels from preceding consonants than for non-high devoiced vowels.

However, although high vowels may devoice in Tokyo Japanese, voiceless vowels are universally more marked than voiced vowels. It has been revealed that cross-linguistically, there is no language with a phonemic contrast between voiced and voiceless vowels (Greenberg, 1969). The marked status of voiceless vowels is captured with the context-free markedness constraint in (5):

##### (5) No VOICELESS VOWEL

\* $\underset{\text{V}}{\text{V}}$

Vowels must not be voiceless.

In addition, in order to prevent unnecessary vowel devoicing, a faithfulness constraint concerning the specification of voice is also required, as in (6):

(6) IDENT-IO (voice)

Correspondent segments in input and output have identical values for [voice].

For allophonic variation, the ranking of the constraints is as follows: the context-sensitive markedness constraint, i.e., (4) HVD dominates the context-free constraint, (5) \*V̥, followed by the faithfulness constraint, (6) IDENT-IO (voice), as shown in (7).

(7) HVD >> \*V̥ >> IDENT-IO (voice)

The correctness of this constraint ranking is illustrated in tableaux (8) to (12). First, let us consider the case where a voiced vowel is in the input, but a voiceless vowel appears in the output as in (12).

(8) /sika/ 'deer'

|    | Input: /sika/ | HVD | *V̥ | IDENT-IO (voice) |
|----|---------------|-----|-----|------------------|
| a. | ☞ <i>ʃika</i> |     | *   | *                |
| b. | <i>ʃika</i>   | *!  |     |                  |

The candidate (8b), which does not have devoicing on the high vowel /i/, loses to the actual output (8a), since it violates the highest-ranked context-sensitive markedness constraint, HVD. The selected candidate, (8a), violates two lower-ranked constraints, i.e., \*V̥ (context-free markedness constraint) and IDENT-IO (voice) (faithfulness constraint). However, this does not affect the outcome since this candidate satisfies HVD, the most highly ranked constraint of the three.

This result should be obtained regardless of different assumptions about the voicing of vowels in the input in order to maintain Richness of the Base, a concept that guarantees that evaluation is performed on a set of candidate outputs, not on the input level, and that no constraints can be stated at the level of input (Prince and Smolensky, 1993). Indeed, the same candidate [ʃika] is selected when the input contains a voiceless vowel, i.e., /s̥ika/ as in (9). Again it is HVD that determines the outcome, without interference of the lower-ranked constraint, \*V̥.

(9) /s̥ika/ 'deer'

|    | Input: /s̥ika/ | HVD | *V̥ | IDENT-IO (voice) |
|----|----------------|-----|-----|------------------|
| a. | ☞ <i>ʃika</i>  |     | *   | *                |
| b. | <i>ʃika</i>    | *!  |     |                  |

In order to account for the complementary distribution of voiced and voiceless vowels, we should also be able to prove that voicing of the vowels in the inputs does not affect the outcome when there is no devoicing environment. Let us look at two tableaux for the word, /zikan/ 'time,' one with a voiced vowel as its input (10), and the other with a voiceless vowel (11).

(10) /zikan/ 'time'

| Input: /zikan/                                                                             | HVD | *V̥ | IDENT-IO (voice) |
|--------------------------------------------------------------------------------------------|-----|-----|------------------|
| a.  zikan |     |     |                  |
| b. zikan                                                                                   |     | *!  |                  |

(11) /zikan/ 'time'

| Input: /zikan/                                                                             | HVD | *V̥ | IDENT-IO (voice) |
|--------------------------------------------------------------------------------------------|-----|-----|------------------|
| a.  zikan |     |     |                  |
| b. zikan                                                                                   |     | *!  |                  |

In both cases, because the context is not relevant to HVD, that is, the high vowel is between a voiced consonant and voiceless consonant, the decision falls to the lower-ranked context-free markedness constraint. As shown in both (10) and (11), the context-free markedness constraint \*V̥ is the sole determinant of the output regardless of the voicing of /i/ in the input. Thus, we can conclude that the present ranking is consistent with the concept of Richness of the Base. (Henceforth, only inputs with voiced vowels will be given since Richness of the Base is guaranteed.)

This constraint ranking also predicts correct outputs when a non-high vowel appears between two voiceless consonants as in (12).

(12) /saka/ 'slope'

| Input: /saka/                                                                               | HVD | *V̥ | IDENT-IO (voice) |
|---------------------------------------------------------------------------------------------|-----|-----|------------------|
| a.  saka |     |     |                  |
| b. saka                                                                                     |     | *!  |                  |

As is the case with (10) and (11), the context for the application of HVD does not obtain here, therefore the decision falls to the lower-ranked context-free markedness constraint. The candidate (12b), which has a voiceless non-high vowel, is eliminated because of the violation of \*V̥. Gratuitous voiceless vowels are not permitted.

In the next three subsections (3.2.1 to 3.2.3), we will see that the present aerodynamic approach to vowel devoicing allows us to provide a coherent approach to some other issues. First, another context for vowel devoicing, where silence follows a devoiceable vowel, i.e., so-called "word-final devoicing", will be analyzed. Then, the relationship between accent and vowel devoicing will be analyzed by using aerodynamically motivated constraints. Lastly, an aerodynamic explanation for the fact that long vowels do not devoice in Japanese will be proposed (3.2.3).

## 3.2 Detailed Facts about High Vowel Devoicing in Tokyo Japanese

### 3.2.1 Word-Final Devoicing

In addition to the canonical devoicing context discussed above, there is another context where high vowels devoice. It is generally mentioned that a high vowel preceded by a voiceless consonant and followed by a pause devoices when it has a low tone (e.g., *Nihon Hoso Kyokai* [henceforth NHK], 1966). For example, /kasi/ 'lyrics' is pronounced as [ka̠i̠] when followed by a pause. However, when followed by another word such as a particle, the voicing of the word-final high vowel depends on the initial consonant of the following word; the /i/ in /kasi/ is devoiced if it is followed by a word starting with a voiceless consonant, e.g., /kara/ 'from', i.e., [ka̠i̠ kara], while it is

voiced when followed by a word starting with a voiced consonant, e.g., /demo/ 'even', i.e., [kaʃi demo] (Maekawa, 1989). Thus, in reference to these situations, we can say that a word-final devoiceable vowel (i.e., a high vowel preceded by a voiceless consonant) devoices only utterance-finally; not every word-final devoiceable vowel devoices.

This fact can also be captured by the aerodynamic account of vowel devoicing mentioned earlier. A pause, which is a period of silence, i.e., lack of vocal fold vibration ([–voice]), can be considered as the same as a voiceless consonant. Therefore, we can say that the environment of a preceding voiceless consonant and following pause provides high vowels with the same environment for devoicing as that between two voiceless consonants. In order to allow for the devoicing of a high vowel preceded by a voiceless consonant and followed by a pause, the HVD constraint proposed in (4) is modified as follows.

(13) HVD (HIGH VOWEL DEVOICING) (final version)

$$*C̥ V_{[+high]} \left\{ \begin{array}{l} C̥ \\ \text{pause} \end{array} \right\}$$

No voiced high vowel between voiceless consonants or when preceded by a voiceless consonant and followed by a pause, i.e., between a preceding voiceless consonant and a following voiceless period.

The final version (13) takes the place of the preliminary version (4) in the ranking proposed in (7). Now let us look at an example with a final syllable consisting of a voiceless consonant and high vowel.

