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Foreword

The Department of Linguistics of the University of Victoria is pleased to present the latest issue of the *Working Papers of the Linguistics Circle of the University of Victoria*. Volume 7, No. 1, of the *Working Papers* includes papers representative of current research on language and linguistics at the University of Victoria.

It is the editorial policy of the *Working Papers* to include an even representation of work by graduate students and established scholars. We also have a commitment to an interdisciplinary approach to language issues. The high level of student input in this volume reflects research and scholarship in the mainstream areas of linguistics, as well as in their interdisciplinary relationships. The articles published in this volume are working papers, and inclusion in *WPLC* does not preclude subsequent publication elsewhere.

We wish to thank the Department of Linguistics and the Graduate Students' Society of the University of Victoria for their continuing financial support and encouragement. We also thank the current contributors for their efforts in making a camera-ready volume of this quality possible.

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WPLC
Department of Linguistics
University of Victoria
Victoria, British Columbia, Canada
V8W 2Y2

WPLC Editors
A. Giles, J. F. Kess, and K. Shahin

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PHONETIC ANALYSIS OF KOREAN OBSTRUENTS

John H. Esling

Department of Linguistics
University of Victoria

1. INTRODUCTION

Korean obstruent consonants are examined to identify the prosodic relationship between aspirated, lenis and fortis manners of consonantal articulation and adjacent vowels at the syllable level. The hypothesis that consonantal manner of articulation can be identified by vowel quality alone is tested in a series of perceptual experiments which examine the relative contribution of vowel quality and timing differences to the perception of consonants. Micro Speech Lab and accompanying software are used to process data on the IBM-XT/AT and construct perceptual tasks. A concatenation and editing program (MSLEDIT) developed in the Centre for Speech Technology Research permits random-access auditory and visual waveform comparison of phonetic data as well as recombination of selected sections from up to five separate input files for auditory presentation in psycholinguistic listening experiments. Results support the hypothesis that lenis and fortis consonants can be identified by vowel quality cues alone, suggesting that laryngographic analyses of vocalic phonatory quality should be included in statistical procedures to assess the relative contribution of timing of aspiration and phonation type in the identification of (C)V syllable sequences.

2. LABORATORY METHODS AND PROCEDURES

To allow audio and visual waveform comparison of phonological contrasts within the Korean sound system, and construction and presentation of perceptual listening tasks, development of the data manipulation routine, MSLEDIT, was undertaken on the IBM-PC/XT/AT-based Micro Speech Lab speech processing system in the Centre for Speech Technology Research at the University of Victoria. Micro Speech Lab (MSL) contains a program diskette, internally mounted data acquisition hardware including anti-aliasing filters, A/D and D/A circuitry, and a user's manual with instructions and descriptions of theory of use and applications (Dickson 1985). Software allows user control of signal input, waveform displays, audio output, analysis (amplitude, pitch, spectrum) and file management.

MSLEDIT is a program written to supplement MSL's speech-capturing, storage and processing capabilities, which allows phonetic researchers to access and display graphic waveforms of sampled data files, listen to words or several-second samples of text in any language selected, vary listening sequences, edit existing files, and combine elements of old files into new files. "Designed as a supplementary package to accompany the Micro Speech Lab, the purpose of the program is to provide a highly flexible method for auditory examination and manipulation of digitally stored signals" (Dickson 1987). Up to five sampled data (speech) files can be displayed and monitored individually, in reverse, or in continuous repetition of sequences composed of parts of any displayed file.

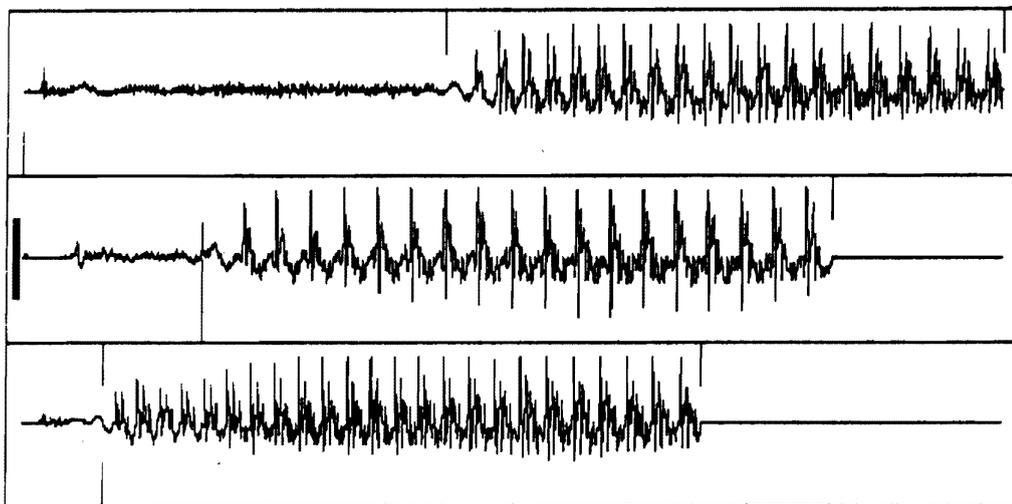
Data for acoustic analysis in Korean are provided from a Phonetic Data Base (PDB) of linguistically organized speech samples assembled using MSL. Words and text samples in the PDB are drawn from numerous linguistic, sociolinguistic and dialect survey sources to reflect a wide range of speech sounds of languages of the world. Samples are digitally encoded using the MSL capturing routine and stored by language on diskette or hard disk and documented on paper by number for reference to phonetic, phonemic and orthographic representations, and English gloss. Phonetic sounds that are normally difficult to obtain, and phonemic inventories of a range of languages not usually encountered, are available in the PDB, including: Egyptian Arabic, Cantonese, Modern Standard Chinese, Inuktitut, Japanese, Korean, Miriam, Nitinaht, Nyangumarta, Rutooro, Runyoro, Scots Gaelic, Skagit (Lushootseed), Spokane, Turkish, Umpila, Xhosa, and Yoruba.

3. ACOUSTIC ANALYSIS

The minimal contrast for dental stops in Korean is illustrated in the MSLEDIT display in figure 1. The aspirated stop demonstrates longest voice onset time (VOT), 0.095sec; the lenis stop is actually partially aspirated with 0.032sec VOT; and the fortis stop demonstrates shortest VOT, 0.015sec, with virtually no aspiration present. All three screens, A B C, are time-aligned to the longest file (A, 0.228sec), and split cursors mark the onset of voicing in each screen. The active cursor is set to screen B where the time read-out is 0.042sec at the onset of voicing, with value 0 displayed as the waveform crosses the baseline, 0.032sec after the initial consonant burst. The output sequence specified in lower case, a b c, represents the marked portions of each screen (between cursors), extracted for display purposes at this stage from original full-length files. A menu of function key operations scrolls across the bottom of the display.

Figure 1. MSLEDIT display of Korean CV sequences: Dental stops.

A: /t^ha/ B: /t⁻a/ C: /t⁺a/



ACTIVE SCREEN B (PAUSE: 200 msec) MARKED: 0.146 sec WIDTH: 0.228 sec
 TIME: 0.042 sec VALUE: 0 OUTPUT SEQUENCE: abc

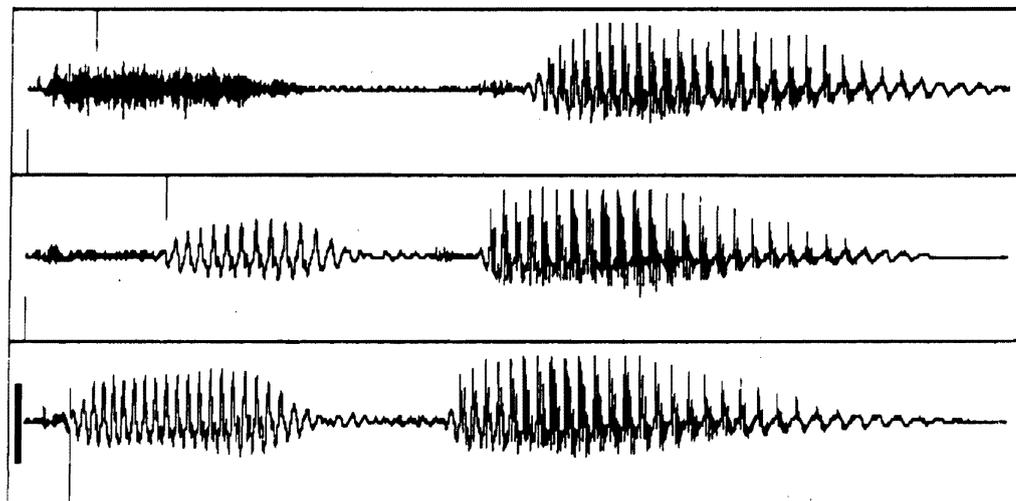
[F3] TIME ALIGN (ALL SCREENS) [F4] SET DELAY (ACTIVE SCREEN) [PgDn]->

These observations parallel and confirm the temporal changes in glottal width found by Kagaya (1974) for the three types of consonants. Aspirated and lenis stops generally begin with similar glottal width, followed by an increase in width for [h] for the former but reduced width during [h] of the latter. Fortis stops begin with narrower glottal opening and decrease rapidly to tight closure of the glottis prior to articulatory release and voicing. Electro-myographic studies have shown, in addition, that the vocalis muscle is distinctly active in the fortis or "forced" series immediately prior to the release of oral stop closure (Hirose et al. 1974; Fujimura 1977). "It is noted also ... that the Korean aspirated ... stops show some momentary activity of the vocalis muscle immediately preceding voice onset" (Fujimura 1977: 286).

Figures 2 and 3 illustrate the extent to which phonatory mechanisms can be seen in the MSL display to differ in their effect on the acoustic waveform. In the three words, a minimal triplet, the strong aspiration of the first example carries into the vowel which remains voiceless. The second example shows reduced intensity of glottal friction, which is much shorter and more intense in the third example, while both have fully voiced vowels. Marking only the first CV sequence of each word (in figure 3) highlights these differences, as well as the contrast in phonatory quality that marks each postconsonantal vowel. Note that the vowel in A is voiceless (whispered).

Figure 2. MSLEDIT display: Initial bilabial stops.

A: /p^hita/
'bloom'
B: /p⁻ita/
'be empty'
C: /p⁺ita/
'be dislocated'



ACTIVE SCREEN C (PAUSE: 0 msec) MARKED: 0.000 sec WIDTH: 0.499 sec
TIME: 0.024 sec VALUE: -3 OUTPUT SEQUENCE: A<C>

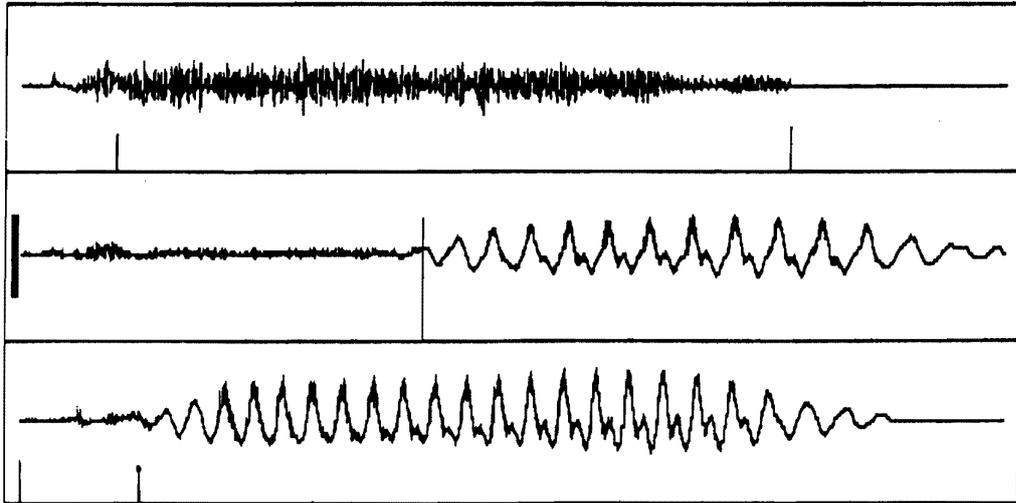
[F1] DISPLAY MARKED <ACTIVE SCREEN> [F2] DISPLAY ALL <ACTIVE SCREEN> [PgDn]->

Figure 3. Initial bilabial stops: Marked CV contrasts.

A: /p^hi/

B: /p⁻i/

C: /p⁺i/



ACTIVE SCREEN B (PAUSE: 0 msec) MARKED: 0.000 sec WIDTH: 0.171 sec
 TIME: 0.070 sec VALUE: 6 OUTPUT SEQUENCE: B<

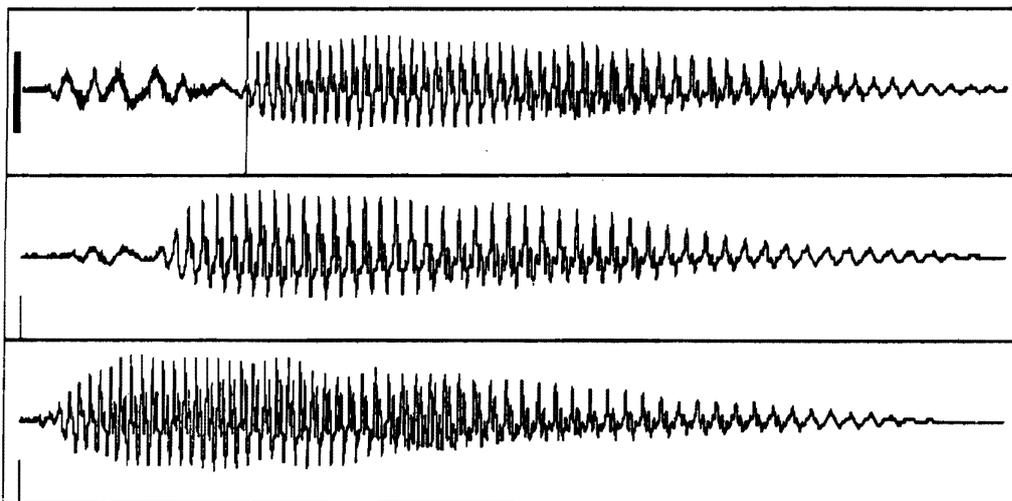
[F3] TIME ALIGN <ALL SCREENS> [F4] SET DELAY <ACTIVE SCREEN> [PgDn]->

Figure 4. MSLEDIT display: Initial bilabial stops.

A: /p^hul/
 'grass'

B: /p⁻ul/
 'fire'

C: /p⁺ul/
 'horn'



ACTIVE SCREEN A (PAUSE: 1000 msec) MARKED: 0.000 sec WIDTH: 0.485 sec
 TIME: 0.110 sec VALUE: 10 OUTPUT SEQUENCE: ABC

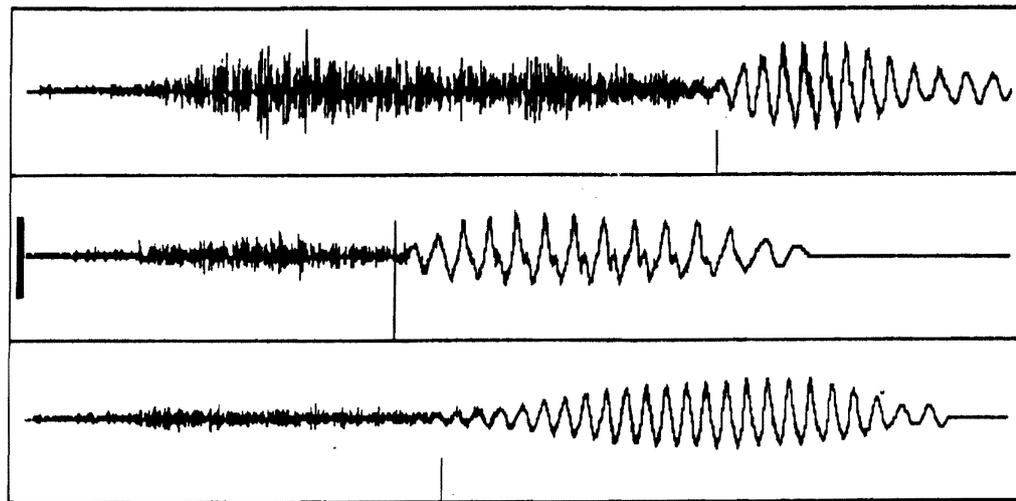
[F3] TIME ALIGN <ALL SCREENS> [F4] SET DELAY <ACTIVE SCREEN> [PgDn]->

Figure 5. Affricate contrasts: Initial CV sequences.

A: /č^hi/

B: /č⁻i/

C: /č⁺i/



ACTIVE SCREEN B (PAUSE: 1000 msec) MARKED: 0.000 sec WIDTH: 0.230 sec
 TIME: 0.086 sec VALUE: -1 OUTPUT SEQUENCE: abc

[F3] TIME ALIGN <ALL SCREENS> [F4] SET DELAY <ACTIVE SCREEN> [PgDn]->

Timing differences are particularly clear preceding an /u/-quality vowel as in figure 4. These distinctions begin to be obscured, however, with the affricate [č] in figure 5, especially where friction is prolonged in the fortis example. Nevertheless, the qualities of the three postconsonantal vowels appear to remain consistent and distinctive. It has been reported that the lenis stops are often heard to be breathy (Kim 1965: 349), and that the fortis stops are accompanied by a vowel of laryngealized quality (Ladefoged 1973: 76). These observations have been confirmed in experimental studies by Hardcastle (1973) who argues convincingly for the recognition of a glottal "tensity" feature, and by Iverson (1983: 198) who identifies the presence of "murmur" in lenis consonants, and especially in /s⁻/ which "correlates well with various reports of its amorphous 'breathy' quality (Kim-Renaud 1974: 14,16)". It has not been documented experimentally, however, that vowels themselves which accompany lenis or fortis consonants differ systematically in phonation type. Because of this possibility, and the implications it would have for second language acquisition theory, a series of perceptual tests was organized to evaluate the role of vowel quality in perceiving Korean consonant contrasts.

4. PERCEPTUAL DISCRIMINATION TESTING

In second language acquisition theory, the argument can be made that CV sequences are critical in the process of acquiring accent (Tarone 1978). A more traditional view

gives more importance to the acquisition of individual consonants or vowels as feature bundles minimally distinct from other members of the inventory. This view is implicit in phoneme theory, but leaves many questions unanswered in second language acquisition research. The assumption followed here is that syllables are not necessarily divided into constituent segments for the acquisition process to operate. The questions examined with respect to Korean are whether consonantal place of articulation can be perceived from vowel quality alone; whether manner of articulation can be perceived by vowel quality alone; and whether CV sequences are identified primarily on the basis of vowel quality or of consonantal features such as differences in timing and aspiration.

Test design and presentation are facilitated by MSL companion software, RANDOM and MSLAUDIO. RANDOM, written for this project by CSTR, arranges a specified set of sampled speech data files into random order and assigns new, numbered filenames in that order. For each perception test, a new randomized order of presentation is created. MSLAUDIO allows a command file to be written by the researcher to load and speak specified files automatically in a listening-test battery (in randomized order in each case here), with pre-set delay times and number of repetitions.

In tests 1 and 2, only a vowel is heard, extracted using MSLEDIT as delimited by the marked cursor positions in figure 1, for example, from the complete set of Korean test words in the Phonetic Data Base. The subject is a Korean graduate research assistant, who is also the original speaker in the PDB recordings. A second subject, the speaker's wife, a non-linguist and non-English speaker, was also tested subsequently. Initial tests are therefore commutation tests, where utterances produced by the subject are presented as data, assuming a criterion of familiarity, in a listening discrimination task by self or spouse (Labov 1972). The task is to identify the consonant which precedes the vowel. Each item is repeated continually on high quality external speakers until the subject chooses to continue by pressing any key, but items are not returned to. The tests begin with a practice run of three items for familiarization with the equipment. The first test is a battery of 39 vowels where place of articulation is not known. In the second test, the 39 vowels are separated into their five respective categories for presentation: labial stops, dental stops, velar stops, palato-alveolar affricates, and dental fricatives.

The results of test 1 indicate that information present in the vowels is not alone adequate to identify place of articulation of the consonant, or whether it is a stop, affricate or fricative. Subject 1 scored 26% and subject 2 only 23% correct in identifying consonants from vowel quality alone. Consonant transition information is usually a strong indicator of consonant identity, suggesting that little transition data is present in these examples. Nevertheless, identification of secondary manner of articulation (aspirated, lenis, or fortis) relying on vowel quality alone is very high, 59% and 67% for the two subjects respectively. Applications of chi-squared with 2 d.f. are significant for both tests at the $p < 0.05$ level, i.e., there is significant evidence for an association between subjects' (correct) selections and the three secondary manners of articulation, even where the consonants themselves could not be identified. It appears from these preliminary data that items with fortis articulation (presence of the "tensity" feature) are easiest to identify (100%, 100%), followed by lenis items (64%, 71%), while aspirated items are virtually impossible to identify correctly (9%, 18%) in the absence of consonant timing information. It is worth pointing out that aspirated consonants also appear twice as difficult to identify correctly for place of articulation as are fortis consonants when there is only vocalic resonance and no timing evidence present. A tentative interpretation is that closure and friction information prior to voicing are important in identifying aspirated consonants, while phonatory quality during vocalic voicing retains identifying clues of lenis and fortis consonants.

Tests 3 and 4 assess the auditory recognition of CV sequences, including 39 original items and 72 manipulated sequences consisting of all possible permutations of C+V made up from the original set. These "artificial" sequences are easy to obtain using MSLEDIT marking, sequence-combining, and file-saving capabilities. Test 3 contains all 111 items, and test 4 includes only the 72 re-ordered items. Each test is preceded by a 10-item practice set. Instructions are to indicate the consonant-vowel sequence heard, with all possible Cs and Vs listed on the response sheet. For subject 1, choices and responses are in phonemic transcription, while for subject 2, all instructions, choices and responses are in Korean orthography. Auditory stimuli are presented only twice in the CV tests, with a brief interval before the next token is heard. Items are loaded in 10-file batches, creating regular pauses in the performance of the task. After the practice run, subjects demonstrated no difficulty in making a choice on the basis of two hearings, whereas in tests 1 and 2, unlimited listening had caused some equivocation.

Results of test 3 can be divided into two parts: identification of original CV sequences, and identification of re-ordered CVs. Both subjects are able to recognize original items correctly (92% and 90%, respectively). The small margin of error is a measure of the interfering effect of the equipment and testing situation, and that the CVs are not complete morphemic units. Re-ordered CVs are scored according to whether auditory identification matches the consonant (C) element or the vowel (V) element from which they were constructed. A third category is scored (N) if identification corresponds to neither element in the constructed CV sequence. In general, recognition is divided fairly equally between C and V cues: C, 43%, 36%; V, 43%, 47%; N, 14%, 17%, for the two subjects. There is a pattern, however, which differentiates these assignments systematically. C assignments predominate for C(aspirated)+V(fortis) and C(fortis)+V(aspirated) constructions. V assignments, on the other hand, predominate for C(aspirated)+V(lenis), C(lenis)+V(aspirated) and C(fortis)+V(lenis) combinations. For both speakers, these 6x2 distributions represent a significant association, at $p < 0.05$ in a chi-squared test with 5 d.f., between the constructed CV test sequences and their auditory identification. C(lenis)+V(fortis) combinations were predominantly identified as aspirated (neither). These observations can be summarized as follows: (1) "Lenis" vowels are perceived as the dominant element in a sequence; (2) aspirated consonants are perceived as the dominant element in a sequence except when the vowel is "lenis"; (3) fortis consonants are perceived as the dominant element in a sequence except when the vowel is "lenis"; (4) "aspirated" vowels and "fortis" vowels are both perceived as being preceded by aspirated consonants when the consonant is lenis.

These findings are supported in test 4, where only the constructed CVs are presented in a different order. The interpretation is that differences of consonant timing and aspiration are significant where vowels have been extracted from aspirated or fortis contexts. Vowels from lenis contexts, on the other hand, signal a lenis consonant whatever consonant was actually heard. There is little difference in these tests between a vowel from an aspirated or a fortis context. If aspiration is long, C is heard as aspirated; and if C is short and tense, it is heard as fortis. Even a semi-aspirated lenis C is heard as aspirated when followed by a vowel from an aspirated or a fortis context. Vowels from a lenis context, however, are readily identified and change the perception of the consonant that precedes them.

This supports the contention that while aspiration and "tensity" are significant consonant indicators, information present in a vowel from a lenis context overrides these indicators in identifying a CV sequence. Laryngealization has been reported by Ladefoged (1973) and by Abberton (1972) as a vocalic prosody of fortis stops, but neither the impression of breathiness ascribed by Kim (1965) to lenis (medium-aspirated) stops nor its pro-

- sodic nature have been demonstrated experimentally. In Abberton's laryngographic study,

breathy voice onset is not consistently present for any stop series but does occur sometimes following the medium and most aspirated stops; in contrast with the least aspirated at the same place of articulation for which breathy voice does not occur (1972: 75).

It is hypothesized here that a distinctive phonatory quality ("breathy" in auditory terms) is associated prosodically with lenis consonants as a principal property of vowels in such CV sequences, and acts as a principal cue in identifying meaning in those sequences. This quality remains distinct from phonation found in aspirated sequences which have been shown in the perceptual tests to be indistinct from their fortis vocalic equivalents. This proposal conforms with recent evidence that "Korean fortis stops [are] generally characterized aerodynamically by higher oral pressure and lower oral flow than their lenis counterparts" (Dart 1987: 146), where tensor vocal tract walls are postulated to account for the tensity observed for fortis stops. It is proposed in the case of lenis consonants to examine in detail, using updated and revised laryngographic techniques (see Esling 1984), the suprasegmental characteristics of phonation type that carry the prosodic cues to consonant identification and, potentially, lexical item recognition.

5. RESEARCH RESULTS

The analysis of Korean aspirated, lenis, and fortis obstruent contrasts has had several encouraging results both theoretically and in practical terms.

1. The Micro Speech Lab system has been shown to illustrate clearly the acoustic waveform contrasts between the three types of articulation. Data access is rapid, and by random selection.
2. Timing differences are confirmed for the three-way contrast, as is the glottalized "tensity" feature of fortis items reported in previous research.
3. Investigation of vowel quality differences, suggested but not addressed explicitly in previous research, reveals consistent low pitch and breathy phonation for vowels following lenis consonants. Fortis consonants are followed by a tense, higher-pitched vowel.
4. Development of MSLEDIT software provides an excellent research format for examining phonetic detail both visually and auditorily (see Dickson 1985, 1987). The recombination capability permits splicing and arranging of data that could only be achieved before with separated linear recordings, tape loops, and laborious splicing of magnetic tape.
5. The system's efficiency has allowed rapid and easy construction of perceptual auditory testing tasks using MSLAUDIO, and the additional development of a program, RANDOM, to automatically randomize speech data files for presentation in listening tasks. Sets of 39-, 72- and 111-file lists have been prepared and presented with minimal effort.

6. Isolated and randomized single vowels presented auditorily to Korean listeners for identification reveal that recognition of place of articulation of initial consonants is very poor, while recognition of manner of articulation is very high. This suggests that vocalic information alone is sufficient to indicate the secondary articulation of a consonant even when that consonant cannot be identified.
7. Presentation of CV syllable sequences, spliced together using MSLEDIT in all C+V permutations, results in a systematic pattern of identifications which confirms (a) that vowel quality (presumably breathiness) and/or low pitch is the indicator of a lenis consonant and (b) that duration of aspiration relative to length of vowel in a syllable determines whether a consonant is perceived as aspirated. Tests have been verified with a second Korean listener, and rating sheets have been prepared in Korean to be used with a wider sample of subjects.
8. Findings suggest that properties of isolated consonants alone may not be the critical elements in successful recognition (and perhaps production) of the syllable-long or word-long items that convey lexical meaning. Such a position reinforces recent second language acquisition work which identifies the CV sequence as a critical unit of choice by learners, and which focuses on the importance of word identification rather than phoneme identification as the basis for building a phonological system in an L2. Such evidence suggests that it is unwise to concentrate on consonantal details in L2 pronunciation teaching when it may be the vowel of the syllable that carries a large portion of the clues that learners rely on to distinguish meaning.

6. FURTHER RESEARCH

The development of microcomputer-based speech processing software in Micro Speech Lab format, including MSLEDIT, MSLAUDIO, and MSLSPECT, and continued updating and improvement of the Phonetic Data Base, facilitates the collection, presentation and comparison of speech sound material for phonetic research. The system permits expedient access to large amounts of diverse data, active manipulation and organization of speech items, and rapid presentation of data for aural discrimination testing. The system also contributes significantly to phonetics instruction (see Esling 1987) and to the training of teachers in the use of technological aids for the delivery of speech sound information. Additional applications include the computer-network transmission and sharing of speech data for collaboration in phonetic research.

In the further study of Korean obstruents, electrical impedance laryngographic analysis (Fourcin 1974; Esling 1984) will be combined with Micro Speech Lab procedures to evaluate the "breathy" and "tense" phonatory features of vowel quality indicated in present research, and to differentiate vowel quality from the effect of pitch. Current results illustrate and strengthen the possibility of developing speech analysis packages around the Phonetic Data Base theme. Research is also being carried out to apply Micro Speech Lab technology to the comparison, analysis and on-screen phonetic transcription of glottalized consonants of Salish and Wakashan languages stored in the PDB. This research potential is made possible through a cooperative effort involving resources in the Department of Linguistics and the technological expertise of the Centre for Speech Technology Research at the University of Victoria.

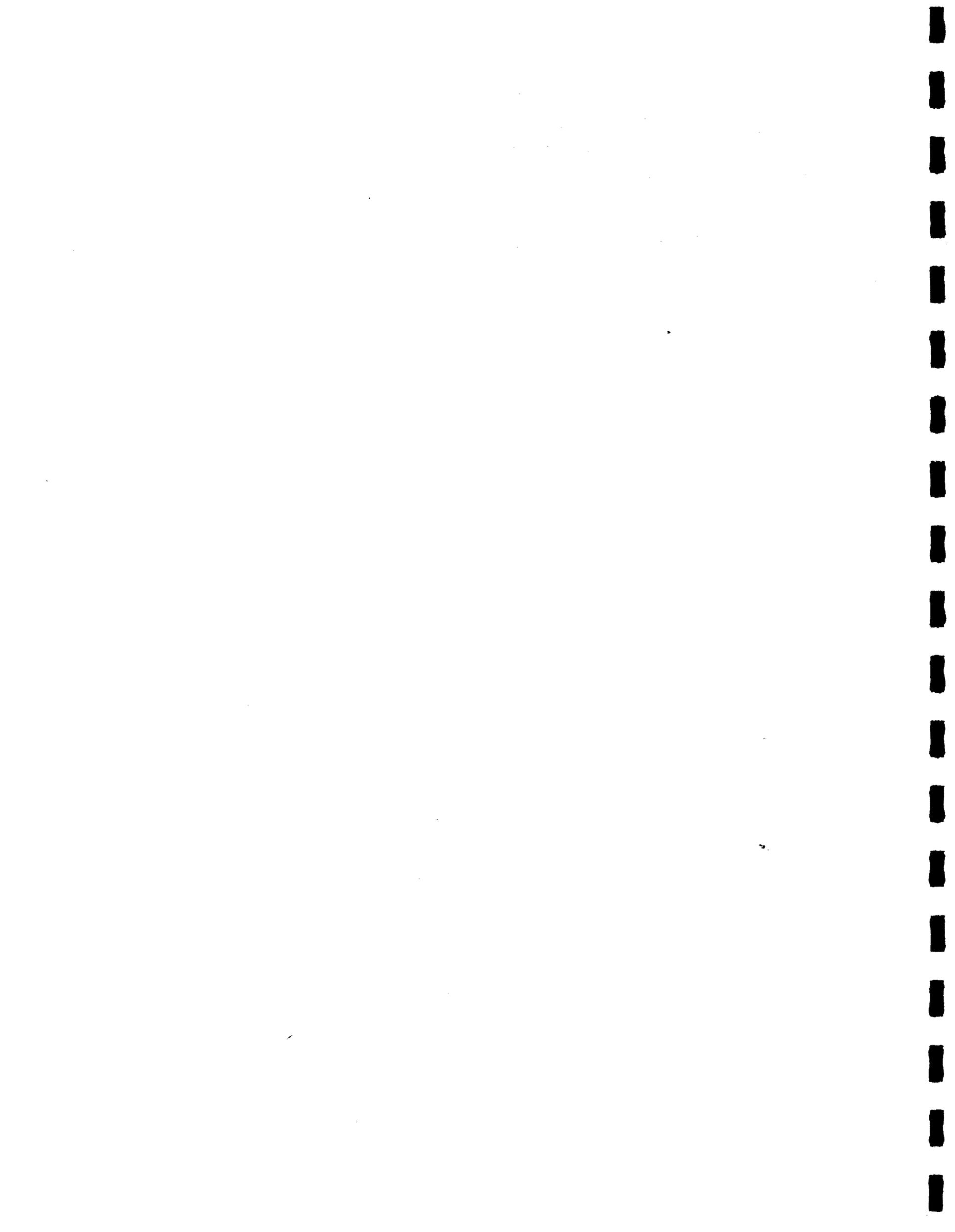
NOTES

I am indebted to my co-researchers, Geoff O'Grady, Thom Hess, Barry Carlson, and numerous colleagues and graduate students who are the source of the majority of linguistic material in the Phonetic Data Base. Particular appreciation is extended to Yong-Bum Kim and to Seung-Hee Kim for their cooperation in this project. The indispensable assistance and collaboration of Craig Dickson and Roy Snell of the Centre for Speech Technology Research at the University of Victoria in conceiving and developing microcomputer-based speech processing systems is gratefully acknowledged, as are general university research grants from the Social Sciences and Humanities Research Council of Canada.

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A PRELIMINARY INVESTIGATION OF THE ACOUSTIC CONTEXT OF HOMOGRAPH PAIRS

Suzanne Urbanczyk

Department of Linguistics
University of Victoria

1. INTRODUCTION

The processing of lexically ambiguous words poses problems to both humans and machines. Much of the work in examining lexically ambiguous words or ambiguity in general has been of a psycholinguistic nature. There has been much work generated in this area over the past fifteen years. This paper attempts to examine some of the phonetic context surrounding lexically ambiguous words with the hope that this context will add further information that facilitates us as hearers and speakers in our disambiguation process. It is hoped further that some generalizations can be made from the results of this investigation, and by referring to previous research relating to the prosodics of ambiguous sentences, and prosodics in general.

2. PREVIOUS RESEARCH

While there has been little research in the area of acoustic environments surrounding lexical ambiguities, the research being discussed in this paper can be divided into two main focusses: language and speech. The work done in the area of lexical ambiguities that shall be considered to be of the language point of view is that of the psycholinguistic research. For years researchers have tried to discover how the mind processes ambiguities. It is thought that reaching an understanding on the processing of ambiguous items will aid in the understanding of how we process unambiguous items. On the other side of the coin is the research centering on the speech aspect of ambiguities. Little research has focussed on lexical ambiguities, with the majority of work being done in the area of syntactic ambiguities. Research in the area of prosodics, i.e. duration and intonation in particular, has reached a point today where there is enough information to develop models of speech timing and intonation for implementation on synthetic speech systems. One problem that all text-to-speech systems encounter is that of the treatment of ambiguities. Ambiguities of the syntactic nature must look to the discourse structure for solutions, while ambiguities of the lexical nature must look to the structure of the sentence, or syntax for a solution. While the work in psycholinguistics on lexical ambiguities has aided in understanding normal processing, it is hoped that the work done in speech technology on normal utterances will have a contribution to the correct handling of ambiguities for synthetic speech systems. In order to develop rules for natural sounding synthetic speech, or a theory of speech timing that accomodates lexically ambiguous words, more information must be obtained on the phonetic nature of lexical ambiguities.

2.1 Duration

Cooper and Paccia-Cooper (1980) have published the results of years of research in their investigations on durational aspects of syntax and speech. The majority of the work

cited in their book tends to focus on syntactically ambiguous sentences, and the strategies that people incorporate in the prosodics for the disambiguation process. Cooper and Paccia-Cooper state that the lengthening that occurs in nouns over verbs can be attributed to their final position in major grammatical category phrases. Earlier work by Streeter (1978) and Lehiste *et al.* (1976) have provided the ground work in research in the area of duration in regards to the processing of syntactically ambiguous sentences. It was found by Lehiste *et al.* that the manipulation of duration was not successful in the disambiguation of sentences that contained deep-structure ambiguities. These are the sort that can be seen in sentences like *Visiting relatives can be a nuisance*. While these sentences are ambiguous at the level of deep structure, the two interpretations that can be made of the sentence involve lexical ambiguities of the word *visiting*. That is to say that in one interpretation the word is a verb and in the other the word is an adjective. Therefore while these sentences are ambiguous at the deep structure, what makes them ambiguous is the presence of lexically ambiguous words. Lehiste *et al.* claim that the disambiguation was unsuccessful because there was "no increase in the relevant interstress interval due to temporal manipulation." i.e. there were no pauses, and no durational adjustments that could be made based on the presence of different phrase boundaries. They conclude by saying that the disambiguation was unsuccessful when there is only one surface bracketing, as is the case with deep-structure (lexical) ambiguities. Although the bracketing is apparently the same in the two cases, in fact the structure must be different as the word *visiting* functions as a different part of speech in each case. Perhaps there is more going on in the prosodics than what was manipulated in their experiment. While it is not my intent to investigate this aspect of lexical ambiguities it is hoped that this preliminary study will bring up areas of further investigation that will assist in solving this problem.

2.2 Intonation

The results of a number of experiments with fundamental frequency contours in sentences have lead Cooper and Sorensen (1981) to the conclusion that while the declination represents a global trend of the fundamental frequency over a major syntactic constituent, fall-rise patterns are reflections of other types of syntactic boundaries. Other work in this area includes research with the declination line in English by O'Shaughnessy and Allen (1983), and Pierrehumbert (1979).

3. PURPOSE

The purpose of this study is to conduct a preliminary investigation on the acoustic context of lexically ambiguous words. Lexically ambiguous words, or homographs, are words which have the same spelling but have different meanings and often function as different parts of speech. While homographs are often pronounced the same, they may be pronounced differently. Little work has been done on the speech aspect of this linguistic phenomenon. Therefore the majority of research that shall be discussed relating to acoustic information shall be centered on aspects of prosodics associated with syntactically ambiguous sentences, and the prosodics of different lexical categories.

In particular, the items under investigation in this study are homograph pairs. Homograph pairs are items such as *trash can*, in which the individual words have different parts of speech, which can be determined from the structure of the sentence. For example, all the homograph pairs in this study can be either an adjective and a noun (AN), or a noun and a verb (NV). This can be seen in the following sentences:

Everyone agrees that the trash can smells awful.

Everyone agrees that the trash can smell awful.

Ten sentences were selected which contain homograph pairs of this nature. That is to say that there were five homograph pairs. The sentences selected came from a study by Frazier and Rayner (1987), in which they examined how people processed lexically ambiguous words as they read them, by monitoring their eye movements. A list of the sentences used in this study is supplied in the Appendix. The sentences were arranged in a randomized order in a list, with some filler sentences constructed that had a similar structure to the sentences containing the homograph pairs.

Homograph pairs provide the researcher in acoustics an interesting framework from which to examine supersegmental effects. The fact that the homograph pairs differ only in the syntactic environment provides an opposition from which one is able to test, or investigate, certain aspects of prosody: in particular, the effects of syntax on speech. All the phonological information of the words is the same in the AN and NV pairs. The only difference that one can test is syntactic. The same combination of speech sounds functions as an adjective in one case and a noun in another. Also confounded with this difference in lexical category is position in the syntactic constituent.

There has been much work in the area of phrase-final lengthening (Sorensen *et. al.* 1978, Cooper and Paccia-Cooper 1980, and Klatt 1979). One would expect that there should be different effects due to position in the phrase of the first word in the homograph pairs. That is to say that the syntactic boundaries differ for the pairs. In the AN pair there is an NP phrase boundary (indicated by a square bracket]), following the noun, the second word in the pair. A N]. However for the NV homograph pair, the NP phrase boundary follows the noun, which is the first word in the pair. N] V. As the adjective in the first pair is the same word, but with different meaning and lexical category, as the noun in the second pair, one would expect that the effects of phrase final position will be noticeable in the noun and not the adjective. In fact the phonological environment surrounding this word is identical. The sentences were constructed with the intent that the ordering of words is identical until after the last word of the homograph pair has been encountered.

4. PROCEDURE

The procedure adopted here is similar to that of Sorensen, *et. al.* (1978). Three speakers were selected on the criterion that they were male, within their mid-twenties in age, and had voices that did not exhibit peculiar voice qualities or intonation patterns. Herein the speakers shall be identified as CJ, PB and TH. All speakers had normal, or corrected to normal vision. Speakers were tested individually in a sound-proof room. Each speaker was presented with a typed list of the sentences as described above and filler sentences in a randomized order. They were instructed to practice each sentence until they felt that they could read it in a natural manner, without errors, and without placing emphatic stress on any particular word. The speakers were permitted to place stress on a word if they felt that this would make the meaning of the sentences clearer. This was decided upon to see if there was a particular strategy that was used by one speaker vs. the others, or by all speakers in general. Once a sufficient recording level was obtained, the subjects were then instructed to read each sentence out loud. The sentences were then recorded on a reel to reel magnetic tape. Data was then digitized using routines developed at the Centre for Speech Technology Research on the research tool Micro Speech Lab (MSL). The sampling rate was fixed at 10,000 samples per second, and the recording was filtered by a band-filter internal to the system at 70 Hz and 4000 Hz. The data resolution was set at 10 bits. This has been found to be adequate when examining speech for the

purposes of investigating aspects of prosody.

5. ANALYSIS OF DATA

The sentences were captured using the method mentioned above. The homograph pairs were then isolated from these sentences and saved for further analysis. In the analysis of these homograph pairs, two aspects of prosody were examined: intonation and duration. It was decided not to examine the amplitude of the pairs, as the recording levels for each sentence were not constant, and in the capturing of the data, the level for input was adjusted in order to obtain the greatest resolution of the wave form. The durations of the homograph pairs were compared, as well as the pitch ranges of the pairs. The homograph pairs are identified as follows:

poor state is identified as PS(AN) or PS(NV) summer bears is SB(AN) or SB(NV) metal rings is MR(AN) or MR(NV) trash can is TC(AN) or TC(NV) military might is MM(AN) or MM(NV)

It is necessary to discuss the results in terms of what happened as a general trend as well as what was found in each pair, because each homograph pair was embedded in differing syntactic contexts. Two analyses of the duration were made. One was to determine if there was a difference in the mean duration of the differing homographs, across the speakers, the other was to determine if there were speaker differences. For each homograph pair, the mean duration was determined between the AN groups and the NV groups.

The homograph pairs were isolated from the sentences and the duration of the entire event, including pauses between words if there were any, was measured. In the MM sentences, judgements were made by the experimenter as to the vowel-consonant boundary between the homographs and the preceding words. Results of this analysis can be seen in Table 1.

