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## FOREWORD

The editors of this issue, Sandra Kitch, Julie Bailey and Lorna V. Rowsell, are pleased to present the seventeenth issue of the *Calgary Working Papers in Linguistics* published by the Department of Linguistics at the University of Calgary. The papers published here represent works in progress and as such should not be considered in any way final or definitive.

This issue of CWPL includes papers by professors and students, both graduate and undergraduate, of the University of Calgary. Dr. John Archibald's paper examines research data taken from L2 learners of English to determine what role L1 plays in acquiring English stress. Dr. Elizabeth Ritter and Dr. Sarah Rosen discuss the aspectual role CAUSER and how it is assigned. Their argument looks at evidence of indirect causers being assigned post-lexically.

As a representation of our M.A. programme, Corrie Rhyasen gives an in-depth analysis of Chilcotin Tone and argues that otherwise problematic alternations can be shown to be predictable under an autosegmental approach. Hooi Ling Soh investigates the verbal prefix *-ter* in Malay. In her paper, she suggests a delinking mechanism within the argument structure, specifically between the thematic and aspectual tiers.

Finally, we present two papers from our undergraduate programme. Susan Armstrong evaluates the division of logical actors into agent, author and instrument and demonstrates how the addition of a fourth, namely causer, would better explain the grammatical or non-grammatical status of certain puzzling sentence types in English. Lastly, Greek-English codeswitching is examined by John Karras and shown to be rather systematic regarding where in an utterance a switch may be made.

We are extremely thankful to Vi Lake for all of her help in the preliminary preparation of these papers for printing. She spent many long hours setting up the originals to the Pagemaker format and had lots of patience with those of us who were just learning how to use this software! Thanks as well to all of the contributors without whom we would, of course, have no issue at all.

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## CALL FOR PAPERS

*Calgary Working Papers in Linguistics* is an annual journal which includes papers by faculty and students in Linguistics and related disciplines, both at the University of Calgary and elsewhere.

The editors would like to encourage all readers to submit papers for future publication. The deadline for submission of papers is August, 30 in order to meet an Autumn publication date. The editors would like contributions on 3 1/2 inch Micro Floppy Disks (preferably Macintosh Apple and Microsoft Word format). We furthermore request that the submissions follow the APA style sheet, use 10x10 point *Times* font, and leave a 2.056" top- and bottom-margin, as well as a 1.75" margin on both the left and the right hand side. In those rare circumstances in which the contributor does not have access to a computer, the editors will accept two typed copies of the paper. Those wishing to submit papers should send manuscripts to the address given below. Postage costs should be included if the disk containing the manuscript or the paper copy are to be returned. Appearance of papers in this volume does not preclude their publication in another form elsewhere.

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# A LONGITUDINAL STUDY OF THE ACQUISITION OF ENGLISH STRESS<sup>1</sup>

John Archibald  
University of Calgary

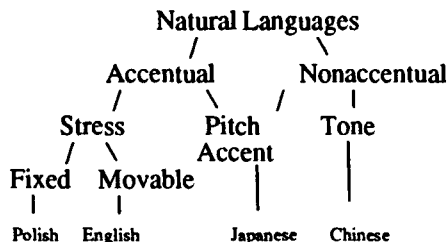
## 1.0 Introduction

For some time now I have been investigating the acquisition of second language stress systems in an attempt to get an idea of what the representations and processes involved in interlanguage phonology are. The study that I discuss today differs in two respects from my previous studies. One, it is a longitudinal study, and two, it involves different first languages. Ideally, it might have been better to change only one of the factors, but these are the subjects who were available to me for a longitudinal study. As a result, this paper has more to say about the influence of the first language type on second language acquisition than on patterns of development over time, because, as we shall see, the performance didn't change very much over time.

## 2.0 A Taxonomy of Stress Systems

There are several different types of stress systems found in natural languages. One taxonomy is shown in # 1:

1.



There are languages like English that use pitch to signal stress accent, and languages like Chinese that use pitch phonemically. Languages like Japanese appear to have characteristics of both types.

In previous studies I looked at native speakers of Polish and Hungarian (essentially fixed stress languages) acquiring English stress. Polish usually stresses the penultimate syllable and Hungarian usually stresses the initial syllable. I also looked at native speakers of Spanish (a movable stress language) acquiring English stress. These studies had been conducted assuming the metrical parameters proposed by Drescher and Kaye (1990), shown in (2).

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<sup>1</sup> This paper was read at the Canadian Association of Applied Linguistics. Calgary, May 1994.

2. P1: The word-tree is strong on the [Left/Right].  
 P2: Feet are [Binary/Unbounded].  
 P3: Feet are built from the [Left/Right].  
 P4: Feet are strong on the [Left/Right].  
 P5: Feet are quantity-sensitive (QS) [Yes/No].  
 P6: Feet are QS to the [Rime/Nucleus].  
 P8: It is extrametrical on the [Left/Right].  
 P8A: There is an extrametrical syllable [No/Yes].

The differences between the languages are shown in (3).

3.	<u>Spanish</u>	<u>Polish</u>	<u>Hungarian</u>	<u>English</u>
P1 (word tree)	right	right	left	right
P2 (foot type)	binary	binary	binary	binary
P3 (built from)	left	left	left	left
P4 (strong on)	right	right	left	right
P5 (QI/QS)	QS	QI	QS	QS
P6 (sensitive to)	rime	NA	nucleus	rime
P8 (extrametrical)	yes	no	no	yes
P8A (extramet. on)	right	NA	NA	right

From these tables, it can be seen that while there may be parametric differences between the languages studied, the same kinds of representations were being constructed in the first and second languages, that is, representations of stress.

In this paper, I hope to expand my data base by looking at native speakers of a Tone language (Chinese) and a Pitch Accent language (Japanese). As shown above, it has been argued that these languages are not stress languages, and therefore subjects who have these languages as their L1's may have very different kinds of representations. Furthermore, they would have to acquire a new way of representing prominence in their second language. I will argue that we see these subjects treating English stress as a lexical phenomenon.

### 3.0 Research Design

The basic research design used in my earlier studies forms the basis of this study as well. Subjects perform both production and perception tasks related to stress assignment. First they had to read a list of words out loud (see # 5 on the handout). (Departing from my earlier studies, I did not have the subjects engage in any sentence level tasks, as they were not found to perform significantly differently on these tasks.) Stress placement was transcribed on these words. Then the subjects listened to the same words they produced as they were read out loud on a tape recorder by a native English speaker. After a training session, the subjects had to mark which syllable they perceived stress to be on.



### 3.1 The Subjects

In this study I gathered data from ten subjects in November of 1993. Only four subjects were able to be reassessed in March of 1994. The subject profiles are given in # 4:

4.

	Age	L1	L2 Level (out of 6)
Subject #1	19	Cantonese	5
Subject #2	19	Japanese	6
Subject #3	32	Mandarin	6
Subject #4	21	Mandarin	3

### 3.2 The Test Items

The words that the subjects had to produce and perceive are given in # 5 of the handout:

- 5.
- |                       |                       |                      |                    |
|-----------------------|-----------------------|----------------------|--------------------|
| <u>Class One</u>      | <u>Class Two</u>      | <u>Class Three</u>   | <u>Class Seven</u> |
| aroma                 | agenda                | cinema               | hurricane          |
| Manitoba              | consensus             | javelin              | baritone           |
| arena                 | appendix              | venison              | antelope           |
| Minnesota             | veranda               | America              | candidate          |
| horizon               | synopsis              | cabinet              | matador            |
| <br><u>Class Four</u> | <br><u>Class Five</u> | <br><u>Class Six</u> |                    |
| maintain              | collapse              | astonish             |                    |
| appear                | elect                 | edit                 |                    |
| erase                 | observe               | cancel               |                    |
| decide                | adapt                 | consider             |                    |
| achieve               | convince              | interpret            |                    |

The following (shown in # 6) are the defining characteristics of the classes of words (ignoring some phonological details that are not relevant to our discussion):

- 6.
- |                 |  |
|-----------------|--|
| Class One:      | Noun, penultimate stress due to heavy penult (tense vowel)               |
| Class Two:      | Noun, penultimate stress due to heavy penult (branching rhyme)           |
| Class Three:    | Noun, antepenultimate stress due to lack of heavy syllables              |
| Class Seven:    | Noun, antepenultimate stress due to stress retraction (secondary stress) |
| <br>Class Four: | <br>Verb, final stress due to heavy final syllable (tense vowel)         |
| Class Five:     | Verb, final stress due to heavy final syllable (branching rhyme)         |
| Class Six:      | Verb, penultimate stress due to lack of heavy syllables                  |

One of the ways to get a picture of the interlanguage grammar is to look at the errors that the subjects make in their production and perception of the stress patterns of these word classes. In other words, native speakers of English have knowledge of these word classes and therefore it is something that non-native speakers have to acquire. In my previous studies, it was a robust finding that the perception tasks were significantly different (and significantly more accurate) than the production tasks. I.e., the subjects were better at perceiving stress accurately than they were at producing stress accurately.

#### 4.0 The Results

The following chart, shown in #7, gives a profile of the numbers of errors that the subjects made:

7.

	<u>Perception</u>		<u>Production</u>	
	<u>T1</u>	<u>T2</u>	<u>T1</u>	<u>T2</u>
Subject 1	19	22	10	9
Subject 2	0	1	11	9
Subject 3	15	13	10	10
Subject 4	10	22	10	9
	<u>44</u>	<u>58</u>	<u>41</u>	<u>37</u>
Mean	11	14.5	10.25	9.25

T-tests did not reveal any significant differences in the mean numbers of errors<sup>2</sup>. The closest to significance was the change in production from T1 to T2.

One of the first things to note is that for three of the four subjects, the perception scores are worse than the production scores (this is true of the means as well). We also note that from Time 1 (November) to Time 2 (March) the perception scores actually got worse. The production scores did improve but not significantly.

If we break the above chart down into errors by class, the picture shown in #8 emerges:

<sup>2</sup> T1 Prod/T1 Perc: .8734; T2 Perc/T2 Prod: .3714; T1 Perc/T2 Perc: .3295; T1 Prod/T2 Prod: .0917.

8.

		<u>Perception</u>		<u>Production</u>	
		<u>T1</u>	<u>T2</u>	<u>T1</u>	<u>T2</u>
Subject 1	C1	2	3	2	2
	C2	3	4	1	0
	C3	4	4	1	0
	C7	2	2	2	3
	C4	2	1	1	1
	C5	4	5	2	2
	C6	2	3	1	1
Subject 2	C1	0	1	1	1
	C2	0	0	0	0
	C3	0	0	2	1
	C7	0	0	4	2
	C4	0	0	0	1
	C5	0	0	3	3
	C6	0	0	1	1
Subject 3	C1	3	1	2	2
	C2	2	2	1	2
	C3	3	1	2	0
	C7	2	4	1	1
	C4	1	1	0	1
	C5	2	2	3	3
	C6	2	2	1	1
Subject 4	C1	2	1	2	2
	C2	0	4	0	1
	C3	4	2	0	0
	C7	2	5	3	1
	C4	1	4	2	2
	C5	0	3	3	2
	C6	1	3	0	0

Clearly, the differences between word classes were minimal, as were the differences between performance at T1 and T2. In an attempt to see whether the subjects were treating different word classes differently, I combined the production and perception errors to see if class differences would emerge from this view. The result is shown in # 9:

9.

		T1	T2
Subject 1	Class 1	4	5
	Class 2	4	4
	Class 3	5	4
	Class 7	4	5
	Class 4	3	2
	Class 5	6	7
	Class 6	3	4
Subject 2	Class 1	1	2
	Class 2	0	0
	Class 3	2	1
	Class 7	4	2
	Class 4	0	1
	Class 5	3	3
	Class 6	1	1
Subject 3	Class 1	5	3
	Class 2	3	4
	Class 3	5	1
	Class 7	3	5
	Class 4	1	2
	Class 5	5	5
	Class 6	3	3
Subject 4	Class 1	4	3
	Class 2	0	5
	Class 3	4	2
	Class 7	5	6
	Class 4	3	6
	Class 5	3	5
	Class 6	1	3

Again, we note that for each subject, there was very little difference between word classes and very little change from T1 to T2. This can be seen more clearly when we present the data as shown in # 10:

10.

	Time 1						
	C1	C2	C3	C7	C4	C5	C6
Subject 1	4	4	5	4	3	6	3
Subject 2	1	0	2	4	0	3	1
Subject 3	5	3	5	3	1	5	3
Subject 4	4	0	4	5	3	3	1
Mean	3.5	1.75	4	4	1.75	4.25	2
Ranking	C5 > C3, C7 > C1 > C6 > C2, C4						

	Time 2						
	C1	C2	C3	C7	C4	C5	C6
Subject 1	5	4	4	5	2	7	4
Subject 2	2	0	1	2	1	3	1
Subject 3	3	4	1	5	2	5	3
Subject 4	3	5	2	6	6	5	3
Mean	3.25	3.25	2	4.5	2.75	4.25	2.75
Ranking	C7 > C5 > C1, C2 > C4,C6 > C3						

The differences between mean number of errors between T1 and T2 is summarized in # 11:

C1	-.25
C2	+1.5
C3	-2
C7	+.5
C4	+1
C5	same
C6	+.75

Obviously, the changes are very small.

One of the characteristics that I had found previously in the interlanguage grammars of the Hungarian, Polish, and Spanish subjects was that they treated different grammatical categories differently when it came to stress assignment. For example, they treated English nouns and verbs differently. This analysis of the current subjects is shown in # 12:

12.

	<u>Nouns</u>				<u>Verbs</u>			
	<u>Perception</u>		<u>Production</u>		<u>Perception</u>		<u>Production</u>	
	T1	T2	T1	T2	T1	T2	T1	T2
Subject 1	11	13	6	5	8	9	4	4
Subject 2	0	1	7	4	0	0	4	5
Subject 3	10	8	6	5	5	5	4	5
Subject 4	8	12	5	5	2	10	5	4
Total	29	34	24	19	15	24	17	18
Mean	7.25	8.5	6	4.75	3.75	6	4.25	4.5

T-Tests revealed a significant difference in the means of Nouns versus Verbs in Perception at time 2. Perception at T1 and Production at T2 approached significance<sup>3</sup>. So, the subjects were getting better at perceiving stress on verbs.

The picture that is emerging from all of these (non) results is that the subjects in this study did not seem to be acquiring the principles of English stress assignment with regard to such things as the influence of syllable structure or grammatical category on stress assignment. They seem to be treating stress as a purely lexical phenomenon; something that has to be memorized as part of the phonological representation of a word. This analysis is supported when we look at the patterns of change from T1 to T2 by lexical item and see how many items stayed the same (whether right or wrong), how many became more nativelike, and how many got worse. This pattern is shown in # 13:

13.