(14) /kasi/ 'lyrics'

| Input: /kasi/                                                                               | HVD | *V̥ | IDENT-IO (voice) |
|---------------------------------------------------------------------------------------------|-----|-----|------------------|
| a.  kaʃi |     | *   | *                |
| b. kaʃi                                                                                     | *!  |     |                  |

Candidate (14b) is ruled out because of the violation of HVD, which now also prohibits a high vowel preceded by a voiceless consonant and followed by a pause, and the correct candidate (14a) with a voiceless final vowel is selected.

### 3.2.2 Accent and Vowel Devoicing

Maekawa (1989) mentions both synchronic and diachronic connections between vowel devoicing and accent, which have been observed by previous researchers: the synchronic connection is that accented vowels do not devoice as often as unaccented vowels; and the diachronic connection is that the existence of vowel devoicing caused accent shift in some dialects in Japanese (e.g., Nitta, 1985). Since the diachronic relationship between vowel devoicing and accent is beyond the scope of this paper, it will not be discussed any further in this paper; however, it would be a very interesting topic to pursue in a future study.

First, some basic facts about accent in Tokyo Japanese are introduced. (See e.g., Uwano [1989] and Vance [1987] for more information on accent in the Japanese language.) In Tokyo Japanese, a word can be either accented or unaccented. Each accented word has accent, which is characterized by a pitch fall from high to low. In the following discussion, the last high-pitched mora in an accented word is called the accented mora, indicated by an acute accent mark over the vowel. In Tokyo Japanese, specifying the accented mora in a word is enough to predict the tonal pattern of the rest of the word; if the initial mora is not accented, it receives a low tone, and the succeeding moras up to the accented mora receive a high tone. In the case of unaccented words, there is no such fall in pitch, and the melody starts with a low tone and the remaining moras receive a high tone. The difference between a word with final

accent and an unaccented word is not clear when pronounced in isolation, but it becomes clear when followed by another word such as a postposition. For example, a final-accented word /otokó/ ‘man’ and unaccented word /sakana/ ‘fish’ have the same pitch pattern LHH when pronounced in isolation, but the difference emerges when followed by a postposition, e.g., /wa/ (topic marker), i.e., /otokó-wa/ LHHL vs. /sakana-wa/ LHHH. For  $n$ -mora words there are  $n+1$  accent patterns in Tokyo Japanese. (This number can be correctly predicted by the Prosodic Faithfulness constraints introduced in [16]; see Footnote 5.)

Previous researchers have noted that devoicing of accented vowels tends to be avoided (e.g., Han, 1962; Vance, 1987). However, devoicing of accented vowels has recently become more acceptable in Tokyo Japanese, especially among younger speakers (Tsuchida, 1997). When a word has initial accent and the initial vowel is devoiceable, i.e., a high vowel between two voiceless consonants, there are often two possible pronunciations given to the word, as seen in both NHK (1966) and Hirayama (1960): in one pronunciation the initial vowel is devoiced and accented; in the other pronunciation the initial vowel is devoiced and accent shift or deaccentuation occurs in order to avoid a voiceless accented vowel. Of the two possible data sources I am able to consult, Hirayama’s (1960) data will be used in the following analysis, since the pronunciations in Hirayama seem to be closer to the pronunciation of average speakers, although there seem to be some irregularities as well.<sup>4</sup> The following are examples of words that have more than one entry in Hirayama’s (1960) dictionary. (The actual pitch patterns for the two pronunciations in each word in [15] are given in parentheses following each pronunciation.)

- |      |              |                   |            |        |    |            |        |
|------|--------------|-------------------|------------|--------|----|------------|--------|
| (15) | a. /kíka/    | ‘vaporization’    | [kíkka]    | (HL)   | or | [kíká]     | (LH)   |
|      | b. /tíketto/ | ‘ticket’          | [tíkketto] | (HLLL) | or | [tíkkétto] | (LHLL) |
|      | c. /sísja/   | ‘branch office’   | [sísja]    | (HL)   | or | [sísja]    | (LH)   |
|      | d. /síseki/  | ‘historical site’ | [sísseki]  | (HLL)  | or | [sísseki]  | (LHH)  |

In all the examples in (15), the only devoiceable vowel, which is also in the initial syllable of each word, devoices whether it is accented or not. In the first variant, the high vowel is devoiced and accented at the same time. In the second variant, the accent shifts to the following mora as in (15a) and (15b); in (15c) and (15d) deaccentuation occurs and the second variants become unaccented. In either case, however, the voiceless vowel of the second variant is no longer accented and has a low tone.

This is the case of free variation where a single input is mapped onto two grammatical outputs. In order to predict both correct outputs in an OT analysis, we will draw on a concept called “free ranking” (Anttila, 1995; Kager, 1999: 404 – 407), instead of a single deterministic ranking, in which each input is mapped to only one output. Free ranking assumes that two constraints  $C_1$  and  $C_2$  are freely ranked where the evaluation procedure branches: in one branch,  $C_1$  is ranked above  $C_2$ ; in the other branch the ranking is reversed. In addition to free ranking, we need to propose a set of faithfulness constraints to prohibit accent shift and deaccentuation, which are adopted from Alderete (1999) as in (16), and a context-free markedness constraint to prohibit having voiceless accented vowels as in (17). First, the three Prosodic Faithfulness constraints proposed by Alderete (1999) are introduced.

<sup>4</sup> NHK (1966) is highly prescriptive; for example, almost no voiceless vowels between two fricatives are described, which does not correspond to the situations observed in previous studies such as Hirose (1971) where 70% of high vowels between two fricatives were devoiced.

## (16) Prosodic Faithfulness (PROS-FAITH) (Alderete, 1999: 18–19)

a. MAX-PROM: For  $x$  a prominence,  $\forall x \exists x' [x \in S_1 \rightarrow x' \in S_2 \ \& \ xRx']$

'Every prominence in  $S_1$  must have a correspondent in  $S_2$ .'

b. DEP-PROM: For  $x$  a prominence,  $\forall x \exists x' [x \in S_2 \rightarrow x' \in S_1 \ \& \ xRx']$

'Every prominence in  $S_2$  must have a correspondent in  $S_1$ .'

c. NO-FLOP-PROM:

For  $x$  a prominence,  $y$  a sponsor, and  $z$  an autosegmental link,

$\forall x \forall y \forall z [x \text{ and } y \text{ are associated via } z \text{ in } S_1 \rightarrow$

$\exists x' \exists y' \exists z'$  such that  $(x, y, z)R(x', y', z')$  and  $x'$  and  $y'$  are associated via  $z'$  in  $S_2$ .

'Corresponding prominences must have corresponding sponsors and links.'

MAX-PROM and DEP-PROM maintain the contrast between accented and unaccented words by prohibiting the deletion of an accent in the input (MAX-PROM), and the insertion of an accent that has no correspondent in the input (DEP-PROM). NO-FLOP-PROM requires that the position of the prominence stay the same in the mapping from one structure to another. Alderete (1999) assumes that in the Japanese grammar, these three faithfulness constraints are ranked in the same position with respect to each other, together constituting the constraint PROS-FAITH, and are ranked higher than alignment constraints that assert a fixed position for prominence structures (e.g., the right edge of the word).<sup>5</sup> However, in the following analysis, we will see that the three constraints are not always ranked in the same position with respect to each other.

Next, let us turn to the context-free markedness constraint that prohibits voiceless accented vowels:

## (17) NO VOICELESS ACCENTED VOWEL

\* $\text{v}$

Accented vowels must not be voiceless.