A subsequent analysis of the durations of the individual words was made to see which word was the cause of this difference. In all cases, each word was measured from the same acoustic event. There were ten words in all, and of the six measurements of each word the measurement was taken from the same point. For example in the word STATE, the duration was determined to be from the onset of the frication to the end of voicing, or for the duration of /ste/. Results of these durational differences are given in Table 2.

It was generally found that the adjective noun pairs were longer than the noun verb pairs. The exceptions to this were the homograph pairs PS and MM. The significance of this shall be discussed in the subsequent section. The differences can be accounted for in terms of findings from previous research. The difference between the AN and the NV homograph pairs was calculated to discern if there was indeed any difference. For instance, when examining the homograph pair TRASH CAN, the duration of all six versions was calculated. Three speakers X two variations (AN vs. NV). A mean duration for the AN pair was found and a mean duration for the NV pair was found. The difference was taken, with the results that there is a trend for the AN pair to be longer than the NV pair.

An examination of the individual homographs was made in order to determine if there were effects due to phrase final position. In comparing a single homograph as it functions as an adjective vs. a noun, there were no conclusive results. That is to say that it was not a clear case that the noun was longer than the adjective. It could be safe to say that there was no significant effect due to phrase final lengthening. In fact in some homograph pairs the adjective was longer than the noun. This shall be discussed further in the discussion section. The results of the analysis of the individual speakers and the mean

durations can be seen in Table 2.

When examining the intonation, or pitch contours of the homograph pairs, there was an analysis done by the algorithm in the program MSLPITCH to calculate the pitch. The pitch extraction algorithm functions by breaking the waveform into regular intervals (frames). Each frame was 20 msec long. It then examines each frame to determine and compare the time coordinates between the amplitude peaks. Once a period, or pitch value has been found, this is compared with the values for the surrounding frames and a figure of merit is assigned as a measure of accuracy. As the algorithm is not precise in areas of voicing transition, and low energy data, a manual calculation was required on some areas of the speech signal. This was done by locating the segment of the wave form that had inaccurate pitch calculated. A mark was placed on an amplitude peak of the wave form, and the next peak was located. The pitch for that frame was then determined by calculating the inverse of the period. After the pitch contours for the homograph pairs were calculated, graphs were made to compare the pitch contours for each speaker in each condition.

As a preliminary measure of the data, the range for each homograph was calculated, and the mean pitch excursions for each of the ten homograph pairs was determined. This was then compared for AN vs. NV homograph pairs. The results of these measurements can be seen in Table 3. Generally the same pattern of results was obtained as for the duration. There were greater pitch ranges in the AN pairs than in the NV pairs. As part of the analysis of intonation, graphs of the pitch of the homograph pairs were made. This was done in order to see if there were any differences in the pitch contours in the homograph pairs. The significance of this and an explanation of the data shall be proposed in the subsequent section.

6. DISCUSSION

6.1 Duration

The results of the duration of AN-NV homograph pairs suggest that the AN pairs are of a longer duration than the NV pairs. The exceptions to this are the data for the pairs PS(AN) PS(NV) and MM(AN) MM(NV). The significance of the exceptions shall be discussed first, with a discussion of the implications of AN pairs longer than NV pairs saved until later. The sentence containing the PS(NV) homograph pair differed in its syntactic structure from the other NV sentences. *In many large nations, the poor state the rich deprive them of their rights.* In the other sentences, the verb form of the homograph subcategorizes for prepositional phrases, adjective phrases, verb phrases, and other phrasal categories. In the sentence above, the verb STATE subcategorizes for the largest syntactic constituent, S'. This contains two major boundaries before the next word is encountered, S' and S. Following the word state, there is a *that* deletion site. The syntactic structure surrounding the homograph pair is given below to illustrate the major boundaries.

Adjective Noun

NP[the ADJ[poor] N[state]] VP[V[deprives] ...]

Noun Verb

NP[the N[poor]] VP[V[state] S'[COMP[] S[NP[the rich]]...]]

This sentence pair shows the exception to the other pairs in that it is the only one (as well as MM(NV) and MM(AN)) that exhibits the verb as longer than the noun. This is interesting from the point of view of work done by Sorenson *et. al.* (1978) who found that nouns were typically longer than verbs. The only time that a verb was found to be longer in their study was when it occurred in final position in a phrase. In this example the verb is clearly at the beginning of a major grammatical category, and the noun is clearly at the end. The three speakers exhibit that the verb was longer than the noun, when the entire duration of the word was measured. It is interesting to note that when PB read the sentence, he automatically inserted the word *that*, and the duration of the word *state* still showed a difference in the length as a noun and a verb.

While it is clear that this is not much evidence to base any conclusions on, it would be interesting to investigate further. As the verb occurs before the largest grammatical category in English, S', with the occurrence of *that* deletion, perhaps this exerts a greater effect on the lengthening of words than a other phrasal categories. It could be possible that there are more factors contributing to the lengthening of certain words than simply occurring at the end of a major syntactic boundary. It could in fact be a possibility that it is the presence of a following syntactic boundary that determines the lengthening, and not the fact that a word belongs at the end of a phrase. A further explanation for the lengthening of the word *state* as a verb is that it could be a lengthening to compensate for the *that* deletion immediately following. Work done by Cooper and Paccia-Cooper (1980) suggests that a word preceding the presence of *that* shows a small but significant lengthening. This lengthening was not found in the word immediately preceding a *that* deletion site. However, the nature of the word itself, in the study by Cooper and Paccia-Cooper, is a noun. The word *that* was deleted immediately following a noun. The phrase following the noun, even though it is a clause, is optional in their study. In the example being discussed here, the word in which lengthening occurs differs in two ways: it is a different part of speech (verb), and the word subcategorizes for the following constituent (S'). *State* subcategorizes for and therefore must be followed by an S'. This syntactic boundary might have more psychological relevance, and hence be more apt to be manifest in the speech.

In a more detailed examination of the durations of the individual homographs there were some interesting results. It was found that the word *summer* in the homograph pair SB, had the same mean duration as a noun and an adjective, but there were large subject differences. The mean durations can be found in Table 2. Because the duration of *summer* (A) is the same as *summer* (N) we can assume that there was no lengthening due to its place as the final member of the NP constituent. Would it be possible to conclude that the lengthening is then determined by the following syntactic boundary? More importantly, why does *summer* not lengthen in NP final position or if it does lengthen in NP final position, why does it lengthen in Adj position? Looking at the word *bears*, it was found that it is longer in NP final position, when functioning as a noun, than when functioning as a verb in initial position in the VP (for two out of three subjects only.) This is in accordance with previous findings. When a lexical item is in final position in a phrase, it is almost always followed by another phrase boundary, delimiting the beginning of another phrase. If one were to examine the individual duration of the words in the homograph pair SB, it would appear that the data from CJ are anomolous. If this data were rejected, then one could see the expected phrase-final lengthening of the noun *summer* as well as the noun *bears*.

A similar set of results was obtained for the sentences MM and TC. *Military* and *trash* were found to be the same duration as adjectives and nouns. It was found that the mean duration of CAN(V) was reduced by approximately fifty percent of the mean duration of CAN(N). While the reduction of this word, based on its position within a constituent, or based on its part of speech can account for some of the difference in length, most of this reduction must be attributed to the fact that CAN(V) functions as a modal in the sentence it was embedded. Functor words have been noted to be more reduced than other words as they carry very little semantic information that contributes to the meaning of

the sentence. While the mean duration of the word CAN(V) was found to be reduced quite drastically, one speaker (PB) placed emphatic stress on the word. In this case, the duration was slightly longer than CAN(A). This did not seem to affect the overall mean duration for the word. This shall be discussed further in a section focussing on the effect of modals on the prosodics of the sentence.

6.2 Intonation

The same pattern of results obtained in examining the mean durations of the AN homographs against the NV homographs was obtained when examining the mean pitch ranges of these words. It was found that there was a greater pitch range found in the AN pairs than found in the NV pairs. This can be explained in terms of what is happening to the declination curve of the entire sentence. Declination curves are patterns of pitch ranges, that occur in sentences. The pattern of declination occurs in several languages. In English there has been much work in this area. There is a general trend for the pitch of a sentence to drift down near the end of an utterance. At major syntactic boundaries, the declination line can be reset, so that the following constituent begins at a higher pitch. Therefore one would expect that the pitch of a word in a homograph pair would be lower when it is at the end of a major syntactic boundary. This generally occurs to a noun when the homograph pair is an AN and not when it is an NV. The declination line is often reset at the end of an NP when in long utterances. It has been found that the pitch of the final word is higher in comparison to the first word when it is a V. That is to say that it has been found that the second word in the homograph pairs (N and V) is lower when it is at the end of a syntactic boundary than when it is not.

As was the case in examining the durations, there is an exception to this general finding. Again it is the homograph pair PS that deviates. In this pair, there is a greater pitch excursion in the NV pair than the AN pair. In examining the pitch contours of this homograph pair, several observations can be noted. CJ showed a clear fall-rise pattern on the word STATE(V). Cooper and Sorensen (1981) have noted that "a local fall-rise pattern of F0 accompaies the boundaries of clauses" and that "the magnitude of these fall-rise patterns was greater at strong boundaries." It can therefore be safe to say that, based on the results of the lengthening of the word STATE(V) and the pitch contour exhibited by CJ, this speaker indicates that the boundary S' is a strong boundary. All subjects had a lower verb than a noun in the PS(NV) sentences. This is also an indicator of a strong syntactic boundary.

6.3 Modals

There has been some discussion in the literature on the effect of modals on the pitch contour of a sentence, and in particular on the continuation rise when one is given emphatic stress. O'Shaughnessy and Allen (1983) state that often the presence of a modal that carries contrastive information, i.e. information that is not redundant, there is a large slope of the pitch in the word. They state further than when there is emphasis on a particular word, it is realized in modals more than any other word class. In fact nouns and verbs are the lowest of the content words to carry emphasis, as they are the basic elements of the proposition. Of the ten sentences, there were two that contained a homographic word functioning as a modal. These are the MM(NV) and TC(NV). It has already been discussed that there was a lengthening of the modals when the speakers gave these words prominence in the sentences.

O'Shaughnessy and Allen (1983) make a distinction between two types of modal in their examination of the declination curve of English: 'restrictive' and 'nonrestrictive.' Restrictive modals tend to be emphasized. *Might* is considered to belong to this class, while *can* is considered to belong to the nonrestrictive class of modals. They state that

"restrictive modals received emphasis because they indicate the speaker's feeling about the proposition." Perhaps in the sense that PB emphasized *can*, it can be considered to be a restrictive modal in this situation. O'Shaughnessy and Allen state that it is important to keep in mind the fact that F0 emphasis is relative and one can expect a deemphasis of the main verb in sentences involving restrictive modals. In a later examination of these sentences, MM and TC, it was found that CJ and PB did exhibit a de-emphasis of the main verb when the restrictive modal was emphasized. The deemphasis has only been measured in terms of relative pitch height to the modal. In fact the following verb was of a lower pitch than the modal.

7. SPEAKER VARIATION

It is necessary to discuss on a more primary level the various strategies and speaker variations that occurred in this investigation. Of the three speakers, PB spoke with a rapid speech rate. Therefore it seemed that he used variations in the pitch to carry more information than variations in duration. In fact he exhibited the widest pitch range of all three speakers. It might be possible to conclude that the disambiguation of the homograph pairs by PB was effected more by a strategy based on pitch than duration.

In the analysis of the pitch ranges, TH had a relatively low pitch with not as much excursion as PB. CJ when reading the sentence SB(NV) perhaps did not rehearse as much as the other sentences which he read. This data provides an anomaly to the other data in that paradigm. If this were to be thrown out, the trend would be that of the homograph pairs, the noun is longer than the adjective, and the noun is also longer than the verb.

7. CONCLUSION

Although this has been a preliminary, or investigative study on the acoustic environments surrounding homograph pairs, it seems clear that there is merit in this approach to the study of the effect of syntax on speech. The effect of syntax on speech is manifest in the prosody of an utterance. It seems duration and intonation sometimes work together in not only disambiguating utterances, but also at phrasal boundaries. Other research has supported the acoustic and psychological reality of syntactic boundaries on speech. This preliminary study supports some of these findings while also proposing that certain boundaries have a greater significance than others. The presence of clausal boundaries such as S and S' exerted a greater effect of lengthening on a previous word (V), than an effect of lengthening of a noun due to final position in a noun phrase. This seems to point to the idea that the durational adjustments that must and do occur in speech are more complex than have been previously suggested.

From the work done in this study it is clear that there are avenues of further investigation. One area that shall be pursued is the effect of *that* deletion from clauses that are optional vs. clauses that are subcategorized for by the verb, or noun.

APPENDIX

In my opinion, the military might be very dangerous in that country.

In my opinion, the military might of that country is very dangerous.

We all should have known that metal rings loudly, and for a long time.
 We all should have known that metal rings are very strong.

Susan was extremely surprised that the summer bears no resemblance to the winter back home.
 Susan was extremely surprised that the summer bears resemble the winter bears back home.

In many large nations, the poor state the rich deprive them of their rights.
 In many large nations, the poor state deprives the rich states of their rights.

Everyone agrees that the trash can smell awful.
 Everyone agrees that the trash can smells awful.

TABLES

Table 1. Mean durations of the differing homograph pairs, and their differences.

Homograph-Pair	Mean-Duration(sec)	Difference(sec)
PS(AN)	.611	.059
PS(NV)	.670	
SB(AN)	.777	.107
SB(NV)	.670	
MR(AN)	.710	.086
MR(NV)	.624	
TC(AN)	.604	.060
TC(NV)	.544	
MM(AN)	.684	.073
MM(NV)	.757	

Table 2. Durations of individual homographs by various speakers and the mean durations. (sec)

	MILITARY		MIGHT	
	A	N	N	V
CJ	.552	.566	.285	.384
PB	.390	.402	.189	.183
TH	.479	.456	.217	.189
	----	----	----	----
mean =	.474	.475	.230	.252

	METAL		RINGS	
	A	N	N	V
CJ	.370	.330	.510	.440
PB	.325	.315	.335	.225
TH	.324	.266	.369	.330
	----	----	----	----
mean =	.340	.304	.405	.332

	SUMMER		BEARS	
	A	N	N	V
CJ	.465	.347	.471	.478
PB	.326	.334	.382	.215
TH	.326	.422	.408	.202
	----	----	----	----
mean =	.372	.368	.420	.298

	POOR		STATE	
	A	N	N	V
CJ	.224	.186	.384	.405
PB	.193	.205	.253	.273
TH	.223	.216	.294	.345
	----	----	----	----
mean =	.213	.202	.310	.341

	TRASH		CAN	
	A	N	N	V
CJ	.345	.373	.286	.098
PB	.289	.275	.149	.189
TH	.340	.336	.161	.096
	----	----	----	----
mean =	.325	.328	.199	.128

Table 3. Pitch Ranges of the Homograph Pairs and the mean Pitch excursions. (Hz)

	POOR STATE	
	AN	NV
CJ	30	29
PB	26	51
TH	33	32
	--	--
mean =	30	37

MILITARY MIGHT		
	AN	NV
CJ	26	24
PB	48	30
TH	25	21
	--	--
mean =	33	25

SUMMER BEARS		
	AN	NV
CJ	29	27
PB	77	32
TH	40	30
	--	--
mean =	49	30

TRASH CAN		
	AN	NV
CJ	46	28
PB	33	27
TH	19	12
	--	--
mean =	33	22

METAL RINGS		
	AN	NV
CJ	19	26
PB	38	26
TH	17	12
	--	--
mean =	25	21

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REPLACING A WORD-ORDER STRATEGY IN INFLECTIONS: THE DEVELOPMENT OF SENTENCE CONSTRUCTION BY A RUSSIAN-SPEAKING CHILD

I.M. Heaman

Department of Linguistics
University of Victoria

1. INTRODUCTION

Child language-learners quickly learn to recognize and rely on the sentence patterns that are characteristic of their native language. English, for example, has a rigid SVO word order; and it has been demonstrated that children learn at an early age to assign an interpretation of Agent-Verb-Object to an NVN sequence in the main clause (Bever 1970). As an operating principle, this strategy is inadequate when applied to some constructions such as the passive but it holds good for most of the sentences that children encounter. Gradually the semantic notions of agent and object are replaced by the broader grammatical categories of subject and object. The practices learned at an early age serve as a foundation on which subsequent learning can be built without radical reorganization.

In adult Russian, however, syntactic roles are not indicated by word-order but by inflectional suffixes. Russian, like other Indo-European languages, has an underlying, unmarked SVO word order,¹ but variations such as SOV or OSV are common. The word-order found in spoken sentences is often chosen to reflect certain factors that relate to the content of the sentence rather than its syntax. Typically the new and most important information is placed at the end of the sentence.²

Russian children, then, are faced with a complex task in learning sentence construction. First they must learn the basic, unmarked word-order and the relationships that it encodes; subsequently they must be prepared to suppress this strategy in favour of using inflections to mark basic grammatical relationships. Further, word order is reassigned to take on another function. In effect, the basic operating procedures have to be modified as the approach to sentence structure is reorganized.

Slobin (1981), Ammon and Slobin (1979), and Slobin and Bever (1982) carried out a series of cross-linguistic comprehension experiments with children between the ages of 2;0 (years; months) and 4;4 years, spaced at 4-month intervals. It was found that children learning inflectional languages (Turkish and Serbo-Croat) performed significantly better overall in interpreting causative and transitive sentences (in which the subject and object are often distinctively marked) than children learning word-order languages like English and Italian. It was concluded that the local clues provided by inflections facilitated comprehension. However, notable differences emerged between the data for the Serbo-Croat and Turkish children at certain ages. The Turkish children showed a steady improvement in performance from the initial age-level on, and this fact was attributed to the clear and unambiguous morphological system of Turkish. The Serbo-Croat children, however, failed to show any improvement in performance until after the second age-level (i.e. 2;8 years), and their earlier performance was significantly different from chance only on those sentences which are formed with neuter nouns and thus do not have

a distinctive object marking.

It was suggested that for the younger children studied, the presence of a distinctive inflection leads to confusion over which of the conflicting strategies should be followed, whereas the absence of a marked inflection encourages the application of a word-order strategy. The greatest increase in correct responses by children of the third age-group was for the object-marked sentences; by the fourth age-level the performance on them reached 100%.

It is stated that, at the second age-level, "children begin to be aware that case inflections can countermand basic, word-order strategies in sentence processing, but they have not yet mastered the necessary inflectional strategies to allow them to identify grammatical relations on the basis of inflectional cues alone".

How the transition is made from a word-order strategy to an inflectional system in language production, as against comprehension, has not received much attention. Some valuable insights can be obtained by examining the Russian data provided by Gvozdev, a Russian linguist who made a meticulous and exhaustive study of his son's development in the 1930s (the somewhat idiosyncratic arrangement of the material in the original tends to obscure some of the developmental tendencies contained in the findings). I have drawn selectively upon the data and also on Gvozdev's perceptive comments. I have devoted attention to those events which I find especially salient and attempted to explain the motivation for some of the less obvious procedures resorted to. The emphasis is mine and also the independent conclusions.

2. FIRST UTTERANCES

Single words, often with sentential force, were produced between 1;3 and 1;8. They were restricted to a few words, labelling people, animals, parts of the body, objects and some activities.

The same form of a word was used to express different meanings, distinguished by intonation: *mama* 'there is mama' or 'mama, come here!'; *papa* 'there is papa' and 'that is papa's'; *maka* 'there is milk' or 'give me milk'; *p'is'i* 'write' and 'pencil'.³

The base form for most nouns was the nominative. The exception was *maḳa* for 'milk', a mass substance in frequent demand which was first produced as a partitive genitive, the form for requesting some of a mass noun. There was no single dominant form of verb; the first forms to appear were the imperative and the infinitive.

Baby talk or caretaker items made their appearance and were used heavily. These are amorphous words borrowed from the child or invented by adults to approximate children's speech. They functioned as nominals: *mu* 'cow'; verbally: *prua* 'walking'; and were also used to refer to a state or condition: *t'utu* 'invisible, in hiding'; *bo-bo* 'ill, painful'.

3. FIRST WORD COMBINATIONS

The first word combinations appear at 1;7 and they remain fairly short and simple, consisting of 2-3 words, until approximately 1;10. The utterances fall into two main

groups composed of requests or statements. The requests call for an object or for an action to be carried out (see Table 1).⁴ In all but one case, the first word announces a request is being made, the second word specifies what is needed: 'papa, go!' 'more milk'.

Table 1. Early Requests.

is'o mak-a (more milk-GEN)	'more milk' (1;8)
mama, sup-a (mama-NOM soup-GEN)	'mama, some soup' (1;9)
papa, d'i (papa-NOM, go-IMP)	'papa, go' (1;8)
mama, l'as' (mama-NOM lie-down-IMP)	'mama, lie down' (1;9)
t'ap'i p'ec'ka (stoke-IMP stove-NOM)	'stoke the stove' (1;9)

The exception is formed by a transitive verb in the imperative: 'stoke stove'.

The partitive genitive which is, in effect, the request mode for many substances such as bread and milk, is applied to mass nouns at 1;9: *mama, sup-a* 'mama, some soup'. This is at a time when the nominative *sup* is being produced in utterances other than requests and the suffix, which is only applied to nouns of non-feminine gender, is extended, incorrectly to feminine nouns: *daj *sol'-a* (for *sol-i*) 'give [me] some salt'.⁵ It therefore appears that he has learned the function of the suffix, if not its precise context.

4. STATEMENTS

Particular attention is given to utterances which express actions and specify a location as they illustrate admirably the progressive stages of sentence construction.

The first words usually occur in a single, unbranched form. In intransitive combinations with a single argument and a verb (N V), the actor or thematic subject is always in initial position, followed by the verb, which may consist of a root only, a root + stressed suffix, or a baby-talk item which is never inflected (see Table 2).

There are few instances of early transitive constructions, with two arguments. The first ones produced lack an inflected verb, even in strings of more than two words (see Table 3). These utterances contain an agent, or, in one case, a beneficiary, in initial position, followed by an object or an instrument, an N N sequence. One utterance has a sequence of three nouns without a verb: 'grandma mouth stick', i.e., grandma put a stick (toothpick) in her mouth. In three examples a verb in the infinitive appears at the end of the clause. In two cases these infinitives are glossed by Gvozdev as verb complements, after a missing verb of motion: 'mama crust buy'; 'mama butter buy', i.e., mama [has

Table 2. Early Intransitive Sentences.

mac'ik baba (boyØ sleep=BT)	'the boy is sleeping' (1;9)
T'os'a prua Tosja walk=BT)	'Tosja is walking' (1;9)
d'ad'a t'ut'u grandpa-NOM knock=BT)	'grandpa is knocking' (1;9)
baba pl'a (grandma-NOM cry=VSTEM)	'grandma is crying' (1;9)
mak-a k'ip'-it' (milk-GEN boil-3PRES)	'the milk is boiling' (1;9)
papa s'id'-it' (papa-NOM sit-3PRES)	'papa is sitting' (1;9)

gone] to buy bread/butter.

These examples of agentive constructions without a verb are in striking contrast to sentences produced by children learning other languages. Studies by Bowerman (1973), Bloom, Lightbown and Hood (1975), Braine (1976) and Anglin (1980) cited few examples of an SO combination in early utterances by Finnish, Swedish, Samoan and English-speaking children. Braine, indeed, settles on the combination of act + object moved/manipulated as the typical formula for describing an agentive relationship. Further, Bloom et al. state that the four English-speaking children they studied between the ages of nineteen and twenty-six months showed no developmental difference between speech data encoding the two kinds of action events: transitive, with an agent, and intransitive, with an actor only.

Locative statements also show a preferred pattern (see Table 4). They contain two components, an entity in subject position and in second place its location or state, formed by either an adverb, another noun, or a baby-talk item: *Tosja tam* 'Tosja there', i.e., 'Tosja is over there'. It should be noted that as the present tense of the copula is not expressed on the surface in Russian, this formulation is a complete, well-formed sentence in Russian. The nouns, typically, appear in a single, unchanging form, whether they act as subjects or locatives, and there are no prepositions. With a second nominal argument, then, the locative meaning is derived entirely from the word order: *baba kl'es'a*, 'grandma chair', i.e., 'grandma is sitting on the chair'.

5. SUBSEQUENT DEVELOPMENT

5.1 Morphology

After 1;10 the child becomes capable of longer utterances and he starts to add grammatical suffixes regularly in rapid succession. Between 1;10 and 2;0 he marks contrasts between nominative singulars and plurals, and between the nominative,

Table 3. Early Agentive Statements.

d'ad'a bad'a (grandpa water-NOM)	'grandpa [poured] water' (1;9)
mama s'os'ka (mama-NOM brush-NOM)	'mama [is sweeping the floor] with a brush' (1;9)
mama kol'ka kupat' (mama-NOM crust-NOM buy-INF)'	'mama [has gone] to buy bread' (1;9)
mama mas'a kupat' (mama-NOM butter-NOM buy-INF)	'mama [has gone] to buy butter' (1;9)
mama t'am n'is'ka c'itac' (mama-NOM there book-NOM read-INF)	'mama is reading a book there' (1;9)
n'et, mayc'ik blin-a no boy \emptyset pancake-GEN)	'no, some pancake [for] the boy' (1;9)
d'ad'a n'ik (grandpa-NOM snow- \emptyset)	'grandpa [is carrying] the snow' (1;10)
baba l'ot pal'en'-i (grandma-NOM mouth \emptyset stick-?)	'grandma [put] a stick in her mouth' (1;11)

Table 4. Early Locative Statements.

T'os'a t'am (Tosja there)	'Tosja is there' (1;7)
s'anc'ik d'un'd'u (hare \emptyset chest \emptyset)	'the hare is [behind] the chest' (1;8)
k'is'en' p'ec'ka (jelly \emptyset stove-NOM)	'the jelly is [on] the stove (1;9)
baba kl'es'a (grandma-NOM armchair-NOM)	'grandma [is sitting down in] the chair' (1;9)

accusative and genitive cases in the singular. Diminutive morphemes appear. A distinctive accusative suffix, the feminine allomorph, is added, at first to objects affected by verbs of transmission and relocation such as 'give', 'carry', 'put', and 'throw'. Later the accusative ending appears after other transitive verbs such as 'read', 'draw', and 'do' and the category is considered learned by 2;0.

Where the semantic notions expressed are unambiguous the case system is easily grasped; the child, typically, learns one allomorph for each case, usually a phonologically distinctive one, and overgeneralizes it: thus the feminine accusative *-u* is applied to accusative nouns of all genders; similarly the masculine and neuter instrumental suffix, *-om*, is added to feminine nouns in preference to the correct, more ambiguous one.

Learning verbal morphology poses greater problems. Russian has a complicated system for showing person agreement, whereby suffixes denote first, second and third person singular and plural in the present tense, gender and number in the past tense. Stems, in turn, may show mutation and suppletive forms. Stress is mobile. The child, inevitably, simplifies this proliferation of forms. At first he uses the infinitive, both for the imperative and the present tense. The use of the infinitive in place of the present drops out between 1;10 and 1;11, shortly after the infinitive begins to appear as the complement of tensed verbs: *citac' ac'-u* (read-INF want-1PRES) 'I want to read' (1;10). The past did not appear until after 1;10. One dominant allomorph was overgeneralized in both the past and the present; the feminine *-a* in the past and *-it* for the third person present. However, the difference between the present and the infinitive is not always clear as the child tends to palatalize dental (and other) consonants after a non-low, non-back vowel, especially before 1;11, so that *t'* is often produced instead of *t* (and *t'* is the characteristic ending of the infinitive). The stress patterns of the verb were also regularized.

The difficulty of acquiring tensed verbs is in contrast to the readiness with which the child masters the feature of aspect. The distinction of telicity, whereby verbs in the past and future are marked with reference to an end result, such as the completion of an action, is a vital one in Russian. The difference between perfective and imperfective, or telic and atelic forms of the verb is made, in many cases, by adding a prefix. As soon as tensed verbs enter the child's speech, and he is phonologically capable of the discrimination, which may mean adding a third syllable to a word, he marks the distinction virtually without error.

6. EXPANDING THE SENTENCE

6.1 Checking and Culling the Roots

It is reasonable to assume that, as the child slots in grammatical suffixes, he learns to phase out the word order strategy. The task, however, is not straightforward and examination of the data shows that in some cases it takes several stages to complete an operation. It can be seen from the data how the major difficulties are resolved.

The period between 1;10 and 2;0 is one of intense morphological development as previously unanalysed units are analysed and turned into differentiated forms. The stem is of paramount importance in this process and it is clear that roots are carefully screened. Most of the lexical units that the child has been using contain roots that can act as stems and add affixes but this is not true of all the terms he has been using indiscriminately; amorphous components that were hitherto accepted are now found wanting so they are discarded and replaced.

One group of words stands apart, isolated from this process of analysis and differentiation: the baby-talk items. They first entered the child's speech when all words were treated as unanalyzed wholes, and they resembled other words in having not only a semantic value but also a syntactic role, as demonstrated by their distributional

privileges. For example, baby-talk items stood in first place if they represented nominal subjects and followed the subject if they represented verbs. As utterances expanded in length, these components retained the distributional privileges of other members of their syntactic class and combined with other words as desired, acting as singulars or plurals, infinitives or tensed verbs though never changing in form: *l'uhl'u pr'id-ut* 'oink-oink will come-PL' (the pigs will come); *S'en'ic'k-i tam bobo* 'Ženečka-DAT there ouch' (it hurts little Ženja there); *mak-i baj-baj* 'shoes bye-bye' (the shoes are sleeping); and *mac'ik prua b'elac'-a hoc'-ic* 'boy wants to get-ready walky' (where the baby-talk verb *prua*, 'walk', is in a construction involving three verbs).

No attempt is ever made to regularize these anomalous forms or to use them as a basis for derivation, for example by constructing an infinitive from *baj* 'sleep', such as *bac'*, along the model of *daj* 'give', *dac'* to give; grammatical affixes are also never added. The treatment of baby-talk items separates them from other categories of indeclinable words. Adverbs such as *tam* 'there' are also never declined but they have no constraints on their placement and they move freely within the sentence, occurring initially, medially, or finally. Later, the child unhesitatingly adds case-markers to indeclinable foreign nouns: *pal'to* 'overcoat', locative *v *pal't-e* (at 2;10).

The baby-talk items do not disappear all at once but they are phased out over a period of time and replaced by their regular counterparts. A clear picture of how the replacement procedure works is given in utterances where the child translates from the baby-talk register to standard Russian by placing the two terms side-by-side either at the word or the phrasal level: *tal'ik t'ut'u pl'ac'-ic'* 'the old man hidey (BT) is hiding'; *mal'c'ik l'igl-a pat'*, *baj l'igla* 'the boy lay down to sleep, lay down bye'.

Other unorthodox units were replaced during this period in the same way. The imperative *p'is'i* 'write' was used in two ways upon its appearance; to express both 'pencil' and 'write!'. The use of the word as an imperative continues, but it ceases to function as a nominal and the regular term *karandaš* 'pencil' was substituted; again, the substitution occurred at the surface level: *daj gal'anda daj p'is'-i* 'give pencil give write' (1;11).

6.2 Treatment of the Verb

The ability to add grammatical suffixes to a string does not necessarily keep pace with the child's desire to expand the sentence and, when faced with several new tasks, as will be demonstrated, he sometimes adopts short-term, interim measures that temporarily relieve his work-load. Sentences with more than one noun argument and a tensed verb mean that he has to deal with problems both of affixation and placement before he has fully mastered either process.

When only one operation at a time has to be performed on an already familiar word combination, little difficulty is experienced, for example when tense is added to an intransitive verb, an N V sequence. (The tense marker is often in an over-generalized form as the personal endings are not learned until after 2;0): *n'is'ka l'is'it* 'the book is lying' (1;10), *man'c'ik s'id'el'a* 'boy sat' (1;10). Combining a subjectless imperative (an unchanging form) with two case-governed nouns in the predicate (V-tense N N) also presents no discernable problem: *al'i vad'-i kl'us'k-u* 'pour water-GEN mug-ACC' (1;11); *daj l'apa s'en'ic'k-i* 'give hat-NOM Ženečka-DAT' (1;11).

More of an obstacle is encountered by combining a tensed verb with a noun in the predicate, for example in agentive or locative statements. According to Gvozdev, before

1;11 the verb follows the noun in the predicate in seven instances and precedes it, the standard order, in only two utterances. Between 1;11 and 2;0 the verb occurs before the noun five times, and after it twice (see Table 5). (In some of these sentences the subject is expressed only by person agreement on the verb.) These facts seem to point to a developmental progression, OV > VO. Gvozdev explains the displacement of the verb in the earlier utterances by the theory that the most recently acquired element is added to the end of the string, that is, the choice of word order recapitulates the sentence's evolution; verbs which enter last in these combinations are placed after the other items. Similarly, at a later date, modifiers that have to be inflected first start to appear at the end of the sentence without agreement; later, equipped with a suffix, they are moved in front of the head noun. Gvozdev's theory explains what happens, but not why this step is taken.

The strategy may, it seems to me, result from having to insert an inflected constituent into the middle of an existing word combination at the same time as the child is learning to add grammatical markers on a regular basis. Earlier utterances showed that the child relied on the positional pattern N N when the first noun represented the agent or thematic subject, and the second the object, instrument or location: 'papa snow', 'grandma chair'. Now suffixes must be added: the accusative as a category is developed between 1;11 and 2;0. Verb morphology also has to be factored into these constructions. The development of verbs as a category has already been mastered: as shown, both verb roots and their baby talk equivalents occurred in N V sequences among the first combinations. The problem, then, seems to lie in having to prepose the verb before the noun in the predicate, at the same time as tense (and aspect) are being added.

If one examines the sentences produced between 1;10 and 2;0 which combine two arguments and a tensed verb, it transpires that when the infinitive is used as the present tense it always occurs at the end of the clause, whereas the tensed verbs occur both finally and medially. These data suggest that there is a progression whereby the child starts from a sequence, formed by the subject in first place and the object, instrument or locative in second; next he learns to add the necessary verb in untensed form to the end of the sequence while he works out how to mark the feature of tense; finally, having done so, he inserts the verb medially between the two original constituents. For an agentive statement, then, the sequence reads:

S O > S O V-tense > S O V+tense > S V+tense O

Locative clauses with a tensed verb and a noun in the predicate observe a similar pattern; the undifferentiated verb first occurs in final position and is not moved up until tense has been added.

Locative clauses with a tensed verb and a noun in the predicate observe a similar pattern; the undifferentiated verb first occurs in final position and is not moved up until tense has been added.

This observation holds true even when Ženja starts to show the subject by agreement on the verb only. (He first refers to himself in the third person as 'boy' or Ženja).

The acquisition of the inflected adjective shows a similar pattern. Attributive adjectives first found at the end of the sentence in uninflected form were not moved into position before the head noun until some form of agreement had been added.

As soon as the basic word order has been acquired variations in it start to creep in almost immediately. By the middle of 1;11 sentences are produced with inversion in

Table 5. Verb Placement in Later Agentive and Locative Statements.**a) Verb in Final Position**

fampa *n'is'-it' (lamp-NOM carry-3PRES)	'I am carrying the lamp' (1;10;17)+
ic'ka *nas'-ol-a (egg-NOM find-PAST-F)	'I found the egg' (1;11;8)
mamyc'k-u l'ubl'-u (mama=DIM-ACC love-1PRES)	I love mummy' (1;11;10)
gus'k'-i kan'tink-u *klad'-il (goose-PL basket-ACC put-PAST=M)	'I put the geese in the basket' (1;11;20)
papa n'is'ka c'itac' (papa-NOM book-NOM read-INF)	'papa is reading a book' (1;10;7)
mama bl'oda *n'is'-it' (mama dish-NOM carry-3PRES)	'mama is carrying the dish' (1;10;25)
mac'ik pal'ena *kl'ad'-it (boy∅ stick-NOM put-3PRES)	'the boy is putting the stick' (1;11;25)
baba l'ep kup-al'-a (grandma-NOM bread∅ buy-PAST-F)	'grandma was buying bread' (1;10;13)
mac'ik kl'es'a s'id'-it' boy∅ armchair-NOM sit-3PRES)	'the boy is sitting in the armchair' (1;10;3)

b) Verb in Medial Position

l'am-al'-a puc'-ik (break-PAST-F twig∅)	'I broke the twig' (1;11;10)
d'ad'a n'is'-ot' muka (grandpa-NOM carry-3PRES flour-NOM)	'grandpa is carrying the flour' (1;11;29)
S'as'a gl'ib-al'-a ugl'-i (Sasa rake-PAST-F coal-PL)	'Sasa raked the coals' (1;10;18)
joka val'a-s'-c'a pal'-u (Christmas-tree -NOM roll-3PRES-REF floor-LOC)	'the Christmas-tree is rolling [on] the floor' (1;11;28)
ic'ka l'it'-el'-a dunduk (egg=DIM fly-PAST-F chest∅)	'the little egg flew [behind] the chest' (1;11;8)

+ The age is in: years; months; days.

which the subject follows the verb in an intransitive sentence: *val'a-ic'-c'a tam katuka* (spin-#PRES-REF there bobbin) 'the bobbin is spinning over there' (1;11;27); and the subject follows the object in a transitive sentence: *l'apatk-u baba d'e-l-a* (spade-ACC grandma-NOM make-PAST-F) 'grandma made a spade' (1;11;16). In other words, even before the case endings are all in place, word order is already being disassociated from its original function of helping to define relationships between items and is assuming a new role in a schema in which constituents are ranked in terms of the importance of the information they carry.

7. CONCLUSIONS AND DISCUSSION

Several points of interest emerge from the above outline.

From the perspective of linguistic development one is struck by the great emphasis placed on the thorough checking of roots to make sure that no inadmissible items are treated as stems. The strict insistence on retaining only regular base forms at the time when grammatical affixes are being introduced is at odds with events some months later when children start to make innovations. Innovations come to be formed on a wide variety of words, and not only on stems but also on particles and even on already inflected items, with a conspicuous disregard for morphological rules, the same rules that are being observed here so scrupulously.⁶

The urge to bring order into the assortment of terms in use means that words now come to be assigned to classes and are no longer allowed to stray across syntactic boundaries, as when 'write' is blocked from signifying 'pencil'. Presumably this move ensures that only the appropriate affixes are attached to the members of each word class and therefore it can be regarded as a step in the direction of setting up formal categories, such as noun and verb. There has been considerable discussion and controversy in the literature over precisely how grammatical categories evolve from children's semantic notions (Braine 1976; Maratsos 1981). In Russian it appears that this process is linked with the onset of differentiation.

There is plainly a developmental difference between the acquisition of transitive and intransitive sentences, with transitive sentences taking longer before they are fully developed. These findings conflict with data from several other languages, and they may be related to language-specific features of Russian, such as the need to add case and verb markers.

It is suggested that the child first controls the verb as a lexical item. He also realises that its place is after the thematic subject and he puts it there in N V combinations but it is the missing element in N V N constructions (expressed as N N) when his utterances are still of limited length. A little later he turns his attention to these incomplete clauses, conscious that they need a verb, that it must follow the subject and that the feature of tense must be attached for the sentence to be well-formed. However, he is not able to perform these operations simultaneously, and so he adopts an interim strategy. He retains the original N N formula and tacks the verb on at the end while he learns to apply a tense marker. Once tense has been added he moves the verb into position between the two original sentence constituents. Placing the verb at the end of the sentence has the advantage of letting him tackle one grammatical operation at a time in morphologically complex clauses.

In terms of cognitive development, it appears that output at a given moment is influenced by what lies ahead, anticipating future developments. For example, verbs, like other words, are first produced in truncated or unchanging form. Nevertheless, verbs are left out of early word combinations if they deal with a transitive situation, though not elsewhere. It seems that future problems with verb declension cast a shadow over the linguistic decisions made at an earlier date. Similarly, flexible word order is introduced relatively early, before the case system is fully in place, indicating that the child has already started to remodel his sentence structure to satisfy the criteria of adult speech.

In the broader field of linguistic theory, the data may help shed some light on the properties of a transitive clause.

The effortless ease with which Ženja discriminated between telic and atelic (or perfective and imperfective) verbs may be compared with the early emergence of object marking. Each of these distinctions represents a clear semantic notion and one which is linked to transitivity. Hopper and Thomson (1980), in their analysis of the transitive clause, suggest that it represents a continuum, bringing together concrete actions and definite nouns. They draw up a transitivity hierarchy, according to which telic verbs and affected objects are higher in transitivity than atelic verbs and unaffected entities. They point to Gvozdev's data on object case-marking, reported by Slobin on various occasions and discussed more fully in 1981, as support for their suggestion that object case-marking is functionally motivated by the transitivity of the clause as a whole, rather than the need to distinguish subject from object. Slobin further claims that the notions which languages grammaticize are closely related to children's cognition of 'prototypical' events and that there is a correlation between object case-marking and the cognitive perception of 'prototypical' transitive events. The early introduction of the telic/atelic distinction in Russian likewise points to strong functional motivation for such treatment. Thus, this feature which discriminates between the presence or absence of concrete, directed action may be another factor entering into the perception of what constitutes a prototypical transitive event and its high ranking in the transitivity hierarchy appears to be justified.

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NOTES

- ¹ A.R. Lurija (1946) determined in experiments with aphasic patients that they fell back on a SVO strategy to disambiguate transitive sentences and, in the process, ignored inflectional clues which would have given another interpretation.
- ² This topic has received detailed attention in the literature by, among others, O. Krylova and S. Havronina (1976).
- ³ I have used the ISO transcription system. I have retained Gvozdev's phonetic rendering of the consonants produced, but I have simplified his description of the vowels, using the symbols *i* and *y* for both stressed and unstressed variants.
- ⁴ The tables give a representative sample of utterances, not the complete corpus, except for the early agentive statements. The abbreviated grammatical morphemes are NOM: nominative, ACC: accusative, GEN: genitive, LOC: locative, Ø: zero ending, M: masculine, F: feminine, PRES: present, PAST: past, PL: plural, VSTEM: verb stem, REF: reflexive, DIM: diminutive, INF: infinitive, IMP: imperative, BT: baby talk and ?: difficult to classify.
- ⁵ Forms with * denote errors produced by systematic over-generalization. A rule has been learned and applied without exception, even where not appropriate.
- ⁶ The well-known children's author, K.I. Čukovskij, collected and published a collection of children's colourful sayings, including a number of innovations. A linguistic analysis of these innovations is included in my thesis.

A METRICAL ANALYSIS OF THE LILLOOET STRESS SYSTEM

Andrea Giles

Department of Linguistics
University of Victoria

1. INTRODUCTION

By applying Hayes' (1981) metrical theory of stress, this paper attempts to provide an analysis of the Lillooet stress system. Lillooet is a Northern Interior Salish language spoken in British Columbia. Previous work on the Lillooet language includes van Eijk (1985) which provides an extensive analysis and description of the stress system of Lillooet in the theoretical framework of classical structuralism, as well as Bates (1983) which provides a metrical account of Lillooet.