	<u>Perception</u>			<u>Production</u>		
	Same	Better	Worse	Same	Better	Worse
Subject # 1	24	4	7	32	2	1
Subject # 2	34	0	1	27	5	3
Subject # 3	29	4	1	24	5	4
Subject # 4	16	3	15	30	3	1
Total (/138)	103	11	24	113	15	9
Mean (/35)	25.75	2.75	6	28.25	3.8	2.3
Mean %	74	8	17	80.7	10.9	6.6

<sup>3</sup> N T1 Perc/V T1 Perc: .0773; N T2 Perc/V T2 Perc: .0305; N T1 Pro/V T1 Prod: .0689; N T2 Pro/V T2 Pro: .6376.

In both perception and production, the vast majority of the lexical items (for all subjects) did not change their stress from T1 to T2. On the production task, more lexical items did become more nativelike (3.8) than became less nativelike (2.3). However, on the perception task, more items became less nativelike (6) than became more nativelike (2.75). Overall, their perception of English stress was getting worse (though the overall picture is largely influenced by subject # 4, the same pattern (to a lesser degree) is found in subject # 1).

At first blush, this seemed perplexing. Subjects 1 and 4 are native speakers of Chinese, a tone language. These subjects, I thought, should be very sensitive to differences in pitch, as pitch is phonemic in their first language. But I don't think this is necessarily the case. If we turn it around, then we should argue that because English speakers have movable stress in their L1, and that English stress is manifested (partially) by an increase in pitch, that English speakers should be sensitive to differences in tone in Chinese. Anecdotal at least (though see Juffs, 1989; Leather, 1990) English speakers have a hard time learning to perceive different Chinese tones. It seems likely that the difference between linguistic versus non-linguistic processing is crucial. Obviously, English speakers have the ability to distinguish differences in pitch when they are presented as non-linguistic stimuli (e.g. musical notes) but they are not accustomed to doing this when processing linguistic forms. Conversely, my initial expectation that Chinese speakers should be good at perceiving pitch differences in English was probably not taking into account the linguistic processing of English forms. The subjects would probably do quite well on nonlinguistic tests of pitch discrimination.

The fact that pitch is phonemic in the L1 may shed some light on what is going on. When we think of other aspects of a phonemic representation, say that in Japanese /l/ and /r/ are not phonemic, this is often something that affects cross-linguistic transfer. The learner's initial assumption is that things that are phonemic in the L1 will be phonemic in the L2. This could be what is going on with pitch in these subjects. If pitch (manifested as tone) in the L1 is stored as part of the lexical entry, then the subjects may well be assuming that English pitch (manifested as stress) is also stored as part of the lexical entry.

The Japanese subject seems to be much more successful in his perception of English stress. In terms of his production, he did not appear to be significantly different from the Chinese-speaking subjects. Beckman (1986) has argued that Japanese lacks lexical stress altogether, and that it is really a Restricted Tone language. This is contrary to the taxonomy of Hiraguchi shown back in #1 on the handout. Archangeli and Pulleyblank (1988?) suggest that Japanese has in the lexical entry certain High tones linked to the word. I would argue that these distinctions are not crucial to the discussion here in that they all argue for some mechanism to lexically mark accent (either via stress or tone). The Japanese subject in this study appears to be consistent with this analysis in that he seems to be treating English stress as a lexical phenomenon.

## 5.0 Conclusion

Taken on its own, this paper may seem to be somewhat of a collection of non-results. The subjects didn't change their stress patterns a lot over time and didn't appear to be basing their stress assignment on things like grammatical category or syllable weight. However, when contrasted with the studies that have been done on native speakers of Polish, Spanish and Hungarian (other Stress Accent Languages) we can see that we actually are learning something about the influence

of the L1 when it's a Nonaccentual Language. The subjects in this case appear to be treating stress as a lexical phenomenon. Subjects whose L1's are Accentual languages were transferring their L1 principles and parameters of metrical structure (e.g. quantity-sensitivity, extrametricality). Subjects whose L1's were Nonaccentual languages appear to be transferring quite different things.

This seems to be analogous to Carroll's (1989) study of the acquisition of gender by French Immersion students. She argued that non-native speakers of French were representing gender in a manner which was fundamentally different from native speakers. At times this could produce behaviour that was almost indistinguishable from native speakers but the representation was thought to be different. In Archibald (in press) I argued that this suggests that adult L2 learners can reset existing parameters but may not be able to trigger new structures. This appears to be parallel to what learners from a Nonaccentual language are doing when they are trying to learn an Accentual language. Often they are getting the stress correct on the English words, but they seem to be doing it in a way that is very different from native speakers.

An interesting question is, of course, what kind of evidence would be useful in informing the subjects that their hypotheses were incorrect about English stress assignment, and whether they could ever set up a representational system like that of native speakers, but that goes beyond the scope of this paper.

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# THE INCOMPATIBILITY OF LEXICAL DERIVATION AND POST-LEXICAL ARGUMENTS\*

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## 1. Introduction

Recent work in lexical semantics and argument mapping has attempted to distinguish the aspectual properties of syntactic arguments. A number of authors, including Grimshaw (1990), Pustejovsky (1988), Tenny (1987, 1991), and van Voorst (1988), have argued that aspectual information at least in part determines the mapping of syntactic arguments. For example, arguments that bear the aspectual role CAUSER are mapped to subject position and those that bear the aspectual role AFFECTED THEME are mapped to direct object position. Ritter and Rosen (1993, in press) have argued that aspectual roles are determined post-lexically, i.e., on the basis of the syntactic composition. In the present paper we demonstrate that the aspectual role CAUSER is syntactically assigned. This assumption allows a principled distinction between indirect causers and agents; it also accounts for restrictions on argument inheritance in lexical derivation, including the restriction against derivation of causativized verbs discussed in Pesetsky (1992), and the failure of *-er* nominalization of causativized verbs noted in Brousseau and Ritter (1991).

## 2. Distinguishing Causers and Agents

An agent is a direct causer that receives a thematic role from the verb as well as an aspectual role by virtue of its participation in the event. An indirect causer receives no thematic role from the verb; it merely launches an event, and thus receives only an aspectual role. Consequently, an indirect causer gets its interpretation aspectually, not thematically. It is possible to distinguish causer from agent on the basis of the role that each may play in the event referred to by the verb. The indirect causer does not directly engage in the action denoted by the lexical predicate, but rather triggers the action of the lexical predicate. In this respect, causers differ from lexically selected agents, which are direct participants in the action. The contrasting implicatures in (1) and (2) demonstrate that some external arguments perform the action named by the verb while others do not. In the sentences in (1) the subject is the thematic external argument of the verb, i.e. an agent, and as such it performs the action named by the verb. In the sentences in (2), on the other hand, the subject is an aspectual argument that is not licensed by the specific lexical semantic content of the verb. Consequently, its contribution to the event is not determined by the verb.

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\* We thank Elizabeth Cowper, Diane Massam, the members of the University of Toronto Syntax Project, and the participants at the University of Kansas Workshop on Thematic Roles in Linguistic Theory and Language Acquisition and the 1993 CLA meeting for comments and discussion. Financial support was provided by Social Sciences and Humanities Research Council of Canada Grant No. 410-91-1683 to Cowper and Massam, and the University of Kansas General Research Allocation 3158-XX-0038.

- (1) Agents
- a. The editor wrote the article.  
==> the editor was writing
  - b. The assassin killed the mayor.  
==> the assassin was killing
  - c. The political activist painted slogans all over the walls.  
==>the political activist was painting
- (2) Causers
- a. The lion-tamer jumped the lions through the flaming hoop.  
==> the lion-tamer was not jumping
  - b. The tenant hung black velvet pictures of Elvis all over the walls.  
==>the tenant was not hanging
  - c. The cook thickened the sauce.  
==>the cook was not thickening

We contend that an argument that plays a role in the action named by the verb is a participant in the event by virtue of the fact that it is a thematic argument of the verb, and as such it must be a participant of the core event denoted by the predicate. In contrast, a participant that launches the event but does not perform the action named by the verb can only be involved in a subevent that is construed as causing the core event. Consequently, a participant in the causing subevent is analyzed as an argument because it plays a role in the organization of the event, and not because it is a thematic argument of the verb. If a causer is not a thematic argument of the verb, it is not lexically selected by the verb. In other words, indirect causers are not included in the lexical representation of the verb. In the remainder of this paper, we provide further evidence that aspectual roles such as causer are assigned post-lexically.

### 3. Process Nominals

Chomsky (1970) demonstrates that verb derived nominals inherit their arguments from the base verb (cf. also Grimshaw 1990, Levin and Rappaport 1988). However, there are restrictions on argument inheritance. For example, Pesetsky (1992), following work by Chomsky (1970), observes that causer arguments are not available to the derived nominal:

- (3)
- a. Tomatoes grow.
  - b. Bill grows tomatoes.
  - c. the growth of tomatoes
  - d. \*Bill's growth of tomatoes
- (Chomsky 1972: 25 as cited in Pesetsky 1992: 69)
- (4)
- a. The shirt shrank.
  - b. Bill shrank the shirt.
  - c. the shrinkage of the shirt
  - d. \*Bill's shrinkage of the shirt

Pesetsky (1992) notes that verbs that enter into the causative-inchoative alternation may be nominalized, but that the nominalization is never derived from the causative use of the verb, as illustrated in (3) and (4). He suggests that this restriction is due to the fact that the causative verb contains an abstract causative suffix (CAUS) which blocks further derivation. This constitutes a particular case of Myers' Generalization (Myers, 1984), which states that "zero-derived words do not permit the affixation of further derivational morphemes" (Pesetsky, 1992: 66).

We provide an alternative explanation of the nominalization data. Recall that causers, unlike agents, are not lexically licensed thematic arguments of the verb. Rather, they are purely aspectual arguments, and are added to the representation post-lexically. Consequently, causers will not be available to items that are lexically derived from the verb. We propose that nominalizations such as *growth* and *shrinkage* inherit only thematic arguments, i.e. arguments that are included in the verb's lexical representation. If causation is a post-lexical operation, then causative elements will be unavailable for lexical derivation.

The assumption that post-lexical operations are syntactic leads to the prediction that causers should be available for syntactically derived nominals. This prediction is borne out in gerunds, which have been analysed as syntactically derived (Abney, 1987; Cowper, 1993). The examples in (5) and (6) show that gerunds may be derived from the causative use of a verb. In this respect, gerunds differ from lexically derived process nominals.

- (5)    a.    Bill's growing of tomatoes  
          b.    Bill's growing tomatoes
- (6)    a.    Bill's shrinking of the shirt  
          b.    Bill's shrinking the shirt

#### 4. Non-Event -er Nominals

Restrictions on non-event -er nominals provide further evidence for the hypothesis that the causer arguments are not present in the lexical semantic representation of the verb. As observed by Levin and Rappaport (1988), non-event -er nominals refer to the external argument of the verb they are derived from.<sup>1</sup> As pointed out by Brousseau and Ritter (1991), derived causative verbs of motion appear to disaffirm Levin and Rappaport's generalization. As shown in (7) and (8), -er nominals may be derived from these verbs, but they refer to the direct object, rather than to the subject.

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<sup>1</sup> Following Levin and Rappaport (1988), we restrict the discussion to non-event -er nominals, which do not inherit the full argument structure of the base verb. As these authors point out, event -er nominals inherit the argument structure of the base verb, and presuppose that an event named by that verb has occurred. In contrast a non-event -er nominal refers to the base verb, but does not entail the occurrence of an event. In restricting the discussion to non-event -er nominals, we focus on a derivational process which must be lexical.

- (7) a. The lion-tamer jumped the lions through the hoop.  
      b. The lions are good jumpers.  
      c. \*The lion-tamer is a good jumper.
- (8) a. The psychologist ran the rats through the maze.  
      b. The rats are good runners.  
      c. \*The psychologist is a good runner.

The hypothesis that derived causation is a post-lexical operation provides a straightforward account of this data. Non-event *-er* nominals are derived in the lexicon, where only thematic arguments are represented. Consequently, they may only denote the external thematic argument of the verb. Because causers are not thematic arguments, they are not included in the lexical entry of the verb, and therefore they are not accessible to *-er* nominalization. For verbs of motion such as those in (7) and (8), the participant that moves is considered the thematic external argument.

## 5. Conclusion

We have discussed three pieces of evidence pointing to the conclusion that indirect causers are not represented in the lexical entry of a verb, but rather are added post-lexically. First, the action performed by a causer is not determined by the lexical semantics of the verb. Second, causers are not inherited in the derivation of lexical items because causers simply are not represented in the lexical entry of the base verb. Third, causers may be inherited in syntactic derivation, suggesting that arguments bearing only aspectual roles are like adjuncts in that they are generated in the course of the syntactic derivation.

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# CHILCOTIN TONE: AN AUTOSEGMENTAL ANALYSIS\*

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## 1.0 Introduction

Chilcotin is an Amerindian language belonging to the Athabaskan family. Athabaskan languages are characterized as prefixing languages with rich morphological agreement. They are also categorized as tone languages, although historically they were not. Contrastive tone has evolved as a diachronic change from a stem final glottal stop. Tone in Athabaskan has received little analytical attention. This is likely due to the fact that tone is difficult to analyze when the morpheme to which the tone is lexically paired cannot always be identified, as is the case in Athabaskan generally. Phonological processes often alter the form of a morpheme so drastically that it is not recognizable. Only by comparing different words inflected and derived in a similar pattern can such a morpheme be located and even then it is not always conclusive.

There are a few morphemes within the Chilcotin verb which consistently appear with a high marked tone. The first person duoplural prefix /id-/ always has a high tone. The presence of the /id-/ prefix causes alternations of the stem tone. In most cases /id-/ causes the stem tone to reverse; that is, if the stem has a high tone then affixation of /id-/ would reverse it to a low tone. Alternately, affixation of /id-/ to a low stem tone would reverse it to a high tone. However, there are some cases in which affixation of /id-/ to a high stem tone does not reverse the high tone to a low tone, instead it forms a falling contour tone. I propose that by using an autosegmental framework to analyze tone in Chilcotin the stem tone alternations will become predictable. Two basic autosegmental rules: spreading and tone deletion, can account for the stem tone alternations.

In section 2.0, I introduce the basic morphology and phonology in Chilcotin. Section 3.0 will outline the autosegmental theory in relation to tone. The basic problem of stem tone alternation is explained in 4.0. Finally, in section 5.0 the application of autosegmental theory is applied to Chilcotin to account for the variance in stem tone alternation.

## 2.0 ATHABASKAN VERB MORPHOLOGY AND PHONOLOGY

### 2.1 Chilcotin Orthography

The data presented henceforth will be written in the Chilcotin orthography. The Chilcotin vowel and consonant systems are represented in (1) and (2). In most cases the orthographic symbols are the same as the phonemic symbols but in the cases where they differ the phonemic symbol is presented first:

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\* I would like to thank Michael Dobrovolsky for his valuable comments and insights in developing this paper. I am also grateful to my fellow student, Hooi Ling Soh, for her challenging questions and comments.