This constraint is motivated by various factors. High-pitched vowels are produced with greater subglottal pressure than low-pitched vowels (Titze, 1992, cited in Shadle, 1997: 51); thus, from an aerodynamic point of view, we can assume that the greater subglottal pressure of high-pitched vowels prevents them from devoicing. Accented vowels are high-pitched, therefore, they are less likely to devoice than low-pitched vowels. From the viewpoint of laryngeal articulation, Sugito (1998) observed that the glottis adductor muscle was activated during accented syllables, which conflicts with what is necessary for vowel devoicing, i.e., glottal abduction. According to Sugito (1997, 1998), voiceless accented vowels have no pitch, thus no tone realization is possible on the voiceless vowels themselves, and it is the following vowels that realize a steep falling tone, which serves to show that the immediately preceding vowel has accent. Thus, we may say that voiceless accented vowels are acoustically more marked as well.

Since this is a case of free variation, separate constraint rankings are proposed for each of the two variants, i.e., the first containing a voiceless accented vowel and the second manifesting accent shift/deaccentuation. The relevant

<sup>5</sup> That NO-FLOP-PROM is ranked higher than those alignment constraints ensures that a word with  $n$ -numbered moras has  $n$  number of accentual contrasts because the accent position in the input must be maintained. As mentioned above, since MAX-PROM and DEP-PROM bring about additional contrast, i.e., the presence or absence of accent, these constraints together yield  $n+1$  accent contrasts for  $n$ -mora words (Alderete [1999]).

constraints here are (14) HVD, (16) Prosodic Faithfulness constraints, and (17) \* $\check{V}$ . First, let us examine how these constraints are ranked for the words that have two variant pronunciations, the second manifesting accent shift ([15a] and [15b]). In order to allow a voiceless accented vowel to occur in the first variant, \* $\check{V}$ , which is violated by the output form, must be ranked lowest. Prosodic Faithfulness constraints and HVD are equally ranked for the first variant, since we do not have any direct evidence to suggest that they are ordered with respect to one another (see [18]). In the second variant in these words, NO-FLOP-PROM is violated; thus this constraint must be ranked lower than the remaining relevant constraints here, i.e., HVD, \* $\check{V}$ , and the other two Prosodic Faithfulness constraints (MAX-PROM and DEP-PROM), as in (19). Rankings (18) and (19) predict a pair of variants that alternate between a pronunciation with a voiceless accented vowel and one with vowel devoicing and accent shift (i.e., [15a] and [15b]); the constraints that change positions in the two rankings are NO-FLOP-PROM and \* $\check{V}$ .

(18) HVD, MAX-PROM, DEP-PROM, NO-FLOP-PROM >> \* $\check{V}$

(19) HVD, MAX-PROM, DEP-PROM, \* $\check{V}$  >> NO-FLOP-PROM

Below, it is shown that rankings (18) and (19) can predict correct outputs for the word /kika/ ('vaporization'), which has two variant pronunciations, the second manifesting accent shift.

(20) /kika/ 'vaporization'

| Input: /kika/      | HVD | MAX-PROM | DEP-PROM | NO-FLOP-PROM  | * $\check{V}$ |
|--------------------|-----|----------|----------|---------------|---------------|
| a. $\check{k}ika$  |     |          |          |               |               |
| b. $kiká$          |     |          |          | *!            |               |
| c. $kíka$          | *!  |          |          |               |               |
|                    | HVD | MAX-PROM | DEP-PROM | * $\check{V}$ | NO-FLOP-PROM  |
| a'. $kíka$         |     |          |          | *!            |               |
| b'. $\check{k}iká$ |     |          |          |               |               |
| c'. $kíka$         | *!  |          |          |               |               |

In the upper and lower parts of (20), the optimal candidates are different, as predicted by the two different constraint rankings illustrated therein. In the upper part, (20b) is ruled out since it violates the highly ranked constraint NO-FLOP-PROM by shifting the accent to the following mora, whereas in the lower part, where this same constraint is ranked lowest, (20b') is selected. In both rankings, neither (20c) nor (20c') is selected, because they violate the highly ranked constraint HVD.

In order to predict correct outputs for the words that have a second variant with deaccentuation ([15c] and [15d]), we need to propose another constraint ranking. Since MAX-PROM is violated in the second variant of these words, this constraint must be ranked lower than the rest of the relevant constraints (i.e., HVD, \* $\check{V}$ , DEP-PROM, and NO-FLOP-PROM), as in (21).

(21) HVD, DEP-PROM, NO-FLOP-PROM, \* $\check{V}$  >> MAX-PROM

Constraint rankings (18) and (21) account for the variant pair that alternates between a pronunciation with a voiceless accented vowel and one with vowel devoicing and deaccentuation (i.e., [15c] and [15d]); the constraints that switch positions in these two rankings are MAX-PROM and \* $\check{V}$ . (22) shows that rankings (18) and (21) can predict correct

outputs for words that have a second variant with deaccentuation, such as /sísja/ ('branch office').

(22) /sísja/ 'branch office'

| Input: /sísja/ | HVD | MAX-PROM | DEP-PROM     | NO-FLOP-PROM | *V̥      |
|----------------|-----|----------|--------------|--------------|----------|
| a.  sísja      |     |          |              |              | *        |
| b. sísja       |     | *!       |              |              |          |
| c. síja        | *!  |          |              |              |          |
|                | HVD | DEP-PROM | NO-FLOP-PROM | *V̥          | MAX-PROM |
| a'. sísja      |     |          |              | *!           |          |
| b'.  síja      |     |          |              |              | *        |
| c'. síja       | *!  |          |              |              |          |

Here again, (22b) is ruled out in the upper part of the tableau, because the deletion of the accent violates MAX-PROM, whereas (22b') is selected in the lower part, because it satisfies one of the most highly ranked constraints, \*V̥.

Further support for the present aerodynamic approach comes from examining specific consonantal contexts. Depending on the consonants preceding and following the initial accented devoiceable vowel, vowel devoicing and accent may depart from the patterns discussed thus far in this paper: different devoicing patterns are observed in other consonantal environments. A survey was conducted for this paper using Hirayama's (1960) dictionary (consisting of approximately 100,000 words) in order to examine the relationship between consonant environments and vowel devoicing patterns. Previous studies such as Tsuchida (1997) suggest that high vowels between two voiceless fricatives and those followed by an allophone of /h/ are less likely to devoice than those between two plosives. Thus, the objects of the survey were limited to words beginning with the following four types of sequences containing C<sub>1</sub> [+high] C<sub>2</sub>, as in Table 1 (23):

(23)

|    | C <sub>1</sub> | C <sub>2</sub> |
|----|----------------|----------------|
| a. | plosives       | /s/ or /sj/    |
| b. | plosives       | /h/            |
| c. | continuants    | /s/ or /sj/    |
| d. | continuants    | /h/            |

Table 1: Objects of the survey: words beginning with the four types of sequences containing C<sub>1</sub> V̥ [+high] C<sub>2</sub>

Only words that have a second vowel that is not devoiceable, i.e., a non-high vowel, a long vowel, or a vowel followed by a voiced consonant were examined; consecutive devoiceable environments were excluded from this survey. Table 2 in (24) shows the percentages of words containing a voiceless accented vowel compared to words with a devoiceable accented vowel in the initial mora. In other words, Table 2 shows the percentages of words that have the same vowel devoicing patterns as we have seen in the previous discussion from (15); there are two variants: one devoices the accented devoiceable vowel without any accent shift, while the other devoices the devoiceable vowel with accent shift or deaccentuation.<sup>6</sup>

<sup>6</sup> One of the samples that has a sequence of "continuant – high vowel – /s/" has different vowel devoicing patterns:

(i) /sisa/ 'suggestion' [sisa] or [s̥isa]

This is included in the category that allows devoicing of the accented vowel.

