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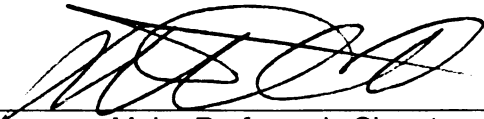
DIALECT CONTACT AND IDENTITY:  
A CASE STUDY OF EXOGAMOUS SUI CLANS

presented by

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DIALECT CONTACT AND IDENTITY:  
A CASE STUDY OF EXOGAMOUS SUI CLANS

By

James Norris Stanford

A Dissertation

Submitted to  
Michigan State University  
in partial fulfillment of the requirements  
for the degree of

DOCTOR OF PHILOSOPHY

Department of Linguistics and Germanic, Slavic, Asian, and African Languages

2007



## **ABSTRACT**

### **DIALECT CONTACT AND IDENTITY: A CASE STUDY OF EXOGAMOUS SUI CLANS**

By

James Norris Stanford

This study investigates dialect contact and identity by examining the systematic patterns of clan contact and immigration found among the exogamous clans of the Sui people, an ethnic minority concentrated in rural parts of Guizhou, China. Sui women, men, and children maintain the dialect features of their home clans to a high degree throughout their lives, regardless of any later migration and long-term immersion in other clan dialects. The study concludes that Sui speakers perform linguistic acts of clan identity that index and maintain their clan memberships. The study also introduces methodology for “socio-tonetic” research and provides progress in variationist sociolinguistic research of indigenous minority languages, Sui acoustic phonetics and dialectology, and dialect acquisition research.

In Sui clan exogamy, the wife moves permanently to the husband’s village upon marriage. Since subtle dialect differences can exist between clans, the wife often has dialect features that differ from the husband’s clan. For example, a woman may use a different 1st Person Singular pronoun than her own husband and children, and subtle clan markers are observed in other words and phonetic features (tones and diphthongs). This study involves detailed analysis of dialect features of such immigrant married Sui women, non-immigrant speakers in their original home clans, and children of immigrant women, as

well as ethnographic interviews investigating community views on dialect and clan identity.

The results show that the immigrant women maintain their home clan dialects to a very high degree rather than acquiring features of the husband's clan. For the children of such women, a transition to the exclusive use of the dialect of the father's clan begins at a young age as they learn about their linguistic identities through the metalinguistic influence of the community, and as they are directly exposed to the local clan dialect features in daily village interactions. Older children and teenagers adhere more closely to the father's clan dialect, fully acquiring that dialect as they reach adulthood. For all members of the community, ridicule is the consequence for use of dialect features that would identify the speaker as a member of any clan other than that person's father's clan. Further, children who use the mother's clan dialect features and women who use the husband's clan dialect features may also be admonished or criticized.

The study concludes that all members of the community -- women, men, and children -- perform linguistic acts of clan identity that continually reinforce their clan memberships. In the case of immigrant married women, such acts of clan identity operate in opposition to an otherwise typical human tendency for some amount of dialect acquisition in situations of long-term immersion (as evidenced by a survey of prior dialect acquisition studies).

## **ACKNOWLEDGEMENTS**

I would like to thank the Sui people for patiently providing the information used in this study and for kindly making arrangements for my housing and data collection. I would also like to thank my committee chair, Dennis Preston, and the other members of the committee: David Dwyer, Grover Hudson, and Yen-Hwei Lin. I also received valuable help from Jerold Edmondson and Richard Wright, as well as from John Hale and the other faculty members of the Michigan State University Department of Linguistics and Languages. In addition, I have benefited greatly from suggestions provided by the “Friends of Sociolinguistics” group at Michigan State University, audiences at New Ways of Analyzing Variation 2005, the 2006 Linguistic Society of America Summer Meeting, the 2006 Michigan Linguistics Society meeting, and other audiences and reviewers. I would also like to thank my family, as well as Tim and Debbie Vinzani, Bob and Alli Burcham, Xiao Man, and many other Duyun friends, and Qiannan Minority Teachers College. I’m also grateful to the MSU College of Arts and Letters and the Department of Linguistics and Languages for funding different phases of this project.

## TABLE OF CONTENTS

LIST OF TABLES.....	viii
LIST OF FIGURES.....	x
1. INTRODUCTION AND HYPOTHESIS.....	1
1.1 Sui Dialect Contact.....	3
1.2 Breaking Ground in Three Areas.....	7
2. BACKGROUND.....	13
2.1 Sui Language and Culture.....	13
2.1.1 The Sui Tone System.....	16
2.1.2 Current Status of the Language.....	18
2.1.3 Dialect Prestige and Intelligibility.....	19
2.1.4 Sui Exogamy.....	21
2.1.5 Sui Folk Linguistic Views on Exogamy.....	23
2.1.6 Women's Social Networks and Communities of Practice.....	25
2.1.7 Glimpses of Sui Culture.....	27
2.2 Research Background.....	29
2.2.1 Prior Studies of Dialect Acquisition and Accommodation.....	30
2.2.2 Children's Development: Control of Sociolinguistic Variables and L1 Tone Acquisition.....	40
2.2.3 Prior Studies of Exogamy.....	45
2.2.4 Outline of a Theory of Variation in Indigenous Minority Languages	50
3. THE LINGUISTIC INVESTIGATION.....	59
3.1 The Speakers.....	59
3.2 Data Collection Methods.....	67
3.2.1 Eliciting Words.....	67
3.2.2 The Interview Settings.....	70
3.2.3 By the Numbers.....	72
3.2.4 Description of Linguistic Variables.....	73
3.2.4.1 Phonetic and Phonological Variables.....	73
3.2.4.2 Lexical Variables.....	75
3.3 Linguistic Results for Married Women and Baseline Speakers.....	77
3.3.1 Lexical Variables for Married Women and Baseline Speakers.....	77
3.3.2 Tone Variables for Married Women and Baseline Speakers.....	85
3.3.2.1 Introduction.....	85
3.3.2.2 Tone Results for Married Women and Baseline Speakers.....	87
3.3.2.2.1 Extracting the Raw Tone Data.....	88
3.3.2.2.2 Time Normalization.....	88
3.3.2.2.3 Syllable Edge Effects.....	92
3.3.2.2.4 Mapping Sui Tone Inventories.....	96
3.3.2.2.5 A Brief Venture into Sui Tonology.....	102

3.3.2.2.6 Pitch Normalization: The Problem of The Baby and The Bathwater.....	106
3.3.2.2.7 Results for the T1 Variable for Married Women and Baseline Speakers.....	114
3.3.2.2.8 Results for the T6 Variable for Married Women and Baseline Speakers.....	140
3.3.2.2.9 Conclusions from the Tone Results for Married Women and Baseline Speakers.....	162
3.3.3 Segmental Variables for Married Women and Baseline Speakers.....	166
3.3.3.1 Impressionistic Results for Married Women and Baseline Speakers.....	168
3.3.3.2 Acoustic Results for Married Women and Baseline Speakers...	171
3.3.3.2.1 Baseline Speakers.....	176
3.3.3.2.2 Married Women.....	179
3.3.3.2.3 Conclusions.....	187
3.3.4 Conclusions from the Linguistic Results of the Married Women and Baseline Speakers.....	188
3.4 Linguistic Results of the Children of Immigrant Married Women.....	191
3.4.1 Lexical Variables for Children.....	194
3.4.2 Tone Variables for Children.....	198
3.4.2.1 Introduction.....	198
3.4.2.2 The Children's Tones.....	200
3.4.2.2.1 The Young Children (3-5 years old).....	202
3.4.2.2.2 The Older Children (9-12 years old).....	217
3.4.2.3 Linear Regression and Classification Trees for the Children's Tones.....	220
3.4.2.4 Conclusions from the Tone Results for Children.....	224
3.4.3 Segmental Variables for Children.....	225
3.4.3.1 Impressionistic Results for Children.....	225
3.4.3.2 Acoustic Results for Children.....	228
3.4.4 Conclusions from the Linguistic Results of the Children.....	237
4. THE ETHNOGRAPHIC INVESTIGATION.....	239
4.1 "Why?".....	239
4.2 The Ethnographic Conversations.....	240
4.2.1 Questions Used for Ethnographic interviews.....	240
4.2.2 The Responses.....	242
4.2.2.1 Folk Understanding of the Dialect Contrasts.....	244
4.2.2.2 Married Women's Dialect Acquisition/Resistance.....	247
4.2.2.3 Children's Dialect Acquisition.....	253
4.2.2.3.1 From the Adults' Perspective.....	254
4.2.2.3.2 From the Children's Perspective.....	258
4.2.3 Conclusions from Ethnographic Research.....	262
5. ANALYSIS.....	263
5.1 Summary of Overall Results.....	263

5.2 Identity in the Sui Speech Community.....	266
5.2.1 Adults' Acts of Clan Identity.....	267
5.2.2 Children's Acts of Clan Identity.....	278
5.3 Conclusion.....	284
APPENDIX A Additional Baseline Speakers' Tone Systems.....	289
APPENDIX B Additional Older Children's Tone Systems.....	291
APPENDIX C Initial Phonological Evidence for /tua/.....	294
APPENDIX D <i>R</i> Functions for Normalizing Tones.....	295
BIBLIOGRAPHY.....	301

## LIST OF TABLES

1. Sui Tones from <i>Shuiyu Diaocha Baogao</i> .....	17
2. Acoustic Results in Edmondson et al. (2004) for Tones of Miaocao Township.....	17
3. Speakers Recorded for the Current Study.....	66
4. Results for Lexical Variables (Cognate and Non-Cognate).....	78
5. Standard Deviation at t=390 for T1 for Baseline Speakers.....	116
6. Mean T1 Linear Regression Results (slopes) for Baseline Speakers.....	118
7. Average Standard Deviation at t=390 for T1 for South Married Women.....	120
8. Standard Deviations at t=390 for North Women's T1.....	126
9. Linear Regression Results for Mean T1 (Pitch in semitones versus relative time for t=200 to t=390).....	130
10. Classification Tree Results for Mean T1 Slope (in the range t=200 to 390).....	134
11. Standard Deviations at t=390 for T6 for Baseline Speakers.....	142
12. Standard Deviations at t=390 for T6 for South Married Women.....	144
13. Standard Deviations at t=390 for T6 for North Married Women.....	147
14. Classification Tree Results for T6 at t=390 (both for mean T6 and individual T6 tokens).....	150
15. Classification Tree Results for Baseline and Married Women's (-a).....	186
16. Children in the Study.....	192
17. Linear Regression For Mean T1 Pitch (semitones) versus Relative Time for t=200 to t=390.....	221
18. Classification Tree Results for Mean T1 Slope in the range t=200 to 390.....	222
19. Classification Tree for mean T6 at t=390 for Children and Baseline Speakers.....	223
20. Graphical Results for the Children's (-a) Vowel.....	235

21. Classification Tree for (-a) for Children and Baseline Speakers..... 236



## LIST OF FIGURES

1. Guizhou Province within China.....	15
2. Sandu Autonomous Sui County in Guizhou Province.....	15
3. Glimpses of Sui Culture (four photographs).....	28
4. <i>lua</i> <sup>1</sup> ‘boat’ .....	90
5. <i>ham</i> <sup>1</sup> ‘three’ .....	91
6. Two T6 Tokens Normalized for Time.....	95
7. Two T6 Tokens with Edge Effect Regions Removed.....	96
8. Tone Inventory of Speaker #3.....	98
9. Mean Tones of South Baseline Speakers.....	99
10. Mean Tones of North Baseline Speakers.....	100
11. South Clan: A Possible Tonological Model.....	103
12. North Clan: A Possible Tonological Model.....	103
13. Mean Tones of Two Midlands Baseline Speakers.....	105
14. The Problem with Simple Linear F0 Normalization. Speakers #1 and #3 contrasted in terms of T1 and T6 ranges.....	108
15. T6 for Three South Speakers.....	112
16. Baseline North and South Speakers’ Mean T1 Tracks.....	115
17. Mean T1 Tracks from t=200 to t=390 for Baseline Speakers.....	117
18. North Baseline Mean T1 Tracks and South Married Women’s Mean T1 Tracks...	120
19. South Baseline Mean T1 Tracks and South Married Women Mean T1 Tracks.....	122
20. South Baseline Mean T1 Tracks and South Married Women Mean T1 Tracks.....	124
21. North Baseline Mean T1 Tracks and North Married Women Mean T1 Tracks.....	126

22. South Baseline Mean T1 Tracks and North Married Women Mean T1 Tracks....	127
23. North Baseline Mean T1 Tracks and Speaker #44.....	129
24. Slopes of Individual T1 Tokens of North Baseline and North Married Women....	136
25. Slopes of Individual T1 Tokens of South Baseline and South Married Women.....	137
26. North and South Baseline Speakers' Mean T6 Tracks.....	141
27. North Baseline Speakers' Mean T6 Tracks and South Married Women's.....	143
28. South Baseline Speakers' Mean T6 Tracks and South Married Women's.....	145
29. South Baseline Speakers' Mean T6 Tracks and North Married Women's.....	147
30. North Baseline Speakers' Mean T6 Tracks and North Married Women's.....	148
31. Close-up of the Set of Low T6 Tone Tracks: Four South Married Women and One South Baseline Speaker.....	151
32. Individual Tokens of T6 Pitch at t=390 for North Baseline Speakers and North Married Women.....	157
33. Individual Tokens of T6 Pitch at t=390 for South Baseline Speakers and South Married Women.....	159
34. Speaker #24, a South Married Woman in Midlands.....	163
35. Speaker #26, a South Married Woman in Midlands.....	164
36. Examples from South and North for the word 'salt'.....	173
37. The (ua) Diphthong Variable for North and South Baseline Speakers.....	174
38. The (ua) Diphthong Variable for North and South Baseline Speakers with Ellipses.....	175
39. (-a) for North and South Baseline Speakers.....	178
40. "Bull's-eye": South married women's (-a) plotted with South baseline speakers'.....	180
41. South married women's (-a) (gray) plotted with North baseline speakers' (-a).....	181
42. North married women's (-a) (gray) plotted with South baseline speakers' (-a).....	183

43. North married women's (-a) (gray) plotted with North baseline speakers' (-a)....	184
44. An Individual South Baseline Speaker (Speaker #3).....	201
45. An Individual North Baseline Speaker (Speaker #20).....	202
46. Speaker #9 (3 year-old North girl).....	203
47. Speaker #9's T6 Divided by Words.....	205
48. Speaker #9 T1 Words.....	206
49. Speaker #25 (5 year-old Midlands boy).....	208
50. Speaker #25 T6 Words.....	209
51. Speaker #27 (4 year-old Midlands girl).....	211
52. Speaker #27 T6 Words.....	212
53. Speaker #10 (4 year-old North boy).....	214
54. Speaker #10 T1 Words.....	216
55. Speaker #19 (9 year-old North boy).....	218
56. Speaker #16 (10 year-old North girl).....	219
57. Speaker #9 (3 year-old North girl).....	229
58. Speaker #10 (4 year-old North boy).....	230
59. Speaker #19 (9 year-old North boy).....	231
60. Speaker #16 (10 year-old North girl).....	232
61. Speaker #12 (10 year-old North boy).....	233
62. Speaker #14 (12 year-old North girl).....	234
63. A South Baseline Speaker (Speaker #1).....	289
64. A North Baseline Speaker (Speaker #21).....	290
65. Speaker #12 (10 year-old North boy).....	291

66. Speaker #14 (12 year-old North girl)..... 292

## 1. Introduction and Hypothesis

Since the global community is increasingly characterized by migration and contact between differing cultures, languages, and dialects, the study of linguistic contact can provide particularly timely sociolinguistic insight. This study sets out to investigate the role of identity in dialect contact and how that identity may be performed linguistically. The investigation is a fieldwork-based case study centered on the systematic adult immigration patterns found within the Sui culture of southwest China. Sociolinguistic investigation of this indigenous minority culture may provide valuable insight not just into the Sui language but also into universal issues of human language variation and identity.