(1) Vowels (Cook 1989)

a) Tense

i u  
æ/a

b) Lax

i/ /e u/o

(2) Consonants (Cook 1989)

b	d	dl	dz	ḏz	dy/j	g	G/gg	g <sup>w</sup> /gw	G <sup>w</sup> /gg <sup>w</sup>
p	t	tʰ	ts	t͡s	tc/ch	k	q	k <sup>w</sup> /kw	q <sup>w</sup> /qw
	t'	tʰ'	ts'	t͡s'	tc'/ch'	k'	q'	k <sup>w</sup> '/kw'	q <sup>w</sup> '/qw'
		l/lh	s	ṣ	c/sh	x/x		x <sup>w</sup> /wh	
m	n	l	z	ḏ	j/y	ɣ/gh	w		ɣ <sup>w</sup> /ḡ

## 2.2 Morphology

Athabaskan is a family of prefixing languages. It is categorized as having a template type morphology because the verb prefixes have prespecified positions. There is an underlying template for the verb that determines the location of each prefix as it is affixed in the word formation process. For example the subject always occurs in position #2 which is next to the stem. The number of prefix positions varies between languages but usually varies around ten positions. Within each prefix position there is a set of prefixes which are mutually exclusive in the fully conjugated verb. The first six positions and their prefix sets are shown in (3):

3. (Cook 1989)

position	position class	prefix set
0	root	
1	classifier:	Ø, 1, l, d
2	subject:	s- (first person singular: 1sg) ne- (2sg) id- (1P duoplural: 1dp) h- (2 dp)
3	primary aspect/mode:	ne- (perfective) wē- (optative) ghe- (progressive)
4	conjugation markers:	Ø, se-, ghe-, ne
5	secondary aspect:	te- (inceptive)
6	secondary mode:	ú- (conative)

The root is almost always CVC or CV, consisting of only one syllable. A classifier is required by the root. The particular classifier chosen is marked in the lexical entry of the root.<sup>1</sup> The root plus its classifier compose a stem.<sup>2</sup> The subject position includes only the first and second person

<sup>1</sup> Due to phonological processes the form of the classifier is not always evident. For this reason, the classifier will only be represented in the derivations when its form is evident.

<sup>2</sup> The distinction between root and stem is not relevant to this analysis (other than the section on morphology). Henceforth, I will use the term stem.



singular and dual forms. The third person forms occur to the left of the sixth prefix, where the third person plural form is marked by the prefix /ye-/ and is sometimes modified by the plural marker /ji-/. The third person singular form is null (Ø), so its position is not easily identifiable. Primary aspect/mode marks what would be the equivalent to tense in English, although the exact meaning of each mode cannot be directly interpreted as tense. The primary aspect/mode prefix is often not evident on the verb because it is deleted through phonological processes. When a stem is inflected for primary aspect/mode a conjugation marker must co-occur with each primary aspect/mode. The choice of the conjugation marker to co-occur with the primary aspect is idiosyncratic and specified by the root. Secondary aspect and mode are optional and can co-occur with primary aspect/mode to modify the meaning. For example, the progressive mode (meaning that the action is not completed) can be modified by adding /te-/inceptive. The derived mode refers to an action which is about to begin.

There are other prefixes which exist beyond the six listed here. It is generally accepted by linguists in Athabaskan that a boundary, called the disjunct boundary, precedes the sixth prefix and any prefixes to the left of the boundary are labelled disjunct prefixes. These prefixes behave differently than the first six (conjunct prefixes) both in terms of phonological rules and semantic transparency. The conjunct prefixes undergo phonological processes which often drastically alter their underlying form. It is not unusual for two or three prefixes to coalesce forming a portmanteau morpheme. The phonological processes which apply to the disjunct prefixes do not alter the underlying form as drastically so the transparency of their meanings is maintained. A typical example of a Chilcotin verb is shown in (4):

- (4)                    te- se- s- chagh —————> tezeschagh    'I am getting big'  
                          position#    5   4   2     0

The stem is in the far right position and the prefixes are attached in their templatic order to the left of the stem. Notice that this verb consists of only conjunct prefixes. Disjunct prefixes are derivational and are optionally affixed to modify the meaning of the verb. It is important to note at this point that although prefixes have a prespecified order in which they must be affixed the order is not predictable according to morphological principles. According to Anderson (1982) derivation occurs closest to the verb and inflection occurs outside of derivation. However, Athabaskan verbs do not observe this morphological typology. In fact it is not uncommon to find inflectional affixes between derivational affixes.

### 2.3 Phonological Rules

A number of phonological rules apply to the verb, particularly within the conjunct boundary:

- (5) **metathesis:** Conjunct prefixes regularly undergo metathesis, particularly the subject and the conjugation marker:  
                          te- ne- bish —> te- en- bish  
                          Conj Subj
- (6) **tensing:** When two /e/'s are adjacent they coalesce into one tensed segment; /i/.  
                          te-en —> tin

Tensing usually co-occurs with metathesis because the conjunct vowels are almost always /e/. Therefore metathesis of conjunct prefixes results in an /ee/ sequence which, consequently, tenses to /i/.

(7) **d-effect:** i) /d/ is deleted before stops

ii) /d/ + /y/ becomes /j/

(8) **epenthesis:** When the conjunct prefixes do not include a syllabic segment epenthetic /he/ is added immediately to the right of the disjunct prefixes (see ii) or in the absence of disjunct prefixes /he/ is added word initially (see i). (Note: ## marks the word boundary, # marks the disjunct/conjunct boundary.)

i) ##s- tsagh —> hestsagh 'I cry (imperfective)'  
1sg- cry

ii) ##te- #s- > tehesbans 'I roll it up (imperfective)'  
up- 1sg- cl- roll

If the first morpheme of the word is conjunct and if it begins with a syllabic segment then epenthetic /h-/ is added initially:

iii) ##- > hunesjan 'I was shy (perfective)'  
mod- perf- 1sg- cl- shy

(9) **vowel deletion:** In a sequence of two adjacent vowels the lax one is usually deleted.  
ne- id—> nid

## 2.4 Tone

Tone in Athabaskan languages can be traced back to a stem-final glottal stop /ʔ/, historically. In some languages /ʔ/ has surfaced as a low tone, as in Dogrib and Sekani and in others it has surfaced as a high tone, as in Slave and Chipewyan (Cook 1989). The tone that has surfaced from the glottal stop in any one language appears to be the only lexically marked tone on stems in that language. Therefore, a stem is marked underlyingly for tone (either high or low depending on the language) or is toneless (Rice 1987, 1989, Odden 1986). Chilcotin appears to fall into the high-tone group of languages because its stems are lexically marked for high tone. If the stem is not marked for high tone then it is lexically toneless. There is no lexical low tone in Chilcotin. Toneless segments not associated with a high tone are marked for phonetic low tone by a default rule (Rice 1987, 1989). The study of tone in any Athabaskan language is a difficult task due to the complexity of the rich concatenating morphology and the phonological rules which often render morphemes almost completely unidentifiable.

### 3.0 THEORETICAL ASSUMPTIONS

#### 3.1 Autosegmental Theory

##### 3.1.1 Autonomy of Tone

According to autosegmental theory tone operates on a different level from other features on the segmental level. Although tone can be identified as being associated to a particular segment, it can also act independently from that segment. For example, in Margi the suffix 'na', which is not marked for tone, takes on the tone of the stem to which it is affixed:

- (10)    a) /sá + na/                      —————> [sáná]    'to lose'  
           b) /ndàl + na/                    —————> [ndàlà]    'to throw'                      (Durand, 1990)

In (10a) the stem /sá/ has a high tone. When /na/, which is toneless, is affixed to the stem, /na/ also becomes marked for high tone. The opposite occurs in (10b); the low tone of the stem /ndàl/ spreads onto the toneless suffix, /na/.

The independence of tone can also be observed in Chilcotin. When a prefix marked for high tone is affixed to a stem which is lexically toneless, the tone will spread onto the stem:

- (11)    a) /ná + sbish/                    —————> [násbìsh]    'I swim around'  
           b) /te + sbish/                    —————> [tesbìsh]    'I'm starting to swim'                      (Cook, 1989)

In (11a) the high tone on the prefix spreads onto the stem. Whereas in (11b) the same stem remains unmarked for high tone when the prefix is also toneless. The tone in (11a) provides an example to demonstrate the autonomy of tone from the phonemic melody and the necessity for a separate tier for tone to be represented.

##### 3.1.2 Autosegmental Theory

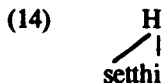
Goldsmith (1990) outlines the autosegmental representation of tone, which posits separate tiers for tones and segments. Tones are represented on an independent tier from the phonemic segments, the tonal tier, on which only tonal features can be specified. The tonal features are either high-tone (H) or low-tone (L):

- (12)
- |         |                |                  |
|---------|----------------|------------------|
| H   L   | tonal tier     |                  |
|         |                |                  |
| b u l u | segmental tier | (Goldsmith 1990) |

In order to establish a connection between the tones of the tonal tier and the tone bearing units of the segmental tier, association lines are included in the representation. Thus, there need to be principles of association constraining the linking of tones to tone-bearing units. In Rice's analysis of Slave tone she notes that a tone which is lexically paired with the stem is realized by the preceding morpheme.



/se-/ is a first person genitive morpheme which is lexically toneless. The association rules in Slave need to link the tone paired with the stem to the toneless prefix, so the derived representation has the effect of the following representation:



In Chilcotin the tone is lexically paired with a morpheme but is realized on the vowel of that morpheme. Tone is realized on vowels in all languages; however consonants can have the capability of bearing a tone in some languages. Therefore, Goldsmith (1990) introduces 'tone bearing units' as the segments on the segmental tier which are capable of bearing a tone, where vowels will always bear tone and any other tone bearing units are determined language specifically.

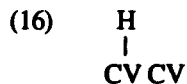
Goldsmith (1990) proposes three constraints for the association of the segmental tier with the autosegmental tier in the Well Formedness Condition:

(15) **Well Formedness Condition (WFC):**

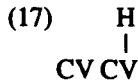
1. All vowels are associated with at least one tone.
2. All tones are associated with at least one vowel.
3. Association lines do not cross.

The constraints of the Well Formedness Condition are applied through association conventions specifying direction of association, (left-to-right or right-to-left), its starting point, as well as options such as spreading.

Tone languages often require a direction of association rule to associate the tonal tier to the segmental tier. This becomes particularly evident when there are more tone bearing units than tones. For example, the Initial Association Rule (Goldsmith 1990) which associates the first tone to the first segment is presented below:

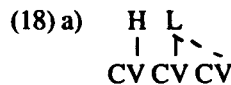


A direction of association is necessary because the left-to-right association, as in the preceding example can produce a very different form from a right-to-left association:

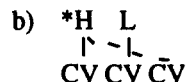


Recall that Chilcotin verbs are formed through concatenation of monosyllabic morphemes. Therefore, an association convention specifying direction of association is not necessary because the tone that a morpheme is paired with associates to the only tone bearing unit, the vowel.

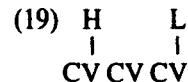
According to the WFC the unassociated segments in the preceding examples must be associated to a tone. Spreading of tones to tone-bearing units is one type of association convention to link unassociated segments. If, after all of the tones have been associated, there remains an unassociated segment then the spreading rule links it to the closest tone. In the following example the final CV segment is unassociated; it associates with the preceding L-tone through spreading.



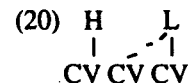
Recall the WFC states that association lines must not cross, so the final CV segment in (18a) cannot associate with the H-tone.



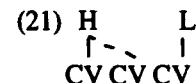
A language which employs a spreading rule needs to specify the direction of spreading. Without a specified direction, it is not always clear which tone will associate with unassociated segments:



In (19) it is not clear which tone, H or L, will associate with the medial CV segment. A right-to-left spreading rule would associated the medial segment to the following L-tone:



A left-to-right spreading rule would spread the H-tone rightwards to the medial CV segment:



In Chilcotin the spreading rule applies from left-to-right. In the following example the /id/ prefix is lexically marked for H-tone. A direction of spreading must be specified to determine if the preceding segment or the following segment (or both) associates with the H-tone.

- (22)        H  
             |  
u-ghe-id-jid

In Chilcotin, an unassociated segment is consistently realized with a H-tone only if it is preceded by H-tone. Therefore, Chilcotin exhibits a left-to-right spreading rule.

- (23)        H  
             |  
u-ghe-id-jid    *hughljid*        'I kept poking it'

The association conventions apply before any other rules in Chilcotin. Recall that Chilcotin verbs are formed through concatenation of monosyllabic morphemes. Therefore, an association convention specifying direction of association is not necessary because the tone that a morpheme is paired with associates to the single tone bearing unit, the vowel.


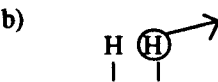
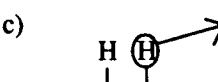
Leben proposed a condition to constrain the patterning and association of identical segments (Leben 1973).

- (24) **Obligatory Contour Principle (OCP):**(Leben 1973)  
For any pair of adjacent segments a and b,  $a \neq b$ .

In the framework of autosegmental phonology, the OCP prohibits two identical tones from occurring in adjacent positions on the same tier. Adjacent tonal positions refer only to the tonal tier and therefore, any intervening segmental material does not affect the tonal tier. For example in a representation such as (25), despite the C between the two V's on the segmental tier, the two H-tones are adjacent, thereby creating an OCP violation.

- (25)    H        H  
         |        |  
        VC    V

Therefore, there needs to be a rule to correct the violation. For Chilcotin, I propose a deletion rule which deletes the rightmost H-tone. A verb which has a H-tone stem preceded by a H-tone prefix violates the OCP. In all such cases in Athabaskan the H-tone associated with the stem is deleted and the stem is phonetically realized as a L-tone. The left-most tone, on the prefix, is never realized as a L-tone. (Note that the rules of reassociation in Chilcotin will be outlined further in section 5.0).

- (26)
- a) 
  
te id tsih<sup>3</sup>      títsh      'We shot several times'
- b) 
  
te-se-id-des      tezídes      'We are becoming heavy'
- c) 
  
ghe-id-losh      ghídlosh      'We loosened it'

Leben also points out that both the underlying and derived tonal representations are subject to the OCP. Whether (25) represents underlying or derived structure, it violates the OCP.

### Multiple Associations

Autosegmental Theory assumes an intermediate tier between the phonemic tier and the tonal tier. The skeletal tier is represented simply with C's and V's corresponding to [-syllabic] and [+syllabic] phonemic segments, respectively.<sup>4</sup> A Chilcotin stem which is lexically marked for high-tone is represented as in (27):

- (27)
- |   |   |   |                |
|---|---|---|----------------|
|   | H |   | tonal tier     |
|   |   |   |                |
| C | V | C | skeletal tier  |
|   |   |   |                |
| j | i | d | segmental tier |

In representing long vowels, geminates, or contour tones, autosegmental theory permits multiple associations between tiers.