(24)

| $\zeta_1 \backslash \zeta_2$ | /s/ or /sj/  | /h/         |
|------------------------------|--------------|-------------|
| Plosives                     | 100.0 (7/7)  | 100.0 (3/3) |
| Continuants                  | 71.4 (10/14) | 14.3 (1/7)  |
| Sum                          | 81.0 (17/21) | 40.0 (4/10) |

Table 2. Percentages and numbers of words that have a voiceless accented vowel compared to those that have a devoiceable accented vowel in the initial mora. The figures in parentheses show the actual numbers of words in each category.

Despite the observations made in previous studies such as Tsuchida's (1997),<sup>7</sup> which mention that vowel devoicing between fricatives and before /h/ are equally prohibited, the results seem to suggest that these two environments are different. While devoicing high vowels between a continuant and /s/ or /sj/ is still common, devoicing high vowels between a continuant and /h/ is far less common. Thus in the following discussion, only vowels before /h/ are assumed to be undevoiceable, and the four examples that allow devoicing of the accented vowel are excluded from the analysis.

The pronunciations for those words that do not allow the devoicing of accented high vowels before /h/ are as follows:

(25) a. /síhai/ 'domination' [jíhai] or [jíhái]    b. /síhen/ 'poetry' [jíhen] or [jíhen]

Unlike in (15), the first variant of each word in (25) does not devoice the initial accented vowel. In the other pronunciation, however, the pattern observed is the same as in (15); the initial vowel is devoiced with accent shift (25a) or is devoiced and deaccentuated (25b).<sup>8</sup> In order to predict the correct outputs, we need to add a constraint to prohibit the occurrence of a voiceless accented vowel before /h/ or its allophones.

(26) \* $\zeta C_{[+cont, -strid]}$

No voiceless accented vowels may precede [h, ç, ø].<sup>9</sup>

This constraint is phonetically grounded. [h] takes much more airflow to produce compared to other voiceless fricatives. According to Shadle (1997: 44), the volume flow rate for [h] may be 1,000 to 1,200 cm<sup>3</sup>/s compared to a rate of 200 to 400 cm<sup>3</sup>/s for typical voiceless fricatives. We may assume that the greater airflow necessary to produce [h] would increase the airflow during the production of the preceding vowel anticipatorily; the increased airflow would

<sup>7</sup> Tsuchida (1997) used a revised version of NHK (1966) (NHK, 1985) as a data source. While I am not able to consult that particular version of the dictionary, from Tsuchida's (1997) analysis, it is clear that NHK's dictionary almost exclusively bans the devoicing of high vowels between two fricatives and before an allophone of /h/, whether they are accented or not.

<sup>8</sup> The same patterns are observed for a minority of words consisting of the sequence "continuant – high vowel – /s/ or /sj/":

(i) a. /sísjoo/ 'teacher' [jísjoo] or [jíjóo]    b. /sjúsa/ 'chief examiner' [júsa] or [júsá]

<sup>9</sup> As mentioned in Footnote 3, /h/ becomes [ç, ø] when it precedes /i, u/ respectively. However, only two out of ten samples in the data in Table 2 have an /u/ following /h/, and none has an /i/ following /h/. Thus, we may say that the constraint in (26) mostly deals with [h] rather than [ç, ø].

lead to voice the preceding vowel. While /h/ appears as [ç, φ] before /i, u/ respectively, possibly resulting in a lower volume flow rate, [ç, φ] may also appear as [h] (Tsuchida, 1997; Vance, 1987); and as mentioned in Footnote 9, there are fewer environments in which [ç, φ] appear, compared to environments in which [h] appears. In addition, as mentioned earlier, it is the following vowel that realizes the accent with a steep falling tone when the initial accented vowel is devoiced. Thus the sequence of “V̥/h/” followed by a non-devoiceable vowel with a falling tone, i.e., [V̥h, V̥ç, V̥φ], would require more articulatory effort than, say a sequence of “V/h/” followed by a level tone, i.e., [Vh, Vç, Vφ]. Note that the present aerodynamic approach can distinguish coronal fricatives and allophones of /h/ in terms of their effects on vowel devoicing, whereas the spread-glottis approach treats them in the same way as having the feature [s.g.] (Tsuchida, 1997). Incidentally, in the present data, there are only three examples containing the sequence “plosive – V̥<sub>[+high]</sub> – /h/” which happen to allow devoicing of the accented vowel, and thus violate the constraint \*V̥C<sub>[+cont, -strid]</sub>. The other examples that have the same consonantal environment are almost exclusively unaccented, and allow devoicing of the unaccented high vowel, which satisfies this constraint.

Since there are two variants for each word, we are once again dealing with a case of free variation. A free ranking between HVD and NO-FLOP-PROM, as shown in (27) and (28), results in correct outputs as in (29).

(27) \*V̥C<sub>[+cont, -strid]</sub>, MAX-PROM, DEP-PROM, NO-FLOP-PROM, \*V̥ >> HVD

(28) \*V̥C<sub>[+cont, -strid]</sub>, HVD, MAX-PROM, DEP-PROM, \*V̥ >> NO-FLOP-PROM

(29) /síhai/ ‘domination’

| Input: /síhai/ | *V̥C <sub>[+cont, -strid]</sub> | MAX-PROM | DEP-PROM | NO-FLOP-PROM | *V̥ | HVD          |
|----------------|---------------------------------|----------|----------|--------------|-----|--------------|
| a.  síhai      |                                 |          |          |              |     | *            |
| b. síhái       |                                 |          |          | *!           |     |              |
| c. síhai       | *!                              |          |          |              | *   |              |
|                | *V̥C <sub>[+cont, -strid]</sub> | HVD      | MAX-PROM | DEP-PROM     | *V̥ | NO-FLOP-PROM |
| a'. síhai      |                                 | *!       |          |              |     |              |
| b'.  síhái     |                                 |          |          |              |     | *            |
| c'. síhai      | *!                              |          |          |              | *   |              |

As was the case in (20) and (22), different winners are produced in the upper and lower parts of the tableau by the different constraint rankings illustrated therein. Both (29c) and (29c’), which contain a voiceless accented vowel before [h], are ruled out because they violate the constraint \*V̥C<sub>[+cont, -strid]</sub>. In the upper part, (29a) is selected since it satisfies all the highest-ranked constraints, whereas (29a’) is ruled out in the lower part due to the violation of HVD. In the same way, in order to predict correct outputs for words whose first variant has a voiced accented vowel and second variant has a voiceless unaccented vowel with deaccentuation (e.g., [25b] /síhɛN/), we need to propose another constraint ranking that pairs up with (27), producing a free ranking between HVD and MAX-PROM:

(30) \*V̥C<sub>[+cont, -strid]</sub>, HVD, DEP-PROM, NO-FLOP-PROM, \*V̥ >> MAX-PROM