In this study, the exogamous marriage system of the Sui people serves as a laboratory for investigation of dialect contact and identity; Sui wives and husbands must originate in different clans, and the wife immigrates to the husband's clan upon marriage. The following specific hypothesis is tested: "Married Sui women who have been living in the husband's clan dialect region for a decade or more will acquire the husband's clan dialect features to a significant degree." In addition, the speech of the children of such immigrant women is examined to determine their dialect features and related identity issues as well.

Contrary to the hypothesis and contrary to many other previous dialect acquisition studies, the results show that the women maintain their original home dialects to a very high degree. This dialect maintenance is attributed to clan identity; specifically, clan-level linguistic *acts of identity* (Le Page & Tabouret-Keller 1985) are being performed by the use of particular dialect features. The married women linguistically identify themselves

according to their original clans rather than the husband's clan, thus showing a remarkable ability to override the otherwise natural human tendency for significant dialect acquisition in situations of long-term immersion.

Children are found to primarily use the dialect features of the father's clan, but some features of the mother's dialect are observed in their speech as well, especially among younger children. Ridicule, admonition, and criticism are reported as the consequences for speakers who use dialect features other than those of their clans of origin.

In an analysis of the observed behavior of immigrant married women, non-immigrant men, and the children of bidialectal homes, this study finds that clan identity has a strong influence on the behavior of all members of the speech community, with each member of the community identifying with his or her father's clan. Immigrant married women linguistically identify themselves as members of their respective fathers' clans through the use of appropriate dialect features, and their children also use dialect features to identify themselves as members of their respective fathers' clans.

This study also shows how indigenous minority languages can provide new insight for quantitative variationist sociolinguistics, including the important role that the social level of clan may play in many such societies. In addition, this study explores the application of sociophonetic techniques to lexical tone ("socio-tonetics"), introducing methodology for an acoustic analysis of tone as a sociophonetic variable. Finally, the study also yields

a deeper understanding of Sui dialect features, providing the first acoustic analysis of several variables as well as a comparison of Sui tonology for different dialect regions.

### **1.1 Sui Dialect Contact**

Concentrated in the colorful mountainous countryside of southern China, the people of the Sui ethnic minority preserve their own unique customs, worldview, and language. The Sui exogamous system is an ancient marriage practice requiring the wife and husband to originate in different clans, and the wife permanently immigrates to the husband's village at the time of marriage. Sui clan members view themselves as having descended from a single ancestral family, thus corresponding to the common definition of clan as "a consanguineal kin group constructed by unilineal descent in which members cannot actually trace their descent to the common, often mythological, ancestor (Fortes 1953)" (Kang 1979:88, cf. Fortes 1953:25, Broude 1994:66, Birx 2006:516, and Radcliffe-Brown 1950:40, cited in Madan 1962:66).

Subtle dialect differences are found between clans, although the dialects in the regions studied here are mutually intelligible. Therefore, as a result of the immigration required by the exogamous customs, married women often have dialect features that differ from their husbands' villages. In this way, from the point of view of linguistic research, Sui marriage customs provide a good opportunity to observe a systematic case of adults immersed in a new dialect environment for a very long period of time. This aspect of Sui culture can serve as a platform for the study of dialect contact and acquisition.

The immigration and dialect contact resulting from Sui marriage customs can lead to intriguing linguistic situations where, for example, a woman uses a different 1<sup>st</sup> Person Singular than her own husband and children. The examples in (1) illustrate a few such variants between two clans, labeled as the “North Clan” and the “South Clan.”

(1) A few examples of clan dialect contrast:

	<u>North Clan</u>	<u>South Clan</u>
<i>1<sup>st</sup> Singular</i>	ej	ju
‘socks’	ma:t	?jɔ
‘market’	tɕe	qe

Note: ɕ represents a fricative that varies from palatal to alveolo-palatal.

The speech of the men, children, and unmarried women of each clan is locally considered to be a homogeneous variety. Henceforth, following Smith & Johnson (1986), *patrilect* refers to the dialect of a person’s clan of origin (since the clans in the study are patrilineal); in addition, *matrilect* is introduced here as a term for the mother’s dialect of a child raised in a bidialectal home; finally, *exolect* is introduced here as a term for the dialect of the clan that a woman has immigrated to as a result of exogamous marriage, i.e., the dialect of her husband’s clan.

Since many prior studies of dialect contact (Section 2.2.1) show significant acquisition by immigrants in new dialect regions, this study tests the hypothesis that married women acquire the exolect in subtle yet measurable ways. According to folk understanding, each married woman maintains the dialect features of her home village regardless of the number of years she may live in her husband’s village. When pressed, some consultants recall



rare cases where an older woman who has been married for a very long time may have a few features of the exolect.

The study presents results and analyses of field research testing the hypothesis with empirical, quantitative observation, thus exploring dialect acquisition and its relation to clan identity. Specifically, the speech of women who immigrated from one clan to another was recorded and compared to the speech of men who had remained in their original dialect regions as well as unmarried teenagers in those regions. In order to control for possible markedness asymmetry between the two regions, women involved in the opposite direction of migration were recorded as well. The women chosen for the study had all lived in the husband's village for a decade or more, except one woman (Speaker #26; see Section 3.1) who had been in the husband's region for nine years rather than a full decade; for convenience in the remainder of the study, the phrase "married a decade" will include her case as well. The dialect features of men in both regions were recorded as a baseline, under the assumption that clan differences significantly outweigh any gender differences (consistent with consultants' reports and prior study). But unmarried teenage girls and boys from both regions were recorded for the baseline as well just in case of gender differences or gender-related normalization issues.

South Clan married women living in the North Clan were targeted for the primary set of interviews, but North Clan married women living in the South Clan and South Clan women living in a "Midlands Clan" were recorded as well. In addition, dialect features of children of such immigrant married women were also recorded so that children's dialect acquisition in such bidialectal homes could be investigated. Ethnographic observations

and conversations were also conducted in order to gain a fuller understanding of the community as well as the members' own sociolinguistic perspectives.

The results suggest that the Sui folk linguists' viewpoint closely matches the empirical data. The married women were found to maintain their home dialects with remarkable precision despite living in their husbands' regions for more than a decade and being relatively isolated from their home regions: (1) The migrant married women's non-cognate lexical variants corresponded to their respective home regions. (2) The women's cognate lexical variants (i.e., pronunciation variants) also corresponded to those found in their patrillects. (3) Discourse markers (introduced below) and other variables produced in the free speech of the immigrant women corresponded to their respective patrillects. (4) The two tone variables known to exist between the two regions were produced with the contours and pitches expected according to the immigrant women's patrillects. (5) The vowels in the women's diphthongs showed the same clear dialect contrast found in their patrillects.

Only one woman (Speaker #15; see Section 3.1), a 59 year-old South woman who had been living in the North clan for 40 years, showed significant evidence of acquisition of an exolectal feature (the tone variable Tone T6; see Section 3.3.2.2.8). An exception that highlights the rule, she self-reported some exolect acquisition and suggested it was due to her frequent interaction with local children. Even in this respect, the Sui folk perspective is shown to be reliable; they report that immigrant women's acquisition of the exolect is very rare, and if it happens at all, it is only in cases of some older women who have been married an especially long time. Moreover, even this woman's speech still remained

primarily patrilectal. (Other older women, such as Speaker #43 (Section 3.1), had been married comparable lengths of time yet showed no acquisition.)

Overall, this study finds that the immigrant women maintain their patrilects' distinctiveness to a high degree: in salient dialect features as well as subtle features, in differing levels of formality, and in different levels of linguistic structure. Likewise, from a young age, the children of such women begin to linguistically identify with the father's clans and eventually speak the patrilect exclusively. Thus, each Sui man, woman, and child linguistically marks his or her own clan membership and identity through the use of patrilectal features. Strong community expectations reinforce this behavior (Section 4).

## **1.2 Breaking Ground in Three Areas**

This study seeks to help break ground in three subfields of linguistics. First, the subfield of dialect acquisition in general has received comparatively little research attention, as noted by Chambers (1992:147), Dennis Preston (p.c.), David Britain (p.c.), and Conn & Horesh (2002:47). As outlined in Section 2.2.1, previous work in dialect acquisition (e.g. Chambers 1992, Payne 1976, 1980, Trudgill 1986, Kerswill 1994, Bortoni-Ricardo 1985, Munro et al. 1999 inter alia) has led to progress in the understanding of how dialect features are acquired or resisted when a speaker immigrates to a new dialect community. However, compared with other topics of linguistic inquiry, dialect acquisition remains underdeveloped. This Sui dialect acquisition study can provide another step in the direction of greater understanding of dialect acquisition.

Secondly, in the field of quantitative variationist sociolinguistics, there has been a relative lack of attention placed on indigenous minority languages. While ethnographic and qualitative research of such languages have provided invaluable contributions, few investigations of such lesser-known language communities have taken the approach of variationist sociolinguistics, i.e., the research of language variation and change that has grown out of the tradition of William Labov (e.g., 1963, 1966, 1972, 1980, 1994, 2001). Instead, such research has largely focused on majority languages or else well-known non-indigenous minority languages. For example, when looking through decades of past programs of one major annual conference on variationist sociolinguistics, one is hard pressed to find more than a handful of studies focused on indigenous minority languages.

Besides leaving gaps in the understanding of lesser-known language communities themselves, this lack of research attention could lead to an incomplete view of language variation in general. Certain aspects of language variation and change may become clearer only by uncovering sociolinguistic issues in such underrepresented communities. For example, though models of social stratification (e.g., Labov 1966) may be very effective in many urban settings, the rural agrarian villages of the Sui people are much more homogeneous in terms of social class (see Section 2.1.3), so other factors such as family clan may be more meaningful. Further, besides pointing out such contrasts, variationist research of such languages may also provide cross-linguistic and cross-cultural support for principles in existing sociolinguistic models. In the same way that phonology, syntax, morphology, and other subfields of linguistics have already gained crucial new perspec-

tives by considering data from lesser-known languages, variationist sociolinguistics may also gain valuable perspectives from such languages as well.

Similarly, since no orthography is in use for Sui, this study addresses a related issue which is often concomitant with the study of indigenous minority languages: how to elicit data in the style of a word-list without using a word list, how to elicit reading passage data without a reading passage, etc. While this study is certainly not the first to address these issues, it provides further methodological exploration and results.

Thirdly, in the realm of variationist sociolinguistic research, much of the focus has been on segmental variables, rather than suprasegmental variables such as tone and intonation, as noted by Cruttenden (1997:128) and Britain (1992). In particular, variationist research of lexical tone is very rare. An anonymous reviewer (*Language Variation and Change*) mentions that one reason that variationist studies of prosody have lagged behind studies at the segmental level is due to technology; vowel formants were accessible to variationist researchers before pitch-tracking technology.

Intonation (but not lexical tone) has been steadily gaining attention in variationist sociolinguistics (cf. Fagyal & Thomas, to appear). Some recent intonational studies include Yeager-Dror et al. (2003), who provide a variationist analysis of prosody in American English corpora with respect to sociolinguistic and pragmatic factors. Grabe (2004) and Grabe et al. (2000) look at intonation variation in British English. Britain (1992) finds intonation to vary with respect to age and ethnicity in New Zealand English. Douglas-

Crowie et al. (1995) observe variation in intonation as a function of sex and social class in Belfast.

However, there have been very few variationist sociolinguistic studies of lexical tone. Of course, tone has clearly played an important role in dialectology, and a great number of studies have analyzed synchronic and diachronic variation in tonal phonology. For example, Haas (1958), Wanna (1992) and Tingsabadh (1993) describe Thai dialectology with respect to tone. Many scholars analyze Chinese dialects and Chinese minority languages in terms of tone dialect variation and historical change (e.g., Chang 1975, Cheng 1977, Chen 2000, Lien 1986, Y. Luo 1996, Edmondson 1994, Evans 2001 inter alia). However, in the field of variationist socio-phonetics where within- and between-speaker variation is observed with respect to sociolinguistic factors, studies of lexical tone are quite rare.