### Multiple Associations (Goldsmith 1990):

Two successive segments on a single tier are associated to a single position on another tier.


Multiple associations have relevance to a tonal analysis of Chilcotin in two regards. First, contour tones surface in sentence final position in Chilcotin (Cook, personal communication). A contour tone, according to Goldsmith's definition of multiple associations, is represented as two tones on the tonal tier associating to a single V-position on the skeletal tier.

<sup>3</sup> Thanks to Eung-Do Cook for providing me with his fieldnotes from Williams Lake 1984-85 for the data in this paper.

<sup>4</sup> The representation of the intermediate tier is assumed in the rest of the examples representing tonal associations directly to the phonemic tier.

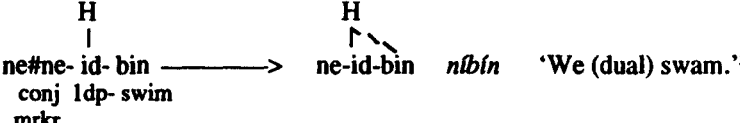
- (28)  tonal tier  
skeletal tier

Second, vowel lengthening also occurs in sentence final position (Cook, personal communication). Goldsmith argues that long vowels must be represented as multiple associations. Thus a long vowel is represented with two V-positions on the skeletal tier which multiply associate to one vowel on the segmental tier.

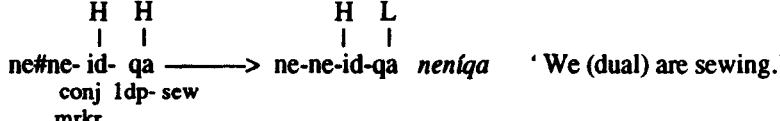
- (29)  skeletal tier  
segmental tier

#### 4.0 STEM TONE ALTERNATION

Chilcotin tone has an interesting pattern related to the first person duoplural prefix /id/. In most cases /id/ causes the tone associated with the stem to change either from H-tone to L, or from L-tone to H. For example if the stem tone is H then in a construction containing /id/ it reverses to L or if the stem tone is L then it changes to H.

- (30) 

Example (30) appears to be a simple case of spreading. The H-tone of the subject prefix spreads to the stem. However, if the stem tone is marked H then /id/ appears to cause the H-tone to reverse and become a L-tone, as seen in (31):

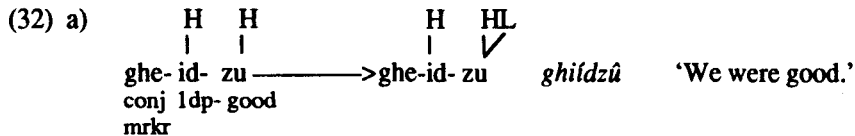
- (31) 

In this case the stem tone in the derived representation is the opposite from the subject prefix so the effects of /id/ cannot be analyzed simply in terms of spreading. There must be some other rule in effect to account for the alternation of the stem tone in (30) and (31). One further example will

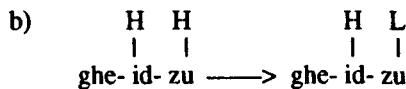
<sup>5</sup> Note that the leftmost representation is the underlying structure of the verb and that the arrow indicates derivation; thus the rightmost representation is the surface (derived) representation.



show that the alternation caused by /id/ is not simply a polarity rule. That is, it does not only alternate between two opposing features (H and L). Example (32) shows that /id/ may create a falling contour tone on the stem from an underlying high tone.



Recall that falling contour tone regularly occurs in sentence final position. (32a) is an example of a verb in sentence final position; if the verb /ghíldzû/ occurred sentence internally it would pattern like (31), in which the H-stem tone became L:



The stem tone alternations due to the /id/ prefix are represented in (33) with their position in the sentence specified:

(33)	STEM TONE	SENTENCE POSITION
a)	L→ H	-internal and final
b)	H→ L	-internal
c)	H→ HL	-final

## 5.0 APPLICATION OF AUTOSEGMENTAL THEORY TO CHILCOTIN TONE

By representing tone autosegmentally, the processes involved in associating and reassociating tones to segments becomes much clearer. This is definitely the case for an analysis of tone in Chilcotin. The /id/ prefix in the Chilcotin verb causes an alternation of the stem tone. In most cases a H-stem tone becomes L or a L-stem tone becomes H. I propose that this alternation can be represented with two rules. One rule is a rightward spreading rule which causes a L-stem tone to become H. The second rule is a tone-deletion rule motivated by the OCP which accounts for the H to L stem tone alternation. The spreading and deletion rules also account for the H-stem tone alternating to a contour tone.

### 5.1 Autosegmental Rules

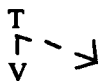
#### 5.1.1 L→ H Stem Alternation

A stem which is not marked for H-tone on the surface is lexically toneless. Therefore, it is a free segment which can be associated to a tone. If the free segment is preceded by a H-tone then it associates with the H-tone through spreading.

- (34) H  
 |  
 na #s bans                    'I am rolling'  
 1sg- roll

The stem /bans/ is toneless and therefore a free segment. It is preceded by a prefix marked for H-tone. The H-tone of the prefix spreads onto the free segment by a spreading rule.

- (35) Spreading Rule (Goldsmith 1990):



In Chilcotin the spreading rule applies from left-to-right like that represented in (35). A segment marked for H-tone will associate rightward to all unassociated segments. All free segments to the right associate with the H-tone because spreading in Chilcotin is unbounded. (36) shows how the spreading rule applies to (34):

- (36) H  
 |  
 nasbans                    *násbáns* 'I am rolling'

The high tone of the prefix spreads rightward to the unassociated segment. (Spreading is indicated by a broken line.) The example in (37) portrays the unboundedness of the spreading rule:

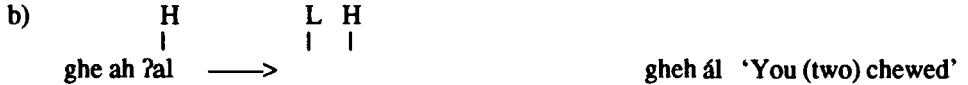
- (37) H  
 |  
 na #je lbans                    *nájélbáns*                    'They are rolling'  
 3pl-cl+roll

The H-tone spreads as far right as it can until there are no more unassociated segments. This rule is motivated by the WFC, which states that all vowels are associated with at least one tone.

In Rice's analysis of tone in Slave (1987, 1989), another Athabaskan language, she noted that H-tone spreads leftwards from the stem. Tones which are associated to prefixes are only lexically associated and they never spread. This analysis will not work in Chilcotin. Recall from examples (36) and (37) that the H-tone paired with the prefix /na-/ spreads to other prefixes and to the stem. Also note the direction of spreading did not initiate from the stem spreading leftwards; instead spreading started from a prefix (on the left of the stem) and spread rightwards. If spreading occurred in a right-to-left association ungrammatical constructions would be formed. For example, right-to-left spreading would predict the H-stem tone to spread to the prefixes in (38a).

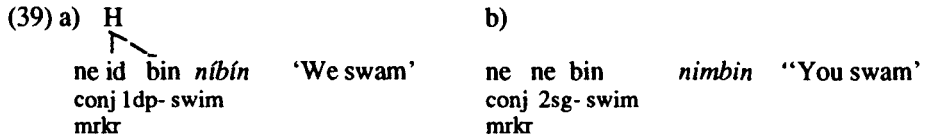
- (38) a) \*                    H                    L   H  
                              |                    |   |  
                              ghe ah ?al                    gheh?al

In fact, in the surface form the prefixes are realized with L-tone, so the right-to-left association wrongly predicts the surface forms. (38b) represents the correct surface form of the verb in (38a):



We will see further evidence for the direction of spreading in the verbal constructions containing /id-/. The H-tone of the /id-/ prefix spreads rightward onto the toneless stem. (See example 39)

The spreading rule applied to the inflected verb containing /id/ will account for the L→H stem-tone alternation. (30) is rewritten here as (39) to show the application of the spreading rule:

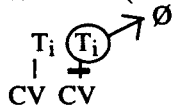


The stem /bin/ which is underlyingly toneless becomes a target for spreading. The H-tone of the /id/ prefix spreads rightward onto the stem. An example from the same primary aspect/mode paradigm is provided to exhibit the contrast of stem tone due to the /id/ prefix. The verb /nimbin/ in (b) has a toneless stem and a toneless prefix. In the absence of any H-tone the stem remains toneless until the derived representation, when L-tone is marked by default.

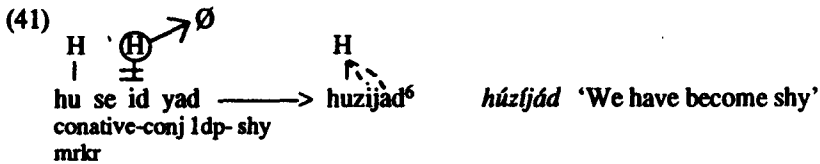
### 5.1.2 H→L Stem Alternations

The OCP prohibits two identical marked tones from occurring in adjacent positions on a tier. Therefore one must be deleted. In Chilcotin, the right-most tone is deleted and then is reassocated to the preceding H-tone by the spreading rule.

(40) Deletion Rule (Goldsmith,1990)



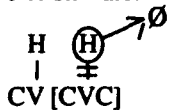
Identical tones are represented as T with the same co-indexed subscript. (41) is an example of the deletion rule applied in Chilcotin at the underlying structure.



In this example the stem tone alternation is not due to the prefix /id/ but to the H-tone of the conative prefix /u-/. The H-tone paired with /id/ is deleted and the preceding H-tone spreads rightwards.

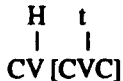
It is important to note that in Chilcotin if the deletion rule applies to the H-tone of a stem the stem does not reassociate to the preceding H-tone. (Note that the tone must have been associated to the segmental level before deletion applies in order to have any affect on whether the preceding tone could spread.)

(42) a) Deletion Rule:



When a stem tone is deleted the deleted tone leaves a tone trace.<sup>7</sup>

b) tone trace



A trace is a device used in syntactic analysis. In a syntactic framework a trace fills a position which was filled by a lexical element, but due to a 'move alpha' rule it no longer occupies the position. The position behaves syntactically as if it were filled; that is, no other lexical elements are permitted to occupy the position, although they could if it were empty. This is why syntacticians postulate a trace. The trace is not lexically apparent, although in the derivation it prevents the position from being occupied. Likewise in an autosegmental framework, I propose that the tone trace is associated to the stem thus preventing other tones from associating to the stem. Therefore, the stem is no longer a target for spreading.

Recall that the WFC requires all vowels to associate with at least one tone, where the tone settings are H or L. This requirement does not account for tone traces. Although a tone trace occupies the position of a tone it is not in itself a tone. Therefore, the construction in (42b) violates the WFC because the final vowel is not associated to a tone. The tone trace must be phonetically

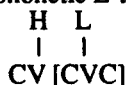
<sup>6</sup> The /h-/ is epenthetic word initially. The /e-/ of the prefix /se-/ is deleted next to the /i/ of /id-/. Also, the d-effect causes the /d+y/ sequence to form /j/.

<sup>7</sup> Personal communication Michael Dobrovolsky.

realized with a tone. Therefore, at the derived structure a phonetic L-tone is assigned to the position occupied by the trace by a default rule.

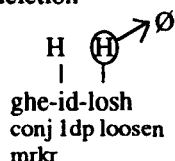
At the level of interpretation (logical form) for syntactic structures, traces which do not contribute to the semantic representation of a sentence are deleted (Lasnik and Saito 1984). In a similar manner, the tone trace is deleted once all of association rules have applied, as not only does it not contribute to the phonetic representation but it violates a fundamental condition, the WFC. At this point the default rule applies, assigning L-tone to the empty position. This corrects the WFC violation by assigning a tone to the last V position.

c) phonetic L-tone

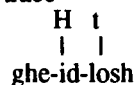


H-tone deletion can account for the H→L stem alternation. When /id-/ occurs with a H-marked stem, the two H-tones are adjacent. Therefore according to the OCP one must be deleted.

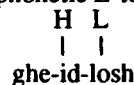
(43) a) deletion



b) trace



c) phonetic L-tone



*ghídlōsh* 'We loosened it'

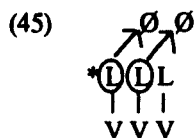
The WFC also motivates the default rule for the same reason as the spreading rule. That is, all vowels must be associated with at least one tone.

(44) **Default Rule:**

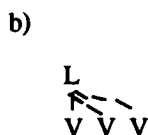
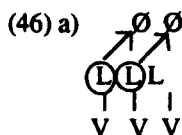
A low tone is assigned to all unassociated segments in the derived tonal representation.

Once all of the association rules have applied then the default rule fills in the gaps by assigning L-tone to those segments left unassociated. A L-tone is assigned to each unassociated segment at the derived representation. If any of the free segments are adjacent, the deletion rule must apply

in order to avoid an OCP violation. Therefore, adjacent L-tones are not permitted. All but one L-tone must be deleted and then that tone spreads rightwards. The directionality of the deletion rule becomes relevant at this point. The deletion rule specifies a right-to-left direction as seen in the H-tone deletion examples (41) and (43). If the deletion rule applied from left to right then the spreading rule could not associate the free segments to a L-tone.



The spreading rule only applies from left-to-right. Therefore the first two segments in (45) would be left unassociated and would violate the WFC. For this reason, the deletion rule must apply from right-to-left in order for spreading to associate the free segments.

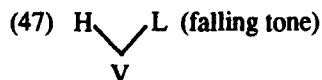


In (46a) the deletion rule applies recursively from right-to-left until only one tone remains. The remaining tone spreads onto the two unassociated segments as seen in (b).

### 5.1.3 H—> HL Stem Alternations

At this point, the stem alternations from H—> L and L—>H can be accounted for using the deletion rule and spreading rule, respectively. However, the H—> HL alternation remains to be explained. As stated earlier, this stem tone alternation can be represented with a combination of two autosegmental rules: the deletion and spreading rules.

Recall that affixation of /d-/ to a H-tone stem in sentence final position causes the formation of a falling tone (HL). A problem arises in analyzing the falling tone as a contour tone. Contour tones are multiply linked constructions in which two different tones are associated to the same segment.



Recall from section 3.1.2, Goldsmith stated that contour tones are multiple associations. He further specifies that contour tones only surface in languages which permit multiple associations of tones to a single V-segment on the skeletal tier. If contour tones surface sentence finally then Chilcotin must permit contour tones. However, there is no evidence for contour tones in positions other than sentence finally. Slave, another Athabaskan language does not permit contour tones

at all (Rice 1989). The existence of contour tones in Chilcotin needs to be questioned because there does not appear to be any support for contour tones being permitted.