Note that the constraint rankings in (28) and (30) are identical to those in (19) and (21) respectively with the addition of the constraint \*V̥C<sub>[+cont, -strid]</sub>. Adding the constraint \*V̥C<sub>[+cont, -strid]</sub> to (20) does not change the outcome for a word that does not contain an /h/ following the voiceless accented vowel, since the context specified by the constraint does not occur. (31) shows that the analysis holds with the addition of \*V̥C<sub>[+cont, -strid]</sub> to (20):

## (31) /kika/ 'vaporization'

| Input: /kika/       | * $\check{V}C$ [+cont, -strid] | HVD | MAX-PROM | DEP-PROM | NO-FLOP-PROM | * $\check{V}$ |
|---------------------|--------------------------------|-----|----------|----------|--------------|---------------|
| a. $\text{ㇿ}$ kika  |                                |     |          |          |              |               |
| b. kika             |                                |     |          |          | *!           |               |
| c. kika             |                                | *!  |          |          |              |               |
|                     | * $\check{V}C$ [+cont, -strid] | HVD | MAX-PROM | DEP-PROM | NO-FLOP-PROM | * $\check{V}$ |
| a'. kika            |                                |     |          |          |              | *!            |
| b'. $\text{ㇿ}$ kika |                                |     |          |          |              |               |
| c'. kika            |                                | *!  |          |          |              |               |

So far, four constraint rankings have been proposed to account for the free variation observed in the interaction between accent and vowel devoicing. Table 3 in (32) shows each of the four constraint rankings and examples that can be accounted for by each ranking.

## (32)

| Constraint Ranking                                                                        | Examples                                  |                             |
|-------------------------------------------------------------------------------------------|-------------------------------------------|-----------------------------|
|                                                                                           | $\check{C} V_{[+high]} \check{C}^\dagger$ | $\check{C} V_{[+high]} /h/$ |
| a. * $\check{V}C$ [+cont, -strid], HVD, PROS-FAITH >> * $\check{V}$                       | kika/sjisa                                | -                           |
| b. * $\check{V}C$ [+cont, -strid], HVD, MAX-PROM, DEP-PROM, * $\check{V}$ >> NO-FLOP-PROM | kika                                      | sjhai                       |
| c. * $\check{V}C$ [+cont, -strid], HVD, DEP-PROM, NO-FLOP-PROM, * $\check{V}$ >> MAX-PROM | sjisa                                     | sjihen                      |
| d. * $\check{V}C$ [+cont, -strid], PROS-FAITH, * $\check{V}$ >> HVD                       | *kika/*sjisa                              | sjhai/sjihen                |

Table 3: Constraint rankings that have been proposed to account for free variation and the outcomes predicted by each ranking. In (32a) and (32d), PROS-FAITH stands for the three Prosodic Faithfulness constraints, which stay together in these rankings. <sup>†</sup>The following consonant can be any voiceless consonant except for /h/.

## 3.2.3 Vowel Length and Devoicing

So far, we have analyzed cases involving short vowels. As described above, Japanese long vowels never devoice regardless of quality, while short high vowels can devoice in certain contexts. This fact suggests that voiceless long vowels are more marked than their short counterparts. Greenberg (1969) observed that long vowels are universally less likely to devoice compared to short vowels. This tendency may be attributable to aerodynamic conditions; with long vowels, there is sufficient time to build up the necessary subglottal pressure for voicing. However, this tendency may also be related to the fact that long vowels tend to contain a tone change within the syllable (i.e., high to low or low to high according to where the long vowel is placed in the word) or a high tone throughout the syllable. As already mentioned, high-pitched vowels are unlikely to devoice; vowels manifesting a pitch change are even less likely to do so. Thus, if we adopt an aerodynamic approach to this issue, we can account for the question of long vowel devoicing in terms of vowel length and/or pitch accent, although we do not have enough evidence to decide which of the two is the more important factor.

## 4. CONCLUSIONS

In this paper, vowel devoicing in Tokyo Japanese has been analyzed formally using OT. Instead of the feature [s.g.] proposed by Tsuchida (1997), which is not phonologically contrastive in the Japanese grammar, and is not phonetically motivated, in the present analysis the feature [voice], which is contrastive in obstruents in Japanese, was

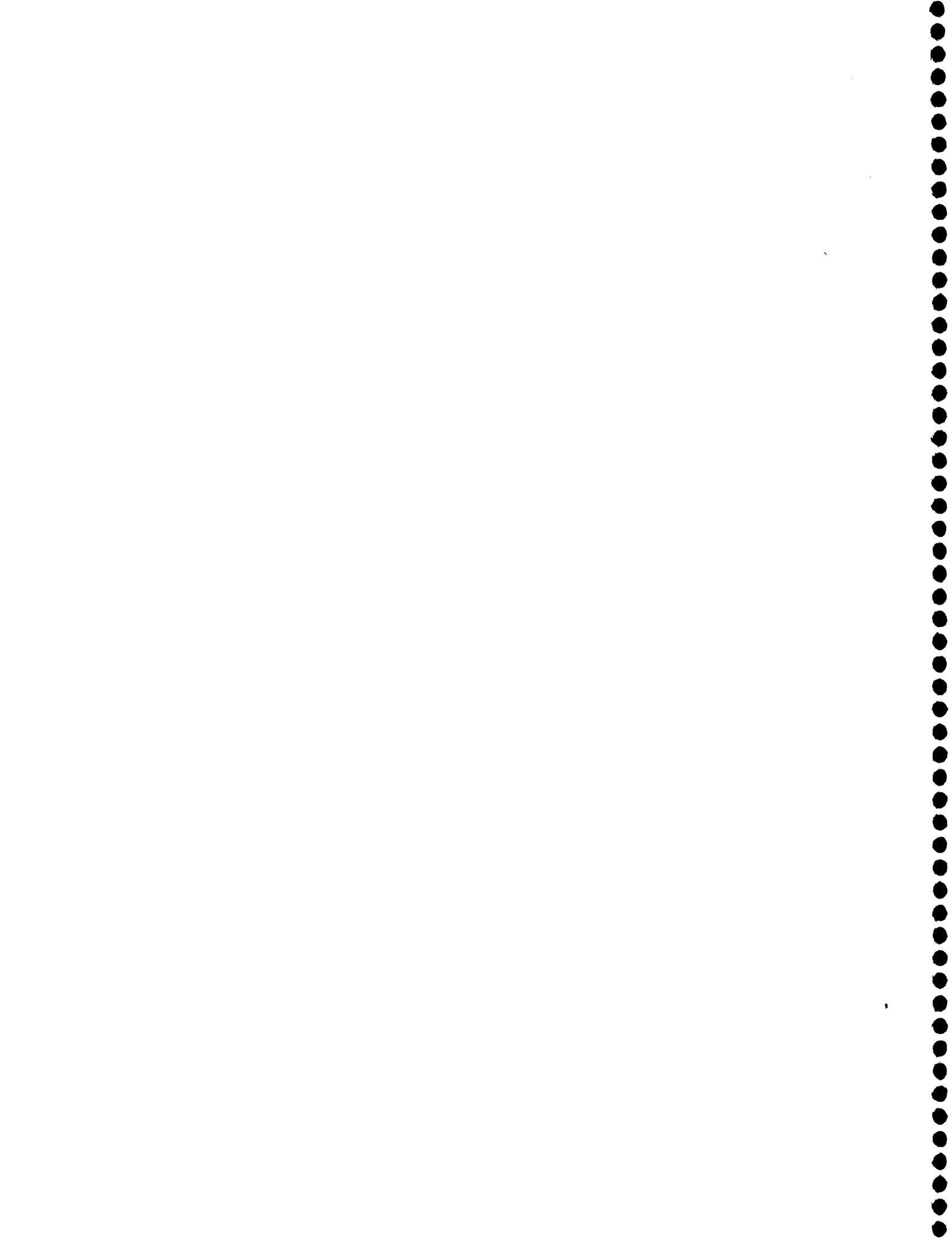
used in such constraints as HVD, \*∇, and IDENT-IO (voice). The constraints introduced in this paper such as HVD and \*∇ were aerodynamically motivated. Moreover, the rankings containing those constraints successfully predicted correct outputs in word-final position (3.2.1) and initial-accented words that show free variation concerning accent shift (3.2.2), as well as in the canonical vowel devoicing context (3.1) in Tokyo Japanese. The possible reasons that long vowels do not devoice in Japanese were also discussed in light of aerodynamic conditions. In a future study, it would be useful to test the present rankings for vowel devoicing in other Japanese dialects, including Osaka Japanese.