A few variationist studies of lexical tone have been conducted, and, although their results are primarily based on auditory judgments, these studies show the efficacy of tone as a sociolinguistic variable. For example, Q. Zhang (2005) uses auditory judgments to measure a tone contrast between Beijing “yuppies” and workers in state-owned businesses. Zhang finds that the workers in state-owned businesses usually used a neutral tone in the second syllable of certain disyllabic words such as *xiansheng* ‘mister’ (*xian* had Mandarin Tone 1 (level tone), while *sheng* had a neutral tone). By contrast, the “yuppies” were more likely retain a full level Tone 1 on both syllables, a pronunciation which is associated with some dialects used by overseas Chinese people. Zhang then combines the results of this tone variable with the results of segmental variables (rhotacization, lenition,

and presence/absence of an interdental articulation) to conclude that the Beijing “yuppies” desire to identify themselves as “cosmopolitan.” In this way, tone is shown to be an important sociolinguistic variable.

Other such studies include Kerswill (1994). In his study of rural to urban immigration in Norway, Kerswill uses auditory judgments of two tones to study variation between the rural immigrants and the local urban speakers (p. 83-101). He then includes tone alongside the segmental variables in his analysis of the variation of the immigrants (e.g., p. 149). Bradley (2006) shows how phonation types of a mid-level Lisu tone vary with respect to sociolinguistic factors such as style, age, gender, and education.

These studies show the value of tone as a sociolinguistic variable and show that tone can be smoothly included with segmental variables in analysis of language variation and change. But such quantitative sociolinguistic studies of lexical tone are vastly outnumbered by research focused on segmental variables. Moreover, the tone studies mentioned above are mainly dependent on the researchers’ auditory judgments, rather than acoustic measurement and comparison of tone pitch tracks. The current Sui study provides an acoustic investigation of lexical tone as a sociophonetic variable, specifically, tone variation in the speech of women and children in the social environment of exogamy.

Tone is a significant aspect of human language and worthy of a great deal of variationist attention; Yip (2002) estimates that 70% of the languages of the world are tonal, and Fromkin estimates that over half of the world’s population are speakers of a tonal lan-

guage (Fromkin 1978; cited in Mattock & Burnham 2006). Tonetics (tone phonetics) has been developing methodology for acoustic tone analysis (e.g. Rose 1994, Zhu 1999), and segmental sociophonetics is a well-developed field as well, of course. It seems then that valuable research could be conducted at the intersection of tonetics and sociophonetics, namely, a subfield that could be called “socio-tonetics,” the acoustic sociophonetic study of lexical tone variation. Thus, the current study includes an emphasis on acoustic “socio-tonetics.”

In addition to these three subfields, this study also investigates the reliability and role of folk linguistics (Preston 2005, Niedzielski & Preston 2000) as well as exploring Sui acoustics and acoustic dialectology. For example, how accurate is the local folk belief that married women from other villages do not change their dialect features even after living in their husbands’ villages for many years? With regard to Sui acoustics, prior to this study, only one Sui region had enjoyed any acoustic analysis: the Miaocao Sui dialect (Edmondson et al. 2004). The current study reports on acoustic observations of the tone systems of the Sandong Sui, Shuilong Sui, and Zhonghe Sui dialects for the first time, thus providing data to test the impressionistic tone systems given in earlier research (e.g. Li 1948, J. Zhang 1980). This study also provides the first acoustic observations of any Sui vowels, namely, the (ua) diphthong in its two dialectal variants (a contrast between Sandong and Shuilong).

The remainder of the study is organized as follows. Section 2 introduces the linguistic and cultural background of the Sui region being studied, prior work on dialect acquisition,



prior research of children's ability to acquire sociolinguistic variables and tone, prior work on exogamy, and variationist research of indigenous minority languages. Section 3 presents the linguistic investigation, including fieldwork methodology and results of lexical and phonetic variables for baseline speakers, immigrant married women, and children. Section 4 presents the ethnographic investigation with a discussion of interviews and other information from the members of the community. Section 5 provides analysis and conclusions. Finally, an Appendix is provided to list some of the R 2.4.1 functions written for tone normalization as well as other additional information as mentioned in the text.

## **2. Background**

### **2.1 Sui Language and Culture**

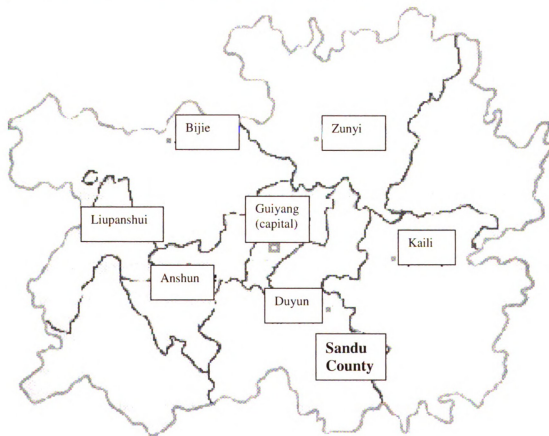
The linguistic and cultural heartland of the Sui people is rural Sandu Sui Autonomous County in the southern part of Guizhou Province in southwest China (Figures 1-2). The Sui people numbered about 346,000 in a 1990 census (He et al. 1992:1), and by 2000 the population had increased to 406,902 (according to Xuecun Wei, Chinese Academy of Social Sciences). The great majority (93%) live in Guizhou Province (Burusphat et al. 2003). Sui is generally classified as a Kadai language in the Tai-Kadai branch of the Tai family (Burusphat, Wei, & Edmondson 2003, Edmondson & Solnit 1988), a language family whose most well known members are Thai and Lao. Like other Kadai languages, Sui is isolating, largely monosyllabic, and has a system of contour tones. Linguistic background on Sui is found in Li (1948, 1977), J. Zhang (1980), Zeng & Yao (1996:262), S. Luo (1992:153-155), Edmondson & Solnit (1988), Edmondson et al. (2004), Bu-

rusphat et al. (2003), Pei (1992:316-32), Z. Wei (1999), Wang (1999), and Pan (1981),  
and Ramsey (1987:232-34).

**Figure 1. Guizhou Province (solid) within China (outline).**



**Figure 2. Sandu Autonomous Sui County in Guizhou Province.**



Sui is generally divided into three major dialects, Sandong, Pandong, and Yang' An (cf. J. Zhang 1980, S. Luo 1992, Burusphat et al. 2003), but those three large dialect regions each include numerous clans. The current study uses detailed, clan-level dialect features that exist within the Sandong dialect region as a tool for examining the Sui exogamous system. These clan-level features are based on the author's field observations as well as some reference to *Shuiyu Diaocha Baogao* (1956), an unpublished, handwritten manuscript (acquired through the help of Jerold Edmondson) that reports on Chinese scholars' investigations of 17 Sui speakers representing nine dialect regions.

### 2.1.1 The Sui Tone System

Since tone is a central variable in the current study, an introduction to Sui tone is provided in this section. Tone pitch values are represented below on a five-pitch range of auditory differences where 5=high and 1=low (Chao 1930). Thus, a tone value of "52" would indicate a high falling tone (falling from 5 down to 2), while a tone value of "33" would indicate a mid level tone and so on. The tone reference numbers, e.g., "Tone 1" (T1), "Tone 2" (T2), correspond to the transcription system traditionally applied to Sui and other languages of the area (e.g., J. Zhang 1980, Zeng & Yao 1996, Edmondson & Solnit 1988). In that transcription system, Tones T7 and T8 are transcribed for "checked" syllables, referring to syllables ending in /-p, -t, -k/. The tones of checked syllables are further differentiated as S "short vowel" or L "long vowel." Further analysis may show that each of the "checked" tones actually correspond phonologically to an "unchecked" tone (Yen-Hwei Lin p.c., Jerold Edmondson p.c.; Li 1948 also indicates this possibility). For example, it may be that T5 and T7 are phonologically equivalent.

The North dialect (Shuilong in Zhonghe Township) and South dialect (Sandong Township) tone systems are listed below as found in *Shuiyu Diaocha Baogao*.

Table 1. Sui Tones from *Shuiyu Diaocha Baogao* (1956:23).

Unchecked Tones

<i>Tone values by region</i>	T1	T2	T3	T4	T5	T6
North	13	31	33	53	35	24*
South	13	31	33	53	35	55

\*A value of 55 occurs in Chinese loan words.

Checked Tones

<i>Tone values by region</i>	T7S	T7L	T8S	T8L
North	45	35	32	31
South	5	35	43	42

Other researchers give slightly different values. For example, reporting on the South region, Zeng & Yao (1996: 260) list a value of 52 for Tone T4 rather than 53 as above. S. Luo (1992) also shows different transcriptions for South: T4 = 42, T7S = 55, T8S = 42, T8L = 53. Edmondson et al. (2004) provide acoustic measurements from Miaocao Village (Table 2), which is located in the North dialect region, near Shuilong. Their results suggest some that some correction of the impressionistic tone values above may be needed. In particular, note the difference in T1, which is one of the tones used in the current study.

Table 2. Acoustic Results in Edmondson et al. (2004) for Tones of Miaocao Township (in the North dialect region).

<i>Tone values for North (Miaocao)</i>	T1	T2	T3	T4	T5	T6
	31	41	33	42	35	24

<i>Tone values for North (Miaocao)</i>	T7S	T7L	T8S	T8L
	44	34	43	43

### **2.1.2 Current Status of the Language**

The Sui people report that their language is an important marker of cultural identity and pride, especially since Sui is not a dialect of Chinese but rather an ethnic minority language. Sui is the exclusive language spoken whenever only Sui people are present. However, interaction with the Han Chinese people, the ethnic majority of China, has led to increasing bilingualism among Sui men. As a result of seasonal employment in Han Chinese areas and other frequent interaction with Chinese speakers, Sui men have generally learned to speak the local dialect of Chinese (a Xinan dialect). Thus among Sui men, the local dialect of Chinese is used for communication with Han Chinese speakers in employment, government, and educational environments, while Sui is the language of home, family, agriculture, and oral tradition. Although teachers in local elementary schools primarily use the Sui language during the first few grades, the classroom language gradually transitions to Standard (Mandarin) Chinese until 6<sup>th</sup> grade when all instruction is given in Standard Chinese (based on consultants' reports).

Due to social and economic circumstances, educational opportunities for girls were limited in the past. Village women who are currently about 25 years old or older are usually monolingual in Sui or have only very limited Chinese ability. Changes in recent years have given the younger generations more opportunities for education and travel, so many younger women are becoming bilingual. However, the women in this study fall into the category of monolingual Sui speakers 25 years or older who have had very little interaction outside Sui regions.

### **2.1.3 Dialect Prestige and Intelligibility**

Among the three main dialect regions, Sandong, Yang'an, and Pandong, (J. Zhang 1980), the Sandong region was chosen for this study. Sandong is the largest of the three dialect regions and is located in the central part of Sandu County, which the Sui people consider to be their cultural center. As mentioned above, variation also occurs within this main Sandong dialect, albeit with a very high level of mutual intelligibility. Numerous different clan-level dialect features are observed among villages within Sandong, and such features are the focus of investigation for this study. As discussed below, these clan-level dialects do not differ in prestige.

First, there is no Sui orthography in use nor any other standardization. Although a Latin alphabet-based Sui orthography was developed by Chinese scholars in the 1950's (cf. Zeng & Yao 1996:262, S. Luo 1992:153-155, Pei 1992:316-32), it never achieved any degree of widespread use among the Sui people. The overwhelming majority of speakers are illiterate in Sui. Although many Sui people can also read Chinese (primarily limited to men and the younger generation of boys and girls, not women who are middle-aged or above), Sui consultants point out that the Chinese orthography would be difficult to adapt for Sui since the languages are quite different. There is no straightforward correspondence between Chinese characters and Sui words -- neither semantically nor phonologically (Chinese has far more disyllabic words which require two characters). Since most Sui people are not trained in any Sui orthography, any written communication in the community is necessarily conducted in Chinese, with the exception of a set of ancient ceremonial iconic Sui characters accessible only to shamans and only used in limited

settings such as divination. (S. Luo 1992 and Pan 1981 give lists of the ancient Sui characters; Wei 1999 contrasts the script with Chinese; Wang 1999 analyzes gravestones carved with the script.) Thus, no Sui written standardization influences dialect status.

Sui consultants report that no variety is considered more prestigious than another. No evidence of sociolinguistic deference to any one dialect has been observed. Moreover, the status of Chinese in the educational system (Section 2.1.2) causes Standard Chinese to be viewed as the educational standard and prestige language, thus precluding the rise of any one Sui dialect as a perceived standard or prestigious variety. Prestige is attached to Chinese rather than any variety of Sui. In repeated interviews with local Sui speakers, there was no indication that any one dialect region (or clan) was perceived as more prestigious than others. Consultants indicate that clan-level dialect features strongly index the speaker's home region and clan, but they do not report any sense of higher or lower social or economic status or other hierarchical sense attached to the dialect features. Instead, the entire Sui region in the study may be viewed as practically egalitarian, and there is no evidence of any social hierarchy that is realized linguistically. Naturally, there would be some variation from family to family in terms of individual prosperity and educational levels. But such variation is limited and non-systematic, and most people view themselves as members of one large Sui farming community, and they view that community as a unified minority nationality within the Chinese state.

Other indigenous minority communities that have been viewed as egalitarian include Nganhcara of Australia (Smith & Johnson 1986), Kaluli of Western Samoa and Papua



New Guinea (Ochs & Schieffelin 1982), the Vaupes region of the Amazon (Jackson 1983:164), Yami of Orchid Island, Taiwan (Rau, in progress), and Sheshatshiu Innu of Labrador, Canada (Clarke, in progress). See Sections 2.2.3 and 2.2.4 for further discussion of egalitarian indigenous minority communities.