Further problems arise in analyzing sentence final falling tone as a contour tone. In fact there does not appear to be any motivation to multiply link a L-tone to a H-tone in Chilcotin. H-tone is associated in the underlying representation while L-tone is assigned at the derived structure by a default rule. The default rule assigns L-tone only to unassociated segments. Therefore, there is no reason for the default L-tone to link to an already associated segment.

According to Cook (personal communication) open syllables which occur in sentence final position undergo vowel lengthening. If the vowel is lengthened then there are two V-segments which can associate to a tone.

The Chilcotin data strongly supports an analysis which posits that the stem tone is associated to the stem before vowel lengthening and that the second position of the lengthened vowel is inserted between the initial C and the V of the stem on the skeletal tier.

(48) C V V

When the H-tone stem is preceded by a H-tone prefix the second stem vowel does not associate through spreading although the first vowel does:

(49) a)            H    H  
                      └─┬─ ?  
                      te we id bji

Recall that a stem segment which undergoes a tone deletion rule does not reassociate. This suggests that it is the second vowel to which the stem tone associates. The OCP requires the stem tone to be deleted.

b) tone deletion

                      H    (H) → ∅  
                      |    |  
                      te we id bii

The first vowel of the stem associates with the preceding H-tone but the tone trace prevents spreading to the segment whose tone was deleted.

c) spreading

                      H    t  
                      └─┬─  
                      te we id bii

The final vowel segment receives a phonetic L-tone by the default rule:

d) phonetic L-tone



For this reason I postulate that the sentence final falling tone is not a contour tone in the strict sense. Instead, the H and L-tones are associated to separate segments.

(50) H L  
| |  
C V V]]<sup>7</sup>

Phonetically the two vowels on the segmental level are not pronounced as two distinct segments, as can be heard in a consonant cluster such as /st/. Instead the two vowel segments are phonetically realized as one vowel with a timing sequence longer than that of one vowel and closer to that of two. The phonetic long vowel is represented as:

derived representation  
VV

phonetic representation  
V:

If the two vowels of a long V at the derived representation have different tonal settings (e.g. HL or LH), then the two tones will create the impression of a contour tone phonetically. The phonetic representation is as follows:

(51) Phonetic Representation:



Analysis of V lengthening

It would be logical to assume that the lengthened vowel position is inserted word finally:

CVV

However, such a representation requires a complicated derivation from the underlying to the derived representations which cannot predict the forms for constructions which have a high tone stem but not a preceding H-tone.

Recall the Initial Association Rule which associates the first tone to the first vowel. Goldsmith cites evidence from Hausa (Newman 1986) showing a right-to-left association. Although there

<sup>8</sup> ]] indicates sentence final position.



is no evidence elsewhere in Chilcotin for the need of a directional association rule, by positing the lengthened vowel position as word final position a right-to-left association rule is necessary.

If the association rule is a left-to-right rule the initial vowel of the stem would not permit spreading from a preceding H-tone due to the deletion rule.

(52) a) deletion

H   H   ∅

|   |

ghe-id-zuu

b) spreading: NO

H   ∅   ∅

|   |

ghe-id-zuu

The default rule would assign L-tone to both vowels of the stem; when in fact the first vowel must be associated to a H-tone in order to create the HL sequence expected on the stem.

c) phonetic L-tone

H   L   ∅

|   |

ghe-id-zuu

A right-to-left association rule avoids this problem:

(53) a) R → L Association:

H   H   ∅

|   |

ghe-id-zuu

When the right-most H-tone is deleted it does not prevent the preceding H-tone from spreading to the first V-position.

b) deletion and spreading

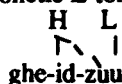
H   H   ∅

|   |

ghe-id-zuu

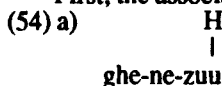
The default rule assigns L-tone to the word final V-position, which would create the expected phonetic falling tone.

c) phonetic L-tone



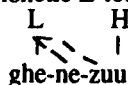
Although this analysis accounts for the H—>HL stem alternation in the presence of a preceding H-tone, it cannot correctly predict the forms in the absence of the preceding H-tone. In the absence of a preceding H-tone, a stem with a H-tone remains as a H-tone because there is no environment to alter it. However, this analysis would predict a rising tone (LH).

First, the association rule links the H-tone to the final V-position:

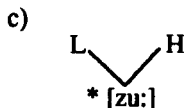


Because spreading in Chilcotin is rightwards, the first V-position would not be marked for H-tone through the spreading rule. Consequently, the default rule would assign a L-tone to all of the preceding toneless segments, including the first stem vowel:

b) phonetic L-tone



As a result the lengthened stem vowel would be phonetically realized as a rising tone but this is ungrammatical not only for this verb but there is no evidence for rising tone at all in Chilcotin:



The analysis which posits the lengthened vowel as word final rather than internal position requires a directional association rule. There is no justification for such a rule anywhere else in the grammar because all morphemes in Chilcotin are monosyllabic. Further, this type of analysis produces ungrammatical constructions. For this reason, an analysis which generates the lengthened vowel position between the C and V of the original stem, where the tone is associated with the original V, is proposed. It accounts for the data based on the two autosegmental rules presented thus far and it produces grammatical forms.

The stem alternation from H—>HL follows from the association rules postulated thus far. If the verb occurs in sentence final position there will be two vowel positions, where the extra vowel is inserted between the consonant and the vowel and the H-tone associated with the original vowel:

- (55) a)  $\begin{array}{cc} \text{H} & \text{H} \\ | & | \\ \text{ghe id} & \text{z[uu]} \end{array}$  'We (dp) once were good'  
 conj 1dp-be good  
 mrkr

The OCP causes the deletion rule to apply to the stem tone:

- b)  $\begin{array}{cc} \text{H} & \text{H} \rightarrow \emptyset \\ | & | \\ \text{ghe id} & \text{z[uu]} \end{array}$

The spreading rule spreads H-tone to the first free segment of the stem. However, a stem segment which has undergone deletion does not reassociate and subsequently remains unassociated.

- c)  $\begin{array}{cc} \text{H} & \text{t} \\ | & | \\ \text{ghe id} & \text{z[uu]} \end{array}$

At the derived representation, the unassociated segments are marked for L-tone.

- d)  $\begin{array}{cc} \text{H} & \text{t} & \text{H} & \text{L} \\ | & | & | & | \\ \text{ghe id} & \text{z[uu]} & \text{ghid} & \text{z[uu]} \end{array} \longrightarrow$

The H→HL alternation is explained then in light of the fact that the falling tone regularly appears in sentence final position, a position in which the vowel of an open syllable lengthens creating an additional segment. The two segments of the lengthened vowel associate with the two tones of the falling "contour" tone. The OCP requires the stem tone to be deleted but restricts the tone-bearing unit from reassociating at the underlying structure. The preceding high tone of the /id-/ prefix spreads to the first vowel of the stem but not the second. Finally, the second vowel of the stem is assigned L-tone by the default rule.

There are some cases in which a contour tone surfaces from a H-tone in a closed syllable:

- (56) a) nítsên 'We are bad' cf. nentsén 'He is bad'  
 b) hughíjíd 'We poked him' cf. hughíjíd 'I poked him' (Cook 1989)

The autosegmental analysis proposed thus far would predict vowel lengthening in the stem of (56a) and (b) in order to provide positions for the two tones (HL). Cook (personal communication) noted the occurrence of vowel lengthening in a stem with a nasal consonant in word final position. Therefore, vowel lengthening is not restricted to open syllables and the same processes apply to both open and closed syllables in sentence final position.

## 6.0 CONCLUSION

The variations in the stem alternations due to the first person duoplural prefix are predictable when analyzed within an autosegmental framework. The L—>H stem alternation is accounted for by the spreading rule. The H-tone of the /id-/ prefix spreads onto the toneless stem. Second, deletion accounts for the H—>L stem alternation. When the /id-/ prefix is present the adjacency of the two tones violates the OCP. The deletion rule requires the second tone to be deleted. A language specific rule prevents the stem segment of a deleted tone from being reassociated in the underlying representation. The default rule allows a L-tone to be assigned to the segment at the derived representation. Finally, the H—>HL stem alternation is the result of deletion and spreading applied to a stem in sentence final position. The HL is not a contour tone in the strict sense although phonetically it is realized as a contour tone. Instead, it is a H-L pattern associated to the two positions of the lengthened vowel. Thus Chilcotin stem alternation can be accounted for with two basic autosegmental rules: spreading and deletion, with some language specific variations.

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## EXTERNAL ARGUMENTS AND *TER*- IN MALAY\*

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University of Calgary

### 0. Introduction

The verbal prefix *ter-* in Malay is associated with three unrelated meanings: adjectival passive (be V-ed), accidental (happened to V) and abilitative (able to V). We argue that the prefix *ter-* has no independent semantic content, and the various interpretations of *ter-* result from *ter-* suppressing certain elements in the argument structure of the verb. Based on the behavior of the prefix *ter-*, we propose a model of argument structure which allows us to modify the semantic roles within the thematic and the aspectual tiers of the argument structure. We propose that argument structure operations include the delinking of a semantic role (thematic and/or aspectual) from the argument. This delinking mechanism permits finer operations on arguments, resulting in a more articulated inventory of argument types.

In section 1, the different types of *ter*-constructions, adjectival, accidental and abilitative, are presented. In section 2, the theoretical assumptions underlying the analysis proposed here are outlined. Based on Grimshaw's (1990), Ritter and Rosen's (1993a,b) and van Voorst's (1987) work, we propose a new model of argument structure representation which involves a formal linking/delinking mechanism between the thematic and aspectual tiers in the argument structure. In section 3, we provide an analysis of *ter*-constructions using the linking/delinking mechanism. We show that *ter-* has no independent semantic content and the different interpretations of *ter-* result from the way *ter-* suppresses certain semantic roles within the argument structure of the verb. In section 4, the conclusions of this paper are presented and some implications of our proposal are explored.

### 1. Types of *ter*-constructions

When *ter-* attaches to a verb, it forms one of three types of constructions: adjectival, accidental and abilitative *ter*-constructions. Each of these constructions is described below.

#### 1.1 Adjectival *ter*-constructions

Adjectival *ter*-constructions have an adjectival passive reading and are perfective (i.e. the event is completed). The theme (internal argument) in adjectival *ter*-constructions occupies the subject position, and the agent role (external argument) is not expressed. The adjectival *ter*-passive is

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shown in (1a) and it is contrasted with a verbal passive formed by the verbal prefix *di-* in (1b).

- (1) a. Adjectival passive  
Pintu itu terbuka (\*oleh Ahmad).  
door the *ter-* open by Ahmad  
'The door was open(ed) (\*by Ahmad).'  
(stative—e.g. a description of the state of the door.)
- b. Verbal passive  
Pintu itu dibuka (oleh Ahmad).  
door the *di-* open by Ahmad  
'The door was opened (by Ahmad).'  
(eventive—e.g. a description of the opening of the door.)

Unlike the verbal passive in (1b), the agent role may not be expressed in adjectival *ter-*passives as shown by the asterisk inside the bracket with the agent *by*-phrase in (1a).

## 1.2 Accidental *ter*-constructions

In accidental *ter*-constructions, the agent has no intention or volition over the occurrence of the event. This type of construction has perfective aspect. The accidental reading is apparent in the active accidental *ter*-construction in (2a) as it is contrasted with the neutral active sentence in (2b).

- (2) a. Accidental active  
Anaknya termakan racun itu.  
child-her *ter*-eat poison the  
'Her child accidentally ate the poison' (Karim 1978: 112)  
or 'Her child happened to eat the poison.'
- b. Neutral active  
Anaknya makan racun itu.  
child-her eat poison the  
'Her child ate the poison.'

The agent is obligatory in accidental *ter*-constructions. This type of construction does not appear in the negative (Haji Omar 1970:17). In (3), when the sentence is negated with the negative marker *tidak*, we cannot get an accidental reading.

- (3) Negative active  
Anaknya tidak termakan racun itu.  
child-her not *ter*-eat poison the  
\* 'Her child did not accidentally eat the poison.'  
or \* 'Her child did not happen to eat the poison.' (Karim 1978:112)

The incompatibility of negation with an accidental reading will be discussed further in section 3 below.

### 1.3 Abilitative *ter*-constructions

Abilitative *ter*-constructions express the notion that someone is able to do something. Unlike the perfective reading of the accidental constructions, we get an imperfective reading in abilitative *ter*-constructions. The ability reading produced by *ter*- in the active abilitative *ter*-construction in (4a) is contrasted with the neutral active reading associated with the verbal prefix *me*- (an active transitive morpheme) in (4b).

- (4) a. Abilitative active  
Ahmad **terbawa** buku yang berat itu.  
Ahmad *ter*- carry book which heavy the  
'Ahmad is able to carry the book which is heavy.'
- b. Neutral active  
Ahmad **membawa** buku yang berat itu.  
Ahmad *me*-carry book which heavy the  
'Ahmad carries the book which is heavy.'

As in accidental *ter*-constructions, the agent must be realized in abilitative *ter*-constructions. Unlike accidental *ter*-constructions, which cannot appear in the negative, abilitative *ter*-constructions are more common in negative statements (Johns 1976:297). In positive statements such as (2a) and (4a), the sentences are in fact ambiguous between an accidental and an abilitative reading (Haji Omar 1970:20). However when the sentences are negated as shown in (5), the only reading available is the abilitative one.

- (5) Negative active  
Ahmad **tidak terbawa** buku yang berat itu.  
Ahmad NEG *ter*- carry book which heavy the  
'Ahmad is not able to carry the book which is heavy.'  
\* 'Ahmad did not accidentally take the book which was heavy.'

The ambiguity between an accidental and an abilitative reading in positive statements and the disappearance of this ambiguity in negative structures is crucial to the analysis proposed here.

### 1.4 Summary

We have seen in section 1.1 to 1.3 above that *ter*- affixation produces three different types of constructions. The properties associated with each type of *ter*-construction are summarized in (6).

(6)

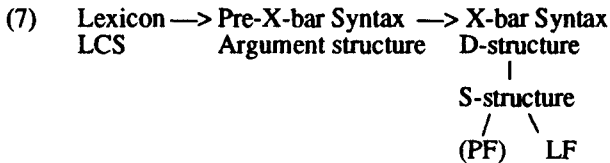
	Adjectival	Accidental	Abilitative
Aspect	perfective	perfective	imperfective
Negative	(not relevant)	positive statements	negative statements
External argument	no agent	requires agent	requires agent

In all three types of *ter*-constructions, the degree of involvement or the participation of the external argument in the event is modified. In adjectival *ter*-constructions, the agent argument cannot be expressed, giving us an event which has no agent argument. In accidental *ter*-constructions, the agent loses control/volition and becomes an unintentional causer. In abilitative *ter*-constructions, the agent does not participate in any event. In the following sections, we show how these effects of *ter*- can be represented formally.