## REFERENCES

- Alderete, J. D. (1999). *Morphologically Governed Accent in Optimality Theory*. PhD dissertation. University of Massachusetts Amherst. [ROA-309, <http://roa.rutgers.edu/view.php3?roa=309>]
- Anttila, A. (1995). *Deriving variation from grammar: A study of Finnish genitives*. Ms., Stanford University.
- Beckman, M. E. (1994). When is a syllable not a syllable? *Ohio State University Working Papers in Linguistics* 44, 50–69.
- Greenberg, J. H. (1969). Some methods of dynamic comparison in linguistics. In J. Puhvel (Ed.) *Substance and Structure of Language*. Berkeley and Los Angeles: University of California Press. 147–203.
- Hirayama, T. (1960). *Zenkoku Akusento Jiten* [National Accent Dictionary]. Tokyo: Tokyodo.
- Hirose, H. (1971). The activity of the adductor laryngeal muscles in respect to vowel devoicing in Japanese. *Phonetica*, 23, 156–170.
- Jaeger, J. J. (1978). Speech aerodynamics and phonological universals. In J. J. Jaeger, A. C. Woodbury, F. Ackerman, C. Chlarello, O. D. Gensler, J. Kingston, E. E. Sweetser, H. Thomson & K. W. Whistler (Eds.), *Proceedings of the Fourth Annual Meeting of the Berkeley Linguistics Society*, February 18 – 20, 1978. Berkeley, CA: Berkeley Linguistics Society, University of California. 311–329.
- Kager, R. (1999). *Optimality Theory*. UK: Cambridge University Press.
- McCawley, J. D. (1968). *The Phonological Component of a Grammar of Japanese*. The Hague: Mouton.
- Maekawa, K. (1989). Boin no museika [Devoicing of vowels]. In M. Sugito (Ed.), *Nihongo to Nihongo Kyoiku 2: Nihongo no Onsei/Onin I* [Japanese Language and Japanese Language Education 2: Japanese Phonetics/Phonology I]. Tokyo: Meiji Shoin. 135–153.
- Nihon Hoso Kyokai (ed.) (1966). *Nihongo Hatsuon Akusento Jiten* [Japanese Pronunciation Accent Dictionary]. Tokyo: Nihon Hoso.
- Nitta, T. (1985). Kaga chiho ni okeru 2 mora meishi akusento no hensen [Accent change in two-mora nouns in the dialect of the Kaga region]. *Kokugogaku* 140, 103–119.
- Ohso, M. (1973). A phonological study of some English loanwords in Japanese. *Ohio State University Working Papers*

in *Linguistics* 14, 1–26.

- Prince, A. & Smolensky, P. (1993). *Optimality Theory: Constraint Interaction in Generative Grammar*. Ms., Rutgers University and University of Colorado, Boulder.
- Sakuma, K. (1929). *Nihon Onseigaku* [Japanese Phonetics]. References are to the 1963 reprint. Tokyo: Kazama Shoboo.
- Shadle, C. H. (1997). The aerodynamics of speech. In W. H. Hardcastle & J. Laver (eds.) *The Handbook of Phonetic Sciences*. Oxford, UK: Blackwell Publishers. 33–64.
- Sohn, H.-M. (1975). *Woleaian Reference Grammar*. Honolulu: The University Press of Hawaii.
- Sugito, M. (ed.) (1997). *Onsei Hakei wa Kataru* [Sound Waves Tell]. Tokyo: Izumi Shoten.
- Sugito, M. (ed.) (1998). *Shibata-san to Imada-san* [Mr. Shibata and Mr. Imada]. Tokyo: Izumi Shoten.
- Teshigawara, M. (2001). *Vowel devoicing in Tokyo and Osaka Japanese*. Ms., University of Victoria.
- Titze, I. R. (1992). Phonation threshold pressure: A missing link in glottal aerodynamics. *Journal of the Acoustical Society of America*, 91, 5, 2926–2935.
- Tsuchida, A. (1997). *Phonetics and Phonology of Vowel Devoicing*. Ph.D. dissertation. Cornell University.
- Uwano, Z. (1989). Nihongo no akusento [Accent in the Japanese language]. In M. Sugito (Ed.), *Nihongo to Nihongo Kyoiku 2: Nihongo no Onsei/Onin I* [Japanese Language and Japanese Language Education 2: Japanese Phonetics/Phonology I]. Tokyo: Meiji Shoin. 178–205.
- Vance, T. J. (1987). *An Introduction to Japanese Phonology*. Albany: State University of New York Press.
- Varden, J. K. (1998). *On High Vowel Devoicing in Standard Modern Japanese: Implications for Current Phonological Theory*. Ph.D. dissertation. University of Washington.
- Venditti, Jennifer J. and Jan P. H. van Santen. (1998). Modeling segmental durations for Japanese text-to-speech synthesis. In *Proceedings of the 3rd ESCA Workshop on Speech Synthesis*, pp. 31-36. Jenolan Caves, Australia. [<http://www.slt.atr.co.jp/cocosda/jenolan/Proc/r36/r36.pdf>]
- Yoshida, N. (1998). *Nihongo no boin museika no onseigakuteki kenkyu* [Phonetic study of Japanese vowel devoicing]. Ms., Kyoto University.
- Yoshida, N. (1999). *Boin museika no chiikisa* [Regional differences in vowel devoicing]. Paper presented at Phonology Association in Kansai.
- Yoshida, N. & Sagisaka, Y. (1990). *Boin museika no yoin kenkyu* [Study on factors relating to vowel devoicing]. ATR Technical Report, TR-I-0159.



# THE SUBJECT AGREEMENT CLITIC IN HEILTSUK

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## 1. INTRODUCTION

Those objects which do not fit neatly into a given model of some natural phenomenon are the most interesting. The mere existence of such objects belies some inadequacy of the model. In the study of language, a likely candidate for such an object is the clitic. Clitics sit on the fence between affix and word, morphology and syntax (Zwicky 1977). A descriptively adequate theory of language must be able to account for their behavior.

While the problem of clitics has been tackled by many (cf. Borer 1986; Halpern and Zwicky 1996; Halpern 1998), relatively few have looked at languages outside the Indo-European family. This paper looks at clitics in Heiltsuk, a Wakashan language spoken mainly around Bella Bella and Klemtu on the central coast of British Columbia.

It will be shown that the subject clitic in Heiltsuk can most easily be accounted for with Anderson's (1992) theory of clitics as phrasal affixes.