#### **2.1.4 Sui Exogamy**

Each Sui village consists of a tightly knit clan such that all the men and children in a village usually have the same surname. According to local custom, a man and woman cannot marry if they are both from the same clan (consultants' reports, S. Luo 1992:160, *Shuizu Jianshi* 1985:110, Burusphat et al. 2003:9). The new bride is required to move permanently to her husband's village at the time of marriage. Clans are defined on the basis of folk knowledge of ancestry as well as surname. Children keep their father's surname for life, regardless of later marriage. Thus, a man and woman cannot marry if they have the same surname (S. Luo 1992:160). If a person marries within the clan, the community invokes "severe punishment" (Tang & Wei 2001:93). Exceptions to the surname rule are allowed in cases where two clans have the same surname even though they are known from oral tradition to be historically divergent.

Clans are distinct and influential social units. The author has observed a palpable sense of social distance (tense politeness and social obligation) when members of one clan enter another clan, even though both groups are otherwise socioeconomic equals. Thus, when women immigrate at the time of marriage, they are crossing a significant social boundary.

Within the level of clan, society is further structured by the notion of extended family, *ha:m ya:n "diw*, lit., 'three families of ours', which generally refers to the families of the grown sons of a given set of parents. Thus, a Sui person views him or herself as a member of the Sui ethnic minority within China, a member of a clan within the local Sui region, a member of an extended family in the local village, and as a member of a nuclear family in a specific house. Clans are patrilineal, and the father of a household is observed to take leadership responsibilities such as leading family ceremonies during the Sui New Year festival (author's observations). Grown sons usually establish a separate house for their families, although sometimes a son and his wife may stay in the parents' house for some time if other housing is not available. Elderly parents usually live with the family of one of their sons.

A summary of Sui marriage customs is given below, based on the author's observations and consultants' reports as well as S. Luo (1992:160-63), M. Zhang (1991:166-69), He et al. (1992:194-214), *Shuizu Jianshi* (1985:110-11), Pan (1981:427-31), and Burusphat et al. (2003:9). In the rural areas that are the topic of this study, Sui women marry in their late teens or early twenties. The husbands are generally a few years older at the time of marriage, usually marrying in their twenties. Marriages are typically arranged with the help of parents and a relative (typically an aunt) who serves as a mediator. However, the young men and women themselves can have a strong influence in the decision-making process of choosing their spouses. Marriage relationships often begin as the result of casual interaction between groups of young men and women during market days or festivals where different clans can interact. Since men cannot marry women from their own

clan, such gatherings serve as opportunities for young people of different clans to meet each other and develop a relationship.

At an appropriate point in the relationship, parents and other relatives become involved in formal arrangements, which include meals, gifts such as pork, and other cultural signals which indicate interest in a marriage arrangement. When the arrangements have been finalized, the groom's family provides a dowry of approximately 10-20,000 yuan (US\$1,300-2,500) and sometimes also the gift of a pig. The bride's family buys or builds furniture to present as gifts to the groom's family. For families with enough resources, these gifts include a wardrobe, television set, sofa, and other comforts for the new household. On the day of the wedding feast, the men of the groom's village trek to the bride's village and carry the furniture back to the groom's village, often involving miles of hiking with furniture strapped to carrying poles. That evening, a wedding feast is held in the home of the husband's family. Along with the other symbolic activities outlined above, the final wedding feast in the husband's village indicates that the man and woman are now married and that the wife is now a resident of her husband's village rather than her parents' village. In the event of the death of her husband, a woman does not return to her parents' village but rather remains in her husband's village and is supported by his family.

### **2.1.5 Sui Folk Linguistic Views on Exogamy**

As discussed above, each clan can be considered a cohesive patrilineal social unit spanning a village or cluster of villages that are geographically separated from other clans (although some villages of one clan may overlap geographically with other clans). Given

this social and geographic separation of one clan from another, it is not surprising to find that a clan often has subtle dialect features distinguishing it from other clans. In the local view, the speech of the men, children, and unmarried women of each such clan is considered homogeneous (based on consultants' reports and also observation of the community). The Sui people report that a married woman identifies herself with her parents' village and that this identity is reflected by the way she maintains the dialect features of her home village throughout her life in her husband's village. Furthermore, even though the married women in a given village may have originally come from a variety of different clans, this does not affect the village residents' notion of their village as having a focused dialect. Instead, despite the linguistic complexity implied by the exogamous factors outlined here, village residents indicate a clear sense of each clan region as having a focused dialect whose foundation is the men's speech; the community understands that married women use the dialect variants of their home clans, which often differ noticeably from the husband's clan.

This folk linguistic attitude toward their community may be viewed in terms of Labov's notion of speech community as "participation in a set of shared norms" rather than necessarily "marked agreement in the use of language elements" (1972: 120). Or to put it in Gumperz's terms, a speech community is

...a system of organized diversity held together by common norms and aspirations (Wallace 1966, Sherzer 1974). Members of such a community typically vary with respect to certain beliefs and other aspects of behavior (1982b:24).

(cf. Wallace's (1970:23) discussion of "the organization of diversity," which Sherzer & Bauman also cite (1974:6)).

Local residents are consciously aware that married women sometimes have distinctive dialect features that correspond to their home clans, and one consultant even suggested that the existence of differences in 1<sup>st</sup> Person Singular among the clans might be directly related to the taboo on marrying within one's own clan. He speculated that perhaps this pronoun variation was specifically developed in ancient times as a check against intra-clan marriage. Regardless of the accuracy of that hypothesis, it shows a specific awareness of linguistic issues related to exogamy, as well as clear folk linguistic understanding of salient features between dialects. Additional folk observations of the dialect contrast are given in Section 4.2.2.1.

#### **2.1.6 Women's Social Networks and Communities of Practice**

Milroy (1982, 1987) shows the influence of social networks on an individual's speech, and this is another factor to be addressed in the case of Sui exogamy. Sui married women's daily networks are tightly focused on their husbands' villages (consultants' reports and the author's observations). The married women of a given village come from a variety of regions, and they do not appear to form any social networks based simply on common home regions (unlike the immigrant women in Bortoni-Ricardo 1985 (Section 2.2.1) who maintained close networks with other immigrants). That is, although the married women in a given village necessarily immigrated there from other clans, their specific clans of origin depend on the personal and family relationships directing each marriage exchange. Among the various clans represented by the married women in a given village, a married woman may share the same clan of origin with others, so married women are not completely isolated from their patrilects. However, the local clan dialect

is always by far the dominant language variety in each village, and there is no evidence of specific networks or communities of practice (Eckert & McConnell-Ginet 1992, Eckert 1988) that are based on women's clans of origin. Instead, a married woman is immersed in the local dialect on a daily basis (i.e., the exolect), and her social networks are based on solidarity with her husband's extended family within the village and with other married women in the village in general.

Also note that during extensive ethnographic discussions, none of the consultants ever suggested that women's social interaction with other same-dialect women in the village could be the reason that the married women maintain their patrillects so accurately. Instead, the opposite was cited; people who sensed any dialect acquisition in themselves or in others pointed to exolectal social interactions within the husband's village as the cause.

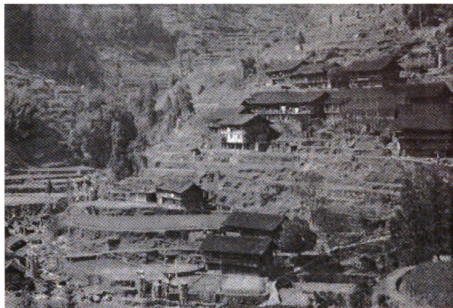
Village life for a married woman is centered around the responsibilities of farming and child-raising in her husband's village, with only infrequent visits to her home and few opportunities for outside employment (observations and consultants' reports). Due to the expense of travel and the social status of most Sui women, a married woman is primarily rooted in her husband's village with limited opportunities for outside interaction. For example, the two main regions investigated in this study ("North" and "South") are separated by about ten miles, which is a considerable distance under the circumstances; the two regions were not linked by road until 1977, and at the present time, interaction between residents of the two regions is still limited due to the fact that very few individuals

own motorized vehicles, bus service is expensive relative to low farming income, and many villages are located far from a road (observation and consultants' reports).

#### **2.1.7 Glimpses of Sui Culture**

Sociolinguistic effects such as those discussed in this study do not exist in a cultural vacuum, of course. The following glimpses of Sui culture (Figure 3) are intended to introduce a sense of everyday life in Sui villages in order to inform the discussion in the remainder of the study. While no human culture can be adequately understood through pictures alone, each picture below may at least contribute about a thousand words' worth of description, as well as personalizing the numbers, charts, and graphs to follow.

Figure 3. Glimpses of Sui Culture (four photographs)



(photo credit: Robert Burcham)



(photo credit: Glenn Cantu)





(photo credit: Glenn Cantu)



## **Section 2.2 Research Background**

In the following sections, the current study is placed in the context of prior research on the following topics: Dialect acquisition (Section 2.2.1), exogamy (Section 2.2.2), children's development with respect to sociolinguistic variables and lexical tone (Section 2.2.3), and variationist research of indigenous minority languages (Section 2.2.4).

### 2.2.1 Prior Studies of Dialect Acquisition and Accommodation

Prior work on dialect acquisition has provided progress toward the goal of understanding how dialect features are acquired or resisted when a speaker immigrates to a new dialect community. However, in comparison with many other topics of linguistic inquiry, dialect acquisition has received relatively little research attention, thus leaving many unexplored issues and unanswered questions about the processes and constraints guiding dialect acquisition (cf., Chambers 1992:147, Conn & Horesh 2002:47). The answers to such questions may lead to new insights about the sociolinguistic patterns to be found in the complex migrations and cross-cultural interactions in the contemporary world and also new perspectives about human universals underlying linguistic acquisition of all types (L1, L2, first dialect (D1), second dialect (D2)).

Such issues of dialect acquisition are pervasive in the human language experience. For example, the author overheard the following dialogue involving a man moving from Michigan to Oklahoma.

(2) A: *They said I'll have to work on my Southern accent.*

B: *You don't have to work on your Southern accent. You'll pick it right up!*  
*[laughter]*

Example (2) is just one instance of the high level of folk linguistic interest in dialect acquisition. A casual mention of dialect acquisition often stirs up numerous anecdotes of people “picking up” a new dialect, including humorous contexts where observers note an acquaintance’s unconscious acquisition of dialect features due to an extended stay in another region. Speakers of any language seem to have some notion of dialect acquisition, and many are quick to share their opinions about how it happens, when it happens, and

who is susceptible (Niedzielski & Preston 2000:102-09). This naturally raises the question of whether or not an empirical investigation of dialect acquisition may confirm such folk views and provide additional insight.

In comparison to other fields of study, the field of dialect acquisition is still in its nascent stages (Chambers 1992:147, Conn & Horesh 2002:47, Dennis Preston p.c., David Britain p.c.), yet researchers have been addressing the issue and reporting results both for immigrant adults and immigrant children, as outlined below.

### **Accommodation and Acquisition**

Numerous studies have shown a general human tendency for a person to adjust features of his or her language in response to contact with different people or groups of people. Such linguistic adaptation may be a subset of a “much wider tendency for human behaviour modification in social interaction” (Trudgill 1986:161) that is a “universal characteristic of human behaviour” (Trudgill p. 2, citing Gatewood & Rosenwein 1981 inter alia). Such linguistic adaptation is well documented in many studies, whether investigated as a short-term effect (usually termed *accommodation*, e.g., Giles 1984) or as a longer term effect (*dialect acquisition*, e.g., Chambers 1992).

Prior studies are outlined below and discussed in terms of accommodation and dialect acquisition, although no categorical distinction is implied between the two. Chambers notes the possibility that the difference between long-term accommodation and dialect acquisition may “prove to be terminological rather than substantive” (1992:148), and

Trudgill follows a similar approach (1986:3ff.,11ff.). Although *accommodation* frequently refers to short-term adoption of style-related variants, and *dialect acquisition* usually refers to long-term adoption of regional variants, Trudgill points out that “it is clear that accommodation can also take place between accents that differ regionally rather than socially, and that it can occur in the long term as well as in the short term” (1986:3).

Accommodation Theory (Giles & Powesland 1975, Giles 1984, Giles & Smith 1979, Giles, Bourhis, & Taylor 1977, Giles, Mulac, Bradac, & Johnson 1987, Giles, Coupland, & Coupland 1991) models how speakers make such linguistic adjustments as acts of *convergence* or *divergence* to the speech of the addressee. The choice of convergence or divergence is determined according to whether a speaker belongs to a dominant group or a subordinate group and whether there is a perceived possibility of improvement in social standing. On this basis, Bell (1984) introduces the Audience Design model, where speakers make linguistic adjustments to the audience, adjusting either toward or away from the speech of the audience according to their desire to achieve either solidarity or social distance.

Bell found confirmation for this model through a study of New Zealand radio news readers (1984). News readers for a radio station with a high status, well-educated audience used less flapping (e.g., in *butter*) than readers for a lower status radio station. Another study showing evidence for Audience Design is Coupland’s (1980, 1984) study of the speech of travel agents in Cardiff, Wales. Coupland finds a correlation between the travel agents’ use of Cardiff English (considered non-standard) and the type of audience. For

example, when speaking to clients, the travel agents used Cardiff English features only 33% of the time, but in casual conversation, those features occurred 76% of the time (Coupland 1980:9). Similarly, Rickford & McNair-Knox (1994, cited in Wolfram & Schilling-Estes 2006:282) report that an African American teenager generally used more African American English features with African American interviewers than with a European American interviewer.

Among the studies that have considered adult dialect acquisition, Munro, Derwing, & Flege (1999) find evidence of adult dialect acquisition in a perceptual study investigating the speech of Canadians in Alabama: five women and five men between 20 and 46 years old who had moved from Canada to Alabama as adults and lived in Alabama from one to 23 years. In their study, the Canadian immigrants were perceived as having “an intermediate degree of ‘American accent’” by non-immigrant listeners from both Canada and Alabama. Thus, Munro et al. find that the immigrant adults acquired phonetic features in a way that was perceptually distinguishable from both their home and adopted communities.