## 2. Theoretical Assumptions

### 2.1 The Model of Grammar

Following Ritter and Rosen (1993a,b), we assume the model of grammar shown in (7) which has two pre-D-structure levels: Lexical Conceptual Structure (LCS) (cf. Jackendoff 1987) and Argument structure (cf. Grimshaw 1990).



LCS is considered part of the Lexicon and represents the meaning of a predicate using notions such as CAUSE, GO, AT and variables which represent the arguments of the predicate. Only argument variables project from LCS to Argument structure. Argument structure level is a syntactic level that is not constrained by X-bar theory. It includes information regarding the thematic arguments selected and the structure of the event (Ritter and Rosen 1993a,b). X-bar syntax is the syntactic component of the grammar which is constrained by X-bar theory, and includes D-structure, S-structure, and LF (cf. Chomsky 1981).

### 2.2 *ter*- and the Level of Argument Structure

We suggest that *ter*- is affixed at the level of Argument structure. One motivation for affixing *ter*- at Argument structure level is that *ter*- modifies the degree of involvement of the argument in the event and provides aspectual information (e.g. the completion of the event (perfective) in accidental and the non-completion of the event (imperfective) in abilitative constructions). Since the Argument structure level is concerned with both the thematic arguments and the aspectual organization of the



event, it is reasonable to suggest that *ter-* is affixed at this level. Furthermore, affixing *ter-* at the Argument structure level allows us to unify the three different *ter-*constructions under one single *ter-* at LCS.

### 2.3 The Argument Structure Representation: Grimshaw (1990)

Grimshaw (1990) proposes that arguments of the verb are projected with specification of their thematic and aspectual information at the level of Argument structure. The organization of the arguments at the thematic and aspectual tiers is based on a hierarchy of prominence. The ranking for the thematic hierarchy is shown in (9). In this hierarchy, the argument in the outermost bracket is the most prominent and the one in the inner most bracket is the least prominent.

(9) (Agent (Experiencer (Goal/Source/Location (Theme)))) (Grimshaw 1990:8).

The ranking for the aspectual hierarchy is shown in (10), with Cause argument being the aspectually most prominent argument (Grimshaw 1990:24). Grimshaw does not identify any other aspectual roles.

(10) (Cause (other (...)))

The argument-structure representation for *eat* is illustrated in (11).

(11)	a. I ate the burger.	
	b. eat      (x      (y))	argument array
	Agent Theme	thematic tier
	Cause other	aspectual tier

*Eat* has two arguments: x, y, which are assigned the thematic role Agent and Theme respectively. The argument x also bears the aspectual role Cause in the aspectual dimension and y is associated with an undefined aspectual role. The aspectually most prominent argument, x, is mapped onto the D-structure subject position.

Within Grimshaw's (1990) model, it is possible to suppress an argument such as in the formation of verbal passives. The suppression of the external argument is shown in (12), where  $\emptyset$  indicates that the external argument x, which is associated with Agent and Cause roles, is suppressed.

(12)	<u>Verbal passive</u>	
	finish      (x- $\emptyset$ (y))	argument array
	Agent Theme	thematic tier
	Cause other	aspectual tier

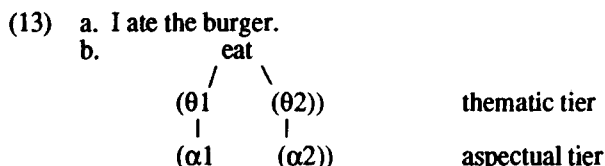
The suppression of the external argument affects the entire argument with its agent and cause roles. Grimshaw's model does not seem to allow us to suppress only the thematic or the aspectual role. Given the different interpretations resulting from affixing *ter-* at the Argument structure level, it seems necessary to allow not only argument structure operations on the arguments as a whole, but also operations which affect only the thematic or the aspectual tier.

## 2.4 A New Model of Argument Structure Representation

Drawing on some of the proposals in Grimshaw (1990), Ritter and Rosen (1993a,b) and van Voorst (1987), we propose a new model of argument structure representation which allows argument structure operations to affect elements in the thematic and aspectual tiers. Section 2.4.1 introduces the linking mechanism between the thematic and aspectual tiers in the argument structure. In section 2.4.2, we explore the delinking operation in argument structure.

### 2.4.1 Linking Mechanism

Following Grimshaw (1990), we assume that there are two tiers in the argument structure: a thematic tier and an aspectual tier. As shown in (13), the verb *eat* is linked with two arguments which are assigned both theta and aspectual roles (Ritter and Rosen 1993a).  $\theta$ -role 1 is thematically more prominent than  $\theta$ -role 2 and  $\alpha$ -role 1 is aspectually more prominent than  $\alpha$ -role 2. The formal linking between the theta and aspectual roles is represented by the lines between the aspectual and thematic tiers.



The model proposed here differs from previous models of argument structure in that not only is there a link between the verb and its arguments in the thematic tier, but there is also a link between the thematic and aspectual tiers.

Following van Voorst (1987), we assume that the subject identifies the beginning point of the event and the direct object identifies the end point of the event. Within our terms, this means that the argument with  $\theta$ -role 1 and  $\alpha$ -role 1 identifies the beginning point of the event and the argument with  $\theta$ -role 2 and  $\alpha$ -role 2 identifies the end point of the event. This is consistent with Grimshaw's (1990) proposal that the most prominent aspectual argument is the Causer, and Tenny's (1992) notion that an internal argument measures out or delimits the event.

Following Ritter and Rosen (1993a,b), we assume that aspectual roles signify the participation or involvement of the arguments in the event. We propose that the involvement of the arguments is determined by volitionality for the external argument. Hence, an external argument which has volition is involved in the event and has an aspectual role, while an external argument which has no volition is not involved in the event and has no aspectual role.

### 2.4.2 Delinking Mechanism

With the establishment of a linking mechanism at the level of Argument structure, it is reasonable to posit an operation of delinking. Delinking means disassociating a certain role from the argument structure. Unlike the delinking used in phonology (e.g. Goldsmith 1990), the

delinking of an element higher up in the representation in this model does not disassociate its dependent elements. Delinking is similar to the notion of suppression in the sense of Grimshaw (1990). Unlike the notion of suppression, which affects only the arguments as a whole, the mechanism of delinking may affect inner components of arguments in terms of their theta roles or aspectual roles. As a result, the delinking operation allows us to make finer distinctions between types of arguments by comparison with a mechanism of suppression.

As the effects of *ter*-center on the external argument of the verb, we will examine all possible manifestations of the delinking operation on the external argument, and ignore how delinking affects the other arguments. Three possible consequences of the delinking operation on the external argument are shown in (14). All these three possible delinking operations are attested in Malay. Two of them, (14b) and (14c), are associated with *ter*-constructions; and the third delinking operation (14d) gives rise to verbal *di*-passives.

(14)

a. no delinking	b. delinking of argument e.g. adjectival passives
$  \begin{array}{c}  V \\  / \quad \backslash \\  (\emptyset 1 \quad (\emptyset 2)) \\    \quad   \\  (\alpha 1 \quad (\alpha 2))  \end{array}  \begin{array}{ll}  \text{thematic tier} \\  \text{aspectual tier}  \end{array}  $	$  \begin{array}{c}  V \\  \neq \quad \backslash \\  (\emptyset 1 \quad (\emptyset 2)) \\  \neq \quad   \\  (\alpha 1 \quad (\alpha 2))  \end{array}  \begin{array}{ll}  \text{thematic tier} \\  \text{aspectual tier}  \end{array}  $
c. delinking of aspectual role e.g. accidental constructions	d. delinking of theta role e.g. verbal passives
$  \begin{array}{c}  V \\  / \quad \backslash \\  (\emptyset 1 \quad (\emptyset 2)) \\  \neq \quad   \\  (\alpha 1 \quad (\alpha 2))  \end{array}  \begin{array}{ll}  \text{thematic tier} \\  \text{aspectual tier}  \end{array}  $	$  \begin{array}{c}  V \\  \neq \quad \backslash \\  (\emptyset 1 \quad (\emptyset 2)) \\    \quad   \\  (\alpha 1 \quad (\alpha 2))  \end{array}  \begin{array}{ll}  \text{thematic tier} \\  \text{aspectual tier}  \end{array}  $

In (14a), no delinking occurs, and we find the argument structure representation of an ordinary verb which selects for a thematic external argument. As a thematic argument, it bears both a  $\theta$ -role and an  $\alpha$ -role. In (14b), we find that both  $\theta$ -role 1 and  $\alpha$ -role 1 are delinked. We claim that (14b) is the argument structure representation of an adjectival passive, where there is no implicit argument interpretation. In other words, we suggest that the entire external argument is removed in the formation of adjectival passives. In (14c), we find that  $\alpha$ -role 1 is delinked. As the argument with both  $\theta$ -role 1 and  $\alpha$ -role 1 marks the beginning point of the event within this model, we claim that when  $\alpha$ -role 1 is delinked, the beginning point of the event cannot be identified. The argument structure representation in (14c) will be shown to be the one characterizing accidental construc-

tions. In (14d), we find that  $\theta$ -role 1 is delinked. As noted earlier, the delinking of  $\theta$ -role 1 does not automatically disassociate  $\alpha$ -role 1 from the argument. We claim that this is the argument structure representation for verbal *di*-passives and the delinking of  $\theta$ -role 1 is equivalent to the suppression of the external argument in Grimshaw (1990). The reason we get an implicit argument interpretation in verbal *di*-passives is because  $\alpha$ -role 1 remains a participant of the event (see Soh (1994) for further discussion).

### 3. An Analysis of *ter*-constructions

We suggest in this section that *ter*- has no independent semantic content and the various interpretations of *ter*- result from *ter*- delinking certain elements in the argument structure of the verb to which it attaches. Specifically, we claim that (i) *ter*- delinks  $\alpha$ -role 1; and (ii) *ter*- may optionally delink  $\theta$ -role 1 or  $\alpha$ -role 2.

When *ter*- delinks  $\alpha$ -role 1, we find accidental *ter*-constructions. When *ter*- delinks both  $\alpha$ -role 1 and  $\theta$ -role 1, we find adjectival *ter*-passives. When *ter*- delinks both  $\alpha$ -role 1 and  $\alpha$ -role 2, we find abilitative *ter*-constructions. The formation of adjectival passives, accidental and abilitative constructions are discussed below in section 3.1, 3.2 and 3.3 respectively.

#### 3.1 The Formation of Adjectival *ter*-constructions

To form an adjectival passive, both  $\alpha$ -role 1 and  $\theta$ -role 1 are delinked as represented in (15a).

- (15) a. 

<u>Basic</u> buka /    \ ( $\emptyset 1$ $\emptyset 2$ )        ( $\alpha 1$ ( $\alpha 2$ ))	‘open’ $\longrightarrow$	<u>Adjectival</u> <i>ter</i> - buka $\neq$ \ ( $\emptyset 1$ ( $\emptyset 2$ )) $\pm$   ( $\alpha 1$ ( $\alpha 2$ ))	‘be open(ed)’  thematic tier  aspectual tier
---	--------------------------	---	--
- b. Pintu itu terbuka (\*oleh Ahmad).  
door the *ter*-open (by Ahmad)  
‘The door was open(ed) (\* by Ahmad).’

The delinking of both  $\theta$ -role 1 and  $\alpha$ -role 1 removes the entire external argument from the argument structure, and as a result, the external argument is not represented at subsequent levels of representation as shown in (15b). Only the internal argument may be realized.

#### 3.2 The Formation of Accidental *ter*-constructions

In the formation of an accidental construction,  $\alpha$ -role 1 is delinked as shown in (16a).

- (16) a. **Basic** makan 'eat'  
 / \  
 (∅1) (∅2)  
 | |  
 (α1 (α2))
- 
- Accidental** *ter-* makan 'accidentally ate'  
 / \  
 (∅1) (∅2)  
 ± ±  
 (α1 (α2))
- thematic tier  
aspectual tier
- b. Saya **termakan** burger itu.  
 I *ter-eat* burger the  
 'I accidentally ate the burger.'

As only  $\alpha$ -role 1 is delinked and  $\theta$ -role 1 remains, the agent argument must be present as shown in (16b). As  $\alpha$ -role 1 is associated with the involvement of the external argument in the event, and this involvement is determined in terms of volitionality, the delinking of  $\alpha$ -role 1 gives us an accidental causer interpretation. Since the argument has no aspectual role, it cannot identify the beginning point of the event. The beginning point of the event becomes non-evident and only the end point of the event is relevant. This is consistent with an accidental interpretation because in accidental events, only the end point is relevant, after which the agent realizes his action.

### 3.3 The Formation of Abilitative *ter*-constructions

To form an abilitative *ter*-construction, both  $\alpha$ -role 1 and  $\alpha$ -role 2 are delinked as shown in (17a).

- (17) a. **Basic** makan 'eat'  
 / \  
 (∅1) (∅2)  
 | |  
 (α1 (α2))
- 
- Abilitative** *ter-* makan 'able to eat'  
 / \  
 (∅1) (∅2)  
 ± ±  
 (α1 (α2))
- thematic tier  
aspectual tier
- b. Saya **tidak termakan** burger itu.  
 I NEG *ter-eat* burger the  
 'I am unable to eat the burger.'

As  $\theta$ -role 1 is not delinked, the agent needs to be realized as shown in (17b). When both  $\alpha$ -role 1 and  $\alpha$ -role 2 are delinked, the external argument and the internal argument are no longer involved in the event. Hence, there are no participants for the event. This is consistent with an abilitative reading. With the removal of  $\alpha$ -role 1 and  $\alpha$ -role 2, both the beginning and the end point of the event cannot be identified. This gives us a non-eventive interpretation in abilitative constructions.

### 3.4 Summary of the Analysis

The argument structures for different *ter*-constructions are illustrated in (18).

(18)

Adjectival	Accidental	Abilitative
$  \begin{array}{c}  \text{ter-V} \\  \neq \quad \backslash \\  (\emptyset 1 \quad (\emptyset 2)) \text{ thematic tier} \\  \pm \quad   \\  (\alpha 1 \quad (\alpha 2)) \text{ aspectual tier}  \end{array}  $	$  \begin{array}{c}  \text{ter-V} \\  / \quad \backslash \\  (\emptyset 1 \quad (\emptyset 2)) \text{ thematic tier} \\  \pm \quad   \\  (\alpha 1 \quad (\alpha 2)) \text{ aspectual tier}  \end{array}  $	$  \begin{array}{c}  \text{ter-V} \\  / \quad \backslash \\  (\emptyset 1 \quad (\emptyset 2)) \text{ thematic tier} \\  \pm \quad \pm \\  (\alpha 1 \quad (\alpha 2)) \text{ aspectual tier}  \end{array}  $

Adjectival *ter*-passives have both  $\theta$ -role 1 and  $\alpha$ -role 1 delinked; as a result, the agent argument may not be expressed. In accidental *ter*-constructions, only  $\alpha$ -role 1 is delinked; resulting in the unintentional causer interpretation in the accidental event. In abilitative constructions, both  $\alpha$ -role 1 and  $\alpha$ -role 2 are delinked; giving us a non-eventive interpretation in abilitative constructions.