## 2. A BRIEF SKETCH OF HEILTSUK GRAMMAR

All the data cited in this paper is from Rath's (1981) grammatical introduction to his Heiltsuk-English dictionary. These are written in the Heiltsuk practical orthography.<sup>1</sup> An accent above a vowel represents high-tone; the lack of an accent represents low tone.

In the basic order of constituents in Heiltsuk the subject appears after the verb and before any other constituents:

- (1) Dáduqvlá wísm-á-ǰi w'ác'-iá-ǰi.  
watch man-d<sub>1</sub>-d<sub>2</sub> dog-d<sub>1</sub>-d<sub>2</sub>  
'The man watches the dog.'

Noun phrases are marked by (up to) two deictic markers. As they are irrelevant to the discussion at hand, they are glossed simply as *d*<sub>1</sub> and *d*<sub>2</sub>.

Modifiers appear to the left of that which they modify. Thus in (2) the adverb precedes the verb, and in (3) the adjective precedes the noun. These are obligatorily marked with what Rath called 'left-hand adjunct suffix', glossed as ADJ here.<sup>2</sup>

- (2) 'Wála-nugva-s dáduqvlá w'ác'-iá-ǰi.  
really-SUBJ-ADJ watch dog-d<sub>1</sub>-d<sub>2</sub>  
'I really watch the dog.'

- (3) aík-a-s uxvthiás-ǰi  
good-d<sub>1</sub>-ADJ roof-d<sub>2</sub>  
'a good roof'

The sentence in (2) also illustrates the fact that Heiltsuk is a pro-drop language. The agreement morpheme is sufficient to convey the person and number of the subject, and so no overt pronoun is required.

<sup>1</sup> See Rath 1981, pp 4–63 for a discussion on its relation to phonetic representation.

<sup>2</sup> There are several words which do not take this adjunct suffix. This is addressed in Section 5.2 below.

Heiltsuk also displays some strange behavior with respect to the agreement morpheme; it is deleted when the subject is adjacent to it. This happens when the verb is sentence initial, as in (1) above. Anderson (1984) also notes the same phenomenon in the neighboring related language Kwakwaka. He further notes that if the subject is stylistically moved into second position when the verb is non-initial, the agreement morpheme again deletes. Presumably the same mechanism is working in both languages, but the nature of this mechanism is unknown.

### 3. SUBJECT AGREEMENT MORPHEME

The subject agreement morpheme in Heiltsuk follows the first word in a sentence, regardless of its category. In (4) it follows a verb, in (5) an adverbial, in (6) a negative, and in (7) a connective.

- (4) Dáduqvla-á-qi wísm-á-ǰi.  
 watch-SUBJ-OBJ man-d<sub>1</sub>-d<sub>2</sub>  
 'The man watches him/her/it/they.'
- (5) 'Wál-i-s dáduqvlá wísm-á-ǰi w'ác'-iá-ǰi.  
 really-SUBJ-s watch man-d<sub>1</sub>-d<sub>2</sub> dog-d<sub>1</sub>-d<sub>2</sub>  
 'The man really watches the dog.'
- (6) 'Kús-i w'ála-s dáduqvlá wísm-á-ǰi w'ác'-iá-ǰi.  
 not-SUBJ really-s watch man-d<sub>1</sub>-d<sub>2</sub> dog-d<sub>1</sub>-d<sub>2</sub>  
 'The man does not really watch the dog.'
- (7) G-i áwá t'hiy'á-qí.  
 and-SUBJ IMP buy-OBJ  
 'And he buys it.'

This morpheme's persistence in following the first word, no matter what part of speech it is, is suggestive of it being a second-position (2P) clitic. This is the hypothesis assumed in this paper.

### 4. A THEORY OF CLITICS

There has long been an interest in 2P clitics, going back at least to Wackernagel (1892), who examined such morphemes in the Indo-European family. More recently, two main approaches to 2P clitics have been proposed. The first, begun by Klavans (1980) and continued by Kaisse (1985) and Anderson (1992, 1993), considers clitics to be phrasal affixes, and 2P clitics to be the phrasal equivalent to infixes. The second, developed by Halpern (1995), gives 2P clitics a syntactic position preceding the first word, but, due to phonological considerations, they metathesize with the first word/constituent. The first approach will be taken in this paper. Henceforth all uses of the word 'clitic' refer to phrasal affixes, and 'affix' stands for lexical affix (in Anderson's (1992) sense).

Most studies of 2P clitics have dealt with auxiliaries and pronouns (cf. Halpern 1998). This has had the effect of producing analyses which assume clitics are prosodically deficient words which are base-generated in the same positions as full words and then moved into their final surface positions. Co-occurrence of a 'pronominal' clitic and an overt NP has been called 'clitic doubling', since it means that there were two syntactic arguments for one  $\theta$ -role. By assuming that clitics are phrasal affixes, Anderson (1992) opened the door to the possibility of agreement clitics (such as the subject agreement clitic in Heiltsuk) because, as he argues, agreement is a sentential feature.

Some mention should be made of the assumptions of Anderson's (1992) theory of morphology, since this is the framework in which the present analysis is set. Morphology is distinct from both syntax and phonology, with its own processes and objects. Morphemes are not objects; morphology is a process of changing the phonological form of a word to mark specific morphosyntactic features. Some morphosyntactic features are the properties of phrases (as opposed to individual words). For example, case and possession are properties of the NP, not of a single word contained in it. The core process in this theory of morphology is the Word Formation Rule (WFR). Each inflectional WFR makes a change to the phonological form of a word based on its morphosyntactic features. Thus, WFRs which create clitics are mapping certain phrasal features onto the phonological form of the phrase. Each of these rules contains information on where the clitic is inserted, much the same as affixal rules do.

All clitic rules specify the value of three placement parameters (Anderson 1992:203):

- (8) a. The clitic is located within some syntactic constituent (S vs. VP vs. NP, etc.) which constitutes its domain.
- b. The clitic is located by reference to the {first vs. last vs. head} element of a specified sort within the constituent in which it appears.
- c. The clitic {precedes vs. follows} this reference point.

Klavans (1995) also requires clitics to be specified as either pro- or enclitics, but Anderson (1992) attributes this to the Stray Adjunction rule of each particular language. This rule specifies the direction in which prosodically deficient material is incorporated. Since the Stray Adjunction rule operates on all such material in a language, it is predicted that all clitics will be either proclitics or enclitics in a given language.

In terms of these parameters, the subject agreement clitic's domain is the sentence, and it follows the first word in this domain. Take a sentence like (6), repeated as (9), for example. The entire utterance is a sentence the first word of which is *k'ús*. The clitic follows this word and attaches to it. The Stray Adjunction rule for Heiltsuk must therefore always attach prosodically deficient material leftward.

- (9) 'Kús-i w'ála-s dáduqvlá wísm-á-ǰi w'ác'-iá-ǰi.  
 not-SUBJ really-s watch man-d<sub>1</sub>-d<sub>2</sub> dog-d<sub>1</sub>-d<sub>2</sub>  
 'The man does not really watch the dog.'

## 5. POSSIBLE PROBLEM

Zwicky and Pullum (1983) point out that clitics can attach to a host following both affixes and clitics, while affixes can only attach to a stem following affixes, not clitics. This essentially means that all affixes must be attached before clitics.

Two things can follow the subject agreement morpheme in Heiltsuk: the left-hand adjunct morpheme (10), and the pronominal object morpheme (11). Neither of these can be affixes if the hypothesis that the subject agreement morpheme is a 2P clitic is true.