Extracting the relevant generalities and specifics from van Eijk's (1985) phonological approach and elaborating on and expanding from Bates' (1983) metrical analysis, this paper attempts to formulate a series of metrical rules which will reflect the nature of the stress system of Lillooet. Bates (1983) generates an analysis which postulates both a Main Stress Rule (MSR) and an Alternating Stress Rule (ASR). In Bates' analysis, the ASR generates only one distinct secondary stress, while this paper, based on van Eijk's (1985) assumption about the role of pre-tonic vowels, contends that those pre-tonic vowels which serve as the counting bases in the assignment of stress must all receive alternating secondary stress. By providing a series of verbal paradigms, this paper will illustrate a metrical analysis which will account for the alternations in the stress system of Lillooet.

2. BACKGROUND AND DESCRIPTION OF METRICAL PHONOLOGY

Extracting stress out of the distinctive feature matrices of standard generative phonology, Liberman and Prince (1977) proposed that stress should be presented as a matter of relative prominence among syllables. To represent this relativity, Liberman and Prince create a system of binary branching tree structures where each pair of sister nodes is labelled S W (strong or weak) or W S (weak or strong), depending on which node is stronger. The labelling of these structures, called feet, is constructed on the projection of the rime of a syllable and are grouped together into binary structures which make up a word tree. When all of the binary grouping and labelling is completed, the syllable which is exclusively dominated by S nodes is the strongest relative prominent syllable.

A set of metrical stress rules will construct a hierarchy of metrical trees, consisting of a foot level and a word level. The rules assigning stress can be iterative or non-iterative, and if iterative, the direction in which they apply may be variable. As well, the shape of the structures which are created may vary: that is, metrical structures may differ in the maximum that is placed on their size; or metrical structures may differ in whether they are right or left branching; or metrical structure may differ in the restric-

tions on what their terminal nodes may dominate; and metrical structures may differ in the procedures for labelling.

In Liberman and Prince's (1977) metrical stress theory, a syllable is called extrametrical if it is ignored by the stress rules; that is, it is treated as if it were not there. Hayes (1981) extends this notion further, arguing that languages may contain extrametricality rules which may apply to large segments of the lexicon-- that is, on the edges of stress domains, it is common for some classes of segments to be unable to be labelled with trees. These segments are accounted for by extrametricality rules which make these segments unavailable for foot construction, and any stray segments at the end of a derivation are attached as weak sisters to the word tree by a convention called Stray Syllable Adjunction.

Hayes asserts that an extrametricality rule has two claims:

- a. that the material marked as extrametrical must always be a single, unvarying unit; and
- b. that extrametricality is assigned only at the right edge of stress domains.

Hayes adds that there are two sizes among unmarked trees; those that are maximally binary and those that are unbounded. This means that dominant nodes must be either terminal or free. Non-branching feet, also known as degenerate feet, are defined as maximally non-branching. A tree is considered quantity-sensitive if terminal nodes that branch under the appropriate projections are, in fact, counted as branching. A tree is considered quantity-insensitive if all terminal nodes are counted as non-branching. Hayes creates a convention which states that if a foot construction rule mentions a rime projection, then quantity-sensitive feet are constructed.

3. PREVIOUS WORK ON LILLOOET STRESS: VAN EIJK

Van Eijk (1985) provides an extensive analysis of Lillooet phonology. In his description of the stress system of Lillooet, van Eijk states that in polysyllabic words, only one syllable is stressed; that is, only one syllable has primary stress. Stress in Lillooet is mobile: it can move to a later syllable if suffixes and enclitics are added. Vital for the assignment of secondary stress in Lillooet are pre-tonic vowels which serve as the counting bases in this stress assignment. Van Eijk uses the term "syllabifier" for any vowel and for any consonant that functions as a syllable with regard to stress. This paper will follow van Eijk's analysis whereby full vowels refer to /a ɐ i i̇ u u̇/ and are abbreviated A and weak vowels refer to /ə̘/ and are abbreviated E.

Van Eijk describes three types of rules which govern the movement of stress:

- a. those that involve full vowels known as "full syllabifiers";
- b. those that involve weak vowels and certain consonants known as "weak syllabifiers"; and
- c. full vowels that always attract stress known as "strong syllabifiers."

3.1 Full Syllabifiers

Van Eijk describes those words with only full vowels as having the following stress movement when suffixes or enclitics are added: stress moves two vowels at a time from the originally stressed vowel, as long as it does not fall on the last one. Full syllabifiers can have a stress movement within a root, from a root to a suffix, or from a root to an enclitic.

3.2 Weak Syllabifiers

In words with only weak vowels, the stress falls, as a general rule, on the first vowel. Van Eijk points out that words consisting of more than two weak syllables are rare and therefore not suitable for generalizations. Words with both weak and full vowels, the weak vowels must be counted when assigning stress but, regardless, stress cannot fall on the weak vowel in this type of word. When weak vowels are in the position where full vowels would receive stress, they are, in fact, ignored. Consequently, van Eijk concludes that when there is more than one syllable after the weak vowel, the stress moves to the first of these syllables whereas when there is only one syllable after the weak vowel, the stress does not move.

Van Eijk points out that two groups of consonants function as weak vowels for stress purposes:

- a. the second consonant in a root-or suffix-final cluster; and
- b. lexical suffixes and enclitics of the shape C or CC.

Like weak vowels, these consonants have to be counted when assigning stress. When any of these consonants are in the same position where a full syllabifier would receive stress, they are ignored. To conclude, a weak syllabifier includes weak vowels and consonantal elements that behave like weak vowels.

3.3 Strong Syllabifiers

Van Eijk points out that strong syllabifiers (which are syllables consisting of full vowels), when in word-final position, tend to ignore the stress tendencies already noted and can be considered to be a marked set and, consequently, fall outside any generalities. Van Eijk considers strong syllabifiers to be found in the lexicon [for our purposes, the strong syllabifier classification is unimportant, since it is the quality of the vowel that is important for metrical phonology; so, in fact, strong syllabifiers can be classified with full syllabifiers].

Van Eijk (1981) formulates a general stress rule (p.88):

1. The counting base for the distribution of the stress is
 - a. the (last) strong syllabifier in a word, or, if there is no strong syllabifier,
 - b. the first full syllabifier, or, if there is no full syllabifier,
 - c. the first weak syllabifier.
2. From this base the stress moves two syllabifiers at a time, as suffixes or enclitics are added, as long as

- a. it does not fall on the last syllabifier in a word, except when the last syllabifier is also the only full syllabifier (here it may move also one syllable);
- b. it does not fall on a weak syllabifier (where it would, the weak syllabifier is ignored).

4. PREVIOUS WORK ON LILLOOET STRESS: BATES

Bates (1983) is a metrical account of stress in Lillooet. Bates indicates that, as illustrated in a series of data sets, a final syllable which contains a schwa followed by a single consonant does not get main stress, while a full vowel (non-schwa) followed by one or more consonants does get main stress. To account for this, Bates proposes the following rules:

1. Extrametricality Rules

- a. Consonant Extrametricality (C-ex)
 - i. $C \rightarrow [+extrametrical]/ ___ \#$
- b. Schwa Extrametricality (ə -ex)
 - i. $\text{ə} \rightarrow [+extrametrical]/ ___ \#$

2. Main Stress Rule:

- a. On the rime projection form a binary, quantity-sensitive S W (left-dominant) foot.

As we have seen from Hayes' Tree theory, a quantity-sensitive foot prohibits a weak foot from dominating a branching rime; that is, a syllable which contains a diphthong or is closed with a consonant. Bates points out that the two extrametricality rules are in a feeding order with C-ex preceding ə -ex. Concurrent with extrametricality rules is Stray Syllable Adjunction which will adjoin the extrametrical constituents to the word tree.

To account for stresses to the left of the main stress, Bates creates an Alternating Stress Rule (ordered after the MSR):

3. Alternating Stress Rule

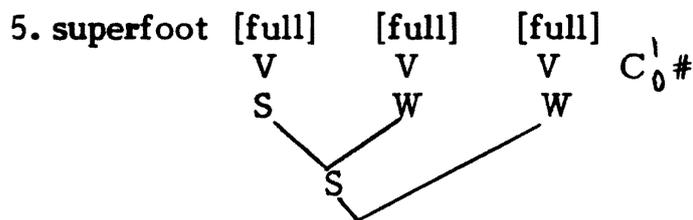
- a. Form quantity-insensitive, left-dominant binary feet across the rest of the word right to left.

Bates, following from the metrical model, adds that when a rule builds quantity-sensitive binary feet (as does the MSR), if the conditions are not met to make a well-formed binary foot (that is, if the creation of such a foot results in W dominating a branching rime), a non-branching foot is formed over the final heavy syllable, and the ASR, if it applies, applies to the material to the left of the degenerate foot. Bates states that the strongest syllable of the word is the strong syllable of the strongest foot, and that secondary stresses are indicated by being the strong members of weaker feet.

Bates considers that the above rules present a general analysis of stress placement, and, to account for any penultimate anomalies, proposes the following general principle which holds for all foot construction by the MSR and the ASR, and can be considered a well-formedness constraint:

4. S may not dominate ə

Bates points out that with the extrametricality rules, one can predict that main stress should appear three syllables from the end of the word (that is, antepenultimate stress) provided that the final syllable is schwa plus one consonant. To account for another class of antepenultimate stress, Bates creates a special type of foot that can be formed by the MSR if particular segmental criteria are met. That is, if and only if the last three vowels are full (non-schwa), and the last syllable is closed by only one consonant, then a left-dominant superfoot is formed:



Bates considers superfeet to be an option of the MSR, disjunctively ordered with the MSR. Finally, Bates postulates a right-dominant W S word tree.

5. A METRICAL ANALYSIS OF THE LILLOOET STRESS SYSTEM

From a review of van Eijk's (1988) descriptive work in verbal paradigms in Lillooet, as well as insights from both van Eijk's (1985) and Bates' (1983) analyses, three major generalizations can be drawn:

- a) In Lillooet, primary stress must work its way from left to right (L-->R);
- b) In analysing alternating secondary stress, the initial syllable plays an important role;
- c) A default mechanism exists when a weak vowel occurs in the position where stress would normally occur.

The first generalization is drawn by noting the tendency of alternating secondary stress to fall, in all cases, on the initial syllable. From this point, secondary stress falls on every other syllable that follows. As no word final stress occurs in Lillooet (other than when forced by weak vowels in a default position), the last alternating syllable receives primary stress (hence, if there is an even number of syllables, primary stress will be penultimate, and if there an odd number of syllables, primary stress will be antepenultimate). It is, at this point, valid to make the assertion that this stress pattern is dependent on the amount of syllabic peaks or nuclei in a word.

The second generalization is drawn by noting that primary stress tends to fall in a position which facilitates (enough) secondary stress to have the alternating stress fall on

the initial syllable. This is important as it establishes not only the role of secondary stress but also the fact that primary stress falls in a position of alternation regardless of penultimate or antepenultimate placement.

The third generalization is drawn by noting the predictable way stress moves when a weak vowel occurs in the position where stress would normally occur. Weak vowels can not accommodate stress in Lillooet. When a weak vowel occurs in the position where a full vowel would receive stress (either primary or secondary), the syllabic peak or nucleus is ignored (that is, if a five syllable word has a weak vowel occurring in antepenultimate position where a full vowel would receive primary stress, that syllable is ignored and the word is treated as if it were a four syllable word).

The above generalizations are based on the tendencies which have been noted in all cases in the following verbal paradigms (note that for representational purposes, C can equal C₀ [this is evidence which supports the assertion that it is the nucleus of the syllable which is instrumental (i.e. full versus weak vowels) as the numbers of consonants in the coda do not affect the placement of stress] and that Ind. = Indicative, Subj. = Subjunctive, Fact. = Factual, F./S. = Factual/Subjunctive, F./S./I. = Factual/Subjunctive/Indicative, 1 = first person, 2 = second person, 3 = third person, S = Singular, P = Plural, cún- "to tell, order", cúł- "to point at", təq- "to touch something", and x^witəns- "to whistle at"):

5.1 Verbal paradigms consisting of only full vowels:

(a) 2 syllable words = CÁCAC

cún-łk-an	1S-3S Ind.
cún-c-k-ax ^w	2S-1S Ind.
cún-łk-ax ^w	2S-3S Ind.
s-cún-cin	1S-2S Fact.
cún-an	1S-3S F./S.
cún-c-ax ^w	2S-1S F./S.
cún-ax ^w	2S-3S F./S.
cún-c-as	3S-1S F./S./I.
cún-as	3S-3SP F./S./I.

This data set of 2 syllable words (that is, an even number of syllables) exhibits penultimate stress.

(b) 3 syllable words = CÁCACAC

cún-ci(n)-łk-an	1S-2S Ind.
cún-wit-k-an	1S-3P Ind.
cún-wit-k-ax ^w	2S-3P Ind.
cún-c-k-ałap	2P-1S Ind.
cún-łk-ałap	2P-3S Ind.
cún-cin-an	1S-2S Subj.
cún-wit-an	1S-3P F./S.
cún-wit-ax ^w	2S-3P F./S.
cún-c-ałap	2P-1S F./S.
cún-ałap	2P-3S F./S.
cún-cih-as	3S-2S F./S./I.
cún-it-as	3P-3SP F./S./I.
cúł-uń-łkan	1S-3S Ind.

cùt-un̄-c-kax ^w	2S-1S Ind.
cùt-un̄-ikax ^w	2S-3S Ind.
s-cùt-un̄-cin	1S-2S Fact.
cùt-un̄-an	1S-3S F./S.
cùt-un̄-c-ax ^w	2S-1S F./S.
cùt-un̄-ax ^w	2S-3S F./S.
cùt-un̄-c-as	3S-1S F./S./I.
cùt-un̄-as	3S-3SP F./S./I.

Here, antepenultimate primary stress occurs with an odd number of syllables.

(c) 4 syllable words = CÀCACÁCAC

cùn-tumúit-k-an	1S-2P Ind.
cùn-tan-í-ik-an	1S-3P Ind.
cùn-tumúit-k-ax ^w	2S-1P Ind.
cùn-wit-k-álap	2P-3P Ind.
cùn-tumúit-an	1S-2P F./S.
cùn-tan-íh-an	1S-3P F./S.
cùn-tumúit-ax ^w	2S-1P F./S.
cùn-wit-álap	2P-3P F./S.
cùn-tumúit-as	3S-1P F./S./I.
cùn-c-al-ít-as	3P-1S F./S./I.
cùn-cih-ás-wit	3P-2S F./S./I.
cùt-un̄-cí(n)-ikan	1S-2S Ind.
cùt-un̄-wít-kan	1S-3P Ind.
cùt-un̄-wít-kax ^w	2S-3P Ind.
cùt-un̄-c-kálap	2P-3S Ind.
cùt-un̄-ikálap	2P-3S Ind.
cùt-un̄-cin-an	1S-2S Subj.
cùt-un̄-wít-an	1S-3P F./S.
cùt-un̄-wít-ax ^w	2S-3P F./S.
cùt-un̄-c-álap	2P-1S F./S.
cùt-un̄-álap	2P-3S F./S.
cùt-un̄-cih-as	3S-2S F./S./I.
cùt-un̄-ít-as	3P-2SP F./S./I.

All forms have penultimate primary stress with secondary stress falling on the the initial syllable; if it were antepenultimate stress, it would leave the initial syllable stressless but Lillooet exhibits a tendency for some degree of stress initially.

(d) 5 syllable words = CÀCACÁCACAC

cùn-tumúit-k-álap	2P-1P Ind.
cùn-tumúit-álap	2P-1P F./S.
cùn-tam-álap-as	3S-2P F./S./I.
cùn-tumúl-it-as	3P-1P F./S./I.
cùt-un̄-túmuít-kan	1S-2P Ind.
cùt-un̄-táni-ikan	1S-3P Ind.
cùt-un̄-túmuít-kax ^w	2S-1P Ind.
cùt-un̄-wít-kaálap	2P-3P Ind.
cùt-un̄-túmuít-an	1S-2P F./S.
cùt-un̄-tánih-an	1S-3P F./S.
cùt-un̄-túmuít-ax ^w	2S-1P F./S.

cùt-uń-wít-álap	2P-3P F./S.
cùt-uń-túmuł-as	3S-1P F./S./I.
cùt-uń-c-ál-it-as	3P-1S F./S./I.
cùt-uń-cíh-as-wit	3P-2S F./S./I.

All forms in this data set have antepenultimate primary stress with alternating secondary stress initially.

(e) 6 syllable words = CÀCACÀCACÁCAC

cùn-tam-àlap-ás-wit	3P-2P F./S./I.
cùt-uń-túmuł-kálap	2P-1P Ind.
cùt-uń-túmuł-álap	2P-1P F./S.
cùt-uń-túmul-ít-as	3P-1P F./S./I.

These forms have penultimate primary stress with alternating secondary stress initially: there is one exception, cùt-uń-tam-álap-as ("to point at" 3S-2P Fact.); but van Eijk (1988) points out that the suffix -tam has zero stress strength. If one ignores this suffix (i.e. syllable) when it appears (for the purpose of this paper, only when it appears in the position to attract stress [i.e. the designate terminal element of a S node]), it follows the stress pattern for a five syllable word (c.f. cùn-tam-àlap-ás-wit ["to tell, order" 3P-2P Fact.], here -tam is not in the position to affect stress and, consequently, this word follows the predicted stress pattern for a six syllable word).

(f) 7 syllable words = CÀCACÀCACÁCACAC

The only seven-syllable example, here, contains the -tam suffix (cùt-uń-tam-àlap-ás-wit "to point at" 3P-2P Fact.) in a position where stress would fall; accordingly, it is ignored and thus follows the stress pattern of a six syllable word.

5.2 Verbal paradigms consisting both full and weak vowels:

(a) 2 syllable words = CECÁC

s-təq-(n)án	1S-3S Fact.
təq-n-áx ^w	2S-3S F./S.
təq-n-ás	3S-3SP F./S./I.

Final stress occurs in this set of examples because the initial vowels are weak; hence, the vowels cannot attract stress.

(b) 3 syllable words

i) CECECÁC

təq-ən-íkán	1S-3S Ind.
təq-ən-c-káx ^w	2S-1S Ind.
təq-ən-íkáx ^w	2S-3S Ind.
təq-ən-c-áx ^w	2S-1S F./S.
təq-ən-c-ás	3S-1S Fact.

Final stress occurs in this data set because the weak vowels fall in a position where stress is predicted to occur; accordingly, stress must fall on the first strong vowel.

ii) CECÁCAC

təq-n-álap	2P-1S F./S.
təq-n-ít-as	3P-3SP F./S./I.

Penultimate stress falls on the leftmost strong vowel; this is evidence for the generalization that there is a tendency to move toward some degree of initial stress.

iii) CÁCECAC

x ^w ítəns-k-an	1S-3S Ind.
x ^w ítəns-k-ax ^w	2S-3S Ind.
x ^w ítəns-an	1S-3S F./S.
x ^w ítəns-ax ^w	2S-3S F./S.
x ^w ítəns-as	3S-3SP F./S./I.

Antepenultimate stress occurs in this set. The weak vowels do not occur in a position to affect stress, consequently these examples follow the stress pattern of 3 syllable words consisting of all strong vowels.

(c) 4 syllable words

i) CECECÁCAC

təq-ən-cí(n)-ɪkan	1S-2S Ind.
təq-ən-wít-kan	1S-3P Ind.
təq-ən-wít-kax ^w	2S-3P Ind.
təq-ən-c-kálap	2P-1S Ind.
təq-ən-ɪkálap	2P-3S Ind.
təq-ən-cín-an	1S-2S Subj.
təq-ən-cín-an	1S-3S F./S.
təq-ən-wít-an	1S-3P F./S.
təq-ən-wít-ax ^w	2S-3P F./S.
təq-ən-c-álap	2P-1S F./S.
təq-ən-cíh-as	3S-2S Fact.

Penultimate primary stress occurs in a similar manner to the examples of 4 syllable words with full vowels, except that in this data set the inherent inability of weak vowels to accept stress is displayed, as no initial secondary stress occurs.

ii) CÁCECÁCAC

x ^w ítəns-wít-k-an	1S-3P Ind.
x ^w ítəns-túmx-k-ax ^w	2S-1S Ind.
x ^w ítəns-wít-k-ax ^w	2S-3P Ind.
x ^w ítəns-álap	2P-3S Ind.
s-x ^w ítəns-túmin	1S-2S Fact.
x ^w ítəns-wít-an	1S-3P F./S.
x ^w ítəns-túmx-ax ^w	2S-1S F./S.
x ^w ítəns-wít-ax ^w	2S-3P F./S.
x ^w ítəns-álap	2P-3S F./S.
x ^w ítəns-túmx-as	3S-1S Fact.
x ^w ítəns-twít-as	3P-3SP Fact.

Penultimate primary stress and alternating secondary stress occurs in this data set, following the pattern of stress of 4 syllable words with full vowels; note that, here, the weak vowels do not occur in a position where they could affect stress.

(d) 5 syllable words

i) CECECÁCACAC

təq-ən-túmuɪ-kan	1S-2P Ind.
təq-ən-táni-ɪkan	1S-3P Ind.
təq-ən-túmuɪ-kax ^w	2S-1P Ind.
təq-ən-wít-kalap	2P-3P Ind.
təq-ən-túmuɪ-an	1S-2P F./S.
təq-ən-tánih-an	1S-3P F./S.
təq-ən-túmuɪ-ax ^w	2S-1P F./S.
təq-ən-wít-ałap	2P-3P F./S.
təq-ən-túmuɪ-as	3S-1P Fact.
təq-ən-c-ál-it-as	3P-1S Fact.
təq-ən-cíh-as-wit	3P-2S Fact.

Antepenultimate primary stress occurs in this set but there is no initial secondary alternating stress because of the weak vowel placement.

ii) CACECÁCACAC

x ^w ítəns-túmi(n)-ɪk-an	1S-2S Ind.
x ^w ítəns-túmuɪ-k-an	1S-2P Ind.
x ^w ítəns-táni-ɪk-an	1S-3P Ind.
x ^w ítəns-túmuɪ-k-ax ^w	2S-1P Ind.
x ^w ítəns-túmx-k-ałap	2P-1S Ind.
x ^w ítəns-wít-k-ałap	2P-3P Ind.
x ^w ítəns-túmin-an	1S-2S Subj.
x ^w ítəns-túmuɪ-an	1S-2P F./S.
x ^w ítəns-tán-ih-an	1S-3P F./S.
x ^w ítəns-túmuɪ-ax ^w	2S-1P F./S.
x ^w ítəns-túmx-ałap	2P-1S F./S.
x ^w ítəns-wít-ałap	2P-3P F./S.
x ^w ítəns-túmih-as	3S-2S Fact.
x ^w ítəns-túmuɪ-as	3S-1P Fact.

Antepenultimate primary stress and alternating secondary stress occurs in this data set; here, again, the weak vowels are not in a position to affect stress.

(e) 6 syllable words

i) CACECÁCACÁCAC

x ^w ítəns-túmuɪ-k-áłap	2P-1P Ind.
x ^w ítəns-túmuɪ-áłap	2P-1S P./S.
x ^w ítəns-túmx-al-ít-as	3P-1S Fact.
x ^w ítəns-túmih-ás-wit	3P-2S Fact.
x ^w ítəns-túmul-ít-as	3P-1P Fact.

In this data set penultimate primary stress and alternating secondary stress occur: an exception is x^witəns-tam-álap-as ["to whistle at" 3S-2P Fact.] but here, again, the -tam suffix, which has no counting value and is in a position to attract stress, is ignored, and the example follows the stress pattern of a five syllable word.

ii) CECECÀCACÁCAC

təq-ən-tùmuł-kálap	2P-1P Ind.
təq-ən-tùmuł-álap	2P-1P F./S.
təq-ən-tùmul-ít-as	3P-1P Fact.

Penultimate primary stress and alternating secondary stress occur where applicable; an exception is təq-ən-tam-álap-as ["to touch something" 3S-1S Fact.] but again the -tam suffix, which has no counting value and is in a position to attract stress, is ignored and the word follows the stress pattern of a five syllable word.

(f) 7 syllable words

i) CECECACÀCACÁCAC

təq-ən-tam-àlap-ás-wit	3P-2P Fact.
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ii) CÀCECACÀCACÁCAC

x ^w itəns-tam-àlap-ás-wit	3P-2P Fact.
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These two examples contain -tam suffixes which are in a position to affect stress; consequently, the -tam suffixes are ignored and these examples follow a six syllable stress pattern.

The point to be drawn here is that a nucleus projection of vowel quality is vital. Once vowel quality has been established, metrical rules can be constructed to account for the stress tendencies outlined above: that is, the alternating nature of Lillooet stress, some degree of stress initially, no (or default) stress finally, and the inability of weak vowels to accept stress (other than by default).

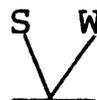
This paper contends that the following rules will serve as a predictable metrical analysis of Lillooet stress:

1. On the nucleus projection, project the quality of the vowel (A or E),
2. If A:
 - a. going from L-->R, construct binary, quantity-sensitive, left-dominant feet (Main Stress Rule [MSR]);
 - b. when binary trees can no longer be created, remove feet that do not branch by a final foot destressing rule [FFD]:
 - i. $F \rightarrow 0 / \frac{\omega}{i}] \text{word}$
 - c. make a right-dominant word tree;

- d. Stray syllable adjunction [SSA]: adjoin a stray syllable as a weak member of an adjacent foot.
3. If an E is projected in a position where an A would take stress [i.e. if, in a binary tree $S \surd W$, E is in the S node position], create a degenerate foot (hence W) which is removed from the foot structure; otherwise, a weak-positioned E can act as like a weak-positioned A ([DF]= degenerate feet).
4. If only one strong vowel is projected, that vowel must have a strong non-branching foot.

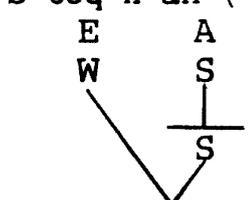
The following derivations will illustrate the working mechanisms of these metrical rules. Because of the predictable nature of the stress in the data sets, it is necessary to take only one or two examples for each syllable sets:

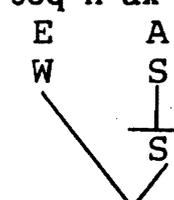
A. 2 syllable words

cún-an ("to tell, order" 1S-3S F./S.)
 A A Nucleus projection (NP)
 S W Main Stress Rule (MSR)

 Word Tree

cún-c-ax" ("to tell, order" 2S-1S F./S.)
 A A NP
 S W MSR

 Word Tree

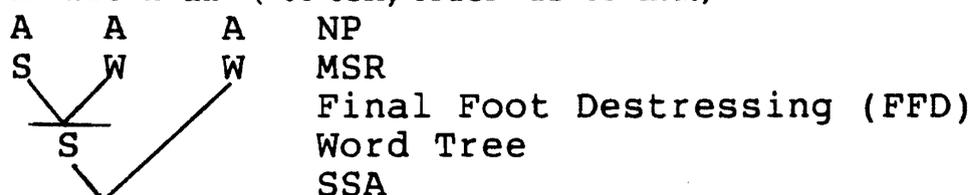
s-təq-n-án ("to touch something" 1S-2S Fact.)
 E A NP
 W S

 DF
 Word Tree
 Stray Syllable Adjunction (SSA)

təq-n-áx" ("to touch something" 2S-3S F.S.)
 E A NP
 W S

 DF
 Word Tree
 SSA

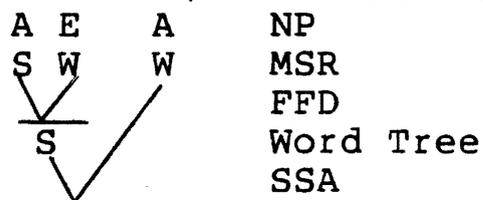
These examples illustrate the necessity of Rule 4 (If only one strong vowel is projected, that vowel must have a strong non-branching foot). These examples also show that it will be necessary to have a final foot destressing rule instead of an extrametricality rule because, in certain cases, it is necessary to have a final strong foot. If an extrametricality rule were in place, it would not be able to account for these final strong feet.

B. 3 syllable words

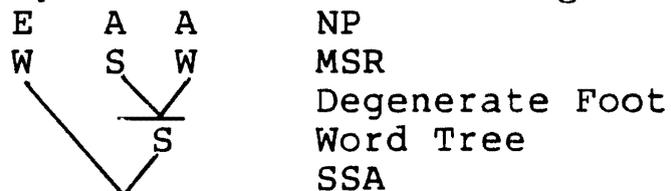
cún-wit-k-ax^w ("to tell, order" 2S-3P Ind.)



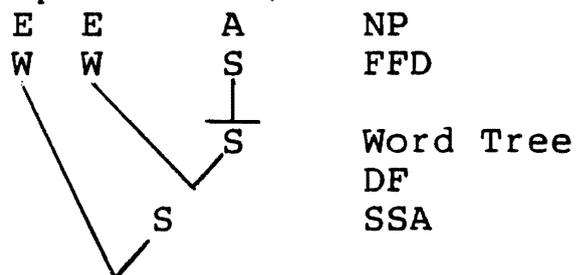
x^wítəns-an ("to whistle at" 1S-3S F./S.)



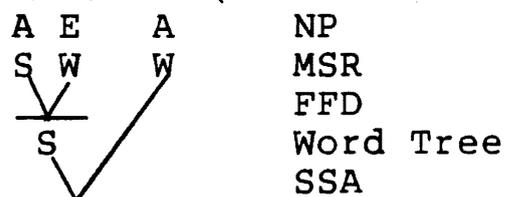
təq-n-ít-as ("to touch something" 3P-3SP F./S./I.)



təq-ən-c-káx^w ("to touch something" 2S-1S Ind.)

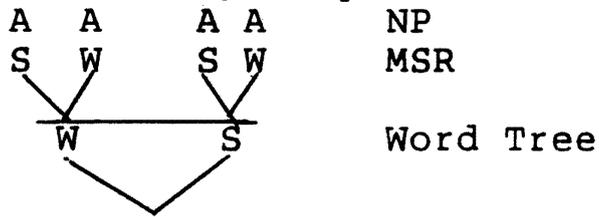


x^wítəns-ax^w ("to whistle at" 2S-3S F./S.)

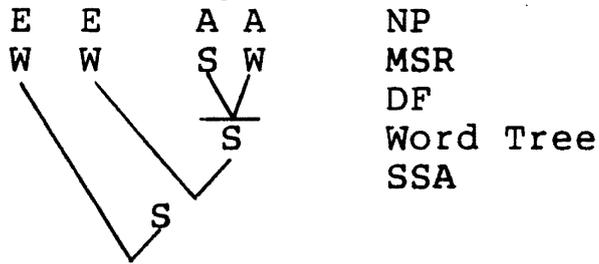


C. 4 syllable words

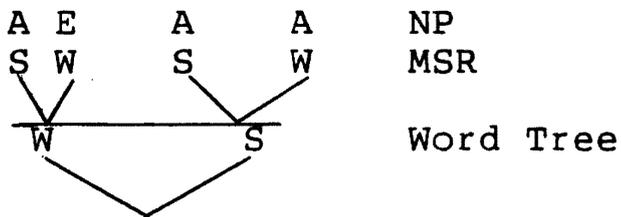
cùt-un-ikálap ("to point at" 2P-3S Ind.)



təq-ən-c-álap ("to touch something" 2P-1S Ind.)

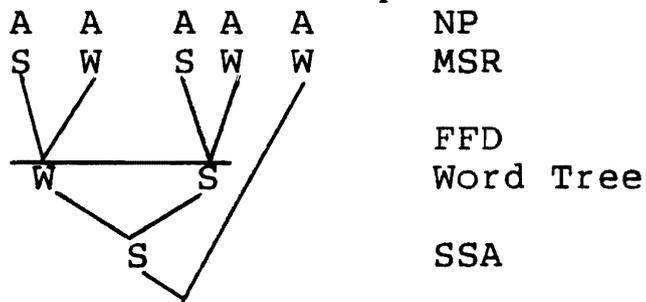


x"ítəns-wít-k-an ("to whistle at" 1S-3P Ind.)

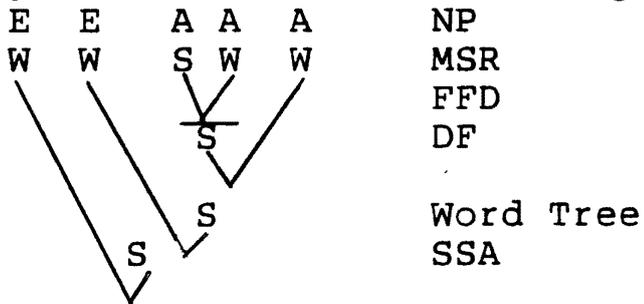


D. 5 syllable words

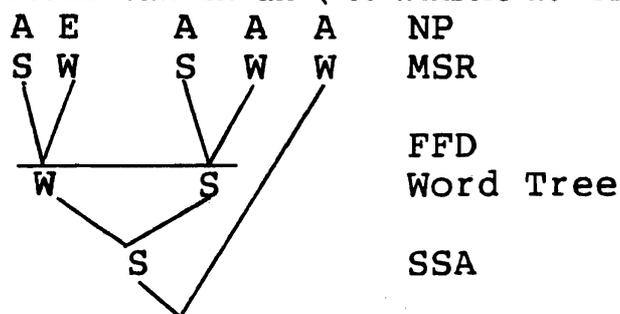
cùt-un-túmuł-as ("to point at" 3S-1P Fact.)



təq-ən-túmuł-as ("to touch something" 3S-1P F./S.I.)

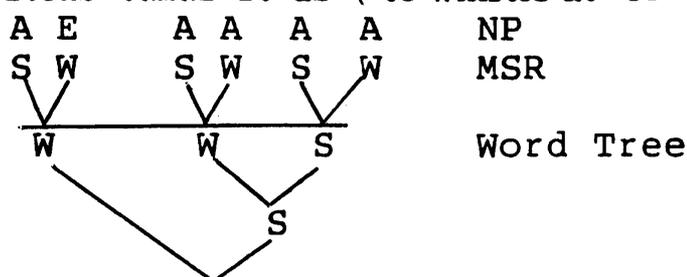


x^witəns-tán-ih-an ("to whistle at" 1S-3P F./S.)

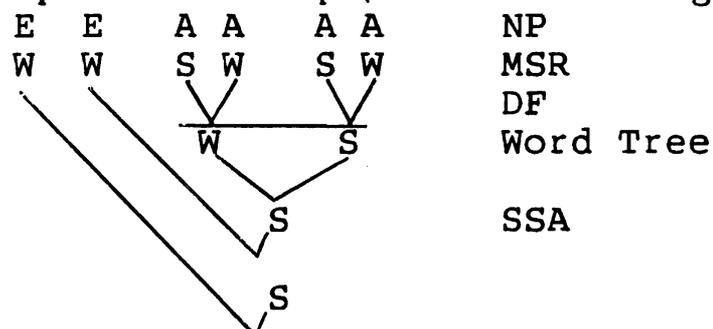


E. 6 syllable words

x^witəns-tùmł-ít-as ("to whistle at" 3P-1P F./S.I.)



təq-ən-tùmł-kálap ("to touch something" 2P-1P Ind.)



6. EXCEPTIONS, SHORTCOMINGS, AND DISCLAIMERS

It is at this point that it must be noted that this paper is, as yet, an introductory, exploratory analysis of Lillooet stress. The research in this paper is based on a set of four verbal paradigms (174 pieces of information) which have exhibited a relatively high degree of predictability. Although the data in this paper provide compelling evidence for the proposed analysis, it may be shown that, in a further analysis of a larger set of data, these metrical rules may not account for all cases.

7. CONCLUSION

The major conclusion drawn from this research is that, in Lillooet, it is the nucleus of a syllable that is vital to the placement of stress. Nucleus projections, which are the formal apparatus for accounting for strong and weak vowels, while indicating the alternating nature of Lillooet stress, also indicate the inherent inability of weak vowels to accept stress. This inability results in default mechanisms when a weak vowel occurs in the position where stress would normally fall.

Having abandoned an extrametrical analysis in favour of a final foot destressing rule to account for final, strong, non-branching feet, it becomes apparent that the inability of weak vowels to accept stress plays an important role. An examination of the stress patterns for the varying syllable lengths provides for three conclusions: (1) primary stress moves from left to right; (2) when analysing secondary stress, the initial syllable plays an important role; and (3) a default mechanism occurs when a weak vowel occurs in the position where stress would normally fall. A projection from these conclusions is that a metrical analysis can account for this remarkably complicated stress system with just a few rules and that these rules share many properties with stress in other languages, even though the surface facts may appear quite different. These conclusions coupled with metrical theory can provide a relatively simple analysis of stress in Lillooet.

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**SEMANTICS OVER SYNTAX—AMBIGUITY AS A
PSYCHOLINGUISTIC NON-PROBLEM**

Ronald A. Hoppe and Joseph F. Kess

Department of Psychology and Linguistics
University of Victoria
Victoria, British Columbia, Canada

Much of the research in the psycholinguistic investigation of ambiguity argues that ambiguous sentences are processed differently than more typical sentences. Also, much of the research used sentences in isolation or with a brief context. But in normal discourse, context is of an extended macrothematic type. We changed two classic experiments of ambiguity by adding context which had a general framework that established semantic constraints within which a given syntactic structure and ambiguity was to be processed. The processing of ambiguous sentences tended not to be different than the processing of normal sentences. This paper summarizes the results of two studies that examined the effects of semantic context on the eradication of multiple meanings when processing ambiguous sentences within a thematic whole including the possibility that the multiple meanings are processed unconsciously.

Support for the notion that more than one meaning of an ambiguous sentence is processed has come mainly from studies which have presented the sentences in isolation in the tradition of treating the sentence as the unit of language. This tradition tended not to appreciate that normal discourse involves inferences from verbal and nonverbal context as well as one's past experience. Most of the experiments that did use context did not have an extended context but instead had a brief prior context of a sentence or even simply previous words within the ambiguous sentence. Semantic constraints play an important role in providing an overall structure in which sentence processing occurs in typical discourse. We supplied such semantic constraints by providing a thematic context wherein ambiguous sentences occurred with the expectation that only a single meaning of the ambiguous sentence would be processed and, therefore, the ambiguous sentence would not be truly ambiguous to the processor.

The procedure in both experiments was to auditorily present ambiguous sentences preceded by a thematic context. The first experiment used a dichotic listening task in order to detect whether more than one meaning was being processed unconsciously and the second experiment used a phoneme monitoring task. Both examined the possibility of the unconscious processing of more than one meaning.

The dichotic listening task was devised by Lackner and Garrett (1972) who used it in a classic study of the processing of multiple meanings of ambiguous sentences presented without context. Ambiguous sentences were presented to one ear and disambiguating sentences to the other unattended ear. The disambiguating sentences were of two types, one disambiguated a particular meaning of the ambiguous sentence and the other disambiguated the other meaning of the same ambiguous sentence. Most of the time the subjects reported a

meaning of the sentence that was consistent with the disambiguating sentence thereby supporting the notion that both meanings were available when the ambiguous sentence was being processed. In our experiment each of the ambiguous sentences was preceded by a thematic context that biased one meaning of the ambiguous sentence. The sentences were either lexically or structurally ambiguous of the surface and underlying types. One-half of contexts biased a meaning consistent with disambiguating sentence and the other half biased a meaning which was inconsistent with the meaning of the disambiguating sentence. Generally, the subjects perceived the meanings that were consistent with the context rather than those that were consistent with the disambiguating sentence. It is apparent that the context provided semantic constraints that permitted only one meaning of the sentence to be processed so much as to eliminate the effects of the disambiguating sentence. The effects of the context was same for both lexical and structural ambiguities.

Another classic experiment that supported a multiple meaning interpretation of ambiguity processing was that of Foss (1970) (extended by Foss and Jenkins, 1973), who used a phoneme monitoring technique. Typically, the reaction times to monitored phonemes was longer when the phoneme followed a lexically ambiguous word than when it followed an unambiguous control word. The effect still occurred when the ambiguous word was preceded by a biasing context within the same sentence (Foss and Jenkins, 1973).

As with the dichotic listening study we expected that semantic constraints provided by a thematic context would prevent more than one meaning to be processed. Subjects were given structurally ambiguous sentences to monitor for a phoneme which occurred following the ambiguity, and they were also given unambiguous control sentences similar to the ambiguous sentences and monitored for the same phoneme occurring in the same position. Some of the sentences were preceded by a thematic context and some were not. Generally, the reaction times to the phonemes in ambiguous sentences were longer than in unambiguous sentences. However, these differences were not significant when the sentences were preceded by the contexts. The results of Foss (1970) were replicated for one of the no-context conditions where the reaction times were significantly longer in the ambiguous sentences than in the unambiguous sentence, but were not replicated in the other non-context condition. To summarize, we found that when ambiguous sentences were preceded by a thematic context, it did not take significantly longer to react to a critical phoneme than when the sentences were unambiguous.

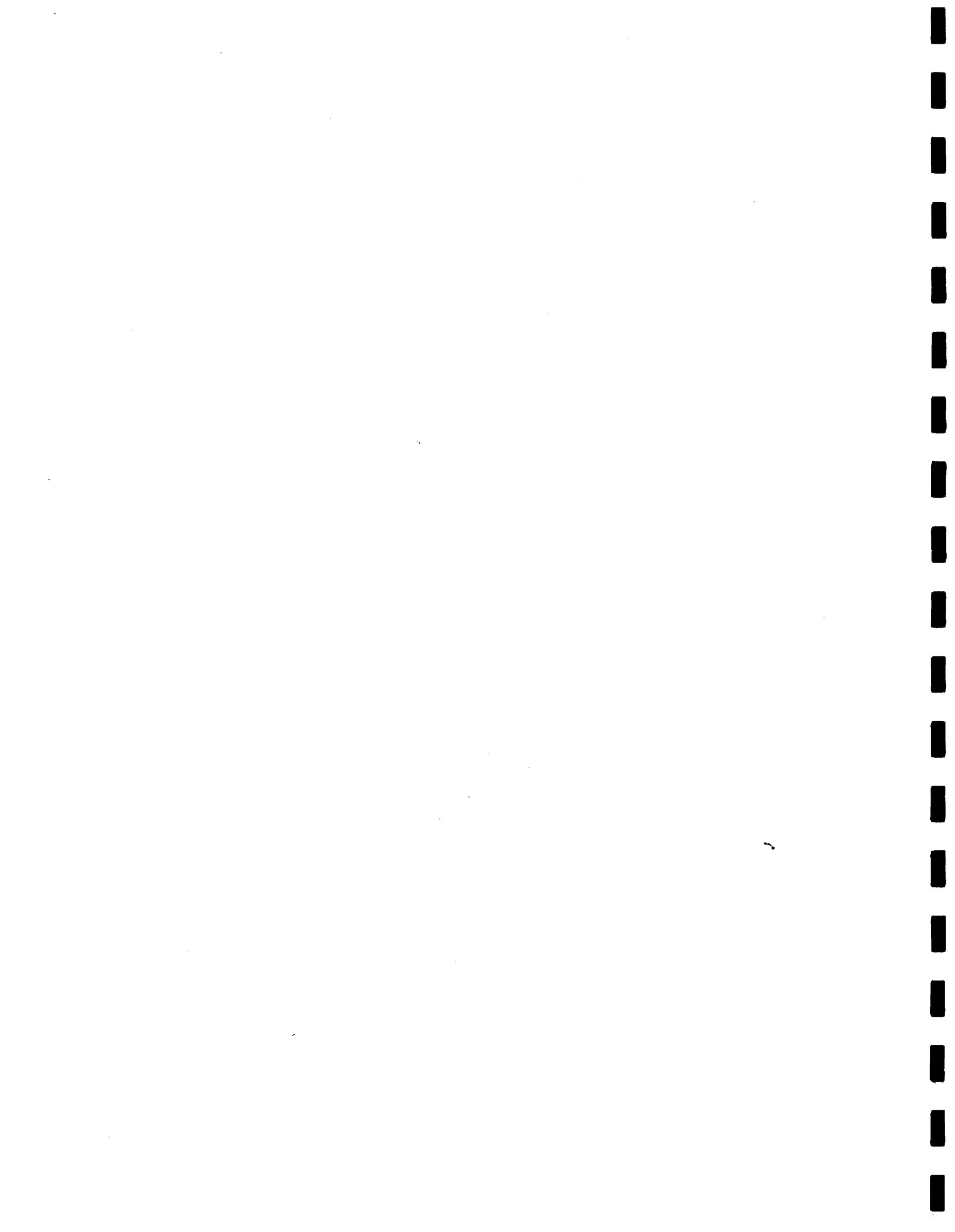
Both of the experiments provide support for the single reading hypothesis of processing ambiguity in ordinary discourse when the ambiguity does not occur in isolation but occurs within a semantically constraining context. The dichotic listening study does not imply that the single meaning is selected prior to or post to the ambiguity. However, the phoneme monitoring study supports the notion that the single meaning is selected prior to the ambiguity.