### 3.5 Evidence

The above analysis is supported by three pieces of evidence: (a) the number of arguments in each type of *ter*-construction; (b) the impossibility of accidental interpretation with negation, and (c) the aspectual interpretations of *ter*-constructions.

We observe that there is one less argument in adjectival *ter*-constructions in comparison with the number of arguments of the base verb before the affixation of *ter*-. The number of arguments in accidental and abilitative *ter*-constructions remains the same. Within our analysis, this is because a  $\theta$ -role is delinked in adjectival *ter*-constructions but not in either accidental or abilitative *ter*-constructions. In accidental and abilitative *ter*-constructions, only the  $\alpha$ -roles are affected.

The second piece of evidence is the impossibility of accidental interpretation with negation. We find that certain *ter*-constructions are ambiguous between an accidental and an abilitative reading as shown in (19).

- (19) Saya termakan burger itu.  
       I *ter*-eat burger the  
       'I accidentally ate the burger.'  
       'I am able to eat the burger.'

When the sentence is negated, we find that the ambiguity between accidental and abilitative readings disappears and the only reading available is the abilitative reading as shown in (20).

- (20) Saya tidak termakan burger itu.  
I NEG. *ter*-eat burger the  
'I am unable to eat the burger.'  
\* 'I did not accidentally eat the burger.'

If we assume that negative markers such as *tidak* negate the occurrence of the event, a negative *ter*-construction can refer only to a non-event. The only non-event interpretation available for *ter*-constructions is the abilitative reading. It is not possible to obtain an accidental reading because to get an accidental reading, an event must have occurred.

The third piece of evidence comes from the aspectual interpretation of *ter*-constructions. Our analysis provides an elegant account of the aspectual interpretation of various *ter*-constructions. Recall that adjectival and accidental *ter*-constructions have perfective aspect, while abilitative *ter*-constructions have non-perfective aspect. Given that a perfective event is completed, it must have an end point. The end point of the event is identified by the direct object (van Voorst 1987) or an internal argument which has both a  $\theta$ -role and an  $\alpha$ -role within our model. In adjectival and accidental *ter*-constructions, the internal argument has both a  $\theta$ -role and an  $\alpha$ -role. As a result, the end point of the event is identified, giving us a perfective aspect. In abilitative constructions, the internal argument has only a  $\theta$ -role and no  $\alpha$ -role. As a result, the end point of the event is not properly identified, consistent with a non-perfective aspect.

#### 4. Conclusion

We claim that *ter*- has no independent semantic content and the various interpretations of *ter*- are a consequence of the effects of *ter*- on the argument structure of the verb. In the analysis of *ter*-constructions, we propose a new model of argument structure representation which involves a formal linking/delinking mechanism between the thematic and aspectual tiers in the argument structure. This model of argument structure allows argument structure operations to affect the thematic and the aspectual tiers, enabling finer distinctions to be made regarding argument types.

While Ritter and Rosen (1993a) propose that some arguments have only an aspectual role and no theta role, we suggest that certain arguments in *ter*-constructions have a theta role but no aspectual role. This analysis suggests that there are at least three types of arguments:

- (i) arguments with a theta role and an aspectual role (normal thematic arguments);
- (ii) arguments with an aspectual role only (aspectual arguments);
- (iii) arguments with a theta role only (non-aspectual arguments).

This analysis supports a separate level of Argument structure and a representation of argument structure which includes aspectual information with regards to the structure of the event. It also supports Grimshaw's (1990) and Ritter and Rosen's (1993a,b) insight that the interpretation and mapping of arguments depend on the role the arguments play in the event.

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# THEMATIC ROLES: A SEMANTIC FEATURE ANALYSIS

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## 0. Introduction

Theta theory is a means of showing the semantic relationship between a predicate and the participants minimally involved in the activity or state it expresses, referred to as arguments (Haegeman, 1991). By assigning a *thematic role* to an argument, the said relationship can be expressed. The inventory of thematic roles has not been universally agreed upon; I will base this paper on the roles identified in Frawley's *Linguistic Semantics* (1992).

Frawley divides thematic roles into two groups — participant and nonparticipant roles. Participant roles are required by the predicate and usually appear as a subject or object of the verb; nonparticipants are usually found as adjuncts to the verb. Within the category of participant roles are two subgroups: logical recipients and logical participants. Logical participants are the arguments which carry out the action, whereas logical recipients undergo the action. Several variations have been proposed as to what roles are in these subgroups and what their defining characteristics are. Frawley has proposed three argument roles which are grouped under the category of *logical actors*: the roles of agent, author and instrument. Based on his descriptions of the category of logical actors, and the roles themselves, I propose to make two points in this paper. First, I will show that based on syntactic evidence there exists a fourth role in this category, which I will name *causer*. Secondly, in my opinion there is not a clear theoretical discussion of the relationship between the roles in the category of logical actors. I will propose that, through use of a binary feature system, we can show more clearly the relationship the roles have to each other with respect to their semantic and syntactic function.

This paper is organized as follows: in section 1., I will outline the subgroup of active participants as defined in Frawley (1992). In section 2., I will introduce and justify the existence of the role of *causer*, which I feel is missing from the sub-group of logical participants. In section 3., I will propose a binary feature system to classify and organize these roles. In section 4., I will give syntactic evidence for the grouping of the roles as such.

## 1. Participant Roles in Frawley

*Logical Actors*, as stated in the introduction, are a subgroup of participant roles — they are the “doers” of the predication. Frawley recognizes three roles in this category. They are as follows:

1. Agent - deliberate and intentional actor; *volitionally carries out action and is the primary “doer”*
2. Author - also the primary ‘doer’, however while an agent carries out an action for internal reasons, the author carries them out for external reasons. *No volition is involved hence an author is not usually animate.*
3. Instrument - the means by which the predicate is carried out. It must be acted upon by someone or something else because it *cannot act independently.*

## 2. The Role of *Causer*

As stated in section 1, instruments cannot carry out an act independently, but must be *acted upon*. The 'actor' may be overtly realized in the sentence or may be simply implied, as we see in examples (1a) and (1b) below:

- 1a. John brewed a fresh pot of coffee with his new coffeemaker. (Overt actor)
- b. The coffeemaker brewed a great pot of coffee.

In (1a) both the 'actor' and the instrument are overtly stated. In (1b), however, the 'actor' is not overt. The sentence is still perfectly grammatical even though the reader knows that there must be an actor; the coffeemaker cannot make coffee on its own. Now we can look at (1c):

- 1c. John brewed some more coffee.

Here, it is the actor who is overt in the sentence and the instrument is only implied. However, once again the reader is aware of the instrument's participation in the predication. We know that John does not have a special body part from which he can brew coffee. The instrument, *the coffeemaker*, is a necessary component semantically (although not syntactically) and is implied even when not overtly stated.

It has been stated that the actor who acts upon the instrument in order to complete the predication is an agent. This role does involve volition, as does the actor who acts upon the instrument. We remember that the agent is the "primary involved doer" of the action. In a sentence such as *John put the coffee in the filter* or *John turned on the coffee machine*, we can agree that John is the agent. However, in a sentence such as (1a) or (1c) it is clear that both *John* and *the coffeepot* are required to carry out the predication. Furthermore, in (1b) it is evident that *John* is not even a required overt element in an active sentence. If we can freely omit either *John* or *the coffeemaker* and still have a grammatical sentence, then we cannot say that one or the other is the *primary, involved doer* of the action. It seems they both play an important part in the action of brewing the coffee.

As well, the main difference between an author and an instrument is that an instrument requires an outside force to act upon it in order to complete the predication. In (1) above, *John* requires an outside force to act upon in order to make the coffee. It seems this would distinguish *John* from an agent, which acts independently as the primary, involved doer.

Based on the above reasoning I would like to propose the existence of a fourth role in the 'logical actors' group: that of *causer*. As stated in Frawley, (1992), a causative event is, "abstractly an if/then relationship between two events". In other words, a causative event is a relation between two events: A caused B to do X. The sentences in (1) depict this relationship. John acts upon the coffeemaker by turning it on, filling it with water, etc. and the coffeemaker subsequently acts by brewing the coffee. In other words, John is *causing* the coffeemaker to brew the coffee; he is the *causer* of this event.

### 3. A Binary Feature System

In section two, the role of causer was proposed to define the role of an actor who is acting upon an instrument in order to complete the predication, or causing the instrument to complete the predication. So, the causer is a volitional actor who must act upon an instrument — who is dependent upon that instrument for successful completion of the predication. In turn, the instrument is a non-volitional role which must be acted upon for successful completion of the predication. The roles of agent and author are independent actors; they do not require ‘assistance’ from any other actor to act. I propose that these four roles can be classified by the use of binary features; the two features necessary are [+/- volitional] and [+/- independent]. Thus, the four roles would be classified as follows:

1. Agent:        [+ vol], [+ind]
2. Causer:       [+ vol], [-ind]
3. Author:       [-vol], [+ind]
4. Instrument: [-vol], [-ind]

The feature [+vol] refers to the volition of the argument; as we see here, agents and causers are both volitional. The feature [+ind] refers to the ability of the actor in question to act independently without having to act upon something or be acted upon by someone (something). The roles of agent and author are both [+ind].

### 4. Evidence

In order to justify my classification of these roles it is necessary to show syntactic/semantic proof that roles which are grouped together as a result of these features somehow ‘belong’ together. We will first look at the feature [+vol]. This feature groups together the roles of causer and agent. My hypothesis can be justified through testing sentences with the prepositional phrase *on purpose*, as shown below:

- 2a. Bill hit Tom *on purpose*.
- b. Diane photographed Eileen *on purpose*.
- c. \*The wave hit Tom *on purpose*.
- d. \*The camera photographed Eileen *on purpose*.

As we can see in (2a) and (2b), when we add the prepositional phrase *on purpose* to a sentence with either an agent or a causer as its subject, the sentence is perfectly grammatical. However, when we try to add *on purpose* to a sentence with a [-vol] subject, instrument or author, the sentence is at best silly (to most people!) and meaningless. Only subjects which are [+vol] can do something *on purpose*, which means only agents and causers. This test could of course be done with a number of prepositional phrases and adverbs which imply volition: *for a good reason*, *intentionally*, etc.

In order to justify the feature [+ind], I will not simply be showing what can be done with the roles it specifies, that of agent and author, but more importantly I will be showing what cannot be done with roles which are [-ind], causer and instrument. As previously explained, a causer requires an

instrument to act upon in order to complete the predication, although the instrument need not be overt, as was shown in (1c). Similarly, an instrument requires a causer to act upon it in order to complete the predication, and the causer need not be overt, as seen in (1b). Therefore, on the surface we may see the same syntactic structure for a sentence whether the subject is an agent, an author, a causer or an instrument, as shown in (3) below:

- 3a. *Mary* hit John.—agent
- b. *Lightning* hit John.—author
- c. *Mary* hit John. (with the ball)—causer
- d. *The ball* hit John.—instrument

As is shown above, to simply omit the instrument in (3c) and the causer in (3d) does not render the sentence ungrammatical. However, the result is different when these roles are not simply omitted, but overtly rejected. In showing this we must use a predicate which cannot simply take an agent or author (as with *hit* above) but requires an instrument/causer, such as the verb *brew* as seen in (1). As shown in (4) below, we cannot reject the causer or the instrument in a sentence using this verb:

- 4a. John brewed the coffee.
- b. ? John put the coffeemaker back in the cupboard, then proceeded to brew the coffee.
- c. ? John walked into the empty room and brewed some coffee.
- d. The coffeemaker brewed a pot of coffee.
- e. ? The coffeemaker on the third shelf in the kitchen cupboard began to brew a pot of coffee.
- f. ? As John drove home with his new coffeemaker in the trunk, he prayed it wouldn't start brewing.

So as we see in (4), although we are free to omit either an instrument or a causer in a sentence where they are both required thematically by the predicate, we cannot reject the presence of one or the other — in other words, we cannot overtly imply that the causer could or did effectively complete the predication without the instrument, or that the causer could do so or did so without the instrument.

When the subject of the sentence is [+ind], we cannot admit the assistance of another argument in the completion of the predication, as seen in (5) below:

- 5a. John hit Jim.
- b. John hit Jim with a book.
- c. Lightning hit Jim.
- d. ?John hit Jim with lightning.

In (5b) when we show assistance to *John* by *a book* we now have a causer and an instrument rather than an agent. In (5d) when we show assistance to the author *lightning* by *John*, we simply have an meaningless utterance. Or, if (5d) were possible, as in a superhero cartoon perhaps, we would again no longer have an author, but a causer and an instrument. So as seen here, only arguments which are [-ind] are able to be assisted by another argument in completion of the predication and

cannot be overtly denied the said assistance. (The exception here is when assistance is given by an argument of the same role such as *John and Mary hit Jim* — however this does not form a causative structure).

A possible problem arises when we look at a causative sentence involving two volitional arguments such as in (6) below:

6. The sheriff ran Jim out of town.

Here the structure is causative: A caused B to do X. However, although the sheriff may be the causer, it is apparent that Jim is volitional and therefore is not an instrument, but an agent. Now if we look at (7):

7. A sudden storm made Timmy run home.

Here once again the structure is causative, however a storm is not volitional and hence is not a causer but an author. Somehow it must be accounted for that in causative sentences such as these, a causer or instrument may be replaced by an agent or an author, and possibly other roles.

Causatives like the ones shown in (6) and (7) are in fact different than the ones discussed earlier on. In part 2 of this paper when I discussed causation I pointed out that in sentences like *John brewed coffee with the coffeemaker* John and the coffeemaker are interchangeable as subject of the sentence, as seen in (1b) and (1c). However as shown below in (8), we cannot do so with sentences like those in (6) and (7):

- 8a. The sheriff ran Jim out of town.
- b. Jim ran out of town.
- c. ? The sheriff ran out of town. (different meaning)
- d. A sudden storm made Timmy run home.
- e. Timmy ran home.
- f. \* A sudden storm ran home.

As seen in (8), the two arguments in these sentences are not interchangeable as subjects. As in each case, one can be omitted but the other cannot. It seems that one argument is really more directly responsible for the action than the other since it cannot be omitted. Furthermore, in sentences like (1b) and (1c) where either the causer or the instrument is not overt it is taken for granted to be involved in completion of the predication. Yet although sentences like (8b) and (8e) are consistent with the original sentences in (8a) and (8d), in the former the omitted 'causer' is not taken for granted to be partially responsible for completion of the predication. In fact, no one would even be able to guess (given no context) that there was any 'causer' making Jim run out of town or Timmy run home.