Similarly, Shockey (1984) reports that four Americans living in England from eight to 27 years all showed an adaptation in the direction of British English features. They had moved in the direction of British English in short-*o* as well as in (ow) and in the loss of flaps in intervocalic alveolar stops (only 65% flapping compared to 100% for Americans who had not emigrated).

Wells (1973, cited in Chambers 1992:157) studies Jamaican immigrants in London and finds evidence of significant acquisition. The Jamaicans were participating in local yod-deletion, i.e., moving away from Jamaican pronunciations like /kj-/ for the onset of *cat*, at a level of 79%. They were also moving away from Jamaican pronunciations where *steer* and *stare* are homophones (Jamaican Creole /stier/ and Jamaican English /ste:r/) at a level of 20%. Wells concluded that significant dialect acquisition was occurring, although not complete acquisition:

The evidence...supports the view that adolescents and adults, faced with a new linguistic environment, can adapt their speech to a certain extent by modifying the phonetic realization of their phonemes; but they do not on the whole succeed in acquiring new phonological oppositions or in altering the distributional restraints on their phonology (quoted in Chambers p. 157).

Other studies of adult dialect acquisition include Conn & Horesh (2002) who investigate two speakers who had moved from Detroit to Philadelphia. They report that one of the Detroit natives, "Fred," had acquired some phonetic features of Philadelphia speech after moving to Philadelphia. Fred had moved the F2 in the nucleus of (ow) to a position closer to the mean of Philadelphia speakers than Detroit speakers. This fronting was not observed in another Detroit-to-Philadelphia immigrant, "Loretta." Loretta was shown to be moving away from Detroit /æ/, although this movement did not appear to be in the direction of Philadelphia /æ/.

Trudgill (1986:13-21) gives examples of acquisition between American English speakers and English English speakers. For example, he reports that British pop singers absorb American English features (citing Trudgill 1983), and he also reports on acquisition of

American English in his own English English speech. For example, he finds that English English speakers in close contact with American English commonly accommodate in features such as flapping (e.g., *latter*) and /æ/ in words like *dance* and *last*, as well as other features (1986:15-20).

Kerswill (1994, 2002) discusses the immigration of rural residents, *Strils* (1994:31), to Bergen, Norway. The immigrant Strils showed significant signs of acquisition of the urban variety, such as loss of affrication, simplification of clusters, and lowering of /ə/ (1994:156). Kerswill also finds features in the immigrant Stril speakers suggesting that “compromise forms” had been created (1994:161). For example, the Stril immigrant variant of *held* ‘hold’ is [holə], which is a compromise between the original Stril dialect [hɛlt] and the Bergen dialect [holək]. Kerswill notes that Strils have simplified irregular morphemes and complex morphological processes in the direction of simpler Bergen forms. When the Bergen form is the more complex of the two, such as vowel lengthening and syllabification of /l/ in some noun forms (1994:162), he finds that the Strils usually do not acquire that feature.

Bortoni-Ricardo (1985) also finds a significant amount of adult dialect change due to immigration. In a study of rural dialect speakers of Brazilian Portuguese immigrating to an urban center, Bortoni-Ricardo finds that the immigrants’ original rural dialect features had begun to become diffused. In particular, dialect diffusion occurred the most for men who had many interactions in the urban center with urban residents and immigrants from

other regions. She finds that lexical items of the immigrants' rural dialects appeared less frequently after immigration and that previously categorical rules became variable (1985:239). She also observes a contrast in dialect acquisition between the men and women. In many features, the men were found to be acquiring urbanized features more quickly, and Bortoni-Ricardo attributes this observation to the men's greater access to the public domain (p. 241). The women's social interactions were more focused on the home domain. Significantly, however, the women still showed evidence of dialect acquisition:

The female migrants remain still very much confined within their kinship and neighbour network and as a consequence of that are not directly exposed to the mainstream culture... In relation to the diphthong reduction rule, the women are, surprisingly, a little ahead of the men in the acquisition of the standard [urban] variant... In sum, the women are not directly exposed to the standardizing influence but nonetheless their speech does not remain immune to change (p. 241).

Bortoni-Ricardo's observations about the women are notable since her study shows dialect acquisition occurring in the women in spite of strong social networking within the original dialect community and limited interaction in the new dialect.

In a study of migrant adult acquisition of Philadelphia phonology, Payne (1976) reports on seven adults who had immigrated to Philadelphia from different parts of the U.S. (Western Pennsylvania, Massachusetts, New York City, New Jersey, and Cleveland). Six of the seven adult immigrants were found to have a Philadelphia influence in their vowel systems (pp. 126-36). Payne notes that the amount and type of vowel effects varied from individual to individual.



Vousten & Bongaerts (1990) study cognate lexical variants in a case of Dutch adult dialect acquisition (cited in Chambers 1992:156). They find that immigrants to the Venray, Limburg dialect region from other parts of Holland changed their native pronunciation [ei] to the local Venray variant [i] over 60% of the time. Specifically, the percentage of Venray pronunciations were 68.4%, 63.2%, and 71.1% for the words *strijk*, *pijp*, and *rijke*, respectively. For the words *duim*, *muís*, and *duizend*, the immigrants' original variant [œy] was replaced by one of two possible Venray variants ([y] or [u]) at a level of 51.3%, 57.1%, and 59.4% for the three words respectively. Such results are especially notable since lexical variables that are similarly cognate are investigated in the current study (Section 3.3.1).

In a study of language contact in a multilingual community in India (Kupwar village), Gumperz & Wilson (1971) report that Urdu, Marathi, and Kannada had converged in many grammatical features. Similarly, the formation of "New Town" dialects such as those found in Milton-Keynes, England (Kerswill & Williams 2000) and Seishin, Japan (Asahi 2002) also shows contact-induced convergence phenomena.

In addition, a number of studies have examined the dialect acquisition of immigrant children and teenagers. Comparing adults and children, Trudgill suggests that although children have "greater acquisitional flexibility," their ability to acquire new dialects has limits. "Even young children...are subject to limits on degree of accommodation, with certain more complex phonological contrasts and allophonic conditioning patterns not being acquired correctly unless speakers have been exposed to them in the speech of their

parents” (Trudgill 1986:38). Examples of dialect acquisition studies of immigrant children and teenagers are provided below.

Chambers’ (1992) classic dialect acquisition study investigates a group of Canadian children and teenagers who had immigrated to Southern England. Chambers studied five teenagers and one nine year-old who had moved from Canada to southern England. He finds that a range of features was acquired by the immigrants, and he offers eight principles of dialect acquisition based on those results. Among the Canadian immigrants, Chambers finds a “non-ephemeral” shift in dialect which he believes is a “more permanent acquisition” that goes beyond either short-term or long-term accommodation (1992:147-8), referring to Trudgill’s (1986) use of the terms. Thus Chambers’ study finds evidence of dialect acquisition.

Specifically, Chambers finds that the Canadians were acquiring lexical variants (called *non-cognate lexical variants* in the current study) more than pronunciation variants (called *cognate lexical variants* in the current study), leading him to propose a specific principle that “lexical replacements are made faster than pronunciation and phonological variants” (p. 149). He reports that the Canadian immigrants replaced their native Canadian English lexical variants with the British English forms in 52.3% of tested words, compared to only 26.67% replacements in pronunciation variants and 24.9% phonological replacements (p. 152).

Among five phonological processes, Chambers found that the group had acquired the local rules as follows: (1) absence of “T-Voicing” (i.e., flapping in words like *petal*): 55%; (2) absence of low vowel merger (*caught/cot* merger): 31.6%; (3) presence of vowel backing (i.e., southern England pronunciation in *plaster* and *bath*): 23.3%; (4) *r*-lessness: 8.3%; and presence of intrusive *r*: 6.6%. From these results, in addition to his principle that lexical variants are most likely to be affected, he also notes that relatively complex phonological rules are less likely to be acquired than simpler rules.

Evidence of significant acquisition is also reported in other research into teenage and childhood dialect acquisition. In unpublished work by Debra Anderson (discussed in Chambers 1992:152-3), the speech of ten British nannies who had moved to Toronto is examined for acquisition of Canadian English. Anderson finds 50-80% lexical replacement after a residence of one to two years.

Payne (1976, 1980) researches whether children who immigrate to Philadelphia at various ages are able to acquire phonetic variables and phonological variables (the Philadelphia short-*a*). She finds that the children were able to accurately acquire phonetic variables “with notable success” (1980:153, 1976:238). Phonological rules, such as the complex Philadelphia short-*a* pattern, proved more difficult to acquire than phonetic variation (1980:174). Nonetheless, the children still move toward the Philadelphia phonological rules, and she finds a strong overall tendency to acquire the new dialect: “Not only do the children tend to acquire the patterns of the phonetic variables of the local children to a very large extent, but also they shift in the direction of learning the new phonological

patterns of their peers even though they are usually unsuccessful” (1976: 238). She also observes that age of arrival plays a significant role as well as the amount of time spent in the new community (1980:154-155, 175). See Section 5.2.2 for further discussion of Payne’s research.

## **Conclusions**

Although the field of dialect acquisition remains in its early stages when compared to other areas of linguistics, it appears that, *ceteris paribus*, the dialect acquisition norm is for immigrants to acquire a new region’s dialect features to some degree, especially lexical and phonetic features. Neither complete acquisition nor stubborn resistance is observed to be the norm in these studies of dialect acquisition in immigrants (for both adults and children). One might say, then, that the norm for dialect acquisition lies somewhere in-between, with lexical and phonetic variants being the most susceptible to change. Naturally, such a norm would be modulated by many social factors, and the Sui data analyzed below represents a case where acts of clan identity (cf. *acts of identity* in Le Page & Tabouret-Keller 1985) override the norm of dialect acquisition.

### **2.2.2 Children’s Development: Control of Sociolinguistic Variables and L1 Tone Acquisition**

Since children’s language variation is being investigated alongside comparable variation in adults (Sections 3.3 - 3.4), this section discusses (1) prior research showing that young children can control sociolinguistic variables, and (2) prior research showing that children acquire tone very early in their development.

## **Children and Sociolinguistic Variables**

For quite some time, researchers have been reporting that young children have the ability to control sociolinguistic variables. Fischer (1958), in his study of “comparative idiolectology” (p. 54) that foreshadows the many quantitative sociolinguistic studies that followed soon later (e.g., Labov 1963, 1966), recorded the *-in/-ig* contrast in 24 children ages 3-10. He finds contrasts with respect to sex, class, “personality (aggressive/cooperative),” the mood of the speaker, formality, and the particular verbs used (p. 51). His study thus shows that preadolescent children can control measurable sociolinguistic variation.

Evidence that young children have control of sociolinguistic variants that are dependent on age and gender is found in numerous other studies showing that “sometime between age 2 and 4, children’s language shows sensitivity to the social significance of age, as well as of gender” (Anderson 1990:67, citing James 1978, Corsaro 1979a, b, Gordon & Ervin-Tripp 1984, and McTear 1985). Moreover, young children have been found to vary language with respect to addressee; Shatz & Gelman (1973) report that four year-olds produced different features when speaking to adults than when speaking to two year-olds. When speaking to two year-olds, the four year-olds adjusted their speech by reducing utterance length, using less coordinated structures, using more attention-getting speech and more direct imperatives. In addition, Sachs & Devin (1976:81) find that four young children (ages 3;9 to 5;5) adjusted their speech according to addressee; the children were observed to use different features when the addressee was a peer or adult than when the addressee was a baby or a doll.

Local (1978) reports that results of research on two five year-old children suggest that children have “social awareness of linguistic variability and the acquisition of rules for the appropriate use of that variability” (1978:242, quoted in Deser 1991:23). Similarly, Romaine (1984) looks at the use of sociolinguistic variables by Edinburgh school children, finding that the children control variables such as (au), -*in/-iŋ*, and the glottal stop in *butter*. She determines that “young children are able to adapt their linguistic behaviour according to the situation and the participants in different types of interaction” (p. 130).

More recently, studies of children in Philadelphia have shown that 3-4 year-old children are able to master phonetic variants like their parents. Roberts (1997a: 1) finds that “children as young as three had, for the most part, mastered the phonological constraints on (-t,d) deletion. They matched the adult pattern, including the constraint of following pause disfavoring deletion.” Roberts concludes that 3 and 4 year-old children are “actively learning their local dialect...they appear to have learned the sound change patterns that are demonstrated by their mothers and other female speech community members with whom they have contact” (1997b: 264).

On the basis of the evidence above, it is reasonable to expect that most or all of the Sui children in this study (ages 3-12) have the ability to control sociolinguistic variables. Since the clan is the most salient independent variable reported in this speech community (see Section 4), an investigation of the children’s speech with respect to clan dialect variables can provide meaningful sociolinguistic insight. Such an investigation is conducted in Section 3.4.

## **Children and Tone Acquisition**

Tone variables form a central part of the linguistic investigation (Section 3), and the tones of children being raised in bidialectal homes (Section 3.4.2) are compared with the tone variables found in adults. Therefore, in the current section, prior studies of child tone acquisition are examined in order to frame the current study in the context of what is known about L1 tone acquisition in general. In this way, it will be established that the tones of the children's speech may be reasonably compared to the tones of the adults.

Prior studies of L1 tone acquisition provide evidence that children acquire tone very early. Studies of L1 acquisition of tonal languages show that children "master their tonal system before the age of two" (Chu 2006, citing results in J.K.P. Tse 1978 and A. Tse 1992). J.K.P. Tse (1978:199) finds that by age 1;10, the Cantonese-speaking child in his study "seldom made mistakes in tones, but he still had difficulty with many kinds of segmental phonemes." For example, the child in J.K.P. Tse's study pronounced the phrase 'open the door' in Cantonese with correct tones (high level tone on the first syllable, low level tone on the second syllable), yet the segments in those syllables were pronounced incorrectly (*wa wu* instead of *hoi mun*). On the basis of such research, J.K.P. Tse (1978:199) and Li & Thompson (1977:185, cited in J.K.P. Tse) conclude that children acquire the tonal system more quickly than the segmental system.