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ENDNOTES

- ¹An extended version of this article will appear in the *Journal of Pragmatics*.



LES EMPLOIS DE 'TIENS' INTERJECTIF EN LANGUE FRANCAISE

E. M. HERIQUE

Department of French Language and Literature
University of Victoria

1. APPROCHE THEORIQUE

Le but de cette étude sur 'tiens' est de proposer un schéma abstrait rendant compte des différents effets de sens et des environnements syntaxiques de 'tiens'. Nous allons recenser ces effets de sens tels qu'ils sont donnés dans les études déjà faites, et proposer une classification plus exhaustive telle qu'elle apparaît à partir du corpus.¹ Pour qu'un tel schéma explicatif soit valable, il doit figurer une constante qui ne se colore que du fait de situations différentes. Nous verrons que les sens de 'tiens' sont très différents les uns des autres; la question sera de voir ce que le locuteur fait en disant 'tiens', et ce qu'il utilise en langue, en sémantique profonde, pour manifester tant de sens différents. Imaginons l'exemple suivant:

- (1) A - *Pierre n'est pas là.*
B - *Tiens!*

B peut 1) exprimer un étonnement sincère, 2) suggérer que la chose n'est pas étonnante (ironie), 3) insinuer que la remarque ne l'intéresse pas, ou 4) contredire A et, voyant Pierre venir, indiquer qu'il arrive juste.

Il est donc inutile de parler de contenu lexical ou explicite propre à 'tiens' dans un tel énoncé. Tout le sens spécifique vient du positionnement opéré par le locuteur par rapport à la situation d'énonciation. Oswald Ducrot, entre autres, s'est penché avec un certain nombre de collaborateurs sur ce type d'approche et propose des études de cas précises dans Les Mots du Discours.² Sa démarche est une aide précieuse à l'étude des interjectifs. Il s'intéresse à "des mots qui ne sont pas destinés à apporter des informations, mais à marquer le rapport du locuteur et de la situation" (op. cit. p. 131). Cette définition s'applique au phénomène interjectif. Bien que les expressions qu'il étudie ne soient pas toutes des interjections, elles fonctionnent toutes par rapport à la situation d'énonciation. De même, nous chercherons à déterminer la fonction jouée par le mode interjectif dans le langage, afin de voir les différents effets de sens répertoriés comme une fonction unique qui prend différentes significations dans différents contextes.

2. LES SENS TRADITIONNELLEMENT ATTRIBUES A 'TIENS'

Il n'y a pas à notre connaissance d'étude détaillée faite à ce jour sur l'interjection 'tiens'. Les dictionnaires, cependant, renseignent assez bien sur la façon dont 'tiens' a été perçu (et interprété) au cours des trois

derniers siècles.

Il a fallu attendre Le Quillet en six volumes de 1963 pour trouver une entrée propre à 'tiens'. Depuis, les grands dictionnaires consacrent un passage important et détaillé sur 'tiens', même s'ils choisissent le plus souvent de le mettre sous le lemme 'tenir'. C'est le cas du Grand Robert qui consacre dans sa deuxième édition en neuf tomes de 1985 (Grand Robert de la Langue Française = G.R.L.F.) un article de 32 lignes sur 'tiens' avec 27 exemples ou citations. Signalons que ce dictionnaire est le seul à faire de l'équivalent exclamatif méridional 'té' une entrée de dix lignes avec deux exemples. Le Grand Larousse, lui, a toujours réservé à 'tiens' un paragraphe spécial depuis 1933 au moins, mais sans jamais en faire une entrée spéciale.

D'une manière générale, le statut donné à 'tiens' par les lexicographes décroît au fur et à mesure que l'on va loin dans le passé. 'Tiens' apparaît souvent sous la forme d'une rubrique courte qui se trouve presque toujours placée à la fin de la description du premier sens de 'tenir' ("avoir en main"). Le Litttré y consacre ainsi trois lignes, et le Dictionnaire Universel (D.U.) de Furetière (1690) cite juste un datif au même endroit (ex. (2) ci-dessous).

Pour ce qui est des sens décrits pour 'tiens', ils se résument, pour l'ensemble des dictionnaires cités, à trois sens principaux:

I - le don d'un objet (datif pur):

(2) *"Tenez, je vous donne cela".*

(D.U.)

II - l'insistance, moyen d'attirer l'attention:

(3) *"Tiens, passe-moi une cigarette".*

(G.R.L.F.)

III - la surprise:

(4) *"Tiens!... que c'est drôle!"*

(Larousse du XX^e siècle)

Dans leur ensemble, les dictionnaires proposent un alignement de sens parfois très proches, sans synthèse le plus souvent. Par exemple, le Larousse en trois volumes de 1966 cite quatre sens:

a) prends, prenez:

(5) *tiens, voici un livre.*

b) écoute, écoutez:

(6) *tenez, tous vos discours ne servent de rien.*

c) vois, voyez (pour attirer l'attention):

(7) *tenez, le voilà là-bas.*

d) tiens (seulement) pour exprimer la surprise:

(8) *tiens!... que c'est drôle!*

Or les sens b) et c) sont identiques: il s'agit de ponctuer ce que l'on va dire par une expression d'insistance, ou, comme disent certains dictionnaires, d'attirer l'attention. 'Tiens' est traduisible par 'écoute' ou 'vois'; ces verbes ne sont pas toujours interchangeables, mais l'effet de sens produit est identique. Les dictionnaires bilingues sont très intéressants à cet égard

car ils donnent justement des traductions, des explications des sens de 'tiens'. Les traductions proposées pour l'anglais et l'allemand sont soit des variations sur les couples 'voir/regarder' et 'écouter/entendre', soit des formes explicitées renforcées parfois d'une autre interjection. Dans l'ensemble, l'interjection 'tiens' reste une réelle difficulté dans la traduction en un bon nombre de langues.

Le Quillet et le G.R.L.F. font une opposition grammaticale entre un emploi absolu des deux impératifs du verbe 'tenir' et un emploi purement interjectif. Le premier emploi recouvre notre sens datif et, dans Le Quillet, va jusqu'au sens d'intensif; une entrée spéciale y est faite pour l'emploi strictement interjectif. Le G.R.L.F. semble être plus logique car il part d'une opposition entre le sens propre (impératif absolutif: 'tiens'='prends') et le sens figuré qui aboutit à tous les autres sens purement interjectifs. L'opposition est plus exacte, puisque c'est précisément une distanciation progressive du sens premier et propre ("prends cet objet") qui permet tous les autres emplois en tant que "simple interjection". Nous n'utiliserons pas cette distinction qui tient plus compte d'un souci de logique grammaticale que de la réalité sémantique des emplois. Enfin, un des sens parfois attribué à 'tiens' semble plus relever d'un contexte d'emploi que d'un sens particulier: 'tiens' servirait à "finir" une discussion" comme le dit le Lieutenant-Colonel de Thomasson dans son ouvrage Les Curiosités de la langue française. Et de citer en exemple:

(9) - *'Tiens' ou 'Tenez', voilà trois francs.*³

Le Quillet donne également ce sens sous la mention "absolutif", citant un exemple plus éclairant:

(10) - *Tenez, je vais vous proposer une combinaison.*⁴

Ce sens tient beaucoup plus de la situation spécifique que du sens générique. Il est révélateur d'une sélection assez arbitraire des sens qui se rapproche plus de la traduction au cas par cas.

3. DISTINCTION DE HUIT EFFETS DE SENS

Après dépouillement de notre corpus, il apparaît un certain nombre de sens irréductibles les uns par rapport aux autres. Les catégories mentionnées en 2. regroupent les sens les plus évidents, mais semblent insuffisantes: certains sens récents, apparaissant surtout à l'oral, nécessitent une révision des catégories. Celles que nous proposons sont plus des pôles entre lesquels un exemple peut osciller que des cases où irait clairement tel ou tel énoncé. Les huit catégories que nous proposons correspondent à un type d'action du locuteur par rapport à une situation donnée. Les zones sémantiques ainsi définies marquent toutes une attitude différente (donc un acte de parole différent) du locuteur par rapport à son interlocuteur.

3.1 Datif pur:

Le don d'un objet est historiquement et étymologiquement le premier type d'acte indiqué par 'tiens'. Il s'agit du sens unique cité par Furetière.

Nous l'appellerons le sens 'datif', ou 'datif pur'. Le locuteur donne un objet concret à l'interlocuteur et lui indique de le prendre. Il n'y a pas de sens abstrait, pas d'insistance, pas d'acte doublant ou modifiant le don effectué: la situation livre son propre sens et le locuteur la dit. L'équivalent non interjectif serait 'prends':

- (11) Eve expose à Adam ses découvertes grâce au fruit défendu, et lui en propose:

*Tenez, mangez sans tarder plus,
Puis nous irons entre nous deux,
Car nous aurons telles vertus
Que nous serons comme deux dieux.*

(I.G.L.F. Mistère du Viel Testament ch. II, 1.1159
t. I p. 48)⁵

- (12) *Vella, dame, tenez, argent.*
(id. XXXI, 27973 IV 39)

- (13) (*Il prend la lettre, rompt le cachet et la présente à Robert.*)
Tiens, lis et juge-moi.
(LA MARTELIÈRE Robert, chef des brigands. 1793 p. 47)

3.2 Datif à valeur modale:

Le deuxième sens provient d'une abstraction du sens premier: le locuteur utilise ce sens concret pour en faire une transposition à de l'abstrait. Il met en relation l'interlocuteur non plus avec une chose concrète, mais avec un élément abstrait: un corollaire de cette opération est une certaine intensification, la désignation ayant la valeur de différenciation, d'opposition: ce qui est indiqué, c'est le choix, la décision du locuteur. L'aspect fonctionnel qui pouvait caractériser le pôle concret de 'tiens' n'est plus pur, puisqu'il s'agit d'une désignation psychologique, mettant en cause non plus une circonstance extérieure mais un certain choix du sujet parlant.

Ce sens de choix, de décision dans une conversation, accompagne en réalité la plupart des datifs. 'Tiens' devient un accent mis sur la décision de donner; il exprime plus la décision que le don, et la décision peut porter sur tout élément du contexte:

- (14) *Tiens, le voilà ton litre. Il jette rageusement la bouteille.*
(BERNANOS M. Ouine. 1943 p. 1 397)

Pour cet exemple, 'tiens' est chargé du désir qu'a le locuteur de faire changer la situation. Elle traduit plus la brusquerie que le don. Ici, comme dans beaucoup de cas, la syntaxe sera bouleversée au profit de l'expressivité ("le voilà ton litre"), et un commentaire à propos du locuteur vient expliciter la teneur à donner à 'tiens' (adverbes ou locutions adverbiales, adjectifs. Ici: "rageusement"). Dans l'exemple suivant, 'tiens' est bien un datif, et pourtant son sens total ne se comprend que comme décision prise dans une certaine situation:

- (15) [Daniel discute avec Philippe, et lui demande sur un ton plus ou moins accusateur pourquoi il s'est enfui, puis pourquoi il voulait se tuer. Philippe répond:]

- *Ce serait trop long à vous expliquer.*
- *Qu'est-ce qui te presse? dit Daniel. Tiens, verse-toi du whisky.*
(SARTRE La Mort dans l'âme. 1949 p. 127)

Daniel donne bien le whisky à Philippe en disant 'tiens'. Pourtant ce 'tiens' est chargé de la situation énonciative et veut dire aussi: "Je suis décidé à te faire parler."

Il y a un exemple caractéristique à ce sens de 'tiens'; c'est le cas où un coup est donné en disant 'tiens'. D'une part, le sens datif est bien réel: on donne des coups à ..., mais ce sens est abstrait car il ne s'agit plus d'un objet. D'autre part, le fait même qu'il s'agisse de coups fait référence obligatoirement à l'intention du locuteur/acteur: il veut se venger, il est désespéré, il est à bout, etc... Et s'il frappe sans être affectivement impliqué il ne dira pas 'tiens': l'on imagine mal un boucher dire "Tiens (prends ça)!" chaque fois qu'il tue un animal ou le découpe, à moins qu'il ne s'agisse d'un boucher particulièrement pervers.

3.3 Valeur phatique:

Un troisième sens est le sens, souvent mentionné dans les dictionnaires, d'"attirer l'attention" (de l'interlocuteur). L'action/intention du locuteur est ici toujours en évidence: nous la prendrons comme caractéristique de ce troisième pôle sémantique; la désignation d'un objet ou de toute autre référence matérielle a disparu. A tel point que l'on arrive à des énoncés totalement contradictoires du point de vue de la sémantique lexicale classique:

(16) *Tiens, tu peux m'apporter un couteau, s'il te plaît?*

(17) *M. Brun (au chauffeur):*

- *Tiens, petit, donne-moi encore un croissant.*

(PAGNOL Fanny. 1932 p. 10)

Le sens de datif de 'tiens' doit être totalement abstrait de la situation puisqu'il ne concerne ni le couteau ni le croissant, qui au contraire sont demandés et non pas donnés par le locuteur. Seule reste la décision d'intervention du locuteur, qui peut s'expliquer par une foule de contextes situationnels.

3.4. Appui d'un exemple, d'une preuve:

Le sens 4 se trouve essentiellement dans deux contextes: l'exemple et la preuve. Les deux sont un datif, c'est-à-dire qu'il y a présentation objective d'un donné. Mais ce donné n'est pas un objet concret, bien qu'il puisse y faire référence dans le cas de la preuve. Insistons, pour bien distinguer ces deux sens de tous les autres, qu'ils peuvent ne porter aucune nuance d'étonnement ni d'insistance partisane. D'où un certain ton de neutralité parfois, une idée de collaboration entre le locuteur et l'interlocuteur devant la découverte objective d'une preuve ou d'un exemple. Si le locuteur est plus passionné et défend à toute force un point de vue, il n'y a plus mention de preuve, mais argumentation (sens 5). Les exemples, peu nombreux, sont souvent à vérifier scrupuleusement pour s'assurer de leur caractère d'objectivité:

- (18) [Mainville: "Je t'enverrai une lettre..."]
 Oh! Un mot, un simple mot, venant d'un peu loin, pas trop -
 tiens, le Caire, par exemple, ou Port-Saïd.
 (BERNANOS Un Mauvais rêve. 1948 p. 972)
- (19) Mais j'étais fait pour être autre chose que je suis, comprends-tu?
 - Je ne sais quoi... tiens! une truite dans l'eau du moulin,
 quelque chose de frais, de pur...
 (BERNANOS M. Ouine. 1943 p. 1 437)
- (20) [dans cette comédie en vers, Charle (sic) et M. Dubriage, célibataire
 âgé, discutent des avantages du mariage. Charle fait une peinture
 sombre du célibat. M. Dubriage:]
 Voilà ce que j'éprouve;
 Et c'est précisément l'état où je me trouve:
 Et, tiens, mes gens me sont fort attachés, je croi;
 Mais je les vois tous prendre un ascendant sur moi!...
 (COLLIN D'HARLEVILLE Le Vieux célibataire. 1792 p. 26)

Ce sens n° 4 se trouve surtout dans la littérature d'il y a deux siècles, comme ce dernier exemple. Tout comme le sens datif, non-interjectif, ce sens a pris la plupart du temps une coloration affective, partisane ou polémique. En (20) les deux locuteurs abondent dans le même sens et ne s'opposent nullement. Ce style, qui est le style de la pièce et même de toute une époque littéraire donne à 'tiens' un sens de familiarité amicale, presque de confiance qui serait mieux exprimée au 20^è siècle par "ma foi" ou "je crois bien que..." Ou encore, si je veux interpeller l'interlocuteur, je dirai "vous voyez", ou "voyez-vous".

3.5 Argumentation:

Le cinquième sens, l'argumentation, se trouve dans un grand nombre de cas. Qu'il introduise un exemple, une preuve, une opinion ou le rappel d'un fait, 'tiens' a essentiellement une valeur polémique. Le sémantisme de la situation confère à 'tiens' une valeur d'opposition par rapport à l'interlocuteur. Un critère aide à détecter ce sens: l'énoncé contenant 'tiens 5' doit normalement appeler une réplique, une critique, bref, une réponse poursuivant la polémique. Un énoncé contenant un 'tiens 5' ne termine pas une argumentation, pas plus qu'il ne l'initie.

Souvent 'tiens 5' ajoute un argument, place un exemple qui alimente une polémique en cours ou introduit une preuve qui vise à contredire. C'est ce qui distingue l'exemple (20) des suivants:

- (21) Tiens, depuis que je te parle, il doit en être au moins à la rougeole.
 (GIRAUDOUX Electre. 1937 p. 126)
- (22) Je veux dire: pas sur la mer. Qu'il navigue comme toi, tiens! Sur
 le vieux port. Ou sur les rivières, ou sur les étangs, ou... et
 puis nulle part, ...
 (PAGNOL Fanny. 1932 I, 1)

Ces exemples montrent clairement une opposition entre les sens 5 et 4, mais aussi entre 5 et 3: 'tiens 3' est une ponctuation fonctionnelle admise comme telle par le locuteur et l'interlocuteur, et 'tiens 5' est fortement modalisé,

c'est-à-dire qu'il exprime directement l'empreinte du locuteur à propos d'une opinion. Quand à l'opposition entre argumentation (sens 5) et datif (sens 1 et 2), elle est claire puisque 1 et 2 font toujours référence à un objet matériel environnant, tandis que 5 en est totalement abstrait, tout comme 3 et 4. Les sens 1 et 2, eux, s'opposent à tous les autres en ce qu'ils désignent un objet concret.

3.6. Argumentatif absolu:

Le sens 6 est une condensation, une concentration du sens 5. Disons pour le moment que la différence est au moins une question de degré, et que les exemples relevés suggèrent une différence caractéristique de sens entre une argumentation progressive (sens 5) et une argumentation absolue (sens 6). A tel point que 'tiens 6' est un énoncé qui se suffit souvent à lui-même, se rapprochant en cela d'une pro-phrase, et qu'il a ses caractéristiques intonatoires propres: ton bas, accent d'insistance, temps de pause avant et après l'interjection. Il y a peu d'occurrences de 'tiens 6'. L'exemple suivant, magnifique par sa clarté, est le plus caractéristique du corpus:

- (23) Pour l'émission télévisée "Apostrophes", Jacques CHANCEL et Raymond DEVOS s'envoient des piques sous la forme d'un sketch improvisé.
 J. C. accuse R. D. d'être ridicule:
 R. D. - *Moi je suis ridicule, mais alors vous, vous êtes grotesque.*
 J. C. - *Je suis grotesque??*
 R. D. - *Tiens!!!*
 [Ton grave; très fort accent d'insistance; suivi d'une pause.
 Paraphrases: "Eh pardi!", "bén bien sûr (que oui)". Noter le vouvoiement dans tout le dialogue.]

Souvent un 'tiens 6' sera teinté d'agressivité ou pourra exprimer la rancune:

- (24) *Tiens, dit celui-ci au gardien-chef, tu vas voir ce salaud-là!
 Il a encore recommencé,...*
 (DRUON Les Grandes Familles. 1948 p. 250)
- (25) [Conan raconte avec animation la guerre, sur les lieux mêmes des combats, à un ami:]
... T'entendais les Bulls causer dans leur trou, rigoler, parfois, à cinq pas de toi! T'étais là, couché, ton sifflet entre les dents. Tu savais que tu les possédais d'avance... Tu jouissais, tiens!... Et puis, tu te décidais! Ton coup de sifflet, ça dressait d'un coup cinquante types qui tombaient dans la tranchée comme le tonnerre de Dieu!
 (VERCEL Capitaine Conan. 1934 p. 209)

On trouve 'tiens 6' à l'oral surtout ou, à l'écrit, assez récemment seulement, et plus particulièrement chez Sartre. Il est de fait lié à un certain cynisme propre aux individualités sans fard décrites dans l'existentialisme littéraire, et représente dans notre grille d'analyse le mode qui tient compte le plus de la réalité énonciative: le locuteur dit sans masque et sans ambiguïté sa façon de réagir par rapport à un énoncé. Sa réaction est toujours une affirmation claire et énergique de ce qu'il pense, à tel point qu'elle ne laisse pas vraiment de place à une réplique, à une poursuite de l'argumentation: Si 'tiens 5' est un 'argumentatif', nous devons appeler 'tiens 6' un "argumentatif

absolu". Les dictionnaires font peu mention de ce sens. Seuls le Robert et le Larousse citent l'expression "tiens donc!" sous la rubrique 'régionalisme' (G.R.L.F.) ou 'familier' (Grand Larousse: "exprime une désapprobation ironique, un refus"). Nous traiterons séparément de la question de l'ironie. Disons pour l'instant que le sens 6 est bien une désapprobation franche, un refus catégorique non dissimulé, bref, une présentation comme absolue d'une réalité décrite par le locuteur.

Dans l'exemple (24), 'tiens' expose la rancune du locuteur. Cette rancune est exposée sans vergogne, et son ton absolu confère leur force aux implications argumentatives du locuteur. Le schéma "Tiens - tu vas voir" est à mettre en parallèle avec un autre schéma syntaxique courant: "Tiens - voici/voilà/tu vois/regarde". Le verbe de perception suggère un référent objectif, extérieur, absolu (que l'on retrouve explicitement en 'tiens l'); le futur implique une prise en charge de ce référent objectif par le sujet parlant. En (23) nous retrouvons aussi deux éléments: 1) le point de vue subjectif du locuteur, et 2) le côté objectif du contenu ('voir'): le stratagème de R. Devos est de présenter comme évident le contenu de son opinion aux yeux des autres participants qu'il prend ainsi à témoin, leur suggérant de 'voir' le grotesque tel qu'il est. Notons que, de tous les sens de 'tiens', c'est en 'tiens 6' que l'on perçoit la plus forte expression de la subjectivité. C'est donc un terrain d'investigation privilégié pour étudier le paradoxe de 'tiens', qui apparaît comme un binôme subjectif/objectif.

3.7. Etonnement:

Le sens 7, l'étonnement, est le sens qui vient toujours en premier à l'esprit d'un francophone à qui l'on parle de l'interjection 'tiens'. Vient ensuite le sens n° 8, qui est celui de l'ironie. Dans l'optique d'une évolution sémantique constante au cours des âges, peut-être faut-il voir là les sens privilégiés de 'tiens' en cette deuxième moitié du 20^e siècle?

Tous les dictionnaires modernes font état du sens 7, également bien attesté par Léon Clédat (tous articles) qui prétend être le premier à distinguer l'"appel à l'attention" et l'étonnement.⁶ Il est vrai que Le Littré cite l'exemple suivant avec pour seule mention: "familièrement", alors qu'il s'agit en fait, selon toute évidence, d'un cas de surprise:

(26) *Tiens! je ne m'y attendais pas.*
(Littré vol. IV 'tenir' p. 2181)

De même, Littré ne mentionne pas, alors que tous ses successeurs le font, l'invariabilité de 'tiens' exprimant la surprise. On ne peut pas dire, en s'étonnant:

(27) **Tenez! mais il pleut!**

Notons avec Léon Clédat (art. cit.) que F. Brunot ne fait aucune mention de 'tiens!' dans son chapitre sur l'étonnement de La Pensée et la langue où il cite pourtant en note une douzaine d'exclamations.⁷

Les exemples de 'tiens 6' sont très nombreux; ils représentent presque la moitié du corpus écrit au 20^e siècle. Citons entre autres:

- (28) *Rosette: - Tiens, vous! Bonjour. Où est Bruno?*
(MONTHERLANT Un Incompri. 1944 p. 411)
- (29) [Manuel retourne, pour la première fois depuis quelques mois, au restaurant de Mme Philibert, où il était un familier:]
- *Tiens, Manuel! s'écria Emma Philibert.*
- *Tiens, Maman Philibert! cria le jeune homme à son tour, imitant la voix et le geste de la grosse femme.*
(ROY Bonheur d'occasion. 1945 p. 59)
- (30) *Tiens! pensa-t-il. A l'heure qu'il est mon livre a paru!*
(BEAUVOIR Les Mandarins. 1954 p. 93)

Les exemples (28) et (29) décrivent une situation classique pour 'tiens 7': la rencontre plus ou moins inattendue d'une personne, et l'expression d'une salutation.

3.8. Répétition de 'tiens': ironie, insinuation:

L'ironie (tiens 8) pose un problème particulier, à savoir qu'elle peut teinter beaucoup des sens de 'tiens'. L'ironie opère comme un résonateur sémantique optionnel, et nous voulons parler ici des cas où elle est caractérisée, le plus souvent grâce à la répétition de 'tiens'. De façon générale, 'tiens 8' contient un jeu du locuteur sur la vision qu'il présente de la situation: le locuteur dit une chose, et laisse un indice signifiant qu'il en pense une autre. Les indices peuvent être: l'intonation, la répétition, ou une pause après l'interjection:

- (31) J. aperçoit, en évidence sur un tableau d'affichage à l'université, un prospectus annonçant une réunion plus ou moins politique. Il le découvre et s'en étonne de manière critique:
- *Tiens tiens tiens tiens!*
[pause] *Tiens tiens tiens!*
- (32) [Mlle Florentine sert Jean et Emmanuel à boire. Jean la raille et l'attaque sans pitié. Emmanuel la défend un peu et Florentine lui dit:]
- *Ca n'empêche pas que vous êtes mieux élevé que lui...*
- *Tiens, tiens! ricana Jean.*
(ROY Bonheur d'occasion. 1945 p. 130)

On peut imaginer plusieurs intonations à partir d'un exemple écrit, comme (32). Le contexte élargi, souvent aidé d'une précision sur la répartition, définit un 'tiens 8' ("ricana"). La plupart du temps il s'agira d'un 'tiens' répété: la répétition de 'tiens' lui confère un sens de surprise feinte ou accentuée, toujours exprimant le sous-entendu. C'est un retour sur la surprise, c'est-à-dire finalement l'inverse d'une surprise. Si l'ironie consiste à dire une chose pour signifier son contraire, il faut voir en "tiens tiens" une insistance sur l'expression de la surprise qui, par contraste avec la situation réelle, sera automatiquement exclue. Il y a un indice de surface qui confirme la filiation entre 'tiens 7' et 'tiens 8': "Tenez tenez!" ne peut le remplacer; or seul 'tiens 7' ne peut jamais être remplacé par la forme 'tenez'. Pour les autres 'tiens', sauf 'tiens 6', la forme 'tenez' n'est pas exclue.

4. SYNTHÈSE

Nous avons voulu, en présentant les sens de 'tiens' sous forme d'une énumération classique, rendre compte du contenu des descriptions déjà proposées par les lexicographes ainsi que du contenu de notre corpus oral et écrit. Il est évident qu'une autre organisation des sens de 'tiens' aurait pu être proposée. La nôtre est une synthèse des effets de sens recensés, présentés selon le type d'acte opéré par le locuteur dans la situation où il énonce 'tiens'. Les huit sens de 'tiens' correspondent aux actes suivants de la part du locuteur: 1. il donne; 2. il active la situation; 3. il entre en contact; 4. il justifie; 5. il défend une opinion; 6. il rabaisse son interlocuteur; 7. il exprime sa surprise; 8. il retient sa surprise, il insinue.

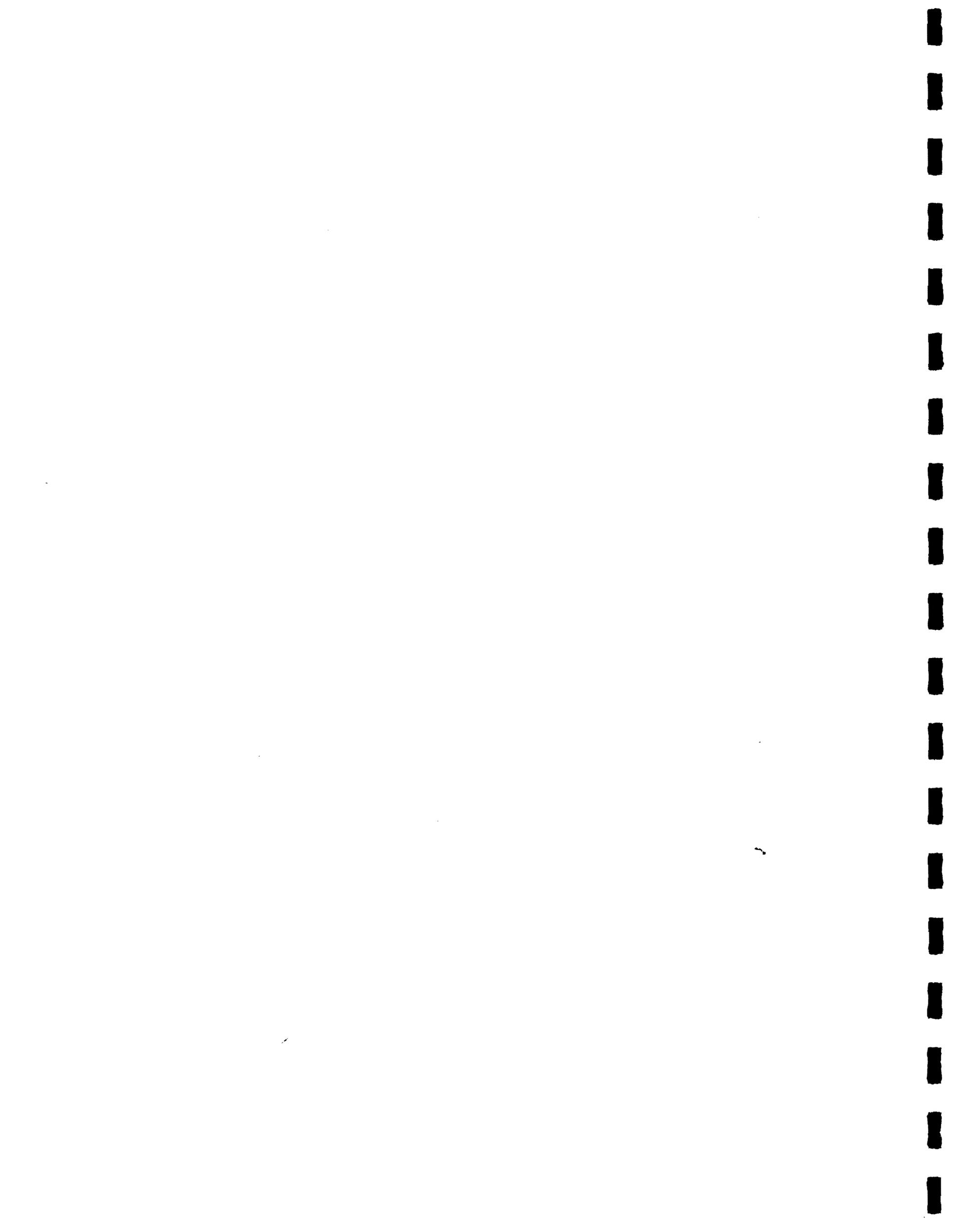
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("Affectivité" par. 22: 1-13. pp. 83-88, notamment par. 22: 6 p. 85 sur 'tiens'. Voir aussi sur 'tiens': "Conversion et transposition", par. 74: 1 et 74: 9, 5, pp. 200 et 204.)
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(Reprise d'articles. Le dernier chapitre, pp. 171-233, élabore la notion essentielle de 'polyphonie'.)

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(Ch. II: "Interjections, mots enfantins, diminutifs" I. Les interjections, pp. 38-46: nombreuses interjections citées et commentées historiquement et étymologiquement. 'Tiens' pp. 45-46.)

NOTES

- 1 Relevés oraux, corpus du Trésor de la Langue Française (T.L.F.), fichier 'Moyen Age' de l'Inventaire Général de la Langue Française (I.G.L.F.).
- 2 Oswald Ducrot et. al. (1980). Les Mots du discours. Paris: Minuit. Etude des expressions suivantes: "Je trouve que. Mais. Décidément. Eh bien. D'ailleurs".
- 3 Lt-Colonel de Thomasson. (1938). Les Curiosités de la langue française. Paris: Larousse.
- 4 Le Quillet en six volumes. (1962). 'Tenir' p. 5,686.
- 5 Pour les exemples tirés du fichier de l'Inventaire Général de la Langue Française, nous donnons les références telles qu'elles figurent sur les fiches I.G.L.F.
- 6 Léon Clédat. (1927). "Menus propos de grammaire: I - l'interjection 'tiens!'" Mélanges A. Thomas. Paris: Champion. Pp. 105-6.
- 7 Ferdinand Bruno. (1922). La Pensée et la langue. Paris: Masson. Pp. 548-9.



GRAMMATICAL USAGE: REGIONAL DIFFERENCES IN SYNTACTIC CHOICE IN CANADIAN ENGLISH*

Gaelan Dodds de Wolf

Department of Linguistics
University of Victoria

It is hypothesized that, of the social and regional factors considered important in language use, certain of these weigh more heavily than others. Thus, of all the variables influencing the nature of speech, age is said to be the most important (George 1986: 136). On the other hand, a generation ago Atwood (1953) noted that some of the more striking differences between cultivated and colloquial speech in English occurred in the conjugation of verb forms. More recently, McDavid and McDavid (1986: 366) concurred that syntactic distinctions reveal more of an informant's social and educational origins than of his or her regional background, while Lakoff (1975) has suggested the importance of gender. Which factors then are significant in the choice of grammatical variants and in the use of the traditional standard and non-standard forms?

1. INTRODUCTION

According to Warkentyne and Brett (1981: 197-199), the decline of grammatical studies in the school curriculum has left a growing uncertainty regarding a clearly defined usage, a problem intensified for Canadians facing the competing influences of both British and American models. In this context, varying viewpoints relevant to a standard in Canadian English have been expressed (Bähr 1976): the prestige view of educated speech (Avis 1973), and the preferred one of majority usage (Gregg 1973, 1984).

In recent questionnaires (Woods 1979, Gregg 1984), information has been sought concerning the choice and use of grammatical variants, and even notions of correctness (Gregg 1985: 180-182). With the data available¹ from two large-scale urban socio-dialectal studies: one in eastern Canada, of Ottawa, the capital city, with 100 informants (Woods 1979), and the other on the Pacific Coast with 240 informants, Gregg's (1984) survey of Greater Vancouver English, the question of the regional and social variability of grammatical items in areas thousands of miles apart can be examined.

To investigate such aspects of linguistic change and the correlation of variation with factors such as location, gender, generation and socio-economic status within the field of Canadian English, some thirty grammatical variables elicited from the 340 informants in the two surveys were analysed and compared. Employing matrices (Charts 1-3 below) which utilized two age (Old, i.e., 40 and over, and Young, under 40) and two socio-

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economic status groups (Group II - High, Group I - Low)² in addition to the two cities and two sexes, statistical techniques involving a loglinear analysis and logistic regression³

Chart 1. Number of Informants by Generation.

Region	Young	Old	
Ottawa	51	49	100
Vancouver	104	136	240
	155	185	T = 340

were used.

Following the extraction of the most frequently occurring variants from each of the grammatical items, the response to choice was examined in order to determine which, if any, of the independent variables might offer an explanation, while further analyses (v. Appendices 1-9) revealed the probability of factors governing individual use.

Of the thirty items studied, almost one-quarter evidenced little or no variation regionally or nationally. These included the preterite forms of the verbs *drink* and *see*, the present perfect of *bring*, the negative imperative of *let*, and contracted negatives with *do* (e.g., *doesn't he*, *doesn't any*, *not any*). Of the remainder, based on a frequency count, almost one-half of the linguistic items showed a certain similarity in usage, while the rest displayed diverging regional norms. These included problematic items such as *between you and me/I*, *to whom/who ... to*, *fewer/less + count noun*, the intensifier *really/real*, the preterites *sneaked/snuck*, *dived/dove*, the past participles *proved/proven*, *drunk/drank*, syntactic variants *didn't use to/never used to*, and the subjunctive *if it were/was*.

A few of these items, shown in Table 1, such as the grammatical variants *have you*, *used not*, *am I not*, the morphosyntactic alternations of *sneaked*, *dived*, *proved*, *lay*, *lain* and *drunk*, provide examples of the direction of social and regional linguistic change.

Chart 2. Number of Informants by Socio-Economic Status.

Region	High Status	Low Status	
Ottawa	60	40	100
Vancouver	120	120	240
	180	160	T = 340

2. SYNTACTIC VARIANTS

2.1 Have you/have you got/do you have

In the case of the variable use of *have* as either auxiliary or main verb in questions (v. Hughes and Trudgill 1979), there was close agreement in the two cities with respect to usage of the more common North American form *do you have*, i.e., approximately one-third of the informants, and again with the lesser use of the typical British social and regional variant *have you got* (25%). However, the Scotch-Irish and northern English *have you* displayed regional discrepancies with one-third of native Vancouverites employing this form. While the response to choice among these variants was made on the basis of age ($p < .001$), each variant showed differing patterns. Thus, while socio-economic status was an important factor in the use of *have you* and *have you got*, with a small but significant increase (from 1% to 3%) in the lower status group, regionally it would appear that a generational shift is occurring among the three grammatical values. For example, whereas *do you have* is the preferred form, and the prestige term (defined, in this case, through the significant interaction of sex, age and socio-economic status), among the young in both Ottawa (Young 57%, Old 18%) and Vancouver (Young 41%, Old 29%), and the form most frequently cited by young women in the eastern city, *have you got* revealed regional variation with respect to a standard since those of lower status in Vancouver (High 22%, Low 28%) along with those over forty, and those of higher status in Ottawa (High 30%, Low 18%) claimed its use. The full verb form *have you*, on the other hand, a locational preference based on age, was the prestige term among those over forty of higher status in Vancouver, and somewhat preferred among the young of low status in that city, as indicated in Table 2. This form was rare, however, among the young in Ottawa.

Chart 3. Number of Informants by Gender.

Region	Male	Female	
Ottawa	47	53	100
Vancouver	120	120	240
	167	173	T = 340

2.2 Am I not/aren't I

In the choice of the variants *am I not* and the rarely occurring Hiberno-English *amn't I* versus the preferred *aren't I* form, age ($p < .0001$) and location ($P < .04$) were the important factors. While Atwood (1953: 31) found *aren't I* rare in the eastern United States thirty-five years ago, two-thirds or more of the informants in both Canadian cities cited this as the most common form; the non-standard *ain't I*, often heard locally in Vancouver among school-aged adolescents, and seen in daily papers, was claimed by 1% or less. Though the lesser used *am I not* occurred significantly more often in Ottawa (26%) than in Vancouver (17%), among those over forty (Old 29%, Young 8%), and those of higher status (High 22%, Low 16%), especially men (Men: High 25%, Low 16%; Women: High 19%, Low 16%), the generational trend in both cities was definitely towards the more colloquial term. *Aren't I* was the preferred form of the young (86%, Old 62%), particularly those of high status (Young High 89%, Young Low 83%; Old High 62%, Old Low 63%), and of young women (93%, Young Men 81%; Old: Women 61%, Men 63%). It would seem then that while *am I not* was prestigious, particularly for men, and for those over forty, *aren't I* has become the more accepted usage among the young.

2.3 Used not/didn't use to/never used to

The negative forms with *used to*, that is *used not*, *never used to*, and *didn't use to*,⁴ were also irresolute, with the choice among forms based on location ($p < .0001$). Seventy-six percent of those in Vancouver preferred the *never used to* form. In the Ottawa data, where wording of the sentence frame⁵ allowed a large number of unusable replies, nearly half (23%) of those offering a suitable response (approximately 50%), suggested *didn't use to*, while almost a similar number admitted to the *never used to* form, and the remainder, the British *used not*.

Table 1. Grammatical Variation and Usage of Selected Items in Canadian English: Ottawa and Vancouver.*

	Ottawa (100)**	Vancouver (240)**	
		Correct	Used***
Syntactic Variants			
have you	10	39	<u>35</u>
have you got	25	18	<u>25</u>
do you have	<u>38</u>	37	<u>35</u>
am I not, amn't I	26	30	17
aren't I	<u>68</u>	66	<u>75</u>
used not, usedn't	6	4	2
didn't use to	<u>21</u>	13	13
never used to	17	76	<u>76</u>
Morphosyntactic Forms			
<u>Preterite</u>			
sneaked	32	52	<u>45</u>
snuck	<u>65</u>	46	<u>50</u>
lay	<u>67</u>	68	<u>68</u>
laid	24	27	<u>27</u>
dived	6	19	23
dove	<u>93</u>	73	<u>74</u>
<u>Perfect</u>			
has lain	<u>50</u>	55	<u>52</u>
has laid	27	37	<u>37</u>
has drunk	<u>64</u>	48	<u>48</u>
has drank	27	44	<u>43</u>
proved	8	18	19
proven	<u>88</u>	76	<u>79</u>

* Figures for missing data and infrequent variants have been omitted.

** Number of informants.

*** The figures in the second column are the percentages given by informants for the so-called correct forms, while the third column refers to the actual use as stated by individual respondents. The numbers underlined indicate majority usage or preferred values in each city.

Table 2. *Have you Usage: Ottawa and Vancouver (Location x Age x SES).*

	N	%
Vancouver Old Low	26	37
Vancouver Old High	32	49
Vancouver Young Low	17	35
Vancouver Young High	8	15
Ottawa Old Low	3	18
Ottawa Old High	6	19
Ottawa Young Low	0	0
Ottawa Young High	1	4

The overwhelming preference in Vancouver, the locational variant, *never used to*, appears, however, to be somewhat lacking in prestige in that city, although the form was favoured to a certain extent by Ottawans of higher status. Generally, *never used to* was the preferred term of older men (Old 69%, Young 49%), and young women (Young 63%, Old 55%), and those of lower status, although *didn't use to* was also frequently cited by Ottawa men (Men 35%, Women 11%; Vancouverites 13%). On the other hand, *used not*, of rare occurrence in Vancouver (2%), and uncommon in Ottawa (6%), was a prestige term for a small percentage of the population, especially those over the age of forty. Use of this term was non-existent among the young in Vancouver, however. Thus, while *never used to* was preferred in Vancouver, in Ottawa it was a term both of innovation and prestige.