- (10) 'Wál-i-s aix-s dáduqvlá wísm-á-ǰi w'ác'-iá-ǰi.  
 really-SUBJ-ADJ well-ADJ watch man-d<sub>1</sub>-d<sub>2</sub> dog-d<sub>1</sub>-d<sub>2</sub>  
 'The man watches the dog really well.'
- (11) Dáduqvla-í-ǰi.  
 watch-SUBJ-OBJ  
 'He/she/it/they watch(es) him/her/it/them.'

### 5.1. The Object Clitic

Fortunately, the object morpheme does behave like a clitic. It can appear either following a subject NP as in (12), or following the verb itself as in (7), repeated as (13).

- (12) Dáduqvla wísm-á-ǰi-ǰi.  
 watch man-d<sub>1</sub>-d<sub>2</sub>-OBJ  
 'The man watches him/her/it/they.'
- (13) G-i ǰwá t'hiy'á-ǰí.  
 and-SUBJ IMP buy-OBJ  
 'And he buys it.'

The sentence in (13) also highlights a difference between the subject and object clitics: the object morpheme does not appear in second position in the sentence. This is likely due to a difference in the positioning parameters of the two clitics. However, a complete analysis of the object clitic is left for further study.

## 5.2. The Left-Hand Adjunct Clitic

In order to be able to say the left-hand adjunct morpheme is a clitic, we must first determine exactly what this morpheme is doing. According to Rath 1981, it marks certain modifiers which appear to the left of whatever they modify. Thus as we saw in (10), repeated in (14), *w'ál* and *aix* are both marked with the left-hand adjunct morpheme.

- (14) 'Wál-i-s            aix-s            dáduqvlá      wísm-á-ǵi    w'ác'-iá-ǵi.  
 really-SUBJ-ADJ   well-ADJ      watch            man-d<sub>1</sub>-d<sub>2</sub>    dog-d<sub>1</sub>-d<sub>2</sub>  
 'The man watches the dog really well.'

This can be formulated as a structural assignment rule, much like how case is handled by Anderson (1992:118)

- (15)  $X \rightarrow [+ADJ] / [{}_Y \text{ \_\_\_ } Y]$

However, *k'ús* does not get marked with this morpheme, as shown in (16). But *k'ús* is the negative, and if, as is widely assumed, negatives head their own phrase, NegP (Pollock 1989), they are therefore not adjuncts. It seems plausible that all those words which appear to the left of the verb but are not marked with *-s* are not adjuncts, but heads of their own phrases, and hence are not subject to the rule in (15).

- (16) 'Kús-i            w'ála-s      dáduqvlá      wísm-á-ǵi    w'ác'-iá-ǵi.  
 not-SUBJ      really-s    watch            man-d<sub>1</sub>-d<sub>2</sub>    dog-d<sub>1</sub>-d<sub>2</sub>  
 'The man does not really watch the dog.'

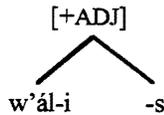
Now that we can say what the adjunct morpheme is doing, we need to account for its appearance following the subject agreement clitic. The answer must be that it is a clitic, not an affix. More specifically, it must actually be a simple clitic or bound word, not a phrasal affix.

The differences between these three objects are crucial, and some definition of the first two is in order. Simple clitics are reduced forms of words whose syntactic distribution is a subset of the distribution of their corresponding full forms (Zwicky 1977). I am borrowing the term 'bound word' from Zwicky, but modifying its definition. Zwicky used it to refer to clitics which have no full-word counterparts, but have the distribution of special clitics (which do have full-word counterparts). He used the English possessive as an example of a bound word. Clearly these are phrasal affixes in our present framework. As this term is obsolete, I shall appropriate it and have it designate a type of word, not a clitic. Bound words have their own syntactic position, but are prosodically deficient and so incorporated into neighboring prosodic units by the Stray Adjunction rule. Thus bound words, like simple clitics, are placed according to syntax, rather than morphology.

Now, let us see why the adjunct morpheme cannot be a phrasal affix. In terms of Anderson's (1992) clitic placement parameters, its domain would be the phrase marked with [+ADJ], and it would follow the last word. Thus in (16) above, the phrase headed by *w'ála* is first assigned the feature [+ADJ], then the adjunct clitic is located following the last (and only) word of this phrase. Heiltsuk's Stray Adjunction rule then attaches it leftward onto this word. If we try to apply this process to a sentence in which the subject agreement clitic is followed by the adjunct clitic, as in (14), we discover a problem. Since its domain is contained within that of the subject agreement clitic, the adjunct clitic would be attached first. This is clearly contrary to the facts.

Since there is no evidence that there is a corresponding free form, it is more likely that the adjunct clitic is a bound word, not a simple clitic. It would then have its own syntactic position, but, being prosodically deficient, be attached leftward by the Stray Adjunction rule. The syntactic position required would be to the right of the modifier, likely a specifier position. This is illustrated in the relevant section of the tree structure for the sentence in (14) (leaving aside the problem of categories):

(17)



## 6. CONCLUSION

In this paper it was shown that Anderson's (1992) theory of clitics as phrasal affixes can account for the subject agreement clitic in Heiltsuk. While this clitic is occasionally followed by one of two morphemes, this is not problematic if they are also considered clitics. Such a hypothesis was shown to be consistent with the data.

## REFERENCES

- ANDERSON, STEPHEN R. 1984. Kwakwalla syntax and the Government-Binding Theory. In *The Syntax of Native American Languages*, ed. by Eung-Do Cook and Donna B. Gerds, volume 16 of *Syntax and Semantics*, 21–75. Orlando, Florida: Academic Press.
- 1992. *A-Morphous Morphology*. Cambridge: Cambridge University Press.
- BORER, HAGIT (ed.) 1986. *The Syntax of Pronominal Clitics*, volume 19 of *Syntax and Semantics*. Orlando, Florida: Academic Press.
- HALPERN, AARON L. (ed.) 1995 *On the Placement and Morphology of Clitics*. Stanford, California: CSLI Publications.
- 1998. Clitics. In *The Handbook of Morphology*, ed. by Andrew Spencer and Arnold M. Zwicky, 101–122. Oxford: Blackwell.
- HALPERN, AARON L. and ARNOLD M. ZWICKY (eds.) 1996. *Approaching Second*. Stanford, California: CSLI Publications.
- KAISSE, ELLEN M. 1985. *Connected Speech: the Interaction of Syntax and Phonology*. Orlando, Florida: Academic Press.
- KLAVANS, JUDITH L. 1980. *Some Problems in a Theory of Clitics*. Bloomington: Indiana University Linguistics Club.
- 1995. *On Clitics and Cliticization*. New York: Garland.
- POLLOCK, JEAN-YVES. 1989. Verb movement, universal grammar, and the structure of IP. *Linguistic Inquiry* 20.365–424.
- RATH, JOHN C. 1981. *A Practical Heiltsuk-English Dictionary with a Grammatical Introduction*. Ottawa: National Museums of Canada.
- WACKERNAGEL, JACOB. 1982. Über ein gesetz der indogermanischen wortstellung. *Indogermanische Forschungen* 1.333–436.
- ZWICKY, ARNOLD M. 1977. *On Clitics*. Bloomington: Indiana University Linguistics Club.
- ZWICKY, ARNOLD M. and GEOFFREY K. PULLUM. 1983. Cliticization vs. inflection: English *n't*. *Language* 59.502–513.