The Sesotho-speaking child in Demuth's (1989) study of tone acquisition had learned a rule for high tone spreading on verbs by two years old. By three years old, he had learned rules of high tone deletion and verb distinction. Demuth also determines that a two year-

old child already is aware that his or her L1 is a grammatical tone language instead of a language that is stress/intonational, lexical tonal, or accentual.

Similarly, in Li & Thompson's (1977) study of Mandarin-speaking children, the findings include:

(1) tone acquisition is accomplished within a relatively short period of time; (2) mastery of tones occurs well in advance of mastery of segmentals; and (3) Mandarin high-level and falling tones are acquired before the rising and dipping tones [Mandarin Tone 2 and Tone 3]; (4) the rising and dipping tones are substituted for each other throughout the acquisition process (1977:185).

They also find that tone sandhi is acquired very accurately upon the appearance of propositional utterances (p. 185).

Regarding Li & Thompson's finding about tone substitution (their point (4) above), although they determine that very young children acquire tones quickly, they do observe some "confusion" in some children between two specific Mandarin tones: the rising Tone 2 and dipping Tone 3. They find some cases where one of these two tones is substituted for the other. They attribute this occasional confusion to the similarities between those two Mandarin Tones (dipping Tone 3 ends with a rising component which may be confused with the rising Tone 2). By contrast, the variability presented below in Sui Tone T6 (see Section 3.4.2) does not appear to be a case of confusion between two tones within a single system but rather confusion between two dialects within a single speech community. In other words, North children's T6 is sometimes raised to a high South-like pitch due to matrilectal influence, not due to substitution with another tone in the North tone system. Moreover, Li & Thompson's entire study looks only at children who are very



young (from 1;6 to 3;0 at the beginning of their 7-month study), so more confusion effects would be expected in their sample. In the current study, the youngest children are 3, 4, and 5 years of age, all of which are well above the 2 year-old line that others claim for tone “mastery” (Chu 2006, citing results in J.K.P. Tse 1978 and A. Tse 1992).

### **Tone Interference Effects**

Children who are bilingual in a non-tonal language may require more time to master the tone system (Law 2006, cited in Chu 2006). For example, Chu (2006) finds that a bilingual English and Cantonese-speaking child at the age of 3;4 had not yet mastered Cantonese tones. However, although the current study involves homes where two varieties are spoken (matrilect and patrilect), it is a bidialectal learning situation, rather than bilingual. Both the matrilect and patrilect are tonal, and they have similar tone systems (differing in only two out of six tones). Nonetheless, some interference effects may be expected at very young ages, and such possible effects are investigated acoustically in Section 3.4.2.2. After all, such interference effects are the whole point of studying tones in the children of the immigrant married women.

### **2.2.3 Prior Studies of Exogamy**

Exogamous marriage customs are not unique to the Sui people, of course, and in fact many scholars argue that is a universal of human culture to maintain some form of exogamy (e.g., Kottak 1991: 45, 114; Radcliffe-Brown 1950:40, cited in Madan 1962:66). Many previous studies have examined a wide range of exogamous situations. Clan-oriented exogamous customs are found in many cultures worldwide such as the Agta

Negrto people of the Philippines (Headland 1987), the Abisi people of Nigeria (Chali-foux 1980), the Xhosa chiefdoms of Ntinde and Qhayi (Jonas 1983), the Haryana region of India (Chowdry 2004), and many others. Like the Sui people, many exogamous cultural systems are patrilineal. For example, Shack (1966) finds a system of exogamy among the Gurage people of Ethiopia who live in patrilineal clans, and the men are required to “seek their wives from the outside” (p. 92). As in the case of Sui, the Gurage people view each clan as having been founded by a single ancestor (p. 101).

In terms of linguistic research, three types of references to exogamy are found. First, in studies of cultures where marriage partners may be freely chosen from either within one’s own group or without, the term exogamous marriage sometimes appears in simple contrast to endogamous marriage. Such a usage of the term does not refer to rigid cultural systems or taboos but rather is a simple social descriptor. In this context, the term often appears in research of bilingualism or language maintenance (e.g., Bernard 1994, Pauwels 1985, Silverman 2000) where exogamous marriage is generally viewed as having a negative effect on the health of a minority language in bilinguals and their progeny.

Secondly, the term exogamous also appears in linguistic research in studies of “linguistic exogamy” (e.g., Aikhenvald 2002: 219, Gomez 1986 *inter alia*), a social system where spouses are required to speak different languages, i.e., “obligatory multilingualism” (Aikhenvald 2002:11). The most well-known case of such linguistic exogamy is in the Vaupes region of the Amazon (e.g. Aikhenvald 2002, Sorenson 1967, Jackson 1974, 1983, Grimes 1985, Gomez 1986 *inter alia*). Specifically, the requirement in the Vaupes

region is that a woman marry a man whose father's language is not the same as her father's language. Jackson reports that the Tukanoans (one group in the Vaupes) view *language* as a linguistic system that is mutually unintelligible with others, being composed of features that distinctly mark the social identity of their own group (1983:166). (However, Jackson notes that some varieties which locals consider to be distinct languages are more likely dialects (p. 19), so linguistic distance does not always correlate with social distance (p. 82).)

By contrast, there is no tradition among the Sui people mandating that each person find a spouse who speaks another language or even another dialect. Rather, they simply must marry someone from another clan. Unlike the Vaupes region of the Amazon, the linguistic differences between Sui wives and husbands discussed in the current study are an epiphenomenon of clan exogamy, not a requirement (linguistic exogamy). Moreover, since nearby clans do not necessarily have significant dialect differences, many Sui households consist of a wife and husband with little or no distinctive dialect differences. For the current study, households were specifically selected where the spouses' clans had notable dialect differences (see Section 3.1). Secondly, across the Sui communities in the current study, the language variation is clearly dialectal, unlike the Vaupes region where differences are viewed as mutually unintelligible. For the Sui clans in this study, contrast is observed only in a relatively small set of features, and all speakers agree that the varieties in the current study are easily mutually intelligible.

Nonetheless, there are likely to be similarities between the Sui and Vaupes societies' linguistic experiences. For example, Vaupes researchers (Jackson 1983:165, Aikhenvald 2002:17) report that language use is a "badge of identity" in the exogamous cultures of the region. Such identity issues appear to be influencing the Sui linguistic behavior described in the current study. Jackson reports Vaupes consultants saying, "My brothers are those who share a language with me. Those who speak other languages are not my brothers, and I can marry their sisters" (1974:62). Jackson further notes that people in the Vaupes community identify themselves with their father's language alone (Jackson 1983:164), and this resembles Sui sociolinguistic attitudes as well.

Thus, the Vaupes region shares some similarities with Sui culture. However, an exogamous situation in northern Australia provides a much closer parallel to Sui and represents the third usage of exogamy with respect to linguistics. Smith & Johnson (1986) investigate the Ngarhcara people of Cape York Peninsula who have an exogamous system where the wife and husband must be from different clans (see also Sutton 1978). The situation is closely parallel to Sui in the following respects: (1) Dialect contact is an epiphenomenon of clan-based exogamy (unlike Aikhenvald's linguistic exogamy 2002:11). (2) The linguistic varieties involved are mutually intelligible dialects. (3) Dialect features are one of the means by which clans are distinguished; the communities are consciously aware of many dialect markers between the clans, thus giving rise to a local concept of clan dialect (patrilect); Smith & Johnson observe "considerable agreement" within the community as a whole about which features apply to which patrilects. (4) The society lacks stratification by social class. Instead, the clan system provides the most

meaningful social groupings. Smith & Johnson argue that the linguistic distinctions among the clans are a natural outcome of social distinctions: “It should not come as any surprise to find that social groups as important as the Nghanhcara patriclans [patrilineal clans] should be marked linguistically” (Smith & Johnson 1986:39).

In addition, Smith & Johnson report that the patrilectal differences are centered primarily around lexical variables. They find few phonological, morphological, or syntactic variables. Likewise, in Sui many of the differences are lexical (such as highly salient pronoun variables), while no morphosyntactic differences are apparent (to date). However, in Sui the differences do extend significantly beyond lexical items since tone and vowel variables are observed, as described below in detail (Section 3.2.4ff.).

Smith & Johnson also find that clan identity plays a key role in society. They report that Nghanhcara children identify with their father’s dialect rather than their mother’s, which is the same effect found among the Sui people (and also in the Vaupes region, for that matter). Further, Smith & Johnson determine that linguistic markers are prominent ones (such as salient lexical differences) precisely for the reason of identifying groups, and they view lexical variables as “lexical markings of social groups” (p. 40). They suggest that lexical variables are under more conscious control than other linguistic variables and therefore provide “a more suitable source of sociolinguistic markers in the learning situation of the Nghanhcara children, who must consciously learn to use their father’s patrilect in a polyglot environment” (p. 40). As discussed below, such an analysis is remarkably consistent with the conclusions reached on the basis of the data in the current Sui study.

However, Smith & Johnson do not investigate the extent to which the Nganhcara immigrant married women maintain their patrillects nor the dialect acquisition experiences of the children of such women as examined in the current study.

#### **2.2.4 Outline of a Theory of Variation in Indigenous Minority Languages**

The Sui sociolinguistic situation investigated in the current study becomes clearer when seen in context with variationist research of other indigenous minority languages. Progress in variationist sociolinguistic research of indigenous minority languages has been limited compared to that of many majority languages or well-known minority languages (see Section 1.2). However, a number of prior and ongoing studies provide initial perspectives and clues about what insights such languages can bring to the realm of variationist sociolinguistics. Prior and ongoing variationist research of indigenous minority languages include Biro & Sipocz, Brunelle, Carrera-Sabate, Clarke, Harlow et al., Lastra, Leonard & Sucuc, Meyerhoff, Montoya-Abat, Nagy, Noglo, O'Shannessy, Pasquale, Thiering, Rau, van Bezooijen *inter alia* in progress for Stanford & Preston (in progress), as well as Di Paolo (2007), Barrett (2006), and Romero (2006).

#### **Social Class**

First, consider the role of social class. Social class has had a fundamental place in the sociolinguistic analysis of many majority languages (e.g., Labov 1966, 1972, 2001, Trudgill 1974 *inter alia*). Yet many indigenous minority language communities, especially those in rural areas like Sui, do not have such clearly demarcated socioeconomic categories. And where identifiable socioeconomic contrasts do exist, they may not fall

along the traditional class lines frequently assumed for majority languages in urban societies. For example, Clarke (in progress) finds that for the “relatively egalitarian” indigenous Innu community of Sheshatshiu, Labrador, “a classification scheme grounded in socioeconomic stratification, as per urban variationist studies...was almost totally irrelevant.” Instead, she finds that the community is best described as having a “covert social hierarchy” divided “according to family and territorial, rather than economic, criteria.”

Other perspectives include Rau (in progress), who views the Yami people of Orchid Island, Taiwan as egalitarian, and social class is not a significant factor in her analysis. As outlined above (Section 2.2.3), Smith & Johnson (1986) describe the Ngunhcara people of Northern Australia as being without stratification by social class. In Noglo’s (in progress) study of Ewe in Togo, he cautions that Western-oriented sociolinguistic approaches rely “too heavily on social class as the primary independent research variable.”

Discussing endangered languages, King (1989) makes a similar point:

In general, the Labovian framework of linguistic change, confirmed only in healthy languages, is valid also in the study of threatened languages, but only if we take account of some differences, mainly in the independent variable of social class... (p. 139, quoted in Montoya-Abat, in progress).

## **Clan**

In such communities where traditional social class categorization is less applicable, what level of social organization can the sociolinguist turn to for variation of a comparable degree? For Smith & Johnson’s (1986) study of Ngunhcara in Northern Australia (Section 2.2.3), as in the current Sui study, the clan was found to be a crucial level of social

organization. In both of these societies, distinct variables bearing socially meaningful contrasts were found on the clan level. These clan-level variables appear to be generally similar in type to Labov's findings about postvocalic /r/ in New York (1966), Trudgill's findings about *-in/-iŋ* in Norwich (1974), and many other such studies (i.e., stable differences between otherwise very similar varieties within a single speech community).

It is proposed here that clan join the "regular litany of nonlinguistic factors" (Hazen 2002:241) that have been "frozen prematurely into a standard list—class, age, gender, ethnicity, region" (Chambers 1993:143, quoted in Hazen 2002:241). Otherwise, the field of sociolinguistics could overlook a fundamental sociolinguistic aspect of many communities.

Moreover, the relevance of clan as a sociolinguistic variable is probably not limited to rural situations. Like Sui, the Hmong people of China and Southeast Asia have clan-based exogamous customs (Yang 2004), and large numbers of Hmong people have immigrated to the United States since the Vietnam War era. The Hmong population in the U.S. is estimated to be 250-300,000 people (Carroll & Udalova 2005), many of whom are living in urban areas. Therefore, an interesting future study would be to see whether Hmong clan-based marriage practices persist in urban U.S. environments and whether any clan-based sociolinguistic effects similar to Sui could be observed (such as resistance to the exolect). Beyond Sui and Hmong, perhaps clan-like effects could also be found in other cultures, such as close-knit families of Italian heritage in the U.S., for example.



## **Lack of a Standard**

Variationist studies of indigenous minority languages like Sui often face the challenge of the lack of an established standard variety and the related challenge of the lack of a standard orthography. Clarke notes this challenge in Sheshatshiu, Labrador (in progress):

The current context...does not represent the usual Labovian focus of study: in Sheshatshiu, not only are speakers often not literate in their first language, they also lack a clearly-defined linguistic standard, encoded via a standardized orthography.