3. MORPHOSYNTACTIC FORMS: PRETERITE AND PERFECT

3.1 Sneaked/Snuck (Past Tense)

The morphosyntactic forms also presented interesting regional differences. While a majority of Greater Vancouverites (52%) claimed that *sneaked* was the correct form, a certain amount of disparity was evident in use, with *snuck* clearly the preferred form in the two cities (Ottawa 65%, Vancouver 50%). Indicating a generational shift, the response to choice of the two variants was made on the basis of age ($p < .0001$). The standard *sneaked*, the preferred form for those over forty, was used significantly more often by those of higher status (High 47% to Low 34%) and men rather than women (Men 43%, Women 39%). This was also the prestige term for the older generation. The colloquial *snuck*, extremely popular with the young (Young 88%, Old 25%), and almost universal in young women, verged on being a term of low prestige. It would seem, however, that its acceptance among the young, particularly women, does not allow it to be classified as a stigmatized form.

3.2 Lay/laid (Past Tense)

In the case of the preterite of the intransitive verb *to lie* (down), distribution of the major variants, i.e., *lay* and *laid*, was based on socio-economic status ($p < .0001$), with *lay* much more apt to be used by those of higher status (High 73%, Low 55%) and age (Old 76% vs. Young 57%). A clear generation gap was perceived in both cities with a national convergence in score as shown in Table 3. Young women were leading the trend away from this form. The use of *laid*, however, while more common among the young, appeared equally lacking in prestige. Older women of high status, and men of high status

tended to use this form least. Since *lay* was plainly the preferred variant of two-thirds of the informants in both cities, and the prestige choice, it seems unlikely that a

Table 3. Usage of *Lay*: Ottawa and Vancouver (Location x Age).

	N	%
Vancouver Old	103	76
Vancouver Young	59	57
Ottawa Old	37	76
Ottawa Young	30	59

generational shift is occurring at this time (cf. Atwood 1953: 18).

3.3 Has lain/has laid (Past Participle)

For the present perfect of *lie*, the preferred form of majority usage in both cities (Ottawa 50%, Vancouver 52%) was *has lain*. The choice of this form versus *has laid* was made on the basis of age ($p < .003$) and socio-economic status ($p < .04$), with *has lain* a generational (Old 63% vs. Young 38%) and prestige (High 62%, Low 39%) term, used somewhat more often by women (53% to 50% for men) and Vancouverites (52% to 50% for Ottawa). The standard value was preserved more often by those over forty of high status, and by higher status women in both cities; lower status women and women under forty in Ottawa used the form least. Regionally, there was a greater difference in use based on socio-economic status in Ottawa than in Vancouver. The non-standard *has laid* was most frequently employed by young women, more often of lower status. Of the other variants, six percent of those informants in Vancouver and four percent of those in Ottawa offered the form *lied*, while eleven percent of those in the eastern city suggested *layen*.

3.4 Has drunk/has drank (Past Participle)

With the perfect of *drink*, i.e., the choice of the preferred value *has drunk* versus the non-standard variant *has drank*, socio-economic status ($p < .0001$) and location ($p < .05$) were the most important factors, with an interaction of sex, age and socio-economic status ($p < .04$) also significant. Twice as many informants of high status (High 69%) as of low (35%) used this term, which was a generational choice (Old 59% to 45% for Young) as well. Older, high status women were most conservative of this value, while young women of lower status diverged most from the traditional norm. Although a generational shift towards the low prestige *has drank* can be noted in Vancouver, those under forty of high status were retaining the standard value. Men in Vancouver (Vancouver: Men 45%, Women 42%) used the former term, i.e., *has drank*, twice as often as men in Ottawa (Ottawa: Men 23%, Women 30%). With respect to other forms, six percent of those on the Pacific Coast offered *drunken* or *dranken*, and three percent in the east suggested *drunken* or *drinken*.

3.5 Dived/dove (Past Tense)

The two remaining verbs are also forms of divided usage, with the choice between *dived* and *dove* made on the basis of age ($p < .001$). *Dove* was clearly the preferred form

in both cities, used by almost 95% of Ottawans and more than 75% of native Vancouverites. While the form *dived* occurred more often in the speech of Vancouver informants, women, those over forty and persons of higher status, *dove* was the prestige term in Ottawa, and the predominant form of the young (93% to 68% for Old), used somewhat more by those of male gender.

3.6 Proved/proven (Past Participle)

In the case of the variants, *proved* versus *proven*, *proven* was again clearly a majority preference, although *proved* was used significantly more often by Vancouverites, women and those over forty, with signs of prestige use in that city. *Proven*, however, was in general use somewhat more often by those of higher status (High 83% to Low 80%), Ottawans (88% to 79% for Vancouverites), by those under forty of high status, and men. Regionally, the use of *proved*, the conservative value, shows vestiges of British influence in Vancouver.

4. CONCLUSION

The examples cited above have shown a few of the regional grammatical preferences in Canadian English in which the choice of an individual variant and the use of a linguistic value appear to be dependent on a factor, or combination of factors, such as age, sex, social class or location. The majority preference or common usage, as in the case of *do you have*, was not necessarily co-terminous with a generational or regional term of prestige such as *have you* in Vancouver, or *have you got* in Ottawa. Certain forms were also associated with gender, e.g., the colloquial use of *snuck* and *really* in female speech, and the male preference for *sneaked*, *dove* and *proven*. Shown in the speech of women over forty and those of higher status and age, gender, generation and socio-economic status combined to offer preservation of standard values in *lay*, *lain* and the past participle of *drink*, while a more striking example of a generational shift in the standard language was noted in the case of *aren't I*, the prestige form of the young versus the older term of preferred usage *am I not*.

Of the thirty grammatical items from the two surveys, seven showed no noticeable variation. From the response to choice between and among linguistic variants in the remaining variables, socio-economic status (40%) and age (37%), followed by location (23%), proved to be the most important factors, with gender important only in the choice between *really* and *real*. However, each of the grammatical values of a linguistic item or variable was associated in a statistically significant manner with one or more of the independent variables, indicating use according to a matrix defined by city, gender, generation or social group.

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Appendix 1

P-value, Significant Factors in the Use of (1) *Have you*, (2) *Have you got* and (3) *Do you have*.

Source	Variant 1		Variant 2		Variant 3	
	F value	PR>F	F value	Pr>F	F value	PR>F
Overall	18.85	.0001*	7.60	.004*	8.78	.002*
SES	12.43	.006*	12.24	.007*	***	
Loc x Age	18.66	.001*	3.39	.098+	17.51	.001*
Loc x SES	16.82	.002*	33.92	.0003*	***	
Age x SES	51.20	.0001*	13.21	.005*	***	
Loc x Sex x Age	***		10.68	.01*	7.64	.017**
Loc x Age x SES	11.33	.007*	16.06	.003*	***	
Sex x Age x SES	***		***		6.39	.03**

* significant at $\alpha = .01$

** significant at $\alpha = .05$

+ significant at $\alpha = .10$

*** not significant

Appendix 2

P-value, Significant Factors in the Use of (1) *Am I not?* and (2) *Aren't I?*

Source	Variant 1		Variant 2	
	F value	PR>F	F value	PR>F
Overall	62.12	.0001*	17.64	.0001*
Location	91.23	.0002*	12.35	.0001*
Age	249.71	.0001*	38.37	.0001*
SES	9.03	.029**	***	
Loc x Sex	19.59	.007*	***	
Loc x Age	8.02	.037**	***	
Loc x SES	10.67	.022**	***	
Sex x Age	54.51	.0007*	19.77	.001*
Sex x SES	12.79	.016**	***	
Age x SES	***		4.86	.05**
Loc x Sex x Age	***		4.50	.059+
Loc x Sex x SES	4.14	.098+	***	
Sex x Age x SES	5.59	.06+	***	

* significant at $\alpha = .01$

** significant at $\alpha = .05$

+ significant at $\alpha = .10$

*** not significant

Appendix 3

P-value, Significant Factors in the Use of (1) *Used not*, (2) *Never used to* and (3) *Didn't use to*.

Source	Variant 1		Variant 2		Variant 3	
	F value	PR>F	F value	Pr>F	F value	PR>F
Overall	42.75	.0003*	18.10	.0003*	6.88	.007
Location	39.57	.002**	49.16	.0001*	***	
Age	***		4.09	.078+	***	
SES	161.38	.0001*	12.98	.007*	***	
Loc x Sex	54.26	.0007*	***		19.17	.001*
Loc x SES	43.27	.001*	5.80	.043**	***	
Sex x Age	***		11.35	.009*	***	
Sex x SES	6.32	.05**	6.87	.031**	4.23	.064+
Age x SES	81.93	.0003*	***		3.28	.098+
Loc x Sex x Age	49.67	.0009*	***		***	
Loc x Sex x SES	40.01	.002*	***		***	
Loc x Age x SES	125.46	.0001*	***		***	

* significant at $\alpha = .01$

** significant at $\alpha = .05$

+ significant at $\alpha = .10$

*** not significant

Appendix 4

P-value, Significant Factors in the Use of (1) *Sneaked* and (2) *Snuck*.

Source	Variant 1		Variant 2	
	F value	PR>F	F value	PR>F
Overall	40.69	.0001*	28.94	.0001*
Sex	16.95	.003*	***	
Age	80.88	.0001*	84.36	.0001*
SES	27.30	.0005*	17.12	.002*
Loc x Sex	18.19	.002*	***	
Loc x SES	***		7.07	.024**
Sex x Age	***		8.04	.018**
Sex x SES	***		3.50	.09+
Age x SES	9.71	.01*	***	
Loc x Age x SES	9.67	.01*	***	

* significant at $\alpha = .01$

** significant at $\alpha = .05$

+ significant at $\alpha = .10$

*** not significant

Appendix 5

P-value, Significant Factors in the Use of (1) *Lay* and (2) *Laid*.

Source	Variant 1		Variant 2	
	F value	PR>F	F value	PR>F
Overall	14.50	.0003*	10.96	.001*
Age	39.80	.0001*	6.29	.033**
SES	39.28	.0001*	21.15	.001*
Loc x Age	5.13	.047**	4.00	.077+
Sex x Age	13.07	.005*	***	
Age x SES	***		4.65	.059+
Loc x Sex x Age	8.71	.01*	5.59	.042**
Sex x Age x SES	***		15.23	.004*

* significant at $\alpha = .01$ ** significant at $\alpha = .05$ + significant at $\alpha = .10$

*** not significant

Appendix 6

P-value, Significant Factors in the Use of (1) *Has lain* and (2) *Has laid*.

Source	Variant 1		Variant 2	
	F value	PR>F	F value	PR>F
Overall	58.62	.0007*	74.40	.0001*
Location	71.12	.0011*	***	
Sex	10.13	.034**	4.61	.085+
Age	207.28	.0001*	195.19	.0001*
SES	31.14	.005*	91.47	.0002*
Loc x Sex	31.68	.005*	4.33	.092+
Loc x Age	22.43	.009*	***	
Loc x SES	64.25	.001*	55.41	.0007*
Sex x Age	***		75.19	.0003*
Sex x SES	***		34.60	.002*
Loc x Sex x Age	***		11.58	.019**
Loc x Sex x SES	35.46	.004*	***	
Age x SES	10.30	.033**	16.03	.01*
Loc x Age x SES	7.37	.05**	***	

* significant at $\alpha = .01$ ** significant at $\alpha = .05$ + significant at $\alpha = .10$

*** not significant

Appendix 7

P-value, Significant Factors in the Uses of (1) *Has drunk* and (2) *Has drank*.

Source	Variant 1		Variant 2	
	F value	PR>F	F value	PR>F
Overall	21.23	.0003*	25.15	.0001*
Age	36.52	.0005*	13.47	.0037*
SES	77.76	.0001*	57.42	.0001*
Loc x Sex	***		11.42	.006*
Loc x Age	12.54	.009*	***	
Loc x SES	6.62	.037**	***	
Sex x Age	8.40	.023**	***	
Loc x Age x SES	4.54	.07+	***	
Sex x Age x SES	5.77	.047**	***	

* significant at $\alpha = .01$
 ** significant at $\alpha = .05$
 + significant at $\alpha = .10$
 *** not significant

Appendix 8

P-value, Significant Factors in the Use of (1) *Dived* and (2) *Dove*.

Source	Variant 1		Variant 2	
	F value	PR>F	F value	PR>F
Overall	35.91	.0005*	74.91	.0004*
Location	11.63	.019**	29.70	.006*
Sex	35.71	.002*	13.95	.02**
Age	19.56	.007*	31.83	.005*
SES	64.24	.0005*	143.50	.0003*
Loc x Sex	48.57	.0009*	71.24	.001*
Loc x SES	64.02	.0005*	131.56	.0003*
Sex x Age	***		4.66	.097+
Age x SES	40.22	.001*	67.27	.001*
Loc x Sex x Age	26.41	.004*	28.40	.006*
Loc x Age x SES	33.81	.002*	56.50	.002*
Sex x Age x SES	8.27	.035**	4.77	.094+

* significant at $\alpha = .01$
 ** significant at $\alpha = .05$
 + significant at $\alpha = .10$
 *** not significant

Appendix 9

P-value, Significant Factors in the Use of (1) *Proved* and (2) *Proven*.

Source	Variant 1		Variant 2	
	F value	PR>F	F value	PR>F
Overall	847.78	.0012*	5.53	.015**
Location	650.13	.002*	14.22	.006*
Sex	365.08	.003*	***	
Age	516.32	.002*	***	
SES	984.87	.001*	6.49	.034**
Loc x Sex	341.87	.003*	***	
Loc x Age	104.92	.009*	***	
Loc x SES	269.10	.004*	***	
Sex x SES	360.77	.003*	6.14	.038**
Loc x Sex x Age	144.66	.007*	***	
Age x SES	1470.26	.0007*	13.25	.007*
Loc x Age x SES	512.01	.002*	3.93	.083+
Sex x Age x SES	438.56	.002*	5.25	.05**

* significant at $\alpha = .01$ ** significant at $\alpha = .05$ + significant at $\alpha = .10$

*** not significant

NOTES

¹ Data Library, University of British Columbia.

² The comparable Woods (1979) *Socio-Economic Class Index* for Ottawa and the Murdoch (1979) *Index of Social Stratification* for Greater Vancouver (v. Gregg 1984) were each divided at midpoint to provide two broad social classifications.

³ I am indebted to Dr. John Petkau and Le Thinh, Department of Statistics, University of British Columbia, for advice and assistance regarding the method of analysis which utilized procedures from SAS (Statistical Analysis System).

⁴ Whereas Atwood commented on the universality of *didn't use to* in the eastern states, this form in Great Britain, depending on the point of view, was either archaic (Fowler 1965) compared with the standard *used not*, or, as a result of verb reclassification, now employed by younger speakers (Hughes and Trudgill 1979: 23).

⁵ The instructions were 'Make the following sentence negative: We used to go there.' Of the *other* responses (47%), 29% replied 'never went' and 12% 'didn't go there.' Missing data accounted for 9% of the total.

The Domain of Reflexivization in English

Thomas E. Hukari

Department of Linguistics
University of Victoria

0. Introduction.

The distribution of reflexive and reciprocal pronouns--hereafter, R-pronouns, following Reinhart (1983a)--has been a major concern in the theoretical literature over the past some fifteen years. A basic assumption in the vast majority of cases has been that the distribution of such R-pronouns is syntactic in nature--from the clausemate condition (Postal, 1971) to the binding conditions (cf. Chomsky, 1981 and Reinhart, 1983a,b).¹ The present paper--focussing specifically on reflexive pronouns--follows this line of inquiry, operating under the assumption that the distribution of reflexive pronouns is statable strictly in terms of syntactic domains where the domain of reflexivization is defined in the context of the feature instantiation system found in Gazdar, Klein, Pullum and Sag (1985)--hereafter, GKPS.²

The analysis presented here follows GKPS (who do not actually provide a treatment of reflexives) in assuming reflexivization is encoded in a categorial-valued syntactic feature, a feature whose migration in trees is regulated by the Foot Feature Principle, where the upper bound of the domain of reflexivization is set by a feature cooccurrence restriction. Simply put, a reflexive feature percolates up to, but not into, the first predicative category containing a specification for the categorial-valued feature SUBJ(ect). This paper departs from GKPS and earlier work in GPSG on reflexives (cf. Gazdar and Sag (1981), Pollard and Sag (1983)) however in the analysis of reflexive agreement, which is treated here as a condition on binding in the semantics (specifically, in the translation to intensional logic) rather than as a principle of syntactic agreement.

The organization of this paper is as follows. Section 1 provides a syntactic account of the domain of reflexivization, where predicative categories form the upper bound on instantiation (percolation) of reflexive feature specifications. Section 2 discusses the range of categories which form barriers for reflexivization. Section 3 provides an account of reflexives in unbounded dependency constructions (i.e., reconstruction contexts). Section 4 discusses conditions on binding (including morphological agreement) in translation to intensional logic. A number of technical points are pursued in appendices. Appendix A offers a reformulation of the Foot Feature Principle (FFP), which regulates the instantiation of the reflexive feature RE. This is because, in its present form, the FFP makes false predictions not only in the treatment of reflexives discussed here but in an account of interrogative pronouns. Appendix B treats binding in unbounded dependency constructions.

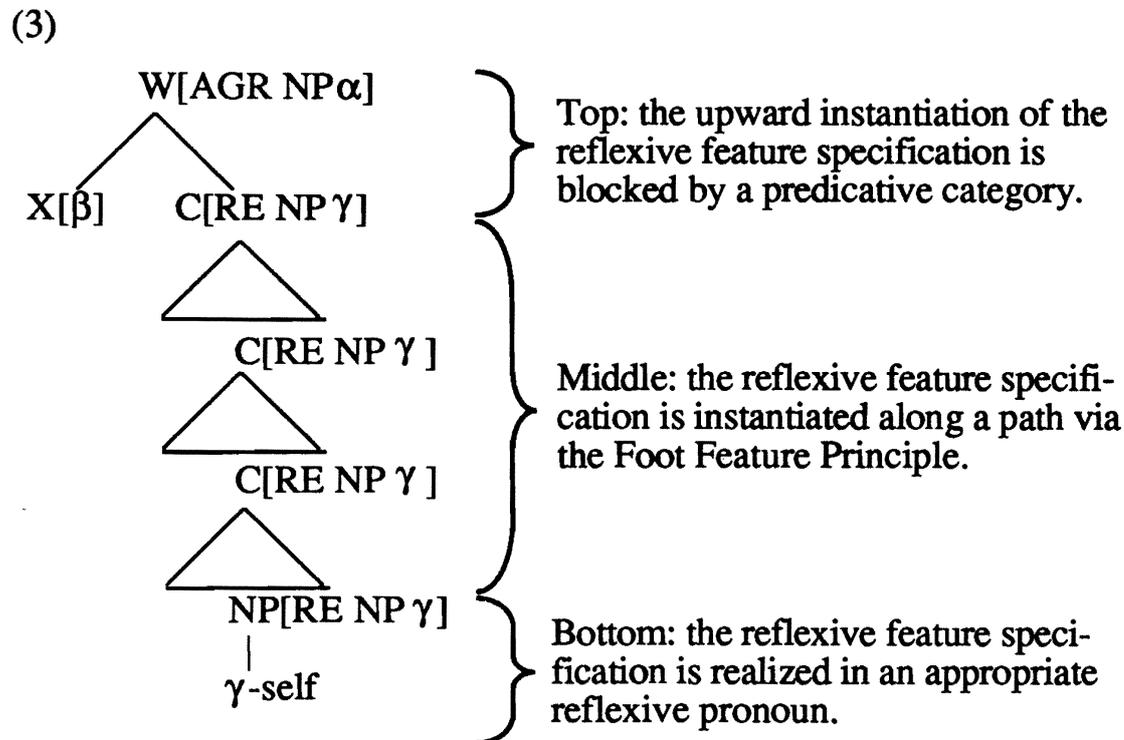
1. Domains.

Reflexivization is represented by the categorial-valued foot feature RE, whose upward migration in trees is limited by the following Feature Cooccurrence Restrictions, which are absolute restrictions on the feature composition of categories in trees.

- (1) FCR 1: $[VP \vee [+PRD]] \supset SUBJ$
- (2) FCR 2: $\sim[SUBJ \ \& \ RE]$

FCR 1 says that verb phrases and elements containing the feature specification [+PRD] (predicative) must also contain a specification for SUBJ. I use SUBJ(ect) in place of AGR(eement) in GKPS to emphasize the role of this feature both here and in a semantic analysis of control (cf,

Hukari and Levine, 1987 and 1988) in encoding salient information about subjects. It is FCR 2 which sets the bound on the percolation of the reflexive feature, saying that no category may be specified both for SUBJ and RE. The reflexive feature, as a foot feature, then percolates from a reflexive pronoun up to--but not into--a category containing a SUBJ feature specification as in the following diagram.³



The analysis owes much to Pollard and Sag (1983), though differing in several respects. First, the present analysis is cast in terms of the feature instantiation system of GKPS, as opposed to the propagation of features by metarules in earlier versions of GPSG. Second, the upper bound on the migration of the reflexive feature here is described strictly within the context of a theory of feature cooccurrence restrictions (FCRs), where all statements involve syntactic feature names or values, or logical connectives. See GKPS for further discussion of Feature Cooccurrence Restrictions and Gazdar, Pullum, Klein, Carpenter, Hukari and Levine (forthcoming) for further elaboration on the formal constraint language.

Pollard and Sag, on the other hand, formulate a cooccurrence restriction which falls outside that theory of FCRs:

(4) *X[R] where Type(X) = <NP, NP> and R is an R-feature [P&S 27, p. 198],

where expressions of the type <NP, NP> are, in their terminology, generalized predicatives, and include N1 and S. As given by them, this is not simply a statement concerning the cooccurrence of syntactic features in a category. Rather, it is a constraint involving a category, a feature specification and the intensional logic (IL) type of the category. In the present analysis, the restriction will be formulated in terms of the syntactic feature SUBJ--in keeping with the definition of FCRs. Intuitively, we can think of categories containing SUBJ as predicative, since they generally will translate as predicate categories.

1.1. Semantics.

Notice that the discussion above focusses exclusively on feature migration with no mention of morphological agreement or binding between a reflexive pronoun and its antecedent. A syntactic agreement principle is certainly not antithetical to GPSG but it is by no means obvious that agree-

ment for person, number and gender in reflexive pronouns differs substantially from general pronominal agreement in English, which strikes me as being more plausibly described in the semantics. For the purpose of exposition, I follow a middle course in section 4, where agreement for inflectional features is a condition on semantic binding. A very brief outline of the approach to binding taken in Section 4 may be a useful digression at this point in showing where the analysis is going.

The categorial valued feature SUBJ can be thought of intuitively as encoding information about subjects, following Hukari and Levine (1987, 1988). The analysis of binding in section 4 follows the type-driven approach to semantic translation in GKPS and in Pollard and Sag (1985), where local (two-generation) syntactic trees are provided with intensional logic translations.

When a specification for RE appears in the daughter of a predicative category (i.e., a category containing SUBJ), this must be bound either to the subject or to a sister in the translation of the mother, either being a possibility in the following as both match the reflexive in inflectional features.

(5) Alice_i told Judith_j about herself_{i,j}.

Under the interpretation where the subject is the antecedent, the binding condition requires a match in inflectional features between the values of RE and SUBJ, so subject binding is possible in a local tree such as the following (in equivalent phrase structure rule format), where a abbreviates appropriate inflectional features.

(6) VP[SUBJ: NP α] \rightarrow V + NP α + PP[RE: NP α]

The verb phrase in (x) will translate approximately as follows when the reflexive is bound to the subject (where x^* marks the relevant positions).

(7) $\lambda_{\mathcal{P}\mathcal{P}}\{\lambda x[\text{told}'(\text{about}'(x^*))(j^*)(x^*)]$

This combines with the actual subject at the level of S to translate as

(8) $\text{told}'(\text{about}(a^*))(j^*)(a^*)$.

But since the object in (6) and the categorial value of RE in PP match in inflectional features, the reflexive can be bound instead by the object, roughly as in

(9) $\lambda_{\mathcal{P}}[\text{told}'(\text{about}'(j^*))(j^*)(\mathcal{P})]$

This, in turn, combines with the syntactic subject to yield (xv).

(10) $\text{told}'(\text{about}'(j^*))(j^*)(a^*)$

This brief discussion glosses over much of the semantics and perhaps it should be emphasized that the reflexive binding translation schema is driven by the syntactic information available in a local tree such as (6). For example, while the constraint on identity of inflectional features can access the object in (6) for object binding, it does not have access to the syntactic subject directly, rather it has available to it the information encoded in the categorial value of SUBJ in the mother (which agrees with the syntactic subject via the feature instantiation system of GKPS, specifically the Control Agreement Principle). By the same token, the condition for subject binding will be met in italicised VP of the following.

(11) I persuaded Alice to tell Judith_j about herself_{i,j}.

Following a standard phrase structure approach, the infinitive VP *to tell Judith about herself* has no syntactic subject but *Alice* controls it and the feature instantiation system of GKPS says that the categorial value of SUBJ in this VP agrees with the controller. The relevant domain for binding will be the minimal VP *tell Judith about herself*, whose value for SUBJ will be exactly as in (6) above.⁴ Thus the analysis presented here makes crucial use of the feature instantiation system of GKPS in defining the domain of reflexivization, although morphological agreement between the reflexive pronoun and its antecedent is a condition on binding in IL rather being a feature instantiation principle in the syntax.

1.2. Monoclausal Structures.

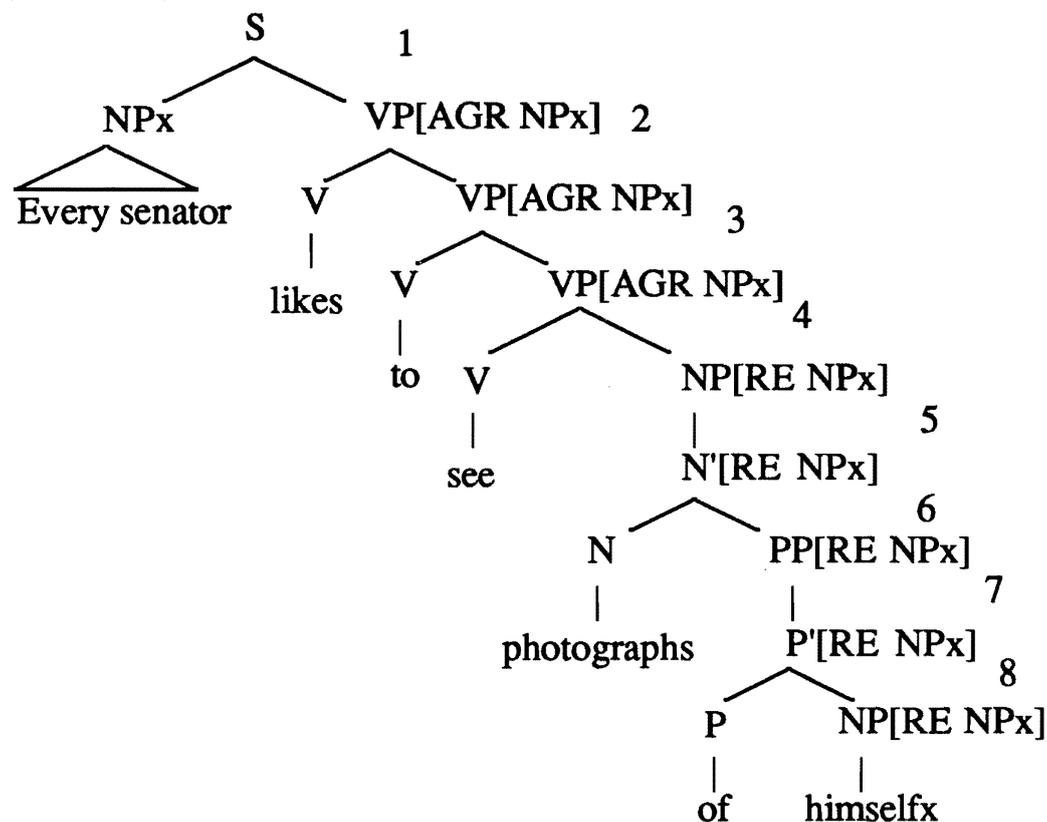
In the simplest cases, the antecedent of a reflexive pronoun is the closest subject as in the following examples, where the antecedent is a subject and a clausemate (though not necessarily a clausemate in other syntactic frameworks).⁵

(12) Felix baked himself a cake.

(13) Freda wanted to bake herself a cake.

(14) Every senator likes to see photographs of himself.

(15) (= 14)



Example (12) is relatively straightforward. A reflexive feature (RE) specification is associated with the reflexive pronoun. I assume reflexive pronouns are assigned to category NP, contra Verheijen and Beukema (1987), who treat reflexive pronouns as, in effect, verbal suffixes in their GPSG analysis, where the verb and the reflexive form are immediately dominated by lexical V.⁶ The FOOT feature RE is identified here with reflexives, though possibly both reflexives and reciprocals involve different values for a single feature (cf. GKPS). The reflexive specification does not percolate upward into the VP category, given the Feature Cooccurrence Restrictions in (1) and (2) above.

Intuitively, we can say that the reflexive pronoun must find its antecedent within the domain (cf. section 1.1 above).

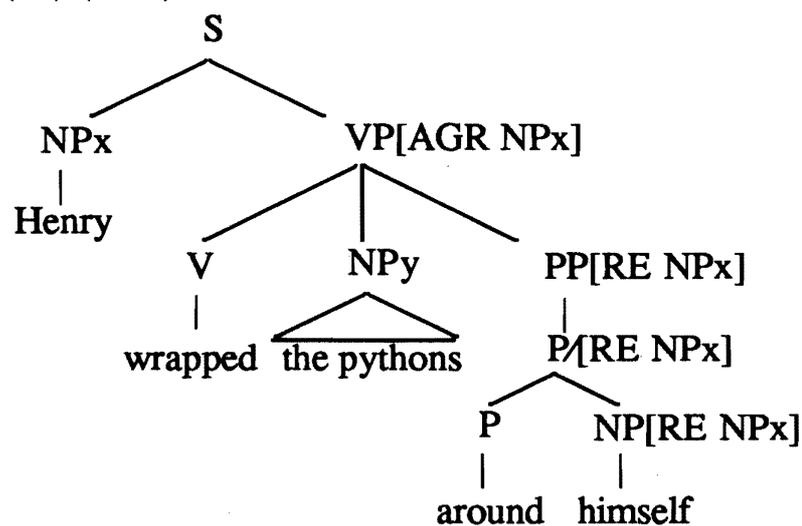
But the syntactic link between the antecedent and the reflexive need not be local, as in (13) and (14) where nonlocal linkage is established through the feature-instantiation principles of GKPS even though these principles are well-formedness conditions on local trees. SUBJ passes down the tree (via the CAP) from the main VP to *see photographs of himself* while the reflexive specification passes up from the reflexive pronoun via the Foot Feature Principle, as in (15).⁷ The Foot Feature Principle (FFP) in Gazdar, Klein, Pullum and Sag (1985) says roughly that if a mother contains an instantiated Foot feature specification (one not mentioned in the licensing ID rule) then so must at least one daughter (and vice versa). Thus the reflexive specification in NP in local tree 8 must pass upward or, looking at it from the other direction, the reflexive specification in the mother NP in local tree 5 must pass downward.

The antecedent of a reflexive pronoun may be something other than a subject, as in (5) above and in the following examples.

- (16) Felix told the girls about themselves/himself.
 (17) Felix talked to the girls about themselves/himself.
 (18) Henry wrapped the pythons around themselves/himself.
 (19) Henry leaned the ladders against themselves/himself.
 (20) The professor showed his colleagues pictures of himself/themselves.

This changes nothing as far as the basic analysis of feature instantiation is concerned. Again, the reflexive feature percolates from a reflexive pronoun up to, but not into, a predicative category.⁸

(21) (= 18)



1.3. Biclausal Structures.

While early transformationalist work on the distribution of reflexives in English assumed the reflexive and its antecedent are within the same minimal clause (cf. Lees and Klima, 1963), it seems generally conceded that certain constituents of subordinate clauses may take on superordinate antecedents. It has long been known, for example, that picture noun phrases may contain reflexives whose antecedents are in a superordinate clause (cf. Ross, 1970), as in (23). I will assume all of the following are grammatical and that they contain bonafide reflexive pronouns (as opposed, say, to emphatics).⁹

- (22) Fred would have preferred for himself to have done better.

- (23) The professor thought that pictures of himself were on sale at the Louvre.
 (24) Felix knew how many pictures of himself Alice showed the press.
 (25) The senator knew which stories about himself his campaign manager had managed to suppress.

One might well question some of these--(22) being much better than (26), for example, though perhaps some principle of parsimony is involved.¹⁰

- (26) Fred would have preferred to have done better.

Note too that a nonreflexive form is possible in place of the reflexive in (23).¹¹

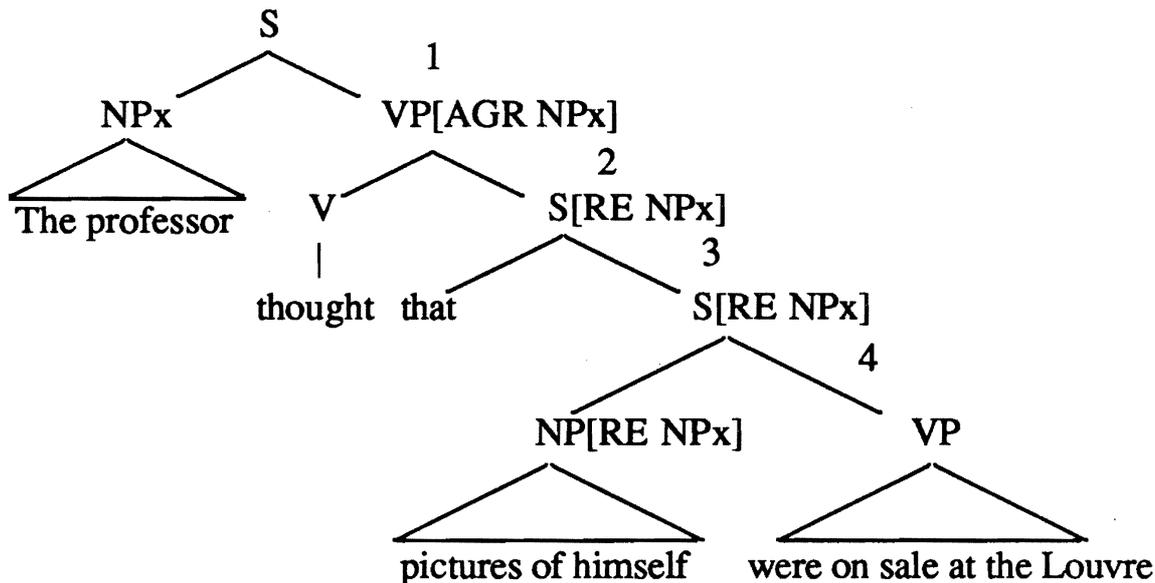
- (27) The professor₁ thought that pictures of him₁ were on sale at the Louvre.

And there doubtlessly is variation among speakers as to whether him or himself is preferred in the following examples.

- (28) Felix claims that photographs of him/himself have been released by a recording studio.
 (29) Fred claims that rumors about him/himself have exacerbated the problem.
 (30) Alice frequently points out that stories about her/herself are generally false.
 (31) Phibbs tells me that descriptions of him/himself can be found in several ancient documents.

But I assume here that the reflexives are grammatical, where RE percolates through S. In (23) the instantiation path of RE passes down from local tree 2 into the subordinate clause subject in local tree 4, as in (32) below. The Foot Feature Principle (FFP), as noted above, says that if a mother contains an instantiated foot feature specification (i.e., one not mentioned in the ID rule) then so must at least one daughter, thus driving RE down into the subordinate clause subject in this case.

- (32) (= 23)



Following Brame (1977), I assume a reflexive pronoun must not be nominative, though this does not prevent it from being the subject of an infinitive clause or a nonhead constituent of a nominative subject.

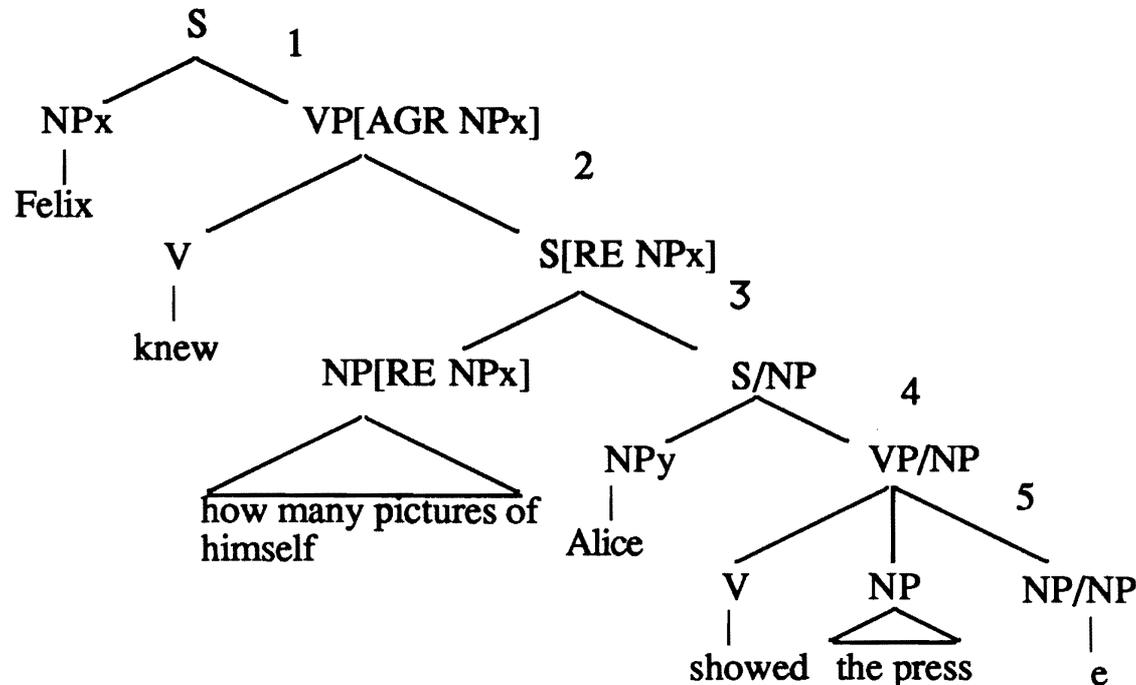
Picture NP reflexives within a clause-initial interrogative constituent as in (32) are analogous.¹² Note that the context for reflexive antecedence is superficial in these examples. Sentences corresponding to (24) and (25) without wh-movement are ungrammatical.

(34) Felix knew that Alice showed the press pictures of him/*himself.

(35) The senator knew that his campaign manager had managed to suppress stories about him/*himself.

This construction will be compared in Section 3 to cases which operate quite differently (i.e. reconstruction).

(33) (= 24)



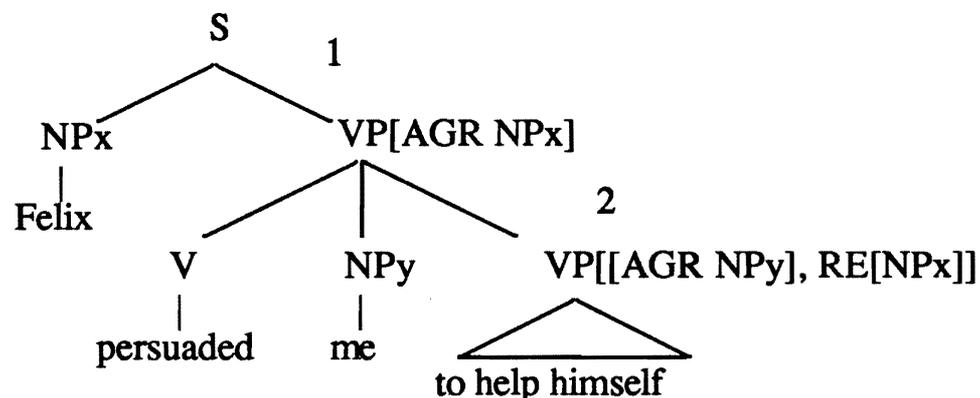
In summary, the domain of reflexivization can be characterized in GPSG by the free instantiation of a foot feature RE(flexive), where FCR 2 prevents any category from containing specifications for both reflexives and SUBJ. Thus the upper bound on percolation of a reflexive feature specification is the first category containing a specification for SUBJ.

2. Predicative Categories.

This section considers which categories constitute barriers to the instantiation of RE, the reflexive feature. It seems clear that RE should not appear in the feature composition of VP as this would give rise to examples such as

(36)*Felix persuaded me to help himself.

(37) (= 36)



If RE appears in the feature composition of infinitive VP, the reflexive feature will percolate up from the reflexive pronoun to the main VP in local tree 2 of (37) below, yielding the incorrect prediction that the domain of reflexivization is, in effect, the entire sentence. Similarly, while RE can pass down into subordinate subjects as in (38), (39) is quite impossible.

(38) The professor thought that pictures of himself were on sale at the Louvre.

(39)*The professor thought that you would give himself the choice classes.

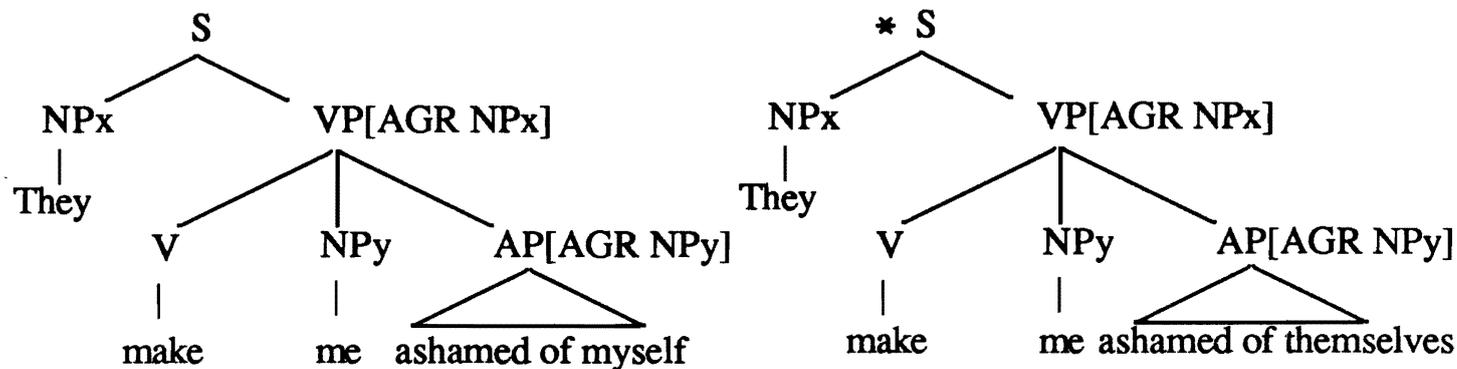
Let us assume that predicative adjective phrases also contain a SUBJ specification and hence form domains for reflexivization. This seems to be the correct generalization, as in the following examples.