Hence I distinguish between the causer/instrument relationship as shown in sentences like (1), where there is a syntactically equal relationship between the causer and instrument, from other causative structures where arguments such as agent and author appear as logical actors. In keeping with the features I have proposed in order to classify causer and instrument, I refer to the type of

causative structures seen in (1). Here, the direct participants can only be a causer or an instrument, as a dependent causative, and the structures shown in (8) as independent causatives. Only in the former causative structures are the participant roles required to be filled by a causer and an instrument. In an independent causative structure other arguments may freely occur.

## 5. Conclusion

In light of what has been shown in this paper, I feel that the use of a feature system is an effective way to show the place each of the logical actors holds within that category and how they are alike or different. I have shown that there is syntactic and semantic evidence for grouping the roles with the features that I proposed, as well as the existence of the role of *causer* which has not been accounted for previously. Perhaps the use of a feature system could be as effective in classifying roles within the category of logical recipients and even non-participants. If so, all argument roles could be much more clearly defined and organized.

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## GREEK-ENGLISH CODE-SWITCHING

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Speaker A: EH TI THA GINEI, THA PAME STO movies?  
E, τί θα γίνει θα πάμε στο  
Hey, what's going on, will we go to the movies?

Speaker B: Well, I don't know. THELO NA PAO STO ESTIATORIO.  
Θέλω να πάω στο εστιατόριο  
Well, I don't know. I want to go to the restaurant.

The above type of dialogue is quite awkward for a monolingual speaker. However, for a Greek-English bilingual speaker there is nothing peculiar with switching from one language to another in mid-sentence. The purpose of this paper is to investigate and discuss the social significance of codeswitching with a concentration on Greek-English bilingual codeswitchers. Codeswitching is defined as the use of two or more linguistic varieties in the same conversation. Usually in a codeswitching environment there are no more than two types of language varieties. These consist of the dominant variety (used in the conversation), referred to in the literature as the matrix language and the other variety, which is called the embedded language. It is important to note here that:

“Although the two forms occur contiguously in the codeswitch, the embedded language forms do not become part of the matrix language” (Scotton, 1985).

In order to avoid any confusion, I will make the distinction between “code-switching” and “borrowing”, two terms which are often falsely fused. Borrowing is used by monolinguals while switching is a bilingual intragroup behavior. An example of a borrowed word into the Greek language is the word “computer”. While many Greek speakers use this term, they are not codeswitching, because the word “computer” has become an accepted word to use among monolingual speakers. The scope of this paper will limit itself to codeswitching while ignoring other linguistic phenomena, such as borrowing.

Codeswitching is an extremely natural strategy of language production for bilingual speakers. There can be various types of codeswitching. For example, there is codeswitching between sentences and codeswitching within sentences. (Intra-word codeswitching will be discussed later). Therefore, one speaks of inter-sentential switching and intra-sentential switching respectively. According to the literature, there is a third type of switching called tag-switching or as Poplack (1980: 118) refers to it, “emblematic switching”. This type of switching involves an exclamation, a tag, or a parenthetical utterance in a different language from that used in the rest of the sentence. In other words, it is a marker or an emblem of the bilingual character of an otherwise monolingual sentence. Here are some examples of inter-sentential, intra-sentential and tag codeswitching:

Inter-sentential:	THEN	XERO,	I'll go and talk to him.		
	Δεν	Ξέρω			
	(I don't know).				
Intra-sentential:	NEY,	THA	PAO	YEA	shopping downtown.
	Ναι	θα	πάω	για	
	(yes, I will go for)				
Tag-switch:	PO, PO!	What a surprise!			
	Πω, Πω!				
	(exclamation)				

Furthermore, Wardhaugh (1992:100) makes another classification. He distinguishes between two kinds of codeswitching: situational and metaphorical. As the word itself implies, situational codeswitching refers to language change according to the specific situation. Hence, one language is used in one situation and another is employed for a different situation. No topic change is involved.

“When change of topic requires a change in the language used we have metaphorical code switching” (Wardhaugh: 106).

The question of why people switch from one code to another is an area that sociolinguistic literature has given extensive weight to. When I discuss the reason for codeswitching, the above classifications of switches will be ignored. Instead, switching will be looked at in the general sense of switching between languages.

At this point, I will comment on a personal observation I have made, which partially goes against Wardhaugh's claim that it is the more educated bilingual speakers that employ codeswitching more often. I believe that educated Greek-Canadians (at least within the confines of the Greek-Canadian community in Calgary, Alberta) tend to codeswitch significantly less than the uneducated ones. Uneducated bilingual speakers have not mastered either language, therefore they extract components from both languages in order to communicate more clearly. I agree that effective codeswitching requires a good command of both languages, a trait which educated bilingual speakers tend to have. Nevertheless, these Greek-English bilingual speakers usually restrict themselves to one language, because of their ability to communicate effectively in that language alone.

Now I will explore the various functions of codeswitching:

### 1. Switching can be employed for *referential* purposes.

When there is a situation where people of common linguistic backgrounds bring up a subject which requires sophisticated language skills, they may choose to use one of their languages because the subject may be more appropriately discussed in one language as opposed to the other. This type of switching is one of the more common ones and bilingual speakers are very conscious of this kind of function. Personally, I am very conscious of this function and am able to predict when I will employ my Greek or English code. For example, I feel more comfortable speaking



in English when discussing a subject such as linguistics or pedagogy because I have been trained at an English-speaking university in these areas. However, I use Greek in the field of science, because I do not know the English technical terms in these areas because I have not received any training in an English school.

2. Another function of codeswitching is the *directive* one.

It is called “directive” because it involves the hearer directly. Appel and Muysken (1987: 119) point out that the directive may be used to exclude or include certain persons in a conversation by either using or avoiding usage of his/her language intentionally. For instance, at a foreign airport, one can often observe the airport officials speaking amongst themselves in their own language in a traveller’s presence, despite his/her inability to speak their language. This phenomenon occurs to exclude the “outsiders” from comprehending the dialogue.

3. A third codeswitching function is the *expressive* one.

Poplock (1980) specifically focusses on this function. Speakers emphasize a mixed identity through the use of two languages in the same discourse. An example of expressive codeswitching comes from Greek-English codeswitching in the large English-Greek communities of Toronto, Melbourne, and New York. Fluent Greek-English bilingual codeswitching has become a mode of speech in its own right, therefore individual switches carry no significant function.

4. A fourth function is called *metaphorical* switching.

This term is used by Gumperz and Hernandez-Chavez (1975). Metaphorical switching is referred to as a phatic function in the majority of the literature. For this function, reference will be made to Appel and Muysken’s (1987) example:

“Think of the stand up comedian who tells the whole joke in a standard variety, but brings the punch line in a vernacular type of speech, e.g. urban dialect” (119).

5. A fifth type of function has been termed *metalinguistic*.

Scotton (1979) makes reference to this term to describe another function of codeswitching. This function can be observed when comments are made directly or indirectly about the languages involved. Such examples can be observed when a speaker switches between different codes to “advertise” his/her linguistic abilities. Such phenomena are very common in even small bilingual communities such as the Greek-Canadian one in Calgary where one can find people switching from one code to the other apparently to impress their interlocutor. An even more interesting phenomenon is the one I have personally observed when listening to Greek-English speakers. Although quite unscientifically documented, I have noticed the following correlation: the more uneducated the people are, the more likely they are to use this metalinguistic function. Sometimes, it can be very humorous or even comical to listen to this type of speech. In addition, this speech has many elements of hypercorrection which further makes it unique. For example, some speakers may add the English plural suffix “-s” to an already pluralized Greek word: “skili + a + (s)” σκυλιά(dogs). Hence a double plural is created.

6. The last and most popular function of codeswitching is the *poetic* function of language.

Appel and Muysken (1987) provide examples from the poet Ezra Pound (Canto XIII). Pound works with complex internal rhymes across languages such as Chinese, Greek, French, and Italian.

Many people are under the false impression that codeswitching is a random mixing of words and sentences governed by no rules and structure. Most of the literature would disagree with this statement. As Wardaugh (108) points out:

“Codeswitching is not just a haphazard mixing of two languages brought about by laziness or ignorance or some combination of these. Rather, it requires conversants to have a sophisticated knowledge of both languages and to be acutely aware of community norms”.

As mentioned, codeswitching is governed by certain rules, just like any other area of language. In other words, there are certain syntactic constraints which permit only a few possible places in which codeswitching can occur. First I will look at particular grammatical constraints (for our purpose I will look at Greek-English codeswitching). Then I will consider universal constraints.

Grammatical Constraints:

1) Switching is allowed between a subject and a predicate in a copular construction:

AFTO TO MAGAZI EINAI down town.  
Αυτό το μαγαζί είναι  
'(This store is) down town.'

2) Each verb phrase (VP) or noun phrase (NP) of a sentence can be in a different code:

EINAI ORAIO CHRISTO, can you tell me where you got it from?  
Είναι ωραίο  
'(It's nice Chris) can you tell me where you got it from?'

3) Subject and object pronouns must be in the same language. (The asterisk signifies an ungrammatical string):

\* You look at AFTON.  
αυτόν  
'You look at (him).'

4) An auxiliary and a main verb must be in the same language:

\* He has ERTHIE.  
έρθει  
'He has (come).'

5) It is unusual to switch within a prepositional phrase (PP).

\* at TO PARKO  
           το πάρκο  
 'at (the park).'

6) It is also peculiar to switch between the article and the noun (although later I will consider some exceptions).

\* O YANNIS KITAXE TO dog.  
 O Γιάννης κοίταξε το  
 '(John looked at the) dog.'

When talking about universal constraints, I will consider two fundamental grammatical and psycholinguistic concepts: linearity and dependency. Appel and Muysken (1987: 123) state that linearity constraints generally state that switching from one language to another in the middle of a sentence is only possible if the linear order of a sentence in both languages is preserved. In addition, Poplack (1980) claims that codeswitches will tend to occur at points in discourse where juxtaposition of L1 and L2 elements does not violate a syntactic rule of either language, i.e. at points around which the surface structures of the two languages map onto each other. To illustrate this point, Poplack uses Spanish and English and shows how these two languages map onto each other. Instead of Spanish, I will use Greek.

English: I gave him	a	pen	so	he	would	write	that.
Greek: TOY ETHOSA	ENA	STYLOETSI	OSTE	(AFTOS) NA	TO	GRAPSEI	EKEINO
Του έδωσα	ενα	στυλό	έτσι	ώστε (αυτός)	να	το γράψει	εκείνο

In this example, switching is only possible where the vertical lines appear, because these are the places where the word order in both languages is equivalent. Where the crossed lines appear, switching is impossible.

Woolford (1983) reformulates Poplack's "equivalence constraint" in generative terms. Instead of using single word correspondence in both languages, Woolford considers the phrase structure rules:

S → NP VP eg.	English: John throws the ball.
	Greek: O YANNIS PETAEI TIN BALA.
	O Γιάννης πετάει την μπάλα
NP → Det N eg.	English: John...
	Greek: O YANNIS ...
	O Γιάννης ...
VP → V NP eg.	English: ...throws the ball..
	Greek: ... PETAEI TIN BALA...
	πετάει την μπάλα

Similarly, the “equivalence constraint” theory makes predictions for other parts of speech like adjectives (adj) and prepositions (P):

English: NP → Det adj N PP

Greek: NP → Det adj N PP

a) The nice cat on the roof...

b) EI OMORFIE GATA STI SKEPI...  
H ómorfē gáta sti skepē

Another model focusses on dependency. This model states that there cannot be a switch between two elements if they are lexically dependent on each other (Appel and Muysken 1987, 124). The authors who have focussed on dependency are DiSciullo, Muysken and Singh (1986). They developed a restriction in terms of “government”, a term that comes from Chomsky’s theory of “Government and Binding”. The restriction is as follows:

“Whenever X governs Y, both constituents must be drawn from the same language” (Appel and Muysken, 1987:124).

An example of government is case assignment. For instance, the Greek preposition STO στο (in) assigns the accusative case:

STO SPITI (accusative)  
Στο σπίτι  
in the house

Therefore, it seems that the only elements that can switch are ungoverned ones such as tags, interjections and exclamations. Nevertheless, this statement is not totally true. Some governed elements may in fact switch. DiSciullo et al. (1986) claim that these exceptions are accomplished through a neutralizing element, such as a determiner, which they illustrate with a Spanish example.

(Again I will resort to the Greek language):

a) PIRA TO bus.

Πήρα το

b) \*PIRA the bus.

c) I took the bus.

Sentence a) is acceptable because the Greek determiner “TO” would make the entire NP Greek in terms of government restrictions. In sentence b) the switch is impossible because the whole sentence would be English.

So far, I have considered switches within and among sentences. I have also explored various syntactic constraints. However, there is another interesting phenomenon which the literature I have consulted does not consider. I will refer to this phenomenon as intra-word switching: switching of elements within a word. Unlike the sentence or phrase level, intra-word switching

follows phonological constraints. First, I will present some examples, then I will try to formulate some rules. (I must advise the reader that this account of intra-word switches is not an exhaustive one. It is just a sample to introduce the phenomenon).

Examples:

"GREEKIZED"		ENGLISH	GREEK
a) STEK-I	Στέκ-ι	'steak'	'brizola'
b) TROK-I	Τρόκ-ι	'truck'	'fortigo'
c) CAR-O	Κάρ-ο	'car'	'aftokinito'
d) CARPET-O	Καρπέτ-ο	'carpet'	'hali'
e) YARTH-A	Γιάρδ-α	'yard'	'avli'

The actual Greek words of (a,b,c,d) are neutral in terms of gender. Hence, the neuter Greek suffixes -I and -O are attached to the English word. The question that arises here is when does one use -I and when -O? The vast majority of Greeks are not trained in linguistics, therefore there must be subconscious rules being applied when these "Greekized" words are being formed. There does not seem to be any clear phonological reason for the choice of alternation of the front and back vowels I and O. In the placement of -A, speakers seem to follow the Greek grammatical gender. The word for "yard" in Greek is of feminine gender. Therefore, the Greek feminine suffix -A becomes attached and creates the word "YARTHA", which is used by most English-Greek speakers. These intra-word switches are common in all Greek-English speaking communities, whether in Canada, the United States or New Zealand.

In general, codeswitching does not have the same functions in every linguistic and social community. For example, the more educated a person is, the more rule-governed intra- and inter-sentential codeswitching will occur. However, intra-word codeswitching (specifically Greek-English speakers) is employed by the less educated people. It seems that this would be a profitable area of sociolinguistics for further exploration. Codeswitching is constantly evolving and very soon it could constitute a new, 'third' language among bilingual speakers: a language with unique syntax, phonology and all the sociolinguistic constraints any language requires.

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