Therefore, to define their objects of study, some researchers have turned to a diasystem framework, e.g., Leonard & Sucuc (in progress) for Mayan, or to a “sociogrammar,” as invoked by Nagy for Faetar (in progress). Unlike studies of a relatively homogeneous speech community (e.g., Labov 1966), many indigenous languages exist in situations of extensive multidialectal or multilingual contact with ambiguous boundaries and no established single standard for the researcher to use as a reference point. Nagy sees such situations from a positive angle, suggesting that a lack of “agreed-on stigmatized forms” in such language communities can change the “lens through which the linguist examines the language.” Thus, the challenge that researchers face by the absence of a standard variety may have the positive result of an escape from the sometimes staid influences of a “standard ideology.” Nagy quotes Cheshire’s observation that “variationists have worked almost exclusively on languages that have been heavily standardized, so the potential influence of the standard ideology on the selection of variables for analysis has been high” (Cheshire 2005:87, quoted in Nagy, in progress).

## **The Dense and Multiplex Village: A Single Community of Practice?**

Another way in which indigenous minority language communities can differ from major-

ity language communities is in the area of social networks. As discussed in Section 2.1.6, analysis of social networks (Milroy 1982, 1987) and communities of practice (Lave & Wenger 1991, Wenger 1998, 2000, Eckert 1988, Eckert & McConnell-Ginet 1992, 2003, Meyerhoff 2000) have played an important role in variationist research and will likely be valuable in many indigenous language communities as well. However, in close-knit village-oriented communities such as the Sui regions of this study, the entire village might be viewed as functioning as the only significant community of practice, and social networking may be too dense to easily evaluate. For Sheshatshiu, Clarke (in progress) observes the following:

An approach in terms of social networks – though originally envisaged as fruitful – proved too difficult to implement in any systematic fashion. In Sheshatshiu, as in other Innu communities, almost every resident has ties (often dense and multiplex) with almost every other resident, through such factors as kinship, marriage, adoption, and co-participation in a range of activities, both within the community and outside.

As for Sui, there may well be social divisions in Sui villages that could be characterized like Mallinson & Childs' (2003) description of "porch sitters" and "church ladies" as distinct communities of practice in Appalachia. Perhaps even literal Sui "porch sitters" and "shamanist ladies" could be identified, although no such social groupings among village women have been observed by the author. However, Clarke's caution about applying such models to indigenous minority communities definitely applies. In most small Sui villages, the village appears to function as a tightly knit community based on close family relationships – an almost perfectly maximally dense and multiplex network. It is very common, for example, for village residents to casually walk into others' homes and join whatever activity is in progress, usually with little or no comment from others (author's observations). Such visits around the village seem as free and natural as the rela-

tionships within a nuclear family in a single home in Western society. In fact, a visitor from the West almost gets the sense that the individual Sui houses are like rooms within one larger encompassing “village-sized house” that everyone can enjoy. But this is not to say that there is no personal property; houses and most other belongings are owned at the level of the nuclear family. Doors of homes are locked at night or when the residents are absent, although this is mainly to protect against theft by non-locals; consultants say that theft between village members is very rare.

While it is surely the case that there is some degree of social division and individual differences in network strength among village residents of such indigenous minority language communities, the differences may be subtle enough that the other dense and multiplex daily interactions override other effects. This is an area that would benefit from future research, but it appears that the current models of communities of practice and social networks should be examined carefully with respect to indigenous minority communities and caution be used when comparing with other results from other societies.

### **Exogamy**

Exogamy is another sociolinguistic issue which becomes especially prominent in many small indigenous minority communities. As discussed in Section 2.2.3, some level of exogamy is a trait of most or all human societies. Yet when exogamy and associated immigration patterns occur in small, clan-based village communities, its sociolinguistic effects become magnified to the point where the clan may be one of the most meaningful independent variables. Such sociolinguistic reflexes of clan-based exogamy are described

in detail here for Sui and also in Smith & Johnson (1986), and these factors are presumably at work in many other similar close-knit communities around the world as well.

### **Gender Roles**

Variationist sociolinguistic research of indigenous minority languages can explore interesting gender effects as well. Labov's principles of gender in language variation may find support in some such communities or be challenged in others, and other gender issues may be uncovered. Labov (1990, cited in Wolfram & Schilling-Estes 2006:237) suggests that (1) women use standard variants more than men for stable sociolinguistic variables; (2) women will use "incoming prestige forms" more than men; and (3) women are usually the innovators in cases of change from below (i.e., below the level of consciousness). Of course, gender roles are highly susceptible to differences in culture (cf. Haeri's 1997 observations about the sociolinguistics of gender in Cairo in contrast to other cultures), so this is an area of potential interest as variationist sociolinguistics addresses more indigenous minority communities. A few examples are given below to show the potential for research on this topic.

In Yami of Orchid Island, Taiwan, Rau (in progress) finds consistency with Labov's suggestions about gender and language variation. Vowel raising in diphthongs is considered a vernacular feature, and young Yami women are currently involved in vowel raising more than men. Rau suggests that Yami vowel raising began as a male feature and has now spread to women, having become indexed with "positive social meaning." Similarly, Clarke (in progress) reports that "like their counterparts elsewhere, Sheshatshiu

women seem more attuned than men to the social symbolism encoded by linguistic features.” In Eastern Cham, Brunelle (in progress) describes a more nuanced situation where men have privileged access to knowledge of Cham cultural history and linguistic resources, which surface as features of an H variety. Therefore, “since linguistic prestige is almost out of reach regardless of the efforts made, [Cham] women make little attempt to use H features in their Formal L speech.” Finally, the current Sui study shows how a gender contrast in adults’ home clans (i.e., villages composed of immigrant women and non-immigrant local men) has a pervasive linguistic effect on the community which appears to outshine other gender differences in the language.

### **Majority Language Contact and Age**

In contrast with many studies of certain majority languages where a fairly homogeneous speech community can be reasonably defined within the bounds of a single language, language contact is very often an unavoidable aspect of many indigenous minority communities. Contact with the majority language is a constant fact of life for many such language communities, thus variationist research often comes face to face with language contact issues. Of course, contact is a key issue in the study of majority languages as well, but since many indigenous communities are politically and socially dominated by a nearby majority language, intrusive language contact issues are often acute. Issues of such contact with a majority language play a prominent role in variationist sociolinguistic studies of Mansi (Biro & Sipocz), Dene (Thiering), Frisian (van Bezooijen), Catalan (Carrera-Sabate, Montoya-Abat), Chichimeco Jonaz (Lastra), Warlpiri (O’Shannessy), Peruvian-Quechua (Pasquale), and Maori (Harlow et al.). Some of these studies also find

a related age contrast; younger speakers are more influenced by the majority language, thus suggesting possible change in progress (e.g., Thiering, Lastra, O'Shannessy, and Brunelle). For example, Brunelle finds that young Cham men are more likely to infuse Vietnamese features in their speech in order to achieve prestige while older Cham men are more likely to use features of the H variety of Cham to achieve prestige.

While the issue of the influences of a majority language is commonly addressed in studies of language death and attrition (cf. Crystal 2000), many variationist sociolinguistic studies are often able to view a speech community as an idealized, isolated object with negligible contact effects from intrusive languages (e.g., classic studies such as Labov 1966, Trudgill 1974). Even when variationist sociolinguistic studies focus specifically on language change, e.g., regional changes/vowel shifts in English, such research can often make the reasonable assumption that no dominant outside language is imposing massive changes due to contact (although external factors are often included as possible original sources, of course, and many studies also specifically seek to look at the influence of contact with other varieties, such as the influence of African American English on other varieties of American English).

By contrast, variationist studies of indigenous minorities are more often than not faced with unavoidable significant influences from socio-economically, politically, and/or culturally powerful majority languages in direct contact with the language of study (e.g., indigenous minorities in North America are a case in point). In many of the studies listed in this section, contact with a majority language is one of the most important factors to

investigate with respect to language variation and change, thus showing another way that variationist research of indigenous minorities often differs from majority language research.

### **Internal Linguistic Factors**

In addition to the external issues of social factors and language contact described above, indigenous minority languages may have further perspectives to provide due to the structure of the languages themselves. Just as postvocalic /r/, -*in/-iŋ*, -t/d deletion, and other famous sociolinguistic variables have provided insight into how languages vary and change, indigenous minority languages have their own variables to be uncovered and then compared and contrasted with variation in other languages. An increasingly diverse sampling of languages helps to extend the horizons of variationist sociolinguistics. On many different levels of linguistic structure of lesser known languages, there may be fresh variationist topics waiting to be explored.

## **3. The Linguistic Investigation**

With the discussion in the sections above serving as background, the details of the current Sui study are now introduced. Section 3 describes the linguistic investigation, and Section 4 describes the ethnographic investigation.

### **3.1 The Speakers**

The current study focuses primarily on two regions about ten miles apart. These two particular regions were chosen in order to optimize the tension between dialect distinct-

iveness versus likelihood of marriage exchanges. That is, for two regions separated by only five miles, the author's prior research suggested that dialect differences would be too limited for a robust study of linguistic effects of exogamy. Although Sui tradition requires the wife and husband to originate in different clans, sometimes the wife's clan and the husband's clan do not have distinctive dialect differences. Therefore, five miles was found to be generally too close. But for two regions separated by a much greater distance, such as 15-20 miles or more, marriage exchanges are less likely. In a given village, it is uncommon to find married women who have emigrated from such a distance. Therefore, a range of ten miles was chosen. The two resulting regions were identified as a "North" dialect (centered around the Shuilong region of Zhonghe Township) and a "South" dialect (Sandong Township region). The author's previous dialect observations of these two regions provided an outline of potential lexical differences to target and also indicated significant phonological differences.

In addition to the North and South clan dialects, six speakers were interviewed in a "Midlands" clan located a few miles north of the South region. As discussed below, Midlands speakers overlap with the South in many features but also share some features with the North, so they represent a transitional zone.

A general overview of the field research is listed below, and then further explanation is given in the text that follows.



## **I. Background research during 1999-2003 and Summer 2004:**

n Extensive dialect investigation, phonological research, and ethnographic study through interviews with Sui speakers during the author's personal language study and research, trips to Sui homes in villages of varying regions, observing daily life and attending festivals and market days.

## **II. Exogamy research 2005-6**

n A total of 44 subjects were recorded with respect to detailed dialect features and ethnographic conversations, and additional ethnographic conversations were conducted with other members of the community as well.

*Exogamy Research Part 1, Summer 2005: 15 total recorded interviews*

- 8 recordings in the North clan:

5 men

3 women, all of whom had originated in the South, then immigrated to the North upon marriage, and had lived in the North for at least one decade

- 7 recordings in the South clan:

4 men

3 women, all of whom had originated in the North, then immigrated to the South upon marriage, and had lived in the South for at least one decade

- Ethnographic interviews were also conducted in all three locations

*Exogamy Research Part 2, Summer 2006: 29 total recorded interviews*

- 19 interviews in the North clan:

7 women, all of whom had originated in the South, then immigrated to the North upon marriage, and had lived in the North for at least one decade

6 children with a range of ages, all of whom had a South woman as mother and a North man as father

5 teenagers who had a South woman as mother and a North man as father

1 teenager who had a North man as father and a Northeast woman (different clan) as mother

- 6 interviews in the Midlands clan, linguistically about midway between the North and South clans, located a few miles north of the South clan:

2 women, both of whom had originated in the South, then immigrated to the Midlands upon marriage, and had lived in the Midlands for nine and ten years

2 young children, both of whom had a Midlands man as father and a South woman as mother

1 teenager who had a Midlands man as father and a South woman as mother

1 teenager who had a Midlands man as father and a Midlands woman (different clan) as mother

- 4 additional interviews in the South clan:

1 man

3 teenagers (as baseline data for the South clan; their fathers were from the South clan; mothers' clans unknown)

- Ethnographic interviews were also conducted in all three locations

As outlined above, three sets of married women were located and interviewed; those who had migrated from North to South at marriage (henceforth “North women”) and those who had migrated from South to North (henceforth “South women”), and finally a smaller set of South women who had immigrated to the Midlands region at marriage. Each woman who participated in this study had been living in her husband’s village for many years, thus ensuring that the women interviewed had been exposed to the new dialect for a significant length of time. Specifically, each woman had lived between nine and 43 years in the husband’s village (the phrase “a decade or more” is used for convenience in this study since only one woman had been in the husband’s region for less than a full decade – nine years in her case).

For logistical reasons and availability of contacts, the primary focus of the study was the people of the North clan and the South women living in the North clan. Thus the majority of the interviews were with immigrant South married women, children of such women, and baseline speakers in both the North and South clans. However, a sample of North women who had immigrated to the South was also conducted so that there would not be uncertainty about markedness or prestige contrast between the dialects. That is, if only South women's dialects were studied, then it might be unclear whether their resistance to dialect changes could simply be due to lower markedness in their home dialect region or differences in prestige. Thus, a small group of North women who had married into the South region were also interviewed as a control group.

In this way, the dialect features of South women who had married into the North Dialect region can be compared with the features of their home region (South) to determine in what ways the women may have adjusted their dialect since marriage, and the results of North women who had married into the South Dialect region are used as a comparison. Additional perspective can be gained from the two South women who had married into the Midlands region, and their results were compared to two baseline Midlands teenage girls. In addition to the women, a set of North children with immigrant South mothers was investigated to investigate the influence of the matrilect. Two Midlands children with immigrant South mothers were recorded as well. South children with North mothers were not available for comparison, so non-varying tone features (tones T2, T4, and T5) were examined in the children to show that there were no developmental issues obscuring the dialect interference effects found in children (Section 3.4.2.2). In addition, since Mid-

lands has a rising tone T1 like South, the Midlands children with South mothers were viewed as a child baseline for T1 to compare with the T1 of North children with South mothers (Section 3.4.2.2).

The speech features of non-immigrant men and teenagers formed the baseline dialect data for each region. Consultants' reports and the author's prior study indicate that Sui dialect differences significantly outweigh gender differences. The author has not encountered gender-exclusive lexical items or other clear instances of gender dependent variables. Of course, there is presumably a good amount of gender dependent variation to be found in Sui just as in most other speech communities. But the clan dialect variables in this study have not been observed to vary with respect to gender in any way that would overshadow the clan differences. Nonetheless, even though gender effects are outweighed by the clan dialect differences studied here, unmarried teenage girls in both regions were also interviewed as part of the baseline data. They serve as baseline speakers in addition to the adult male baseline speakers. This was done in order to control for any possible differences due to gender, especially gender differences in the normalization of acoustic data (cf. Nearey 1977, Zhu 1999:46-56, 78-9). Without such unmarried teenage girls, the baseline speakers and test speakers (the married women and children) would be divided by gender in a way that might cause one to wonder if the measured differences were gender related rather than clan dialect features. Two teenage boys were also included as baseline speakers.