(40) They make me ashamed of myself.

(41) They believe her totally unconcerned about herself/*themselves.

(42) a.

b.



If predicate A¹ did not form the domain of reflexivization--the upper bound on feature migration, then presumably the upper VP would do so and the matrix subject would be a potential antecedent as in the ungrammatical (42b).

An independent--though theory-internal--argument that adjectival categories contain SUBJ specifications involves extraposition: GKPS's analysis relates (43) and (44) but it cannot be extended to adjectives as in (45) and (46) unless the latter contain SUBJ.

(43) That Sandy dislikes chard bothers Kim.

(44) It bothers Kim that Sandy dislikes chard.

(45) That Sandy dislikes chard is apparent to us.

(46) It is apparent to us that Sandy dislikes chard.

The former are related by a metarule which, if stated as follows, will account for both sets of constructions

(47) EXTRAPOSITION METARULE.

$X[\text{SUBJ } S] \rightarrow W$

⇓

$X[\text{SUBJ } \text{NP}[\text{it}]] \rightarrow W, S$

where the feature SUBJ corresponds to AGR in GKPS.¹³ It seems obvious that GKPS intended the extraposition metarule to apply in the case of adjectives. In fact, they give the ID rule in (48), mutatis mutandis, from which (49) can be derived by the revised metarule above.

(48) $A^1[\text{SUBJ } S] \rightarrow H[25], PP[\text{to}]$

(49) A¹[SUBJ NP[it]] → H[25], PP[to], S

An independent matter, of course, is whether SUBJ (or AGR) manifests itself in morphological agreement on the part of the lexical head. While predicate adjectives do not agree with subjects in English, they do, for example, in Icelandic (cf. Andrews, 1982).

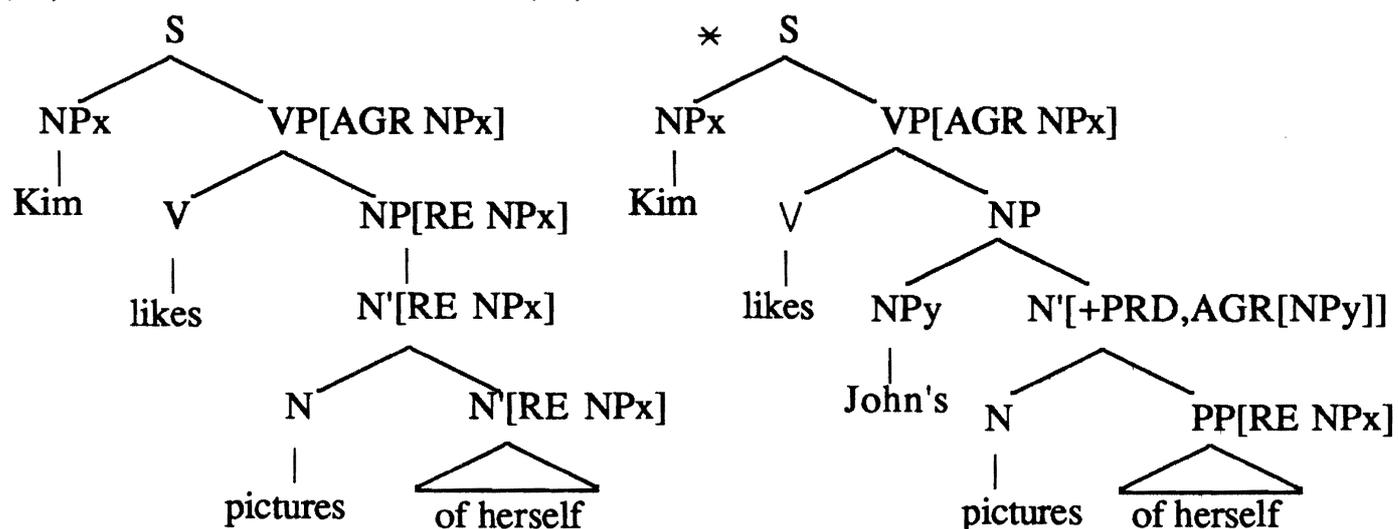
Perhaps noun phrases form a more controversial case as far as the presence of SUBJ goes.¹⁴ But possessed and unpossessed NPs behave differently with respect to reflexives, an amply documented point in the literature (cf. Kuno, 1987).

(50) Kim likes pictures of herself.

(51) *Kim likes John's pictures of herself.

(52)

(53)



The antecedent of the reflexive may appear outside an NP as in (50) but not when the NP is possessed, as in (51). If possessed N¹ is [+PRD], as in the following ID,

(54) NP → NP[+POSS], H¹[+PRD]

then FCR 1 (cf. 1) causes N¹ to contain a SUBJ specification. This of course means that the domain for reflexivization will be N¹ in possessed NPs.¹⁵

Note that this of course corresponds quite closely to Chomsky (1981), where binding condition A says that an anaphor must be bound in its governing category and a governing category may be defined as the first category dominating the anaphor's governor and an accessible subject, where possessive NP counts as a subject. However it might be objected that the feature SUBJ is rather different here, as it corresponds to AGR in GKPS, which is employed in subject-verb agreement and it may seem unlikely that head nouns agree with possessive NPs. However this simply means that a language may show agreement, not that it must. Finnish, for example, shows such agreement.

(55) (meidän) kirja-mme *our book*
our-GEN. book-(NOM)-1P.PL.POSS.

Some complement locative PPs also seem to be predicative, as in the following examples.

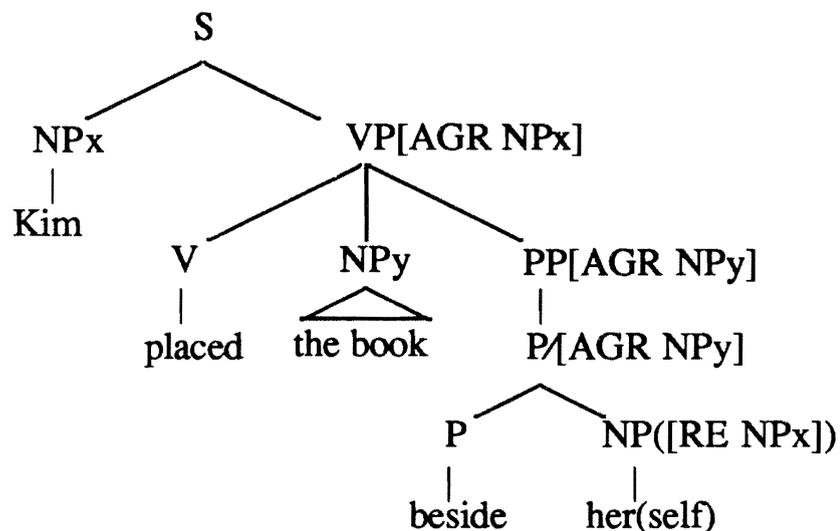
(56) Kim placed the book beside her/?herself.

(57) Fred keeps his valuables near him/?himself.

(58) Professor Zed always has many students around him/*himself.

Apparently the verbs subcategorize for predicative PPs (subject to speaker variation). If, for example, the PP category dominating *beside her* in (56) contains a SUBJ specification by virtue of being [+PRD], then the domain for reflexivization will be the PP (or P¹), which presumably is controlled by *the book*, as in the following tree.

(59)



While reflexive antecedence has not been dealt with yet, clearly we could think of this as involving some relationship between the SUBJ specification in P¹ (ultimately controlled by *the book*) and the reflexive feature. In other words, the subject is quite outside the reflexive domain, so *herself* is not appropriate and *itself* is (though nonsensical). But the prepositional phrase is nonpredicative for speakers who accept *herself* in this context, in which case the reflexive feature specification percolates up into PP where VP forms the reflexive domain.¹⁶

Notice that even when a nonreflexive pronoun is used for subject antecedence, a reflexive pronoun is obligatory if the object is the antecedent. It is difficult to demonstrate this, since most relevant examples are pragmatically bizarre. But if one stretches one's imagination a little, I believe the following judgments hold.

(60) Henry tried to hide the python behind him/himself.

(61) Henry tried to hide the python behind itself/*it.

(62) Henry wrapped the python around him/himself.

(63) Henry wrapped the python around itself/*it.

This follows from the analysis as the object of the verb (*the python*) will be the controller of predicative PP and hence is accessible to the reflexive via the SUBJ specification in P¹. This is an important point, since (61) and (63) clearly illustrate that reflexives are possible in this construction--even for speakers who reject reflexives when the subject is the antecedent--so the PPs in question are not simply barriers to reflexivization. These facts fall out if the licensing immediate dominance rule is either (64) or (65), depending on dialect.

(64) VP → H, NP, PP([+PRD])

(65) VP → H, NP, PP[+PRD]

The first allows for reflexives referring to the subject when optional [+PRD] is not present and the second excludes this case.

In Summary, the instantiation of reflexive feature specifications is blocked by predicative categories, categories containing a specification for the feature SUBJ, which could be thought of as a species of subject. The percolation of reflexive (RE) feature specifications is blocked by Feature Cooccurrence Restriction 2, which says no category may contain specifications for both RE and SUBJ. In other words, predicative categories are barriers to percolation and hence form the domains for reflexivization. These categories include VP, predicate AP, possessed N¹ and certain cases of predicate PP.

3. Reflexives In Unbounded Dependency Constructions.

In section 1.2, we saw cases where a reflexive pronoun in a clause-initial wh-phrase has its antecedent in a higher clause (cf, 24). Let us now consider a fuller range of possibilities.

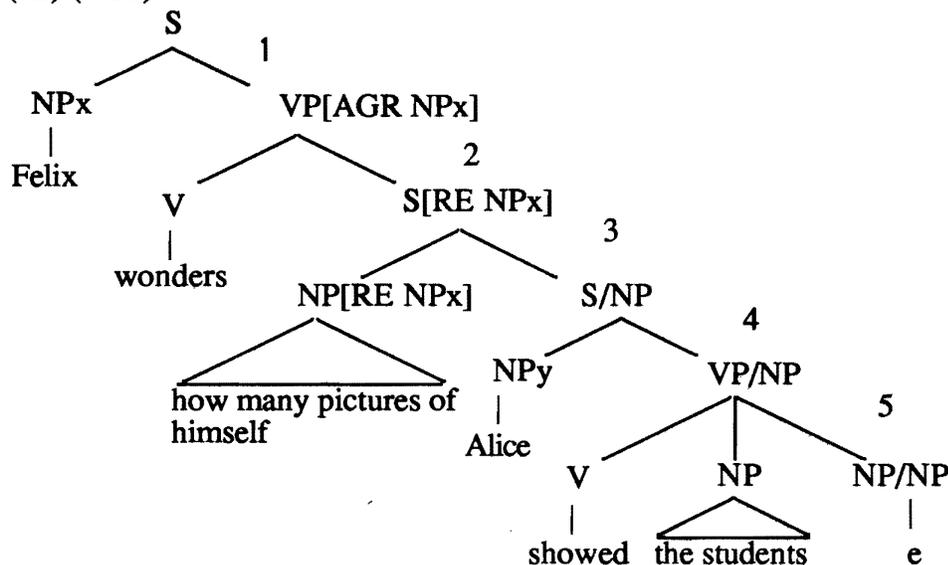
- (66) *Felix* wonders how many pictures of *himself* Alice showed the students *e*.
 (67) *Felix* wonders how many pictures of *herself* Alice showed the students *e*.
 (68) *Felix* wonders how many pictures of *themselves* Alice showed *the students e*.

Example (66) contrasts markedly with (67) and (68). It seems as though the antecedents of the reflexives are determined at the gap site in the latter two, as opposed to (66), which is like (24). Compare the following examples without extraction.¹⁷

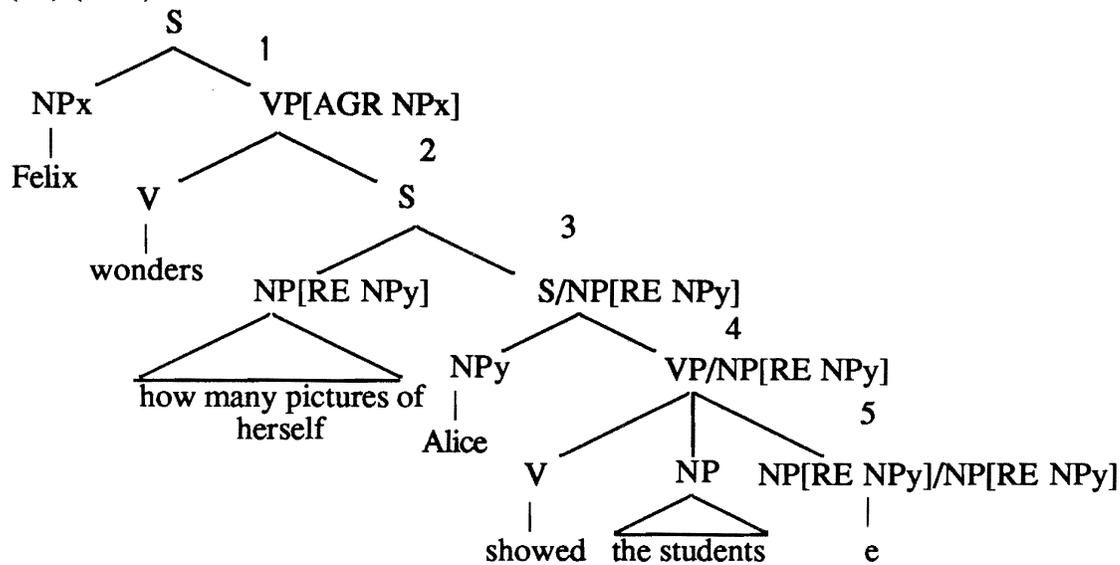
- (69)**Felix* knows Alice showed the students several pictures of *himself*.
 (70) *Felix* knows *Alice* showed the students several pictures of *herself*.
 (71) *Felix* knows Alice showed *the students* several pictures of *themselves*.

On first blush, it seems that (66) involves superficial antecedence while (67) and (68) involve some sort of reconstruction or lowering of the wh-phrase down to the gap site. But the latter can be modelled by the feature composition of categories along the unbounded dependency path. In (72), corresponding to the case of 'superficial' antecedence in (66), the reflexive specification is not encoded in the categorial value of the UDC feature SLASH, while it is in (73), representing the reconstruction case in (67).

(72) (= 66)



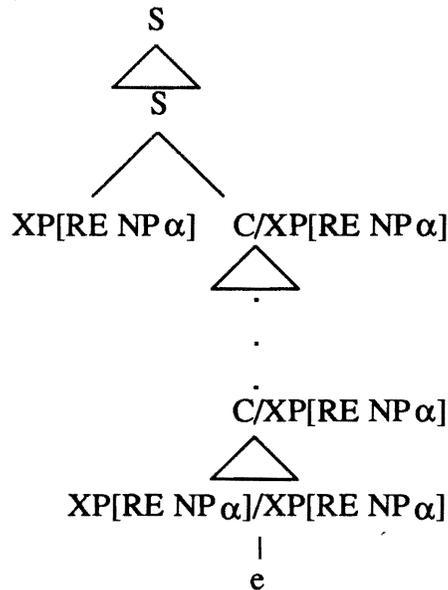
(73) (= 67)



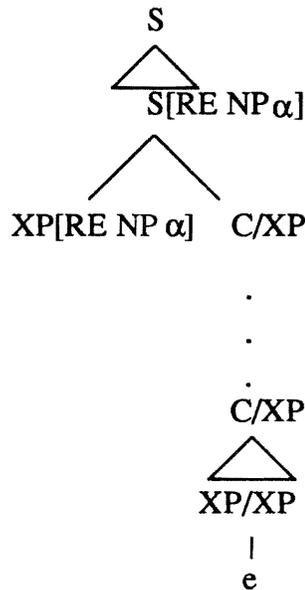
In (723), the reconstruction case, clearly $[RE NP_i]$ in the wh-phrase should link with *Alice* at the bottom of the UDC path, which follows if RE is present in the gapped category, $NP[RE NP_i]/NP[RE NP_i]$, as in local tree 5. Assuming that terminal SLASHed categories are of the form α/α , the reflexive feature specification must be present in the value of SLASH as well in this terminal empty category and it is passed up the tree in the value of SLASH by the instantiation principles. In short, the empty category counts as a reflexive constituent and this information is transmitted up the tree in the value of SLASH.

What is not clear is why the reflexive specification is present in the value of SLASH in (73) but not in (72). Seemingly we need the following two configurations.¹⁸

(74) a.



b.



Configuration (a) pertains to cases where the reflexive behaves as though its antecedent is determined at the bottom of the unbounded dependency construction--as in (67) and (68)--while

configuration (b) describes the seemingly superficial cases, as in (66), where the reflexive's antecedent is determined at the site of the UDC filler (or above).

Two facts may be salient here. First, the reflexive specification percolates up through S in configuration (b) and presumably it does not in (a). Second, the filler and the value of SLASH agree for the reflexive specification at the top of the unbounded dependency construction in (a), but presumably this is not the case in (b). If this characterization is correct, then the analysis in the context of the feature instantiation system in GKPS must involve the following rules.¹⁹

(75) $S \rightarrow X^2[RE NP], H/X^2$

(76) $S \rightarrow X^2, H/X^2$

This yields the option between inheritance and instantiation of the reflexive feature. The top of the unbounded dependency construction in (a) involves ID rule (76) whereas the top in (b) is a projection of (75), as discussed below. These of course can be conflated into (77).

(77) $S \rightarrow X^2([RE NP]), H/X^2$

RE is inherited in (67), corresponding to configuration (a), this is why it does not percolate up into S, since the Foot Feature Principle looks only at instantiated Foot features (those not mentioned in the licensing ID rule) and the licensing ID rule is (75). On the other hand, inherited Foot features (those mentioned in the licensing ID rule) are visible to the Control Agreement Principle, which forces agreement between the filler and the UDC feature SLASH, so RE appears in the value of SLASH and is passed down to the gap site.

RE is instantiated in (66), corresponding configuration (b), and this is why it percolates up to S, since it is visible to the Foot Feature Principle, where the licensing ID rule(76) does not mention RE. But the value of SLASH does not contain a specification for RE in configuration (b) and this is because the Control Agreement Principle as formulated in GKPS (page 89) says, in effect, that the filler and the value of SLASH agree in head features and **inherited** foot features.²⁰

Two caveats may be in order. First, the domain of reflexivization may be clause-bounded for some speakers, who reject reflexives in examples such as

(78) Felix claims that himself/him, Alice refuses to deal with.

though this is difficult to reconcile with (22) under the assumption that (22) is fully grammatical. Second, it is highly likely that the domain of reflexivization in *picture* NPs extends beyond the normal cases. I have assumed here that principles regulating the domain of reflexivization in core cases extend to *picture* NPs when these appear in the appropriate syntactic contexts. But even if this is a reasonable assumption, it seems clear that additional principles come into play in

(79) Felix claims that it is likely that pictures of him(self) have been released by a recording studio.

(80) Felix insists that there are photographs of him(self) in the Louvre.

I suspect such cases may belong in the domain of pragmatic reference, much as presumably does control of infinitive VP when there is no configurational controller, though the following revision of FCR 2 will accommodate them.

(81) FCR 2: $\sim[[AGR NP[+NORM]] \& RE]$

This says, in effect, that reflexive specifications cannot occur in categories which encode referential NP subjects, as opposed to expletive ones. [+NORM] is an abbreviation for NFORM[NORM],

where expletive *it* NPs are NFORM[*it*], *there* is NFORM[*there*] and other NPs contain NFORM [NORM] (GKPS, pp 115-121). RE then passes up through categories containing specifications for expletive subjects. But examples such as following--where reflexives not in *picture* NPs are ill-formed in analogous contexts--lead me to believe that (79) and (80) may nevertheless fall outside the basic generalizations one might make concerning the domain of reflexivization.

(82) Felix claims that it is quite impossible for him(*self) to win the prize.

(83)*Felix claims that it appears to him(*self) that the butler killed the duchess.

Picture NP subjects of experiencer verbs also appear to fall outside the core cases (cf, Postal (1974), Grinder (1970), Jacobson and Neubauer (1976), and Pesetsky (1987)):

(84) Pictures of him(self) annoy Felix.

But this may not be a normal binding context, as the following example suggests, and, if so, examples such as (84) are problems for any current approach.

(85)*Pictures of him(self) annoy no senator.

4. Binding.

The syntactic treatment of reflexives above makes no mention of inflectional agreement between a reflexive pronoun and its antecedent. Since this approach addresses only the problem of defining the domain of reflexivization (expressed as feature-percolation) antecedence does not even come into play. While it is possible to provide a syntactic account of reflexive agreement a more plausible approach is to treat reflexive agreement simply as an instance of pronominal agreement which seems to be a semantic matter in English (e.g., natural gender). Here, I will incorporate inflectional agreement into the conditions on reflexive binding, though a more general treatment may treat the relevant features as semantic and set consistency constraints in the semantic model.

Reflexive binding is set here in the context of a type-driven translation to intensional logic along the lines of Klein and Sag (1985) and GKPS, as opposed to the rule-to-rule approach found in Gazdar and Sag (1981) or Pollard and Sag (1983). We should arrive at translations roughly along the following lines

(86) a. Felix liked a picture of himself.

b. liked' (a'(picture'(f*))) (f*)

(87) a. Kim showed Felix a picture of himself.

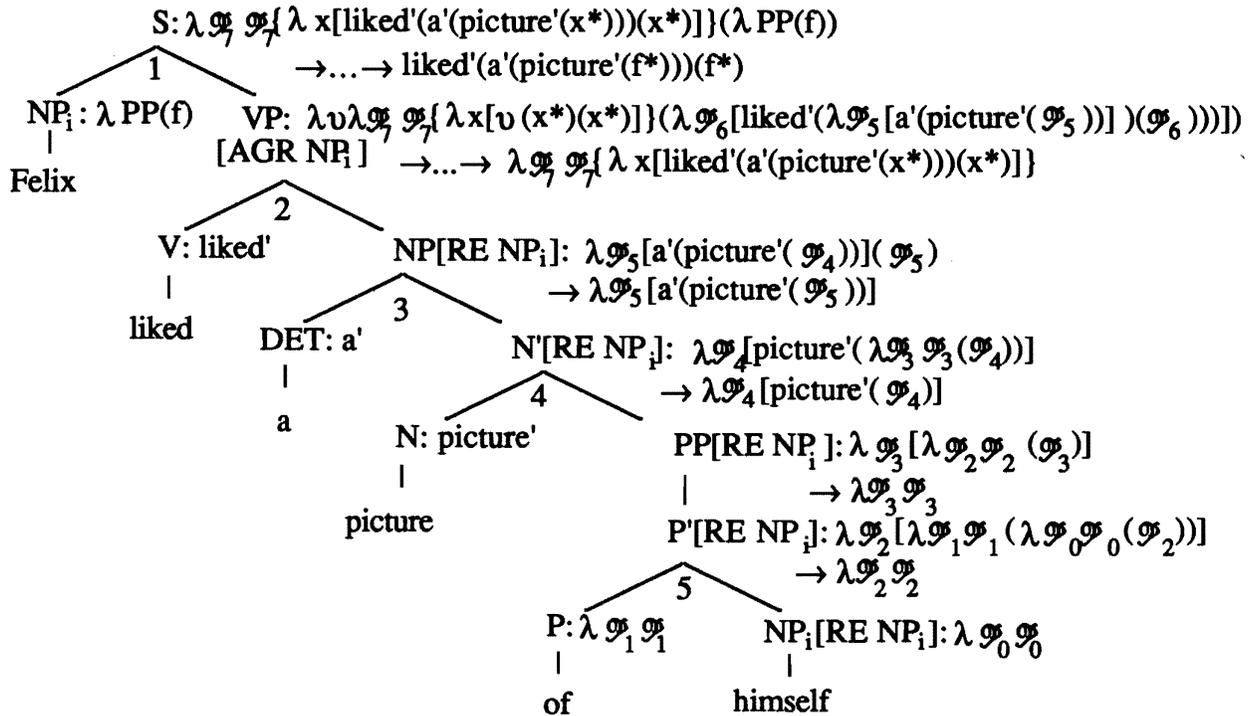
b. showed (a'(picture'(f*))) (f*)(k*)

c. showed (a'(picture'(k*))) (f*)(k*)

where f^* (i.e., $\lambda PP(f)$) and (k^*) translate *Felix* and *Kim* respectively.^{2 1}

A reflexive pronoun translates as the identity function on NP types: $\lambda \mathcal{P} \mathcal{P}$ (cf. Pollard and Sag, 1983). The Foot feature RE is translated, working up the tree, by successive introductions of an NP-type variable bound by a lambda abstraction operator as in the following translation of (86).

(88) (= 86)

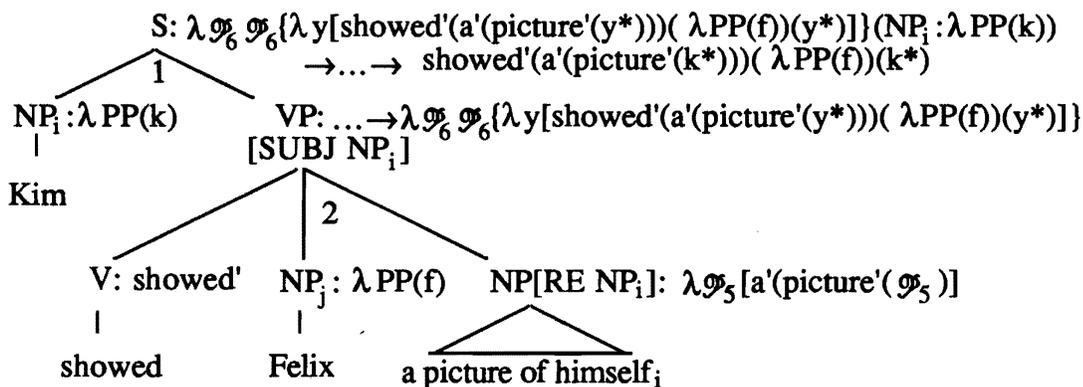


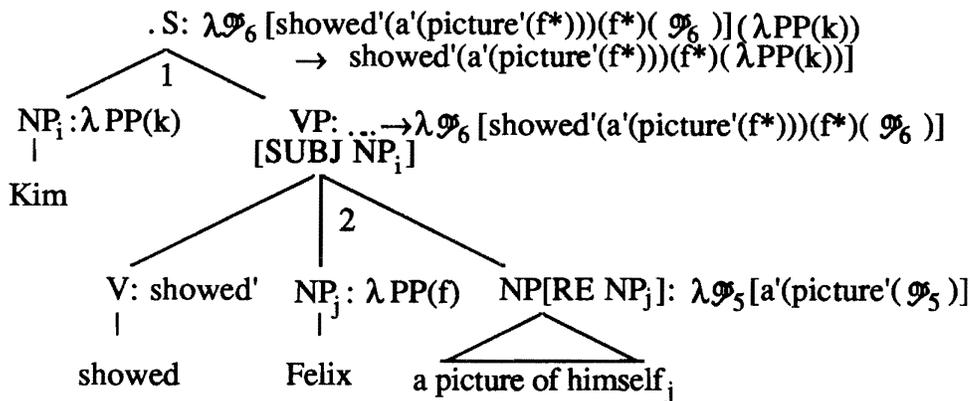
The reader familiar with the translation of unbounded dependency constructions in GKPS will find the translation of RE in the middle of the path analogous. At the top of the reflexive path, in local tree (2), an extensionality predicate (RE_{SUBJ} below) is introduced in the translation of the VP, causing the subject and and reflexive to be bound in the expression

(89) $\lambda \mathcal{G}_7 \mathcal{G}_7 \{ \lambda x [\text{liked}'(a'(\text{picture}'(x^*)))(x^*)] \}$

where the first token of the variable x fills the position corresponding to *himself* and the second, the subject argument position. I return to a formal statement of the binding schemata below.

In (87) either subject or nonsubject antecedence is possible, as in the following trees.

(90) (= 87c) **Subject Binding.**

(91) (= 87b) **Nonsubject Binding.**

The object and the argument inside the indirect object are bound in the nonsubject binding case, where a extensionality predicate (RE_{Obj} below) combines the translations of the daughters in local tree (2) in such a way that these two positions are bound as in

(92) $\lambda \mathscr{P} [\text{showed}'(a'(\text{picture}(f^*))) (f^*) (\mathscr{P})]$

which combines with the subject as in local tree (1). Nonsubject binding will be discussed at some length below.

The binding schema, applicable to local trees (2) in the three examples above, may be stated as follows, where this is intended to fit into the general translation schema in GKPS (cf, GKPS, pages ...). C_0 refers to the mother in the local tree (i.e., VP here).

(93) **REFLEXIVE BINDING SCHEMA.** When any daughter C_i contains a specification for $\langle RE, NP \rangle$, $RE \notin \text{DOM}(C_0)$ and $\text{SUBJ} \in \text{DOM}(C_0)$ then

- i. C_i translates as $C_i'(\mathscr{P})$ and, if there is a daughter C_j and the head daughter is of type $\langle \dots \langle C_i', \dots \langle C_j', VP \rangle \dots \rangle$, then either (ii) or (iii); otherwise (ii).
- ii. a. $C_i(\text{RE})|INFL = C_0(\text{SUBJ})|INFL$, and
 - b. the semantic combination of the daughters (roughly, functional application), ϕ , is bound by $\lambda \mathscr{P}$ (i.e., $\lambda \mathscr{P}[\phi]$) and
 - c. RE_{SUBJ} predicates on the result of (i) and (iib) (i.e., on $\lambda \mathscr{P}[\phi]$).
- iii. a. $C_i(\text{RE})|INFL = C_j|INFL$, and
 - b. the semantic combination of the daughters (functional realization), ϕ , is bound by $\lambda \mathscr{P}$ (i.e., $\lambda \mathscr{P}[\phi]$)--except C_j 's is replaced by \mathscr{P} in ϕ --and
 - c. RE_{OBJ} predicates on the result of (i) and (iiib) and on C_j' (i.e., on $\lambda \mathscr{P}[\phi]$ and C_j'), where $INFL = \{XSP, THRP, SING, GEN\}$.

The predicates RE_{SUBJ} and RE_{OBJ} are extensionality predicates binding, respectively, subject and nonsubject antecedents as follows.

(94) $RE_{SUBJ} = \lambda v^\alpha \lambda \mathscr{P} \mathscr{P} [\lambda x [\nu^\alpha (x^*) (x^*)]]$, where ν^α corresponds to the type of the functional realization of the daughters with the lambda abstract operator (i.e., $\text{TYPE}(\nu^\alpha) = \text{TYPE}(\lambda \mathscr{P}[\phi])$, which is $\text{TYPE}(\langle NP, VP \rangle)$, noted as ν).²²

(101) Kim talked *to the students* about themselves.

Give as a ditransitive verb in (100) will be assigned the intensional logic type $\langle \text{NP}, \langle \text{NP}, \langle \text{NP}, \text{S} \rangle \rangle \rangle$. That is, it is a function from NP-types (*pictures of themselves*) to a function from NP-types (*the students*) to a function from NP-types (*Kim*) to S-types. In Dowty's modelling of the grammatical hierarchy, the left-to-right order in $\langle \text{NP}, \langle \text{NP}, \langle \text{NP}, \text{S} \rangle \rangle \rangle$ is from the leftmost and most oblique argument (the 2-object *pictures of themselves*) to the rightmost and least oblique argument, the subject. Let us further assume, following GKPS, that PPs such as *to the students* translate as NP-types. *Talk* in the context of (101) is of type $\langle \text{NP}, \langle \text{NP}, \langle \text{NP}, \text{S} \rangle \rangle \rangle$, where the first NP corresponds to the translation of the *about* PP.²⁴ So the condition in (i) that the head is of type $\langle \dots \langle C_i', \dots \langle C_j', \text{VP} \rangle \dots \rangle$ says that the nonsubject antecedent C_i must be higher in the grammatical hierarchy than the daughter C_j containing the reflexive specification.

When the antecedent of the reflexive is within the VP the translation of RE is somewhat more complex than in subject-binding, since an extensionality predicate must bind into two arguments within the VP translation. The VP in (79b) must translate as something along the following lines.

(102) *showed Felix a picture of himself*

- $$\begin{aligned} &\Rightarrow \lambda \mathscr{P}_1 \lambda \mathscr{P}_2 \mathscr{P}_1 \{ \lambda x [\text{showed}'(a'(\text{picture}'(x^*))(x^*)(\mathscr{P}_2))] (\text{IPP}(f)) \\ &\rightarrow \lambda \mathscr{P}_2 \text{IPP}(f) (\lambda x [\text{showed}'(a'(\text{picture}'(x^*))(x^*)(\mathscr{P}_2))] \\ &\rightarrow \lambda \mathscr{P}_2 [\text{showed}'(a'(\text{picture}'(f^*))(f^*)(\mathscr{P}_2))] \end{aligned}$$

Note that the translation of the object is outside at the initial stage (i.e. $\lambda \text{IPP}(f)$). In effect, the antecedent NP must be pulled out of the "initial" translation which is to function as the argument of an extensionality predicate, to be replaced by a placeholder.

The verb phrase *showed Felix a picture of himself* translates "initially" as follows, where \mathscr{P}_4 replaces the translation of *Felix* following clauses (i) and (ii).

- $$\begin{aligned} (103) \text{ a. } &\lambda \mathscr{P}_4 [\text{showed}'(\lambda \mathscr{P}_3 [a'(\text{picture}'(\mathscr{P}_3))](\mathscr{P}_4))(\mathscr{P}_4)] \\ &\quad | \qquad \qquad \qquad | \quad | \\ &\text{by (iiib)} \qquad \qquad \text{by (i)} \quad \text{by (iiib)} \\ \text{b. } &\rightarrow \lambda \mathscr{P}_4 [\text{showed}'(a'(\text{picture}'(\mathscr{P}_4)))(\mathscr{P}_4)] \quad [\text{lambda-conversion}] \end{aligned}$$

And this combines with RE_{OBJ} and the translation of *Felix* as in (95).

- $$\begin{aligned} (104) &\text{RE}_{\text{OBJ}}(\lambda \mathscr{P}_4 [\text{showed}'(a'(\text{picture}'(\mathscr{P}_4)))(\mathscr{P}_4)])(\lambda \text{IPP}(f)) \\ &\quad | \qquad \qquad \qquad | \\ &\text{by (iiic)} \qquad \qquad \text{by (iiic)} \\ &\rightarrow \lambda v \lambda \mathscr{P}_1 \lambda \mathscr{P}_2 \mathscr{P}_1 \{ \lambda x [v(x^*)(\mathscr{P}_2)] \} (\lambda \mathscr{P}_4 [\text{showed}'(a'(\text{picture}'(\mathscr{P}_4)))(\mathscr{P}_4)])(\lambda \text{IPP}(f)) \\ &\rightarrow \lambda \mathscr{P}_2 \lambda \text{IPP}(f) (\lambda x [\lambda \mathscr{P}_4 [\text{showed}'(a'(\text{picture}'(\mathscr{P}_4)))(\mathscr{P}_4)](x^*)(\mathscr{P}_2)]) \\ &\rightarrow \lambda \mathscr{P}_2 \lambda \text{IPP}(f) (\lambda x [\text{showed}'(a'(\text{picture}'(x^*))(x^*)(\mathscr{P}_2)]) \\ &\rightarrow \lambda \mathscr{P}_2 [\text{showed}'(a'(\text{picture}'(f^*))(f^*)(\mathscr{P}_2))] \end{aligned}$$

The awkwardness of this translation is of course due to the fact that a constituent of the VP is to have scope over the translation of the VP itself. This is eliminated if we assume binary branching within the verb-complement structure, as do Pollard and Sag (1983) and many researchers working in Montague Grammar (cf, Dowty, 1982a,b), though this entails a very different approach to subcategorization from that found in GKPS and goes beyond the scope of the present study.²⁵

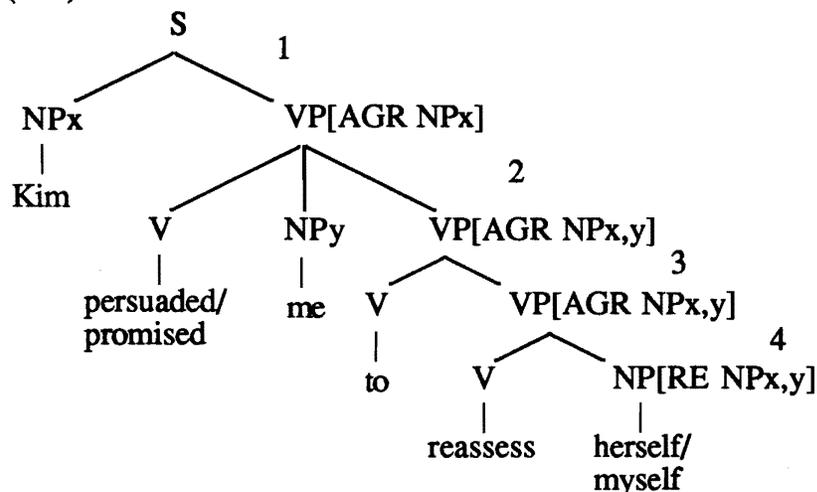
Incorporating reflexive agreement into the semantics or, specifically, into the binding conditions may appear to depart from the original objective of this study: to provide a description of reflexivization which articulates with the syntactic feature instantiation system in GKPS. But this is illusory since the conditions on binding depend crucially on syntactic feature instantiation. Consider the following sentences.

(105) Kim persuaded me to reassess myself/*himself.

(106) Kim promised me to reassess himself/*myself.

The object of *persuade* is the controller of the infinitive in (105) and, via the Control Agreement Principle, it is the ultimate controller of *reassess myself*. This means that the inflectional information associated with *me* will appear in the value of SUBJ in the lower VP, where the binding conditions require, in effect, that the reflexive pronoun be compatible in inflectional features as in the following when the value of RE is NP_y.

(107)



In order for binding to go through, the values of RE and SUBJ must agree in inflectional features in local tree 4. Similarly, *promise* is a subject-control verb, so *Kim* is the ultimate controller of the VP *reassess himself* and the value of RE is then NP_x. Clearly the effects of the syntactic Control Agreement Principle are essential to the analysis.

5. Conclusions.

The domain of reflexivization is described above in the context of the feature instantiation principles in Gazdar, Klein, Pullum and Sag (1985) where reflexivization is represented by a categorial valued Foot feature RE whose percolation defines the domain. The generalization presented here is that RE percolates up to but not into a predicative category--a category containing a specification for SUBJ--and the upward migration of RE is blocked by feature cooccurrence restrictions.

While I see no reason why the actual inflectional agreement between a reflexive pronoun and its antecedent could not be stated in the syntax, I believe that such agreement is essentially semantic and comparable to agreement between other pronouns and their antecedents. I have steered a middle course here by making inflectional agreement a condition on binding. This approach meets the initial objective of providing an analysis of reflexivization which articulates with the syntactic feature instantiation principles found in Gazdar, Klein, Pullum and Sag (1985), though straying somewhat from their dictum that the grammar does not admit semantic filtering.

Appendix A. The Foot Feature Principle.

The Foot Feature Principle as formulated in GKPS will not permit the analysis outlined above, where Feature Cooccurrence Restrictions 1 and 2 block the upward migration of reflexive feature specifications. I propose a reformulation of the FFP here and provide independent evidence for this move.

The FFP is absolute in its current formulation, which says roughly that the mother and daughters must agree in foot features. The formal statement of the FFP is discussed below but the following suffices for the present discussion.

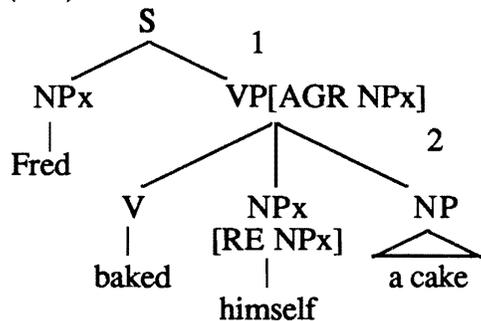
(108) Foot Feature Principle (Informally Stated).

The instantiated foot feature specifications of the mother must form the unification of the instantiated foot feature specifications of the daughters.

Instantiated features are those which are not mentioned in the licensing immediate dominance rule (versus inherited ones, which are mentioned in the ID rule). Local tree 2 below violates the FFP if the reflexive feature specification is freely instantiated in a projection from the ID rule in (109).

(109) $VP \rightarrow H[\#], NP, NP$

(110)



Recall that Feature Cooccurrence Restrictions 1 and 2 block the upward migration of the reflexive specification into VP. So while the FFP insists that an instantiated reflexive feature specification in a daughter be instantiated in the mother as well, the FCRs say this is impossible. In short, FCRs and the FFP as currently formulated conspire to guarantee that no VP (or other predicative category) may dominate a category containing a reflexive specification, clearly an undesirable outcome.

One might counter that a possible remedy is to assume reflexives are introduced by metarules as in earlier analyses of reflexives in Generalized Phrase Structure Grammar (cf. Gazdar and Sag (1981) or Pollard and Sag (1983)). Metarules operate on (lexically headed) ID rules, inducing new ID rules. So, for example, if the licensing ID rule for local tree 2 in (10) were one derived from (54)--as in (55)--the tree would not constitute a violation of the Foot Feature Principle, since the inherited reflexive specification in the daughter would be ignored by the FFP.

(111) $VP \rightarrow H[\#], NP[RE X^2], NP$

There are a number of reasons for believing that this is not the right approach in the context of the version of Generalized Phrase Structure Grammar found in GKPS, however.

For the sake of argument, suppose we posit the following reflexivization metarule.

(112) Reflexivization Metarule.

$$X \rightarrow W, X^2$$

$$\Downarrow$$

$$X[\text{SUBJ NP}\alpha] \rightarrow W, X^2[\text{RE NP}\alpha], \text{ where } \alpha \in \{ \langle f, v \rangle \mid f \in \{ \text{SING, THRP, XSP, GEN} \} \}.$$

That is, for any (lexically headed) ID rule which introduces a BAR-2 category, there is a corresponding ID rule in which the BAR-2 category contains a reflexive feature specification. Note that the metarule introduces SUBJ on the mother, so we can assume that the metarule is restricted to categories which may contain SUBJ specifications. This guarantees that the upper bound on percolation of RE will be a category containing SUBJ. Further, the rule is set up to cause agreement between the value of SUBJ and RE. This is of course an oversimplification of agreement between reflexive pronouns and their antecedents (cf, nonsubject antecedents).

But agreement cannot be stated in a metarule if we assume the analysis of person and number found in Sag, Gazdar, Wasow and Weisler (1985) where third person is {<THRP, +>, <XSP, +>}, second person is {<XSP, +>} and first person is unmarked. Similarly, plural is unmarked and singular is {<SING, +>}. The problem for stating agreement in a metarule is this: the absence of a specification is significant. Suppose we induce the following ID rule from (112).

(113) $VP[\text{SUBJ NP}[+XSP]] \rightarrow H[\#], NP[\text{RE NP}[+XSP]], NP$

Clearly our intent is that the values of SUBJ and RE should be second person plural, however nothing prevents either the value of SUBJ or that of RE from being more fully specified in an instantiated tree, since categories in trees need not be identical to those in ID rules; they extend the categories in the rules. So, for example, the value of SUBJ might be as it is in the ID rule but that of RE could be {<XSP, +>, <THRP, +>, <SING, +>}--since this is a valid extension of the ID rule--yielding ungrammatical examples such as the following.

(114)*You should fix himself a sandwich.

This of course does not preclude the use of a metarule, though it seems clear that metarules are not the place for stating agreement if we accept unary-valued inflectional features.²⁶

Second, if a metarule were involved, it is not at all clear how two or more reflexive constituents could be introduced into the same domain, yet all of the following are grammatical.

(115) Kim sent himself pictures of himself.

(116) Sandy talks to herself about herself.

(117) Leslie persuaded herself that pictures of herself were on sale at the Louvre.

Metarules in GKPS are constrained in such a way that only one constituent could receive a reflexive specification. This is because only a single category on the right side of an ID rule can be mentioned in the input statement of a metarule.²⁷

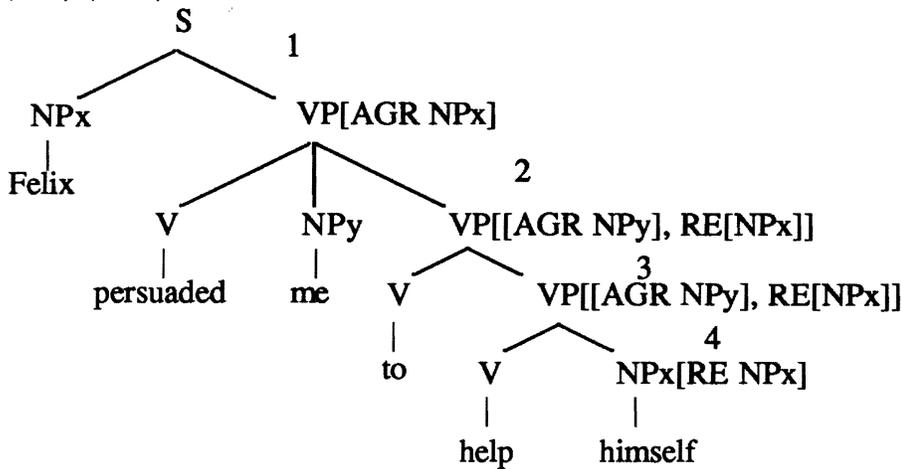
Lastly, a metarule will not in itself eliminate our original problem of preventing the percolation of the reflexive feature through predicative categories as in the following example.

(118)*Felix persuaded me to help himself.

Supposing reflexives are introduced by a metarule, there is no obvious reason why the licensing ID rule for local tree 2 in (64) below might not be the following (ignoring inflectional features in the values of SUBJ and RE).

(119) VP[SUBJ NP] → H[#], NP, VP[INF, RE[NP]]

(120) (= 62)



The point here is that we need a restriction to the effect that predicative categories cannot contain reflexive specifications, regardless of whether or not a metarule is employed. Note that no revision of the metarule would rule out examples such as the following.

(121)*Kim would have preferred for us to have helped himself.

If we assume that reflexive specifications can pass between clauses, then nothing prevents (121) unless FCR 2 is operative.

Given these problems with the introduction of reflexive specifications by a metarule at the tops of reflexive paths, another approach seems preferable if one exists within the context of the theory. As it turns out, Feature Cooccurrence Restrictions 1 and 2 suffice to block the upward migration of RE through predicative categories if we revise the Foot Feature Principle slightly so that it forgives the impossible. The problem is currently as follows: FCRs 1 and 2 make it impossible for a predicative category to contain a reflexive specification but the FFP insists that if any daughter contains a reflexive specification, then the mother must as well—even if the mother is a predicative category. In short, the FCRs and the FFP are at odds with one another. This can be eliminated by reformulating the FFP along the lines of the Head Feature Convention in GKPS, employing the notion free **feature specification** (cf. GKPS, p. 95). Informally, the revised FFP should say something like the following.

(122) FOOT FEATURE PRINCIPLE, REVISED (Informally Stated).

The inherited foot feature specifications in the mother must form the unification of the inherited foot feature specifications in the daughters insofar as this is possible.

The FFP as presented in GKPS is as follows (p. 82).

(123) FOOT FEATURE PRINCIPLE (FFP)

Let Φ_r be the set of projections from r , where $r = C_0 \rightarrow C_1, \dots, C_n$.

Then $\phi \in \Phi_r$ meets the FFP on r if and only if

$$\phi(C_0) \upharpoonright_{\text{FOOT} \sim C_0} = \bigsqcup_{1 \leq i \leq n} \phi(C_i) \upharpoonright_{\text{FOOT} \sim C_i}$$

$\phi(C)|\text{FOOT}\sim C$ denotes the feature-value pairs in $\phi(C)$ --the projection in the tree of category C in the ID rule--where the feature is a FOOT feature and it is not mentioned in C in the ID rule (i.e., the instantiated specifications). More precisely, this is as in (68) or, more succinctly, (69).

(124) $\{\langle f, v \rangle \in \phi(C) \mid f \in \text{FOOT}\} - \{\langle f, v \rangle \mid f \in \text{DOM}(C)\}$

(125) $\{\langle f, v \rangle \in \phi(C) \mid f \in \text{FOOT} \ \& \ f \notin \text{DOM}(C)\}$

The equation in (123) then says that the instantiated foot feature specifications in $\phi(C_0)$ --the mother in the tree--must equal the unification of the instantiated foot feature specifications in the daughters, $\phi(C_i)$.

The FFP is revised as follows, where $\psi(C, \Phi_r)$ denotes the **free feature specifications** in all possible projections of category C in an ID rule r . This is the set of feature-value pairs occurring in all possible projections of C . Here this is restricted to foot features and the notion 'possible projection' at this point means all projections of the licensing ID rule, where the ID rule and any Feature Cooccurrence Restrictions are satisfied.

(126) FOOT FEATURE PRINCIPLE (Relativized)²⁸

Let Φ_r be the set of projections from r , where $r = C_0 \rightarrow C_1, \dots, C_n$.

Then $\phi \in \Phi_r$ meets the FFP on r if and only if

$$\phi(C_0)|\text{FOOT}\sim C_0 = \left(\bigsqcup_{1 \leq i \leq n} \phi(C_i)|\text{FOOT}\sim C_i \right) \cap \psi(C_0, \Phi_r)|\text{FOOT}$$

This says that the inherited foot feature specifications of the mother must be equal to the unification of the inherited foot feature specifications of the daughters intersecting with the free feature specifications of the mother. If a given foot feature specification is, in principle, not possible in the mother then it will not appear in $\psi(C_0, \Phi_r)|\text{FOOT}$. But if it does not, then it will not appear in the intersection, so such cases are forgiven by the revised FFP. In other words, a daughter of a predicative category may contain a reflexive specification and this will not percolate up into the mother due to FCRs 1 and 2.

There may be independent evidence for the relativized version of the FFP. Consider examples such as the following.

(127) I wonder who gave which books to whom.

(128) Which books do you think Felix gave to whom?

These sentences are ruled out, given GKPS's formulation of the FFP and the following Feature Cooccurrence Restrictions in GKPS.

(129) FCR 21: $\sim([\text{SLASH}] \ \& \ [\text{WH}])$

(130) FCR 22: $\text{VP} \supset \sim[\text{WH}]$

SLASH is the unbounded dependency feature and WH is a categorial valued feature involved in interrogative and relative pronouns. FCR 21 models the WH-Island constraint, blocking extraction from wh-clauses as in the following.²⁹

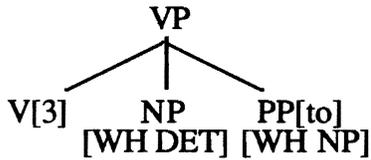
(131)*What do you wonder $[S[\text{WH}]/\text{NPwho ate e}]$?

As the WH feature specification is governed by the Foot Feature Principle, it percolates up to S , where the presence of SLASH then violate FCR 21. I believe (130) is intended to prevent VPs from counting as wh-phrases, blocking examples such as the following.

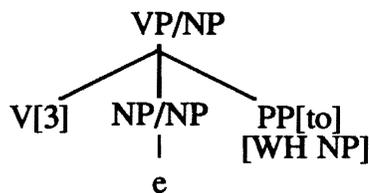
(132)*I wonder to see whom Felix wants e.

The problem in (127) and (128) is that the FFP rules out the following verb phrases.

(133) (cf, 127)



(134) (cf, 128)



These are projections of the following immediate dominance rules (where the second is derived from the first by Slash Termination Metarule 1).³⁰

(135) $VP \rightarrow V[3], NP, PP[to]$

(136) $VP \rightarrow V[3], NP[+NULL], PP[to]$

The FFP insists that VP contain the WH specifications in both cases, but the relevant FCRs say this is impossible, therefore the grammar wrongly predicts that no VP will ever contain a wh-constituent. These problems are eliminated in the new version of the Foot Feature Principle given above.

In summary, the relativized version of the Foot Feature Principle above permits the restriction on the upward migration of reflexive feature specifications by FCR 2. This reformulation has independent motivation in the instantiation of the interrogative feature WH, correctly permitting VP to dominate wh-constituents in (127) and (128). It should be noted that this relativization of the FFP does not constitute a change in the theory, since the notion **free feature specification** is employed in the formulation of the Head Feature Convention in GKPS.

Appendix B: Binding in Unbounded Dependency Constructions.

This appendix considers the binding of reflexives in unbounded dependency constructions, demonstrating that such constructions provide no unsurmountable problems for the analysis of reflexives above.

B.1. The semantics of reflexives in topics.

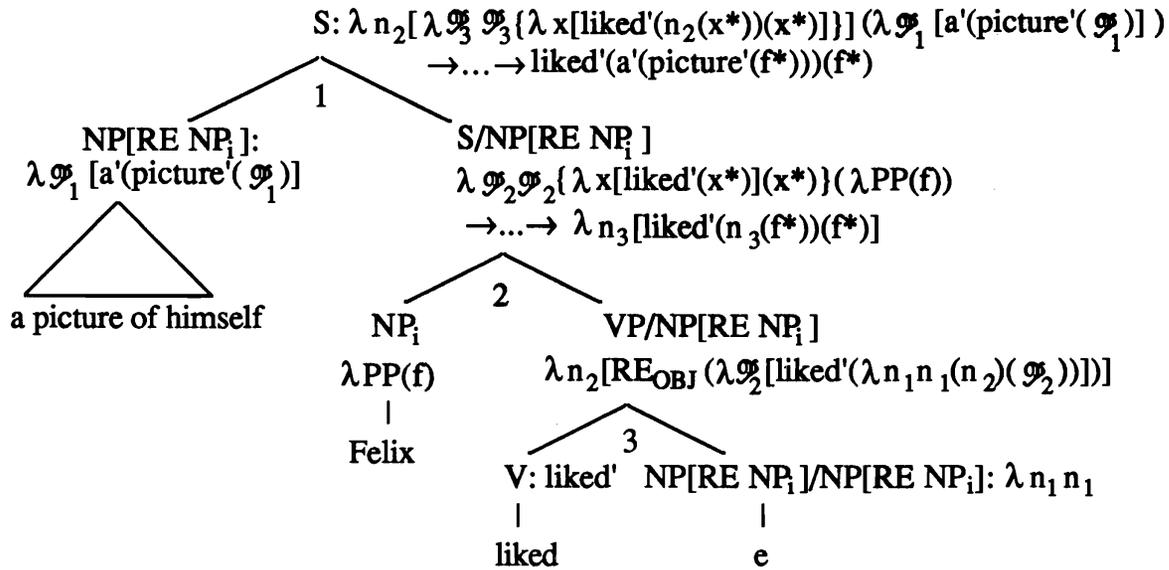
This section briefly outlines the translation of topicalized constructions when the topic contains a reflexive pronoun, as in

(137) A picture of himself, Felix liked.

I assume that topics are not necessarily extensional, following Pollard and Sag (1983) and contra GKPS. The topic will be interpreted down into the gap site, where it is in the domain for binding to the subject.

Note that a specification for RE appears within the value for SLASH in such constructions, as in the following tree.

(138) (= 137)



At the bottom of the UDC path, NP[+NULL]/NP translates as the identity function on NP types-- $\lambda \mathscr{P} \mathscr{P}$ --and, in general, $\alpha[+NULL]/\alpha$ translates as $\lambda v^\alpha [v^\alpha]$, where v^α is $\text{TYPE}(\alpha)$. Since NP[RE NP] is $\lambda \mathscr{P} \mathscr{P}$, which is of type $\langle \text{NP}, \text{NP} \rangle$, the empty category NP[+NULL, [RE NP]]/NP[RE NP] should be a function from $\langle \text{NP}, \text{NP} \rangle$ types to $\langle \text{NP}, \text{NP} \rangle$ types--the identity function on $\langle \text{NP}, \text{NP} \rangle$ types. Hereafter, a variable of type $\langle \text{NP}, \text{NP} \rangle$ will be given as simply n here, so this null category is λnn .

Reflexive binding--the introduction of RE_{SUBJ} --occurs in the translation of *saw e* in local tree 3.

(139) *liked e* \Rightarrow

- i) $\lambda n_2 [\text{RE}_{\text{SUBJ}} (\lambda \mathscr{P}_2 [\text{liked}'(\lambda n_1 n_1 (n_2) (\mathscr{P}_2))])]$ \rightarrow
- ii) $\lambda n_2 [\lambda v [\lambda \mathscr{P}_3 \mathscr{P}_3 \{ \lambda x [v(x^*)(x^*)] \}] (\lambda \mathscr{P}_2 [\text{liked}'(\lambda n_1 n_1 (n_2) (\mathscr{P}_2))])]$ \rightarrow
- iii) $\lambda n_2 [\lambda \mathscr{P}_3 \mathscr{P}_3 \{ \lambda x [\lambda \mathscr{P}_2 [\text{liked}'(n_2(\mathscr{P}_2))]] (x^*)(x^*) \}] \rightarrow$
- v) $\lambda n_2 [\lambda \mathscr{P}_3 \mathscr{P}_3 \{ \lambda x [\text{liked}'(n_2(x^*))(x^*)] \}]$

The addition of \mathscr{P}_2 , the lambda abstraction operator binding it and RE_{SUBJ} in (i) follows the translation discussed in Section 4. The introduction of n_2 and the lambda abstraction operator binding it follows the translation of SLASH in GKPS (pp 229-236). Both SLASH and RE translating in the middle part of their paths by successive introductions of (a) the appropriate variable associated with the daughter constituent containing the Foot feature in question and (b) a lambda abstract operator binding this variable. So n_2 in $(\lambda n_1 n_1 (n_2))$ is the former and λn_2 outside the translation of the whole phrase is the latter.³¹

In local tree 1, the noun phrase *a picture of himself* is of type $\langle \text{NP}, \text{NP} \rangle$, and so is n_3 , bound by lambda in the translation of *Felix liked e*, which therefore predicates on *a picture of himself* as in

(140) $\lambda n_3 [\text{liked}'(n_3(f^*))(f^*)] (\lambda \mathscr{P}_1 [a'(\text{picture}'(\mathscr{P}_1))])$
 $\rightarrow \text{liked}'(\lambda \mathscr{P}_1 [a'(\text{picture}'(\mathscr{P}_1))]) (f^*) (f^*)$
 $\rightarrow \text{liked}'(a'(\text{picture}'(f^*))) (f^*)$

This is of course the desired result, that is, (137) and (99) are equivalent.

(99) *Felix liked a picture of himself*

- $$\begin{aligned} &\Rightarrow \lambda \mathscr{P} \mathscr{P} \{ \lambda x [\text{liked}'(a'(\text{picture}'(x^*))) (x^*)] \} (\lambda PP(f)) \\ &\rightarrow \lambda PP(f) (\lambda x [\text{liked}'(a'(\text{picture}'(x^*))) (x^*)]) \\ &\rightarrow \text{liked}'(a'(\text{picture}'(f^*))) (f^*) \end{aligned}$$

B.2. Reflexives in Constituent Questions.

Reflexive pronouns in *wh*-phrases present obvious problems if we assume the *wh*-phrase is extensional and is therefore not interpreted into the scope of the antecedent.

(141) Which pictures of himself would no teenage boy show to his girlfriend.

However Engdahl (1986) argues convincingly that *wh*-questions are not necessarily extensional. For example, the *wh*-phrase in the following example (Engdahl's (40), p. 167) has both *de dicto* and *de re* interpretations.

(142) Which book did John believe every author would read from?

As she notes, this '...has a reading on which it is appropriate to answer *his latest book* or *his best selling book*.' This reading does not imply John knows anything about the books in question (i.e., they seem to be part of the world of belief).

I will assume here that *wh*-phrases as UDC fillers are not necessarily extensional. However it is difficult to reconcile this with a treatment of questions along the general lines of Karttunen (1977) if we simply interpret the *wh*-phrase in, as in the treatment of topics in the previous section. For example, Karttunen translates (143) (his (34b), p. 20) as in (144).³²

(143) Which girl sleeps?

(144) $\lambda p \exists x [\text{girl}'(x) \wedge \check{p} \wedge p = \wedge \text{sleep}'(x)]$

This denotes a set of true propositions, those for which it is true that the individual sleeps and is a girl. So when a speaker asks such a question, he is requesting information about that set of propositions. Note that the individual, *x*, in subject position-- $\wedge \text{sleep}'(x)$ --is bound outside by an existential quantifier outside the intensional context, but the description *girl'* is also treated as extensional (and would also be in object extraction).

Engdahl notes (following a treatment in Engdahl, 1980), the quantification part of Karttunen's analysis can be preserved while still interpreting the translation of N^1 into the gap context. While she rejects this approach, her reasons are not compelling and I adopt it here, recast into the present analysis. (145) will translate as in (146).

(145) which pictures of himself did Felix like?

(146) $\lambda p \exists F [\check{p} \wedge p = \wedge \text{liked}'(\lambda P \forall x [F(\text{pictures}'(f^*)) \rightarrow P(x)]) (f^*)]$

This involves binding a quantifier *F* corresponding to *which*, rather than the whole NP-translation. Roughly, *F* picks out the pictures such that *p* is true. The translation is as follows, where the variable *F* is a determiner type ($\langle N^1, NP \rangle$) and corresponds to a WH feature specification so the translation is regulated by (i) and (iii) of GKPS's schema, involving Tr_0 and Tr_2 . *Which* translates much like *all*, but it is a function from determiner types to determiner types.

(147) *all* $\Rightarrow \lambda P \lambda Q \forall x [P(x) \rightarrow Q(x)]$

(148) *which* $\Rightarrow \lambda F \lambda P \lambda Q \forall x [F(P(x)) \rightarrow Q(x)]$

(149) *pictures of himself* $\Rightarrow \lambda \mathscr{P} [\text{pictures}'(\mathscr{P})]$

(150) *which pictures of himself*

$$\Rightarrow \lambda F_1 \lambda \mathscr{P}_1 [\lambda F \lambda P \lambda Q \forall x [F(P(x)) \rightarrow Q(x)](F_1) (\lambda \mathscr{P} [\text{pictures}'(\mathscr{P})](\mathscr{P}_1)) \rightarrow \dots \\ \rightarrow \lambda F_1 \lambda \mathscr{P}_1 [\lambda Q \forall x [F_1(\text{pictures}'(\mathscr{P}_1)(x)) \rightarrow Q(x)]]$$

(151) *Felix liked e* $\rightarrow \lambda n [\text{liked}'(n(f^*))(f^*)]$ (cf. 116)

Note that the gap in (151) involves RE (cf, 140 and n is of type $\langle NP, NP \rangle$). (151) and (152) will combine if the translation in the former is provided with an argument of type F , which it will be because WH will percolate up to the mother and clauses (i) and (iii) of GKPS's schema apply.

(152) *which pictures of himself Felix liked*

$$\Rightarrow \lambda F_2 [\lambda n [\text{liked}'(n(f^*))(f^*)] (\lambda F_1 \lambda \mathscr{P}_1 [\lambda Q \forall x [F_1(\text{pictures}'(\mathscr{P}_1)(x)) \rightarrow Q(x)](F_2)) \rightarrow \dots \\ \rightarrow \lambda F_2 [\text{liked}'(\lambda Q \forall x [F_2(\text{pictures}'(f^*)(x)) \rightarrow Q(x)])(x^*)]$$

This is not quite the translation in (146), repeated here.

(146) $\lambda p \exists F [\sim p \wedge p = \wedge \text{liked}'(\lambda P \forall x [F(\text{pictures}'(f^*)) \rightarrow P(x)])(f^*)]$

However, this translation results when (152) combines with the following predicate (save alphabetic variance of P and Q).³³

(153) $Q_{\text{WHICH}} = \lambda v \langle F, S \rangle [\lambda p \exists F [\sim p \wedge p = \wedge v \langle F, S \rangle]]$

(154)

$$\lambda v \langle F, S \rangle [\lambda p \exists F [\sim p \wedge p = \wedge v \langle F, S \rangle (F)]] (\lambda F_2 [\text{liked}'(\lambda Q \forall x [F_2(\text{pictures}'(f^*)(x)) \rightarrow Q(x)])(x^*)]) \\ \rightarrow \dots \rightarrow \lambda p \exists F [\sim p \wedge p = \wedge \text{liked}'(\lambda Q \forall x [F(\text{pictures}'(f^*)) \rightarrow Q(x)])(f^*)]$$

In summary, reflexives in unbounded dependency constructions where the reflexive pronoun in the UDC filler finds its antecedent at the gap site seem to provide no particular problems under the assumption that UDC fillers are not necessarily extensional.

Notes

¹Notable exceptions are Bach and Partee (1980), whose analysis is cast in terms of the translation from syntactic representations to intensional logic following a functional principle (cf. Keenan, 1974), and perhaps Pollard and Sag (1983) whose analysis --though similar in many respects to the one presented here--invokes an intensional logic type it setting the domain of reflexivization. This mixing of levels is outside the range of possibilities for feature cooccurrence restrictions as envisioned here and presented in GKPS (cf, section 1 below).

²While the analysis concentrates on reflexive pronouns, I would hope it is extensible to reciprocals for the most part, though some evidence suggests that the distributions of reflexives and reciprocals differ (cf, Lebeaux, 1983).

³Under the formulation of the FFP found in GKPS this is not true. Rather, if a daughter of VP contains RE, the local tree is inadmissible because the FCR prevents the mother from also containing it. See Appendix A for a discussion of this and a reformulation of the FFP.

⁴The analysis of infinitives in GKPS is assumed here, where *to* is treated as a verb (cf, Pullum, 1982) which selects a base-form (BSE) VP complement. The Control Agreement Principle of GKPS passes the value of SUBJ (or AGR in their system) down to the VP complement.

⁵See Carroll (1986) for an analysis of morphological reflexives used as referring pronouns. Her analysis (somewhat surprisingly) predicts examples such as the following are well-formed, though presumably subject to speaker variation.

i) Felix dislikes myself/themselves.

I focus here on what I take to be cases of bound anaphora.

⁶The facts are not clear, but I believe I would be willing to say that a reflexive is better than a simple pronoun in the following examples, yet presumably a reflexive should be impossible under their analysis.

i) They could see Kim and themselves/*them in the mirror.

ii) Alice sent Harry and ?herself/*her illegal souvenirs from Brazil.

⁷The Control Agreement Principle says roughly that when a category contains AGR, the value of AGR agrees with a controller sister (e.g., a subject) or, if there is no controller, it takes on the value of AGR in the mother. In local tree 2, for example, the infinitive VP has no local controller sister, hence its value for AGR must agree with AGR in the mother.

⁸I return to such examples in Section 2, noting that a nonreflexive pronoun is possible (or perhaps obligatory for some speakers) when the subject is the antecedent.

i) Henry wrapped the pythons around him.

⁹If one were to decide such examples are outside the core cases perhaps they should not be termed 'emphatics', at least not in the sense of Verheijen (1987), who equates the term with intensifiers (e.g., *John himself mowed the lawn*). They might instead fall within the class of referring definite pronouns discussed in Carroll (1986).

¹⁰The so-called Avoid Pronoun Principle in Chomsky (1981, p. 65) might be thought of as a discourse constraint, in which case (22) could be construed to be grammatical but inappropriate in light of the possibility of (26).

¹¹A treatment of bound nonreflexive, definite pronouns is beyond the scope of this paper. It seems clear that reflexives and definite pronouns are not always in complementary distribution, though I give no account here of the cases where a nonreflexive cannot be interpreted as coreferential with another NP. See, for example, Reinhart (1983a), who considers this to be a pragmatic constraint.

¹²Analogous examples are cited by Jacobson and Neubauer (1976). See also Bouchard (1985) and Huang (1983).

¹³The version in GKPS (page 118) is essentially the same except that it gives X^2 rather than X on the left sides of the arrows. Since the first projection above V^0 is V^2 in GKPS's system, the metarule applies to VP rules. But A^1 is the first level above A^0 and hence their version of the metarule can never apply to adjectives, since metarules apply only on lexically headed ID rules (and A^2 will never have a lexical head daughter.)

¹⁴R. Levine (personal communication) notes that predicative NP may necessarily carry AGR in missing object constructions so that the link between the filler (subject) and the gap is completed.

i) Kim is a nuisance to deal with.

ii) Felix is a pain to talk to.

See Hukari and Levine (1987c) for further discussion of connectivity in missing object constructions.

¹⁵This ID rule is of course analogous to Pollard and Sag's treatment and follows, as they note, Keenan and Faltz (1978) in taking possessed N^1 as being predicative.

¹⁶This may be an oversimplification. As noted by Kuno (1987), speakers often find a semantic contrast between examples such as the following.

i) John pulled the blanket over himself.

ii) John pulled the blanket over him.

Kuno's explanation is that the object of *over* is the target in the former and not in the latter. Though I find his explication of the notion 'target' somewhat unclear, I do perceive a difference: I would be more inclined to use (i) if the person pulled the blanket completely over himself, covering his head.

¹⁷A third case, so-called 'pitstop' reflexives (cf, Weisler, 1983), is problematic.

i) How many pictures of *himself* does *Felix* think *Alice* claims the girls liked?

ii) How many pictures of *herself* does *Felix* think *Alice* claims the girls liked?

iii) How many pictures of *themselves* does Felix think Alice claims *the girls* liked?

If (ii) is fully grammatical, then apparently a reflexive pronoun may be bound along the UDC path. Given configurations such as the following, where the mother is the VP whose subject is *Alice*,

iv) VP[AGR NP_i]/NP[RE NP_i]

V
S/NP

it is certainly possible to state binding, where a subject along the UDC path binds the reflexive if this is the correct generalization. However this configuration seemingly violates the Foot Feature Principle, under the assumption that the reflexive specification in the value of SLASH does not travel all the way down to the gap site. This not to say that such cases are beyond the power of the theory. In the worse case, a special exemption to the FFP could be formulated, though a more principled approach would be preferable.

¹⁸This, in fact, is a problem for the analysis in Pollard in Sag (1983). It seems clear that they assume their analysis accounts for configuration (a), where the reflexive feature is encoded in SLASH and passes down to the gap site (though they do not explicitly state this). But nothing in their proposal licenses the lack of a reflexive specification in the mother. In fact, it appears they have an account for (b), but not (a).

¹⁹This optional introduction of features in a licensing ID rule appears to be an essential mechanism for handling certain sorts of optionality in feature percolation in GKPS's system. See, for example, the immediate dominance rule for introducing conjunction markers in Warner (1988).

²⁰More precisely, clause (i) of the CAP says that the value of SLASH agrees with the head features and inherited foot features of the filler. That is, RE need not be inherited in the value of SLASH; if it is inherited in the filler this is sufficient to make RE visible to the CAP. If SLASH were to contain a specification for RE in (66)--i.e., case (b)--this would be inadmissible at the top of the unbounded dependency construction because the CAP would force the filler to contain not only its instantiated RE specification but an additional inherited one, matching the value of SLASH, which is impossible.

²¹For simplicity, the intensionality will not be noted.

²²I follow GKPS's IL types in the presentation here, where TYP(N1) is $\langle e, t \rangle$, rather than $\langle s, \langle e, t \rangle \rangle$ and TYP(NP) is $\langle s, \langle \langle e, t \rangle, t \rangle \rangle$, not $\langle \langle s, \langle e, t \rangle \rangle, t \rangle$ (or $\langle s, \langle \langle s, \langle e, t \rangle \rangle, t \rangle \rangle$). If we assume instead that TYP(NP) is $\langle s, \langle \langle s, \langle e, t \rangle \rangle, t \rangle \rangle$, then RE_{SUBJ} is: $\lambda \nu^\alpha \lambda \mathcal{F} \mathcal{F} \{ \wedge \lambda x [\nu^\alpha(x^*) (x^*)] \}$.

²³The notation $\lambda PP(x)$ and x^* are used equivalently here, both taken to be NP types. Strictly speaking the former should be $\wedge \lambda PP\{x\}$, of type $\langle s, \langle \langle s, \langle e, t \rangle \rangle, t \rangle \rangle$.

²⁴About-PPs are a problem given that the following is ungrammatical.

i)*Kim talked about the students to themselves.

Note that we understand this in such a way that the about-PP describes an implicit theme (i.e., the discussion was about so-and-so). Possibly the about-PP can be viewed as some species of predicative category. If so, the restriction of nonsubject binding to elements which translate as NP-types will account for the ungrammaticality of (i).

²⁵See for example the head-driven approach in Pollard (1984).SUBCAT(egorization) is a list (stack) valued feature. Well-formedness conditions can be cast in terms of matching categories in binary trees with those in the SUBCAT stack (i.e., those in the tree extend those in the stack). In this approach, the complements of a head need not be sisters. In fact, the subject is in the stack.

²⁶See, though, Warner (1988) for difficulties with unary valued inflectional features in light of the Head Feature Convention.

²⁷This of course is not a compelling argument against the use of a metarule, given that one could imagine relaxing this constraint, though such a move is questionable in light of other problems with the use of a metarule noted here.

²⁸This version of the FFP may not be adequate if we wish to rule out examples such as (i) as opposed to (ii) in the syntax.

i) *The person Fred wants to see whom is Alice.

ii) The person whom Fred wants to see is Alice.

It seems that features such as RE and interrogative WH may be bounded, restricted by FCRs, whereas certain other foot features, such as relative WH and probably SLASH cannot be bounded in this way. Calling interrogative WH Q and relative WH R, let us say that Q and RE are BOUNDED while R and SLASH are unbounded. The FFP might then be stated as follows, where, in effect, the original version of the FFP pertains to UNBOUNDED foot features.

iii) Foot Feature Principle (Second Revision)

Let Φ_r be the set of projections from r, where $r = C_0 \rightarrow C_1, \dots, C_n$.

Then $\phi \in \Phi_r$ meets the FFP on r if and only if

i) $\phi(C_0)|UNBOUNDED \sim C_0 = (\bigcup_{1 \leq i \leq n} \phi(C_i)|UNBOUNDED \sim C_i)$, and

ii) $\phi(C_0)|BOUNDED \sim C_0 = (\bigcup_{1 \leq i \leq n} \phi(C_i)|BOUNDED \sim C_i) \cap \psi(C_i, \Phi_r)|BOUNDED$.

²⁹The reformulated FFP correctly rules out (131) and (132). Wh-extraction of VP in main clauses is not eliminated but this can be handled by more direct means such as blocking VP from being a possible value for SLASH.

³⁰STM 1 in GKPS simply introduces [+NULL] on a BAR-2 daughter and a Feature Cooccurrence Restriction forces instantiation of SLASH. Hukari and Levine (1987b, in press) give a different treatment, where SLASH is inherited in the mother and the daughter is replaced by the special terminal symbol e.

³¹Note that $\lambda^{\mathcal{P}}_2$ in (i) is inside the scope of the reflexive predicate while λn_2 , binding the UDC variable, is outside. For those familiar with the translation schema in GKPS (pp 230-231), this shows that the placement of $\lambda^{\mathcal{P}}_2$ here should not be conflated with the translation of Foot features in the mother.

³²His IL expression is cast in a more classical montagovian approach, where subjects predicate on VP translations, as opposed to the approach taken here.

³³Note that GKPS assume that the translation of an interrogative feature into a predicate (cf, QWHICH) does not occur unless the clause is imbedded. This is because it becomes "potent" at the point when the feature specification occurs in a daughter and not in the mother (cf. clause (iv) of their schema). I leave the matter open.

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ARGUMENT AS A FORMULATION-DECISION-DECISION... SEQUENCE

Kimary N. Shahin

Department of Linguistics
University of Victoria

1. INTRODUCTION

Schiffrin (1985) identifies three questions which analysis of argumentative discourse should seek to answer: (1) what is the structure of argument? (2) what is the purpose of argument? and (3) what is the role of social and cultural norms in shaping the discourse? This paper proposes a relatively simple analytical framework which provides an answer to the first question, and sheds some light on the remaining two.[1]

1.1 Problems in Discourse Analysis and the General Aim of this Paper

Discourse Analysis has been noted for its general disunity of approach. In reviewing T.A. van Dijk, Handbook of Discourse Analysis (1985), Frawley (1987) describes it as an "omnivorous field, where one thing is as good as another";[2] Kess (1986a) describes it as a 'collection of approaches'. It is sure that Discourse Analysis must be interdisciplinary in nature. Since discourse is a fundamental medium of social interaction, to the "central disciplines of linguistics, psychology, social psychology, sociology and anthropology"[3] could be added such fields as medicine, law, history, literature and political science -- areas already boasting considerable discourse research. The problem in Discourse Analysis, however, is that researchers from disparate backgrounds have so far been unable to develop a single approach to the single task of analyzing discourse. This disunity of approach has led to a confusion of terms; as Kess (1986b) observes, the present diverse perspectives "define and redefine the problem for their own purposes and from their own perspectives." [4]

This fundamental lack of focus must be addressed, if Discourse Analysis is to proceed past the stage of "an emerging field... in the process of self-identification." [5] This paper is presented as an attempt to work some focus in the specific area of argument.

1.2 Definition of Argument

The literature on argumentative discourse is ambitious and detailed, yet varied in approach. The methodological confusion appears to stem from basic disagreement over the definition of 'argument'. The first of two general opinions considers argument to be formalized debate. It is defined as, for example, "a statement in logical processes of argumentation to support or weaken another statement whose validity is questionable or contentious." [6] The approach here is normative, describing the structure argument

should have (in a formalized framework).[7] To the second opinion argument is conversational disagreement -- 'dispute exchanges'[8] or 'argumentative (parts of) conversation'.[9] The approach within this view is empirical, describing the structure argument is seen to have in informal conversations. Other studies on general discourse have direct bearing on argument, yet argument is either not identified,[10] or is identified only as something like 'troublesome' conversation.[11] There is clearly a need for some consensus on the meaning of 'argument'.

Levinson (1983) provides guidance on this issue, in the observation that "conversation is clearly the prototypical kind of language behaviour." [12] It would seem that informal conversation is the prototypical kind of conversation. Thus, it is sensible to conclude that informal conversation will be the source of prototypical data for the discourse analyst. From there, analysis can proceed to formal or institutional (e.g., doctor-patient, police interrogation, classroom) discourse -- forms which are less prototypical because they are highly conventionalized and occur under specialized constraints.

To take informal argument as the 'prototypical' argument [13] concurs with the reasonable assumption that, historically, people first conversationally argued before they developed and practised formal debate. Van Dijk and Kintsch (1983) describe the development of formal argument as a process of abstraction of the organizational 'macrostructures' of informal argument. That is, argument was recognized to have a beginning and an end; just how the beginning and end were related was defined by classical logic, which packaged argument in terms of syllogistic premises and a conclusion. Further philosophical refinement (cf. Toulmin, 1958) distinguished such elements as datum, warrant, backing, claim and conclusion.

Formal debate is indeed a formalized type of argument. For the discourse analyst, unformalized, informal argument should be the primary definition of 'argument'.

It is important, nevertheless, to explain the place that the notion of 'formal' argument has in conversational dispute: when a speaker argues, he may produce a more-or-less 'formal' argument. For example,

Mrs. Boyle: You're very young.

Mollie: Young?

Mrs. Boyle: To be running an establishment of this kind.
You can't have had much experience.

These three utterances are excerpted from Agatha Christie's "The Mousetrap" [14] and are part of a larger exchange in which the guest, Mrs. Boyle, criticizes the rooming house of Mollie and her husband. Here, Mrs. Boyle argues using her 'formal' argument that

You are very young.

Therefore, you can't have had much experience.

Therefore, you should not be running an establishment of this kind.

This use of 'formal' argument is captured by the distinction of O'Keefe (1982) between argument that is 'made' ('claims-plus-reasons') and argument that is 'had' ('disputatious interaction'). Thus, people may 'make' an argument when they 'have' an argument, but they may 'have' an argument without explicitly 'making' one, as in

Giles: All right. Yes, I was in London. I didn't go to meet a woman there.

Mollie: Didn't you - are you sure you didn't?

Giles: Eh? What do you mean?

Mollie: Go away. Don't come near me.

Giles: What's the matter?

Mollie: Don't touch me.

2. A BASIC APPROACH TO ARGUMENT

There is in the literature no general consensus on what the basic structure of argument is. For example, it has been described as exchange patterns of repetition, inversion or escalation (Brunneis and Lein, 1977), or as 'disagreement-relevant expansions' of a main speech act pair (Jackson and Jacobs, 1980).[15] Although these studies elucidate important aspects of argument, it is possible to approach the issue of structure from a more basic stance.

This O'Keefe and Benoit (1982) have done in isolating one 'generic feature' of argument -- the 'relationship of opposition' between participants. That is, interactants "align themselves in different ways"[16] toward some goal(s), act(s) or belief(s). Such fundamental opposition is described by Bavelas, Rogers and Millar (1985) (with focus on beliefs of interpersonal relationship): "one interactant attempts to define the relationship; this is rejected by an an opposing claim from the other, which is in turn opposed by the initial speaker."[17] This jibes with the commonsense impression that, when speakers argue, they disagree; in other words, they are in opposition to each other (over something).

2.1 The Formulation-Decision Speech Act Pair

The analyst will want to be able to identify how this relationship of opposition is displayed in the discourse. The present claim is that this opposition shows up in the fundamental speech act pair Formulation/Decision. A Formulation is a speaker's personal composition, or representation, of a 'fact'. [18] For example, in

Mrs. Boyle: You're very young.

the speaker has formulated (her evaluation of) Mollie's age. Formulations are subjective entities[19] (hence the implications for argument) and may be as broad or specific in content as the speaker desires.

A Formulation may not always be in full-sentence form, as seen in the second utterance:

Trotter: Would you mind telling me your age?

Miss Casewell: Not in the least ...

Miss Casewell's Formulation (of her state of mind toward Trotter's question) illustrates the (simplistic) fact that grammaticality has little to do with acceptability in discourse.

A Formulation may not always be in propositional form; that is, it may be expressed by illocutionary force, as in

Mrs. Boyle: If I had not believed this was a running concern, I should never have come here. I understand it was fully equipped with every home comfort.

Giles: There is no obligation for you to remain here if you are not satisfied, Mrs. Boyle.

Mrs. Boyle: No, indeed, I should not think of doing so.

Giles' utterance is a Formulation of the social norm that a guest has the freedom to leave an establishment which is found to be unsatisfactory. Its illocutionary force, however, is that of a suggestion that Mrs. Boyle leave.[20]

A Formulation does not occur as an isolated unit; it is the first part in a two-act sequence, or utterance pair. In such pairs, the second utterance is 'conditionally relevant' (Schegloff, 1972) to the first utterance (i.e., it is expected). Just what second utterance is conditionally relevant to a Formulation is defined by Heritage and Watson (1979):

An inspection of our data indicates not merely that formulations occasion receptions ... but also that the character of their receptions is sharply constrained to confirmations or disconfirmations or, more generally, decisions.[21]

Thus, we have the Formulation/Decision speech act pair. That these acts are the basic elements in the process of argument means that argument (as any discourse) is 'interactionally-rooted' (Bilmes, 1985). A Formulation-plus-disconfirmation is the discourse display of the fundamental relationship of opposition between participants, which is the essence of argument. Adopting the notation of Heritage and Watson (1979) (F, D+, D-), a previous example now has the form

F Giles: There is no obligation for you to remain here if you are not satisfied, Mrs. Boyle.

D- Mrs. Boyle: No, indeed, I should not think of doing so.

It is Mrs. Boyle's disconfirming Decision (D-) to Giles' Formulation (F) that makes this an argumentative exchange. Mrs. Boyle's D- is itself a Formulation of her opinion on whether or not she should leave the guesthouse.

2.2 Differences Between 'Dialogue' (Non-argument) and Argument

The fact that every Decision is itself a Formulation is important for explaining the basic structure of argument. Preliminary to that explanation, however, it is necessary to note two major differences between dialogue and argument.

(a) In dialogue, Decisions are not always required (though they usually are). This does not mean that the Formulation/Decision pair does not hold, only that the conditional relevance between the two may be relaxed. For example,

F Miss Casewell: Afraid my car's bogged about half a mile down the road - ran into a drift.

F Giles: Let me take this. Any more stuff in the car?

D- Miss Casewell: No, I travel light.

That Giles does not produce a Decision to Miss Casewell's first Formulation does not make this an incoherent exchange. Note, however, that Miss Casewell does produce a Decision to Giles' own Formulation.[22] We could speculate that, in dialogue, the actual number of Decisions that may be absent is limited: if there were no limit, speakers could develop parallel streams of talk -- not relating their utterances, they would not really be having a conversation any more (cf. Grice, 1975, 'Maxim of Relation').

In argument, however, Decisions are mandatory.[23] They are also constrained, at least initially,[24] to disconfirmations. That is, in order for there to be argument, there must be a minimum two-party exchange,[25] and some initial disagreement.

(b) The Formulation/Decision pair of dialogue is expanded in argument to a minimum Formulation-Decision-Decision sequence. Both Decisions are mandatory, and both are constrained to disconfirmations. For example,

F Mrs. Boyle: If I had not believed this was a running concern, I should never have come here. I understand it was fully equipped with every home comfort.

D- Giles: There is no obligation for you to remain

here if you are not satisfied, Mrs. Boyle.

is not yet an argument. If the next utterance were something like

D+ Mrs. Boyle: Yes, well, perhaps you could show me to my room.

we would not say that Mrs. Boyle and Giles had argued, but that they had merely disagreed on one point. The point is that argument must have uptake; uptake occurs when there is disagreement to disagreement. The minimal structure of argument, therefore, is a F/D-/D- sequence.[26] When this discourse structure occurs, speakers have switched out of dialogue into argument.[27] This is the case in the present example, because Mrs. Boyle's next utterance is actually

D- Mrs. Boyle: No, indeed, I should not think of doing so.

The fact that every Decision is itself a Formulation provides for the on-going process of argument: as a Formulation, every Decision itself requires a Decision. For example, the full exchange in the above example is

F Mrs. Boyle: If I had not believed this was a running concern, I should never have come here. I understand it was fully equipped with every home comfort.

D- Giles: There is no obligation for you to remain here if you are not satisfied, Mrs. Boyle.

D- Mrs. Boyle: No, indeed, I should not think of doing so.

D- Giles: If there has been any misapprehension it would perhaps be better if you went elsewhere. I could ring up for the taxi to return. The roads are not yet blocked. We have had so many applications for rooms that we shall be able to fill you place quite easily. In any case, we are raising our terms next month.

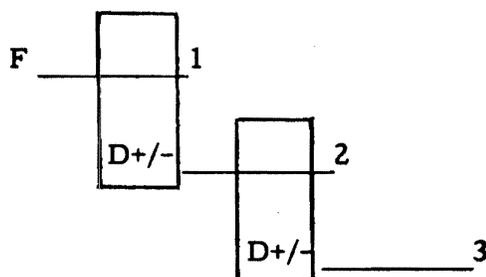
As long as this F/D-/D-... structure continues, the argument continues, and the participants continue to be engaged in argument activity.

3. ARGUMENT-INITIATION

Uptake of argument occurs when a minimum F/D-/D- sequence is produced by at least two speakers.[28] In order to explore the issue of uptake further, it is necessary to turn from the question 'What does argument look like?' (structure) to the question 'When does argument start?' (dynamics of uptake). In answering this, it is useful to invoke the notion of a 'comment slot'. As Bilmes (1985) states, "When A formulates ... then it is expectable that B will comment on that formulation. That is, A has created a slot for such a comment." [29] In argument, (since Decisions are mandatory) Formulation comment slots are mandatorily filled. If they are not filled, and if each one is not filled (at least initially) with a D-, there is no argument.[30]

Argument-initiation is a question of who, of speaker or hearer, has control over the comment slot; i.e., who decides how it should be filled? Whoever has control over the slot has real control over whether or not an argument is to occur.

The template for argument-initiation may be represented as



with slots 1 and 2 pivotal for the achievement or non-achievement of the minimal (F/D-/D-) argument sequence: if slot1 incurs a D-, there is initiation of uptake; if slot2 also incurs a D-, uptake is complete.

3.1 The Role of the Hearer in Argument-initiation

The participant with the most obvious control over slot1 is the hearer, since he is the one who will fill it. If he fills it with a D-, an argument may ensue; the hearer is, thus, in Speier's terms, 'interactionally consequential'. [31]

The hearer has three options:

(a) Fill the slot with a D-, and initiate uptake, as does Giles in

F Mrs. Boyle: If I had not believed this was a running concern, I should never have come here. I understand it was fully equipped with every home comfort.

D- Giles: There is no obligation for you to remain

here if you are not satisfied, Mrs. Boyle.

(b) Fill the slot with a D+, and decline to initiate uptake. In this case, the hearer either agrees with the initial speaker's Formulation, or disagrees, but is not in the mood for an argument, as is

F Christopher: I'm going to like it here. I find your wife most sympathetic.

D+ Giles: Indeed.

cont. F Christopher: And really very beautiful.

(c) Fill the slot with a non-Decision. Heritage and Watson (1979) suggest that a non-Decision performs a 'checking operation' between a Formulation and a Decision. For example,

F Mrs. Boyle: You're very young.

non-D Mollie: Young?

cont.F Mrs.Boyle: To be running an establishment of this kind. You can't have had much experience.

D- Mollie: There has to be a beginning for everything, hasn't there?

D- Mrs. Boyle: I see. Quite inexperienced. An old, old house. I hope you haven't got dry rot.

D- Mollie: Certainly not.

Mollie's comment ("Young?") is a non-Decision prompting further elaboration of Mrs. Boyle's Formulation. Mrs. Boyle's Formulation is an example of how a speech act may span more than one turn (cf. Wunderlich, 1980). The eventual slot of this Formulation is filled with a disconfirmation ("There has to be a beginning for everything, hasn't there?"), which initiates the uptake of this argument. A non-Decision, then, forestalls a choice by the hearer between options (a) and (b), although a choice is ultimately required.[32]

Even with complexity of structure and utterance indirectness, the F/D-/D- sequence still holds. For example,

F Giles: I once read in a paper that these homicidal cases are able to attract women. Looks as though it were true. Where did you first meet him? How long has this been going on?

D- Mollie: You're being absolutely ridiculous. I never

set eyes on Christopher Wren until he arrived yesterday.

D- Giles: That's what you say. Perhaps you've been running to London to meet him on the sly.

Giles' first utterance is an over-all Formulation that Mollie is romantically involved with Christopher Wren. It is actually composed of four sub-Formulations, i.e.,

- F1 I once read in a paper that these homicidal cases are able to attract women.
- F2 Looks as though it were true. (=It is true in this case.)
- F3 Where did you first meet him? (=You have known him for some time.)
- F4 How long has this been going on? (=You have been involved with him.)

Because a Formulation may consist of several acts, it is (or can be) a speech act complex (cf. Wunderlich, 1980). Mollie's utterance ("You're being absolutely ridiculous.") is a comment on Giles' over-all Formulation that she is romantically involved with Christopher Wren. Filling the comment slot of the over-all Formulation apparently also fills the slots of the sub-Formulations -- and satisfies the principle that, in argument, comment slots are mandatorily filled.[33]

3.2 The Role of the Speaker in Argument-initiation

The control of the speaker (of the initial Formulation) lies in his framing slot1 for a D+ (non-argument) or a D- (potential argument). That is, although the speaker is out of the picture, so to speak, once his Formulation is produced,[34] the nature of his Formulation may be such that it increases the likelihood that it be met with a D+ or a D-. Three options the speaker has for framing the slot for a D- are

(a) Produce a F which is blatantly false[35](in the hearer's interpretation), as in

F Giles: I once read in a paper that these homicidal cases are able to attract women. Looks as though it were true. Where did you first meet him? How long has this been going on?

(b) Produce a F which is accusatory in content.[36] In the above example, Giles combines this tactic with that of option (a).

(c) Produce a F which contains a slot-framing structural device. This is an issue which requires further research. Slot-framing devices are likely subtle and may include tag-expressions or intensifiers, e.g., 'quite' and 'old, old' in

F Mrs. Boyle: I see. Quite inexperienced. An old, old house. I hope you haven't got dry rot.

A tag expression which frames a slot for a D+ is the negative tag-question.[37] For example, if the following (hypothetical) Formulation

F You saw him on the night of the twelfth.

were uttered by a cross-examiner in court, one would not be able to predict whether a D+ or a D- would follow. That is, the response could be

D+ Yes, I did.

or

D- No, I did not.

The slot of this Formulation, then, is unframed (unless it were blatantly false, or accusatory). However, adding a negative tag-question will frame the comment slot for a D+ (the desired response for the cross-examiner, who seeks 'agreeing' testimony from the witness):

F You saw him on the night of the twelfth, didn't you?

If one does not stop to think, the D+ ('Yes, I did.') fairly produces itself. The notions of a comment slot and slot-framing appear to explain the impression that tag-questions are leading in the legal setting:[38] a negative tag-question will so frame a slot that, especially for a child, to respond with a D- ('No, I did not.') requires effort. Further research should explore the issue of devices such as tag-questions which may frame a slot for a disconfirmation.

3.3 The Role of Social and Cultural Norms in Argument-initiation

Norms of status or conversational setting may dictate whether or not an argument should occur on a given occasion. That is, they may cast a general D+ or D- framing over all the comment slots in a given conversation. A D+ framing is cast by the (cultural) norm, 'don't discuss religion or politics at formal gatherings': the subjects should not arise, or, if they do, a hearer should avoid their argumentative potential by agreeing with whatever is said about them. Other unformulated norms may cast a D- framing; for example, at political press conferences, debate club meetings, or city council forums, argument is expected.

The speaker/hearer status differential can provide a general D+ framing. For example, a student will not be likely to uptake on an argumentative Formulation uttered by a professor, nor will a parishioner on one uttered by his cleric.[39] The contradictory example of children who typically argue with their parents, and parents who typically tolerate this, suggests that various norms may interact in general slot-framing.

4. ARGUMENT RESOLUTION

The concepts of 'win' and 'loss' in argument are intriguing, yet elusive. Heritage and Watson (1979) discuss achievement of a 'proper gloss' of a Formulation, out of competing 'multiple glosses'. For example, the larger argument

F Giles: I once read in a paper that these homicidal cases are able to attract women. Looks as though it were true. Where did you first meet him? How long has this been going on?

D- Mollie: You're being absolutely ridiculous. I never set eyes on Christopher Wren until he arrived yesterday.

D- Giles: That's what you say. Perhaps you've been running to London to meet him on the sly.

D- Mollie: You know perfectly well that I haven't been up to London for weeks.

D- Giles: You haven't been up to London for weeks. Is-that-so?

D- Mollie: What on earth do you mean? It's quite true.

might be 'resolved' by the hypothetical utterance

D+ Giles: Well, alright, so you haven't been up to London for weeks and you've never seen Christopher Wren till yesterday. I suppose there's nothing going on.

yielding the 'proper gloss', 'Mollie is not involved with Christopher Wren' (a 'win' for Mollie). It might also be 'resolved' by

D+ Mollie: All right! I've not been up to London for weeks, but Christopher has been stopping by while you've been out afternoons. It's only been a fling. Are you

satisfied?

yielding the 'proper gloss', 'Mollie has been involved with Christopher Wren' (a 'win' for Giles).

But it is more likely that, in many instances, interpersonal conflict runs deeper than mere competing Formulations. In the case of the first 'proper gloss', above, Giles may 'lose' the argument, but continue in his suspicions of Mollie. In the second case, achievement of the 'proper gloss', that Mollie has been unfaithful, in no way resolves the conflict, or greater argument, that is present. 'Win' and 'loss' in argument, therefore, are complex notions, and involve several pragmatic factors per conflict situation.

5. CONCLUSION

In a very basic manner, the question 'what is the structure of argument?' has been answered: regardless of utterance indirectness, argument participants will produce the discourse sequence F/D-/D-. The speech acts, Formulation and Decision, are broad acts performed by a speaker and a hearer as they display their fundamental relationship of opposition (over something). Other studies which have examined the composition of these acts, and their patterns of production, may now fit as illustrations of the complexity which the basic F/D-/D- sequence can achieve.

The purpose of argument is a difficult issue to pin down. Since interpersonal conflict may be complex (may occur on several levels, may be 'resolved', yet not resolved), the discourse activity of argument may on the discourse level serve one purpose, yet on the global, interactional, level serve another. For example, petty arguments, especially in the marital context, may serve only to perpetuate some long-standing and mundane conflict between the participants. Conversely, arguments which interactants engage in 'for the heck of it' may occur where no conflict exists at all.

Social and cultural norms appear to have real power in shaping a discourse as argument or non-argument. This power may override speaker/hearer intensity, or the argumentative properties of a Formulation which is false, accusatory, or produced in conjunction with a slot-framing device.

Whatever the complexity an argument may achieve, its discourse structure will be orderly, as the foregoing discussion has tried to illustrate. As any discourse activity, argument is interactionally-rooted: the speech acts that are performed will determine whether uptake occurs, and the nature of the argument which may develop.

- [1] An earlier version of this paper was presented at the Canadian Linguistics Association Conference, Windsor, Ontario in May, 1987. I acknowledge the helpful suggestions of those present at that talk.
- [2] (Frawley 1987: p.363)
- [3] (van Dijk 1985a: p.xiii)
- [4] (Kess 1986b; p.386)
- [5] (Kess 1986a: p.98)
- [6] (Kopperschmidt 1985: p.159)
- [7] See van Eemeren and Grootendorst 1984 and Schiffrin 1985.
- [8] See Brunneis and Lein 1977.
- [9] See Quasthoff 1978.
- [10] See Ragan 1983 and Pomerantz 1984.
- [11] See Schegloff 1972 and Heritage and Watson 1979.
- [12] (Levinson 1983: p.284)
- [13] Jackson and Jacobs (1980) refer to formal argument as the 'prototypical' argument; the present discussion should make clear the sense of 'prototypical' that is appropriate for discourse analysis.
- [14] An important issue in discourse analysis is what constitutes appropriate data. If the primacy of orality over literacy is assumed, then spoken discourse will be the primary data source (not written prose). The use of plays is not unheard of, however; a play is used (and arbitrarily chosen) for this exploratory paper on the assumption that a successful playwright is skilled at producing real discourse. Nevertheless, support for the suggestions made in this paper will have to be found in actual spontaneous discourse.
- [15] An example of 'disagreement-relevant-expansion' of a main speech act pair is the case when an Offer meets with a Refusal, and argument develops around the Offer, or the Refusal, or both.
- [16] (O'Keefe and Benoit 1982: p.170)
- [17] (Bavelas, Rogers and Millar 1985: p.19)
- [18] Along with Bilmes (1985), I propose a broader definition of a 'Formulation' than the sense previously applied by Garfinkel and Sacks (1970), Schegloff (1972), Heritage and Watson (1979) and Bilmes (1981). In these studies, Formulations were limited to metacomments which summarized 'talk-thus-far'.

- [19] Although a thorough explanation will not be undertaken here, Formulations are seen in the present discussion to be valid 'formal structures' of conversation, after Garfinkel and Sacks (1970). Garfinkel and Sacks list the criteria for 'formal structures' as (p.346)

activities (a) in that they exhibit upon analysis the properties of uniformity, reproducibility, repetitiveness, standardization, typicality, and so on; (b) in that these properties are independent of particular production cohorts; (c) in that particular-cohort independence is a phenomenon for members' recognition; and (d) in that the phenomena (a), (b), and (c) are every particular cohort's practical, situated accomplishment.

- [20] This is a classic example of what Grice (1975) describes as 'conversational implicature'.

- [21] (Heritage and Watson 1979: p.141)

- [22] The notion of finding the 'formal' argument underlying a speaker's utterance is crucial in determining what a hearer's Decision is in response to. Although the treatment of questions as Formulations is still sketchy at this point, we could see the question 'Any more stuff in the car?' as a Formulation such as '(It is possible that) you have more stuff in the car.'

- [23] This is a descriptive, not a prescriptive, statement. It is apparent that, in order for there to be argument, speakers must be engaged in their relationship of opposition; this they show by producing (disconfirming) Decisions.

- [24] Decisions are constrained to disconfirmations only initially because, as an argument progresses, 'agreement' may be reached (i.e., there may be an occurrence of one or more D+) on smaller points in what still remains an over-all argument.

- [25] Cases of one-party, intrapersonal argument are excluded from this treatment.

- [26] Millar, Rogers and Bavelas (1984) describe a relational approach, in which this crucial structure is discussed as 'three consecutive one-up moves'; see also Bavelas, Rogers and Millar (1985).

- [27] In the present example, there is no switch from dialogue into argument, since the speakers start off their exchange in argument activity.

- [28] It is possible that a third speaker may utter the second D-, and complete the uptake, as in the hypothetical sequence:

F Speaker 1: You're very unimaginative.
 D- Speaker 2: No, I'm not!
 D- Speaker 3: He's right. You are unimaginative.

- [29] (Bilmes 1985: p.331)

- [30] A slot may be filled verbally or non-verbally, or by silence. Silence may imply a D+ (see Bilmes, 1985), or a D-. Decisions appear to be as subjective as are Formulations -- that the speaker of a Decision may mean one type of response and the hearer may decode it to mean another means that argument is an ever-present possibili-

ty in discourse.

[31] See Speier 1972.

[32] The reality of utterance indirectness suggests another, probably more applicable analysis:

F1 Mrs. Boyle: You're very young.
 D-1 Mollie: Young?
 F2 Mrs. Boyle: To be running an establishment of this kind.
 D-2 Mollie: There has to be a beginning for everything, hasn't there?

where F1, a very indirect Formulation, is distinct in level of indirectness and propositional content from F2. Similarly, D-1 is distinct from D-2 (with the occurrence of a D- of the type that D-1 is meaning that a subsequent D- by this speaker is likely). I thank Ron Hoppe for his suggestions for this analysis.

Actually, the category of 'non-Decision' is uncomfortable, since it suggests a neutral, even void response. A true non-Decision would be the same as the absence of a Decision -- something which does not occur in argument, since in argument speakers are engaged in their opposition. Mollie's 'non-Decision', "Young?", is really a reserved, or indirect, D-, used to mitigate the emerging disagreement in this example.

[33] Following the alternate analysis discussed in the above note, this exchange would be seen as

F1 Giles: I once read in a paper that these homicidal cases are able to attract women.
 F2 Looks as though it were true.
 F3 When did you first meet him?
 F4 How long has this been going on?
 D-1 Mollie: You're being absolutely ridiculous.
 D-2 I never set eyes on Christopher Wren until he arrived yesterday.
 D-1 Giles: That's what you say.
 D-2 Perhaps you've been running to London to meet him on the sly.

where D-1 (Mollie) is a comment on Formulations 1-4. What participants actually track, and tune their responses to, are the made arguments of Formulations/Decisions: D-1 (Mollie) is a comment on the underlying arguments of (the very indirect) Formulations 1-4. This suggests a hierarchical structure of arguments and sub-arguments, which are pursued in a complex manner within the basic F/D-/D- structure.

[34] (except for on-going gestures)

[35] See Bilmes 1985.

[36] See Rosenblum (1987) for discussion of the speech act pair Accusation/Denial, Acceptance.

[37] Another structural device for D+ framing is the Canadian 'eh?'

[38] See Danet 1980a and 1980b.

[39] Recalling an earlier distinction between initiation of uptake, and uptake, the lower-status participant may disagree, but will be unlikely to engage in (i.e., complete the uptake of) an argument. Certain sanctions will apply if this norm of status is broken.

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THE TONE STRUCTURE OF CHINESE REGULATED VERSE¹

Ping Xue

Department of Linguistics
University of Victoria

1. INTRODUCTION

The tone patterns of Chinese regulated verse have long remained as one of the most obscure parts of Chinese versification. It was once believed that no apparent specific structure was obtainable in these traditional patterns except a tendency to group syllables in contrasting pairs. The appearance of metrical phonology (Lieberman and Prince, 1977) stimulated interest in reexamining these tone patterns. Since then, quite a few analyses have been proposed, resulting in recognizing that the phonological representation of the tone patterns in Chinese regulated verse lines has a hierarchically organized structure. This is definitely a great advance in the studies of Chinese versification. However, these analyses did not adequately achieve the goal of offering a unified account of the hierarchy. It seems that the problems or difficulties they suffered from, quite parallel to what was once faced with in the analysis of English stress patterns, result largely from the inadequate exploitation of certain important properties of metrical structure, such as the internal structures of prosodic constituents and relevant domains of rules. As a result, the underlying phonological hierarchy of Chinese regulated verse has not been fully explicated.

This paper will recapitulate the treatments and arguments presented in previous analyses, especially in Chen (1979) and Yip (1980). It will be shown that half-lines as well as metrical feet are independent prosodic categories in Chinese regulated verse. Feet, but not half-lines, are employed in the previous analyses. This paper argues that specifying the independent status of half-lines will not only allow for a unified account of the tone structure, but also provide detailed justification for the claim that the canonical tone patterns in Chinese regulated verse are hierarchically structured.

2. CHINESE REGULATED VERSE AND PREVIOUS ANALYSES

Chinese regulated verse has a highly formalized character, a tradition of more than one thousand years. It is called regulated verse because it requires a poem to have a fixed number of lines, a fixed number of syllables in each line, and, above all, a fixed tone pattern throughout the poem. A poem normally consists of one octet of eight lines, which is subdivided into two quatrains of identical metrical structure. A verse line can either be heptasyllabic or pentasyllabic as long as all the lines of a poem have the same length. The beginning line alternates between two underlying patterns, resulting in two different types, A and B. In poetry, the four Chinese tones are divided into two general

tone categories. Roughly speaking, the one with a steady-state pitch is referred to as "even" tone, while all the others, i.e. those rising, falling and falling-rising contour, are referred to as "oblique" tone. Assuming E and O stand for the even and oblique tones respectively, the basic canonical tone patterns are as in (1):²

(1)	Heptasyllabic A	Pentasyllabic A
	1. O O E E E O O	1. E E E O O
	2. E E O O O E E	2. O O O E E
	3. E E O O E E O	3. O O E E O
	4. O O E E O O E	4. E E O O E
	5. O O E E E O O	5. E E E O O
	6. E E O O O E E	6. O O O E E
	7. E E O O E E O	7. O O E E O
	8. O O E E O O E	8. E E O O E
	Heptasyllabic B	Pentasyllabic B
	1. E E O O E E O	1. O O E E O
	2. O O E E O O E	2. E E O O E
	3. O O E E E O O	3. E E E O O
	4. E E O O O E E	4. O O O E E
	5. E E O O E E O	5. O O E E O
	6. O O E E O O E	6. E E O O E
	7. O O E E E O O	7. E E E O O
	8. E E O O O E E	8. O O O E E

We can see that there is a regular tone alternation within a line, and contrast and repetition of tone-sequences in the whole poem. Since type A and type B verses have the same possible verse lines (they are different only in terms of the ordering of the lines) and the last four lines are identical with the first four lines in an octet, there are in fact only four verse lines permitted for heptasyllabic and pentasyllabic verses respectively, although the number of the possible combinations of E and O in a seven-syllable or five-syllable line is much larger.³

In the light of Liberman and Prince (1977), Chen (1979) proposed an analysis, first demonstrating that these tone patterns could be best accounted for in terms of a binary hierarchy. The rules Chen proposed include the following:

(2) a. Hierarchical Structure

A metrical line is hierarchically structured with exclusively binary branchings. The second half-line can be either right-(R) or left-branching (L).

b. Tone Assignment

Opposite tones (T and T') are assigned to sister constituents down to the level of the metrical foot in this fashion:

$$T \text{ ----} > T' \quad T ; \quad T' \text{ ----} > T \quad T'$$

c. Tone Specification

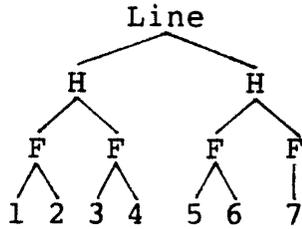
T may assume the value of either E or O, and T' is opposite to T, subject to the Tonotactic Condition.

d. Tonotactic Condition

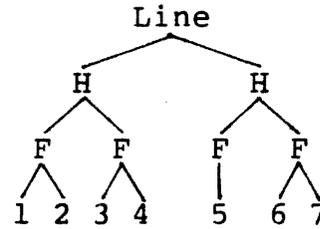
If Tone Assignment produces four consecutive syllables carrying an identical tone, the tones of the second half-line undergo alpha-switching (E to O, and vice versa).

The structures in (3) are examples of the derivation for heptasyllabic lines.⁴

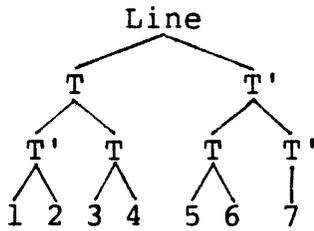
(3)a. Hierarchical Structure
Left-branching



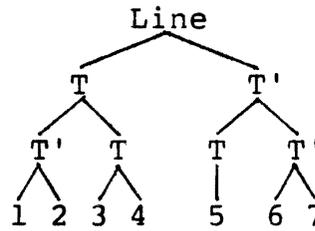
Right-branching



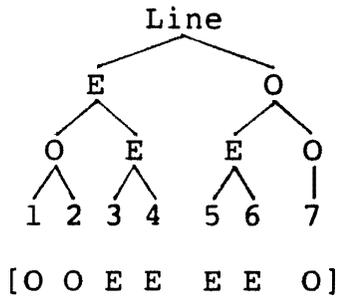
b. Tone Assignment
Left-branching



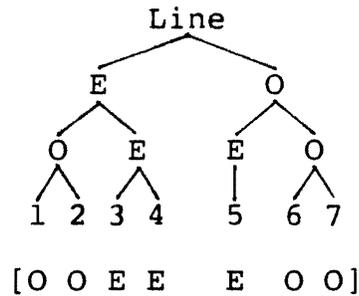
Right-branching



c. Tone Specification
Left-branching

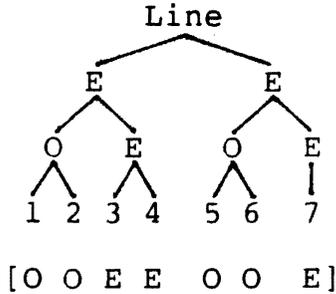


Right-branching



In the structures, H stands for a half-line and F stands for a metrical foot. As shown in (3), although the right-branching structures are suitable, all the left-branching structures are not well-formed structures after the application of the Tone Specification since four identical tones are adjacent. These structures are actually intermediate outputs, which need to be readjusted by the Tonotactic Condition, as shown in (4).

(4) Tonotactic Condition
left-branching

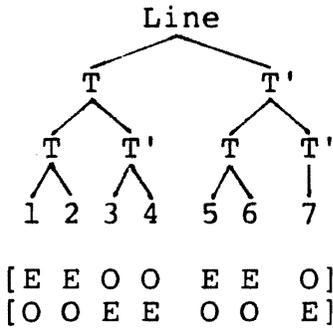


To reject Chen's treatment in terms of the Tonotactic Condition and to relate tone assignment directly to the metrical tree, Yip (1980) suggested the following two rules to treat heptasyllabic and pentasyllabic verse lines respectively. According to Yip, heptasyllabic lines are labelled by Labelling Convention 1, while pentasyllabic lines are labelled by Labelling Convention 2.

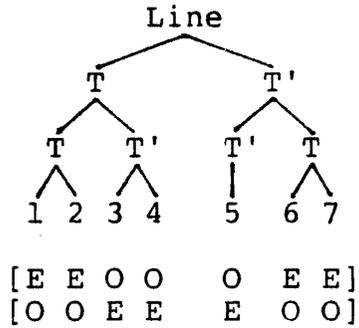
(5) a. Labelling Convention 1

In a pair of sister nodes $N_1 N_2$, N_1 is labelled T if and only if it branches.

Heptasyllabic
Left-branching



Right-branching

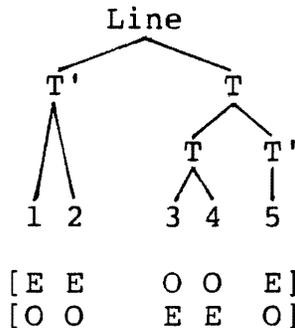


(T = E)
(T = O)

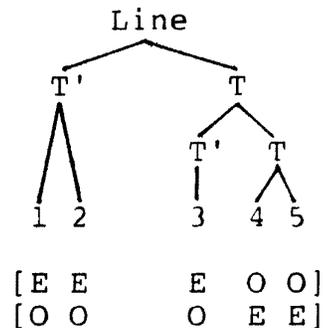
b. Labelling Convention 2

In a pair of sister nodes $N_1 N_2$, N_2 is labelled T if and only if it branches.

Pentasyllabic
Left-branching



Right-branching



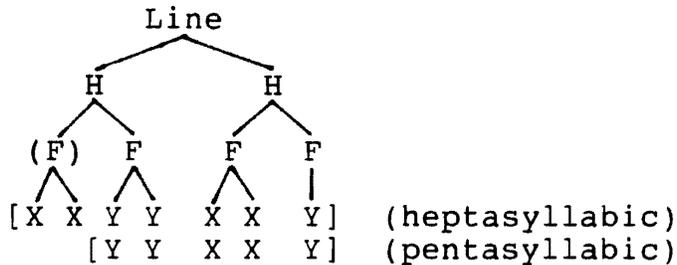
To compare with Chen's analysis, Yip's analysis is a much simpler and more elegant treatment since the distinction between branching and nonbranching nodes has been found to be a relevant factor in node labelling and, therefore, in tone assignment. Regardless, Yip's analysis is still not an optimal treatment, one which should capture all the generalizations. The following sections will illustrate that both heptasyllabic and pentasyllabic verse lines are generated by only one universal convention rather than by two, and that this analysis accounts for some generalizations which have not been adequately discussed previously.

3. FURTHER GENERALIZATIONS

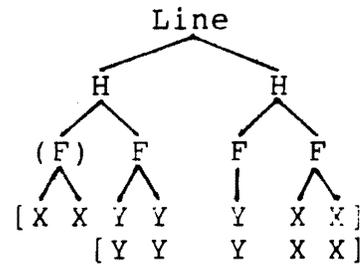
This paper claims that there is only one labelling rule for both heptasyllabic and pentasyllabic verse lines. The first argument concerns intuition, which rejects the treatment that heptasyllabic and pentasyllabic lines are derived independently. Intuition suggests that heptasyllabic lines have a "heavy" beginning part, while pentasyllabic lines have a "light" one. It appears that even though two respective rules did exist, they would be two quite parallel rules slightly modified from one basic rule, not the two "reverse" to each other. Those familiar with Chinese regulated verse have intuition about whether or not a particular verse line is metrical regardless of their poetic training.

The insight provided by the standard traditional analysis clearly can serve as a second argument. Wang (1957) in his influential work on Chinese versification states that both heptasyllabic and pentasyllabic lines can be derived from two basic schemes, which could be depicted as follows:

(8) Left-branching



Right-branching

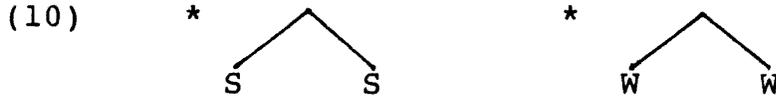


X and Y are distinct dummy variables. In terms of tone specification, X and Y can assume either E or O as their values, but if X assumes the value of E, Y must assume the value of O, and vice versa. Notice that the tone value of the variables X and Y may vary as long as one is opposite to the other, but the parallel relation between heptasyllabic and pentasyllabic lines holds constant as shown in the schemes. Obviously, alternating between the two values, only four possible lines are to be generated for heptasyllabic and pentasyllabic verses respectively. This is just what are permitted.

Given these discussions above, generalizations apparently include at least the following:

- (9) a. Syllables within a foot have the same tone.
- b. Two sister feet, namely, the feet within the same half-line, must have opposite tones.
- c. The two adjacent non-sister feet, that is, the last foot in the first half-line and the first foot in the second half-line, must have opposite tones if and only if the first foot in the second half-line is disyllabic, therefore branching; otherwise, they have the same tone.
- d. The tone pattern of a heptasyllabic line is exactly like that of a corresponding pentasyllabic line except that a heptasyllabic line has one more foot prefixed in the first half-line.

It should be noted that neither Chen's nor Yip's treatment captures all these generalizations. Chen mistakenly ignored the fact, as described in (9c), that the tone value of the first foot in the second half-line alternates crucially according to whether it is branching or nonbranching. As Yip (1980) notes, the problem arises because Chen's tone assignment rules assign the same tone to the two different underlying structures, left-branching and right-branching (i.e. left-nonbranching). Further, although a desired tone pattern is obtained after the application of the Tonotactic Condition, the structure is not well-formed at all, where sister nodes, namely, half-lines, have the same value (see the structure in (4) above). As is well-known, the essence of metrical phonology is relative "prominence", and the universal principle of metrical phonology independently disallows structures like:



Yip's analysis relates the tone alternations directly to metrical structures. But it is not correct that heptasyllabic and pentasyllabic verse lines are generated respectively by two separate rules. Obviously, Yip fails to capture the generalization between heptasyllabic and pentasyllabic verse lines, described in (9d). Any analysis which has systematic exceptions or misses systematic phenomena with respect to the object in question cannot be an optimal treatment.

4. A UNIFIED ACCOUNT OF THE TONE STRUCTURE

Recall the generalizations described in (9) above. Here, one could see that item (a) is trivial. It can be easily handled by assuming that tone is assigned to the foot and each syllable inherits the tone from the foot (see Chen's and Yip's discussions). Item (b) is trivial, as well, since what is required is no more than distinguishing one node from the other. In terms of tree geometry, a number of labelling rules are logically possible. Again, the universal metrical theory can simply predict well-formed rules and does not allow any relevant structures in which sister nodes have the same value, such as:



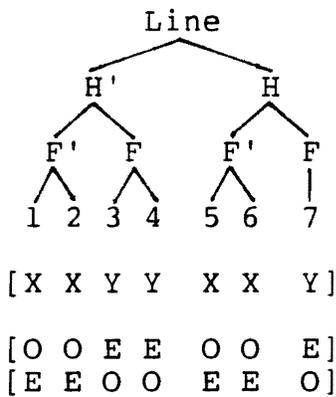
Thus, the question, here, is how items (c) and (d) can be uniformly treated, i.e. the relation between the two adjacent non-sister feet and the relation between heptasyllabic and pentasyllabic lines. As noted, on the one hand, heptasyllabic lines and pentasyllabic lines are distinguished in the first half-line, depending on whether it has two feet or only one. On the other hand, the relation between half-lines is ultimately realized in the two adjacent non-sister feet in terms of tone, crucially according to whether the first foot of the second half-line is disyllabic or monosyllabic. These facts are important. They indicate that at both the half-line and foot levels, the left-hand node is essential and active. Notice that for heptasyllabic verse lines, since the two feet of the first half-line are geometrically symmetrical, theoretically speaking, either a left-oriented or a right-oriented labelling rule will have the same effect in the sense of marking the two nodes with distinct labels and it really doesn't matter which node is considered to be essential and active. For pentasyllabic verse lines, any labelling rule has no effect at all since it is irrelevant in this half-line (having only one foot). Given these facts, this paper proposes that the rule for both heptasyllabic and pentasyllabic verse lines is the following:

(12) Labelling Rule

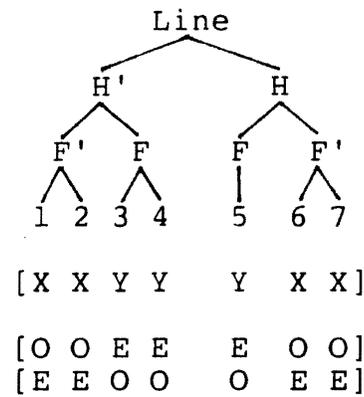
In a pair of sister nodes $[N_1, N_2]$, N_1 is labelled N' iff it branches, otherwise, N_2 is labelled N' .

In the rule, N_1 and N_2 always have labels opposite to each other. This labeling rule, in effect, is exactly like Yip's Labelling Convention 1. The difference is that the analysis being proposed uses this single labelling rule to generate both heptasyllabic and pentasyllabic verse lines.⁵ Further, this analysis stipulates that in the rule the sister nodes N_1 and N_2 refer to two adjacent nodes at the same prosodic level, such as the foot level or half-line level. In other words, the labelling rule is strictly level-sensitive and the foot and half-line are independent prosodic categories in the present analysis. This idea could easily be formulated by specifying: $Tn_1 = Tn_2$, where Tn denotes the prosodic type of a particular node, namely a foot or half-line in the present case. Now consider actual derivations as in (13).

(13) a. Heptasyllabic
Left-branching

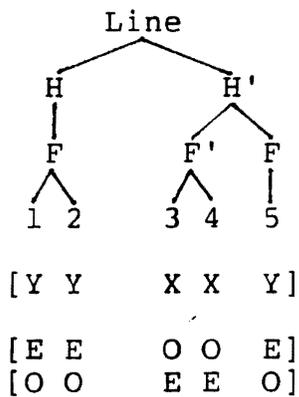


Right-branching

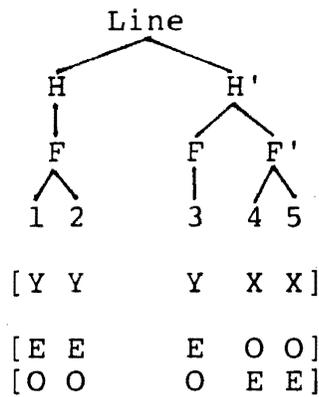


(X = O)
(X = E)

b. Pentasyllabic
Left-branching



Right-branching



(X = O)
(X = E)

For pentasyllabic verse, the foot in the first half-line (being monosyllabic) is not labelled by the Labelling Rule, which is irrelevant here, and the foot simply inherits the label of its mother. As the variables are specified, alternating between E and O, only four possible lines are to be generated for heptasyllabic and pentasyllabic verses respectively. The labelling rule correctly generates all and only those permitted lines.⁶

Notice that for Chinese regulated verse, it is crucial to specify not only the foot but also half-line with independent status. The foot as an independent category is obvious since the tone is directly associated with the foot rather than the syllable. Downer and Graham (1963) propose an analysis, associating tones with syllables, in which they must treat the first four syllables and the other three syllables differently. Then, two questions arised and remained unexplained why odd-numbered syllables 1 and 3 always share the tones of their immediately succeeding syllables, whereas syllables 5 and 7, also odd-numbered, do not, and why syllables 1 and 2 always carry an opposite tone to that of syllables 3 and 4, whereas for the last three syllables the distinct line for the two opposite groups can be either between positions 5 and 6 or between positions 6 and 7. Dower and Graham apparently missed relevant generalizations (See Chen, 1979; and Graham, 1980 for further discussion). Actually, the notion of distinct groups has implied the notion of a super-unit bearing the tone, i.e. the metrical foot. If one says that it is the foot and not the syllable that constitutes the tone-bearing unit, the situation for the first question immediately becomes transparent: the syllables in the same foot must have the same tone.

Assuming half-lines as independent categories may appear odd and farfetched at first sight. But with a little more observation, it becomes apparent that this is a correct assumption. As mentioned, the relation between two adjacent feet is not always the same. The first and second feet always have opposite tones and so do the third and fourth feet, but this is not true of the second and third feet. They carry the same tone if the third foot is monosyllabic, otherwise, they have opposite tones. Remember that the third and fourth feet must have opposite tones even though one of them is a monosyllabic foot. This indicates that there are two kinds of adjacent relations in terms of feet in a verse line. One is obviously stricter than the other. Given a hierarchical representation, the generalization, therefore the answer to the second question above, becomes apparent that the two sister feet within a half-line always have opposite tones, while the two adjacent feet across half-lines do not. Since the relation between sisters is "more local," it will certainly be constrained by a stricter condition. Clearly half-lines are units with intrinsic content.

Wang's (1957) analysis, though not hierarchical, has in effect already suggested the independent status of half-lines. Wang shows that for heptasyllabic and pentasyllabic lines, there are four basic syllables, which are divided into two groups, distinct to each other in terms of tone. Relevant rules, such as adding syllables, further apply within each groups, namely half-lines Wang's idea is interesting because it indicates that half-lines are potentially distinct in terms of tone although the tone is not directly assigned to them. This just reflects the idea of labelling. In the present case, labels are not symbols of tones, but the phonological features which are potentially related to tones and may only be associated with tones at a particular level, i.e. the foot level in the present case. Most unfortunately, Chen simply dismissed Wang as descriptive and linear without paying much attention.

Downer and Graham (1963) offer a similar suggestion. As mentioned before, Downer and Graham treat the first four syllables and the other three syllables differently. This amounts to saying that they are domains for different rules respectively. A verse line is in effect divided into two parts, namely half-lines, distinct to each other. Downer and Graham's and Wang's analyses are important because they provide independent evidence for the existence of half-lines as prosodic categories.

Given half-lines as independent categories, the relationship between heptasyllabic and pentasyllabic lines is, apparently, that of branching vs nonbranching in terms of the first half-line. As a matter of fact, the tone value of the first foot in pentasyllabic lines is always that of the second foot in heptasyllabic lines (opposite to a branching node). This is just what the present analysis predicts.

The notion of prosodic categories is not new and has been widely accepted in the literature concerning various languages. Selkirk (1980) discusses the role of prosodic categories and indicates that English stress makes a special appeal to the syllable and foot and their internal structures. Kiparsky (1979) has a similar discussion, arguing that in English phonology the foot is independently motivated because phonological processes are actually bounded by it; therefore phonological rules make crucial use of the foot as relevant domain. Hayes (1981) presents examples from other languages, supporting the same argument. For the theory of the syllable and its relation to metrical phonology, see McCarthy (1979), Hayes (1981), and Selkirk (1982).

The assumption of level-sensitivity of rules is quite common too. Liberman and Prince (1977) employ the notion of prosodic level. Although the Word Rule and the Compound Rule in English phonology can be reduced to one general rule LCPR, word-internal structure does not count as branching when LCPR applies above the word level. Thus, both "labor union" and "Labor Day" get the compound stress on the first syllable, even though "union" branches at the foot level, contrasting with "day" which is non-branching.

Finally, another issue in the literature should be mentioned, which may also lend itself to the present analysis. The major suspicion against a hierarchical treatment of the tone structure is that hierarchical models seem to be complicated and counterintuitive. Lorentz (1980) argues that since Chinese regulated verse has been so popular in China, the rules governing the tone patterns should be easy to learn. Instead of joining the issue whether the rules are universal principle or "learned constructs," it must be pointed out that Chen's Tone Assignment with Tonotactic Condition and Yip's "reverse" rules did make the situation complicated. No wonder people complain that it is hard to see how poets construct a non-metrical structure first and then fix it up by a special condition. It is also hard to see how poets construct two quite parallel patterns with two mutually "reverse" rules. Contrasting to these treatments, the present analysis is apparently not only general but quite intuitive as well. The notion of branching vs nonbranching is simply another way expressing the intuitive idea of being "heavy" or "light" (disyllable foot vs monosyllable foot for example or in a larger unit).

5. CONCLUSION

The canonical tone patterns of Chinese regulated verse have a hierarchical structure. It is hierarchical because the syllables are grouped in terms of the feet which in turn are organized in terms of the half-lines, submitting to the relevant tone conditions as shown before. As a result, the relation between any two contiguous feet in a line as well as the relation between any two contiguous syllables is not simply a matter of linear adjacency. As we have seen, it is either the relation between two sister feet within a half-line or the relation between two non-sister feet across half-lines.

Thus, half-lines are essential prosodic categories in the tone structure of Chinese regulated verse. The traditional analyses Wang (1957) and Downer and Graham (1963) provide independent support for recognizing their existence. Neither Chen nor Yip captured the insight from Wang and Downer and Graham, or fully realized the essentiality of specifying the half-lines with independent status, although they virtually foreshadowed the notion half-line. As a consequence, they failed to represent the tone structure in a satisfactory way.

In the present analysis, by contrast, the half-lines play a crucial role. This is crucial because it not only permits a straightforward representation of the tone structure but also provides necessary and adequate justification for the claim that there is a phonological hierarchy. The logic is quite simple: the claim does not truly stand until the independent status of the half-line as well as the foot is fully recognized.

NOTES

- 1 I wish to thank Dawn Bates and WPLC editors for their helpful comments and suggestions.
- 2 Some deviation is tolerated to certain syllable positions, but that is not the concern of this paper (cf. Chen 1979, 1980). The canonical patterns and the data can be found in most standard reference books on Chinese poetry, e.g. Wang (1957) and J. Liu (1962).
- 3 The absolute numbers of the combinations of E and O in a seven-syllable and five-syllable lines are 2^7 and 2^5 respectively.
- 4 The derivation for pentasyllabic lines is exactly in the same fashion.
- 5 Yip (1980) points out that her treatment is of particular interest because it is consistent with the proposal (Halle and Vergnaud, 1978) that metrical trees in all languages are labelled by one of universal conventions, Labelling Convention 1, or its mirror image Labelling Convention 2. But note that the present treatment is perfectly consistent with the proposal.
- 6 For ordering the lines into actual verse pattern, see Chen's (1979) discussion.

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