For all of the teenagers, there is some question about the influence of their mothers' dialects. After all, the children in any Sui village are necessarily the offspring of exogamous marriages, and many have a mother whose original clan dialect diverges significantly from local speech. As a result, it is possible that some may retain features of the matrillect into older childhood. While the possibility of mother-influenced dialect features is noted, the strategy of including teenagers among the baseline speakers serves as a practical solution to the issue of controlling for gender and normalization differences between married women and men-only baseline speakers. Thus, for the purposes of this study, such teenagers are considered to be part of the baseline of their respective regions. Of course, an ideal solution would be to find unmarried women, rather than teenage girls, to serve as baseline speakers. However, since most village women marry in their late teens or early twenties and then emigrate immediately to the husband's village, it was more difficult to locate unmarried women in that relatively narrow window between adolescence and marriage.

A table of the speakers recorded for this study is given below (Table 3). "Speaker number" is an arbitrary index number. The table is ordered by this index number for the reader's reference in the remainder of the study. "Length of time in new region" corresponds to the number of years since marriage, as estimated by the speakers (rough estimates in some cases). The mother's clan is indicated for each child; the mother's clan is also indicated for teenagers if known.

Table 3. Speakers Recorded for the Current Study.

Speaker number	Clan of origin	Type of speaker	Age	Length of time in new region
#1	South	Baseline man	23	-
#2	South	Baseline teenage girl	16	-
#3	South	Baseline teenage girl	16	-
#4	South	Baseline teenage girl	14	-
#5	South	Married woman	41	20 years
#6	South	Married woman	52	35 years
#7	South	Married woman	36	12 years
#8	South	Married woman	40	16 years
#9	North	Girl (South mother)	3	-
#10	North	Boy (South mother)	4	-
#11	South	Married woman	29	10 years
#12	North	Boy (South mother)	10	-
#13	Mixed (§3.3.4)	Married woman	34	16 years
#14	North	Girl (South mother)	12	-
#15	South	Married woman	59	40 years
#16	North	Girl (South mother)	10	-
#17	North	Baseline teenage girl (South mother)	16	-
#18	North	Baseline teenage girl (South mother)	15	-
#19	North	Boy (South mother)	9	-
#20	North	Baseline teenage boy (South mother)	15	-
#21	North	Baseline teenage boy (South mother)	14	-
#22	North	Baseline teenage girl (Northeast mother)	16	-
#23	North	Baseline teenage girl (South mother)	15	-
#24	Midlands	Married woman	34	10 years
#25	Midlands	Boy (South mother)	5	-
#26	Midlands	Married woman	29	9 years
#27	Midlands	Girl (South mother)	4	-
#28	Midlands	Baseline teenage girl (Midlands mother, different clan)	16	-
#29	Midlands	Baseline teenage girl (South mother)	14	-
#30	North	Baseline man	30	-
#31	North	Baseline man	28	-
#32	North	Baseline man	45	-
#33	North	Baseline man	24	-
#34	North	Baseline man	40	-
#35	South	Baseline man	27	-

Table 3 continued.

#36	South	Baseline man	42	-
#37	South	Baseline man	55	-
#38	South	Baseline man	39	-
#39	North	Married woman	35	11 years
#40	North	Married woman	40	approx. 20 years
#41	South	Married woman	38	17 years
#42	South	Married woman	41	23 years
#43	South	Married woman	71	43 years
#44	Northeast	Married woman	47	17 years

The speaker labeled as “Northeast” clan (Speaker #44) is from a different clan (and has a different surname) than the other Northerners in this study. Her clan, labeled here as Northeast due to its location relative to the other clans under discussion, is firmly within the northern region as a whole, but it is reported to have dialect differences with the particular clan being called the “North” clan in this study. Initial reports from consultants suggest a tone difference, for example. As explained below, the results from Speaker #44 match the other northern speakers enough that her data is considered a useful addition to the analysis, but her results are treated with caution and discussed individually as needed.

## 3.2 Data Collection Methods

### 3.2.1 Eliciting Words

Since there is no Sui orthography in use and since most Sui women over 25 years old are monolingual, data collection could not depend on traditional word lists and reading passages. Furthermore, even if a written language were available, word lists and reading passages would only be useful for the study of acquisition of certain phonological/phonetic variants. For lexical variants, dialect acquisition research requires physical objects, pictures, or other similar prompting (following Chambers 1992:147, for example,

where he uses pictures of a car for *trunk* versus *boot*, etc.). In this Sui study, speakers were asked to describe pictures, count, identify physical objects and actions, as well as provide a free speech sample. The number of possible words available for analysis was therefore narrowed by the fact that each word must represent a concrete, everyday concept that is easily elicited without the use of writing.

As Labov (1972:209) notes, the very act of interviewing often causes the speakers to adjust their speech toward a more formal, self-monitored style which is likely to diverge from their everyday vernacular (the Observer's Paradox, Labov 1972:209). Since the speech of formal interviews often does not accurately reflect a person's vernacular speech, the interviewer must find a way to elicit the data in the most natural style possible given the constraint of needing to record specific words for analysis. For this study, the words selected for research represented simple objects and concepts such as *knife*, *chopsticks*, *sit*, *hat*, and so on. Then, physical objects and pictures were prepared which provided a clear prompting for these words. In addition, antonyms were found to be a useful tool for eliciting certain words. For example, to elicit the word *front*, the interview can set up a scene with a toy boat and two small dolls, saying, "The boy is in the *back*; the girl...?" The speaker will usually respond with a phrase such as, "The girl is in the *front*."

### **"Flexible phrase list" speech style**

Since this unwritten language prevents the use of a standard word list style or reading passage style, a "flexible phrase list" style was used. The speakers used a short phrase to frame each word such as "Now I am saying \_\_\_\_\_" or "I see \_\_\_\_\_ there" or



“That’s a \_\_\_\_\_.” Carrier phrases are common in other sociolinguistic research. However, this Sui study differs in that words were elicited in positions of prosodic focus in phrases that were allowed to vary slightly. In this way, it is hoped that the outcome approximates the level of formality of a reading passage style rather than a word list. The speakers were consciously aware of the word being elicited in each recorded phrase. This awareness resulted in a brief emphasis of the word through a slight prosodic focus (in terms of loudness or duration or both) as compared to the rest of the phrase. This approach proved effective and practical for the specific linguistic and cultural environment.

For example, since Sui is not an object of study in the local educational system, a fixed carrier phrase style is ineffective. Speakers were not accustomed to holding to a fixed pattern in Sui speech, nor are many of them consciously aware of grammatical differences in phrasing. In addition, speakers sometimes place a discourse particle such as *a* or *ni* or *o* at the end of phrases in a way which is difficult to control. In this respect, phrase final position would not be a reliable defining position for the elicited words. Rather, a position of prosodic focus is more reliable as a constant defined position between speakers and between tokens. By eliciting each word from its position of prosodic focus in a short phrase, the data can be collected appropriately. The outcome is that (1) specific words of interest are collected more efficiently than in free speech, (2) the words are more isolated than those of free speech and therefore more appropriate for analysis of tone (Section 3.3.2), and (3) this method avoids the highest level of formality (word list or citation style), providing instead a level of formality which may approximate reading passage style.

In order to produce responses that were as natural as possible, the author did not inform the speakers of the specific purposes of this dialect-oriented study. But it was necessary to give a reason for the recorded interview that would satisfy the speakers' curiosity; the speakers were not familiar with linguistic research, and most had never met a Westerner before. Therefore, the author explained that it would help him to continue to learn the Sui language if he recorded people talking. In this way, when objects were introduced, the author could simply ask, "What is this called?" or "What do you call this?"

In terms of the types of dialect features elicited, this study follows Chambers (1992) in focusing on the following three sets of variables: non-cognate lexical variables, cognate lexical variables ("pronunciation variants" in Chambers 1992) and phonological/phonetic variables. Syntactic variation between the two dialect regions is minimal and not yet outlined, so syntactic variables were not elicited in this study (cf. Section 2.2.3 where Smith & Johnson (1986) also find no morphosyntactic variation among the partilects of the exogamous Nghanhcara people in northern Australia). Semantic variables have also not been investigated in this dialect acquisition study since previous work doesn't provide North-South dialect semantic variation to consider.

### **3.2.2 The Interview Settings**

The North Dialect recordings were conducted in a North clan region of Shuilong in Zhonghe Township, and the South dialect recordings in a South clan region of Sandong Township. The Midlands recordings were conducted in a Midlands village in Zhonghe

Township. In this way, speakers were recorded in their normal regions of residence, both for the men and married women as well as the children and teenagers.

Sociolinguistic interviews are never entirely immune from the possible effects of the interviewing situation itself. In this study, the interviewer (the author) is a non-native speaker of Sui and he used the Midlands dialect in these interviews, a dialect positioned about halfway between the North and South regions. As a foreigner speaking Sui (with associated non-native speech errors), the interviewer's speech is viewed as a curiosity rather than a variety that native speakers would want to emulate in any way. Therefore, it seems unlikely that any particular dialect features in the interviewer's speech would have a significant influence on the speakers.

Of course, the mere presence of an interviewer necessarily has some impact on the naturalness of the speakers' speech. However, these factors were kept constant in all three regions, so any related effects can be considered the same for all three sets of speakers. In addition, the recording venues were not always ideal. For example, in one location, the recording venue that the host had kindly arranged turned out to be a house whose doors had not yet been installed. As subsequent interviews were arranged in other locations, the author ensured that doors would be available. However, since the presence of a foreigner -- especially a foreigner with recording equipment -- generates interest from the rest of the community, it is not possible to guarantee that speakers were always isolated from occasional curious visitors. The interviewer maintained the recording environment as much as possible and culturally appropriate for a foreign guest.

### 3.2.3 By the Numbers

89 words that exhibit dialect variation were selected to be recorded in the 2006 interviews, and 50 words were used in the initial study in 2005. The specific words are given below (Section 3.2.4). In the 2006 recordings, speakers were asked to produce 4-5 tokens of each targeted word in flexible phrase list style. They also provided a citation style production for six words representing each of the six tones, repeating each of those words ten times. In addition, speakers produced additional tokens of especially key words (such as ‘boat’ *luaʔ* which has both the (ua) diphthong variable and the Tone 1 variable (see Section 3.2.4) by means of an additional exercise: a brief game where the interviewer repeatedly placed a key object (such as a bag of salt *?duaʔ*) above/beside/under a toy boat and so on. Speakers also used a counting speech style; they counted up to 13 twice (since the first 13 ordinal numbers include several relevant variables). As for the 2005 recordings, speakers gave 2-3 tokens of the words in flexible phrase list style and counted up to 13 twice. Thus, in 2006 each speaker was recorded pronouncing a total of approximately 450 tokens of targeted words (somewhat fewer for the very young children), as well as free speech samples including ethnographic conversations. In 2005 each speaker produced a total of approximately 120 tokens of targeted words and provided free speech samples. In both 2005 and 2006, some speakers did not produce every targeted word. For example, sometimes the author’s pictures or pantomimed efforts did not communicate a given word to a particular speaker.

### 3.2.4 Description of Linguistic Variables

#### 3.2.4.1 Phonetic and Phonological Variables

The variables in this section are considered systematic processes in the language, whereas lexical variables are discussed in Section 3.2.4.2. Two tone variables and two diphthong variables were observed: variation in Tone T1 and Tone T6 (see Section 2.1.1 for an introduction to Sui tones) and variation in the diphthongs (ua) and (ia), as described below. Target words were selected primarily on the basis of the author's prior research; *Shuiyu Diaocha Baogao* (1956) was also consulted.

The lists below include both the 2005 and 2006 targeted words, and they are organized according to the dialect features they target. Some words appear in more than one category. The words are in the South dialect variant unless otherwise specified. Superscripted numbers indicate tone numbers (Section 2.1.1).

a. Phonological variables: (ua) diphthong, (ia) diphthong, tone T1, tone T6

Words elicited for the (ua) diphthong variable:

ʔdua <sup>1</sup>	<i>salt</i>
lua <sup>5</sup>	<i>rest</i>
tua <sup>3</sup>	<i>Sui New Year</i>
lua <sup>1</sup>	<i>boat</i>
luan <sup>2</sup>	<i>to crawl</i>
juan <sup>1</sup>	<i>to stand</i>

Words elicited for the (ia) diphthong variable:

mia <sup>1</sup>	<i>hand</i>	liak <sup>7</sup>	<i>to lick</i>
lia <sup>2</sup>	<i>face-up</i>	ɕia <sup>2</sup>	<i>tea</i>
fia <sup>3</sup>	<i>lint</i>	ɕia <sup>1</sup>	<i>sharp</i>
ʔdia <sup>3</sup>	<i>seedling</i>	ʔbiak <sup>7</sup>	<i>female</i>
lian <sup>5</sup>	<i>hot pepper</i>	ɕiaŋ <sup>1</sup>	<i>sunny</i>

Words elicited for T1:

un <sup>1</sup>	<i>chair</i>	juan <sup>1</sup>	<i>to stand</i>
lua <sup>1</sup>	<i>boat</i>	ʰda <sup>1</sup>	<i>eye</i>
le <sup>1</sup>	<i>book</i>	ʔdua <sup>1</sup>	<i>salt</i>
ɲəŋ <sup>1</sup>	<i>drum</i>	ɣɔ <sup>1</sup>	<i>spider</i>
ʔnəŋ <sup>1</sup>	<i>nose</i>	qəŋ <sup>1</sup>	<i>gruel</i>
q <sup>h</sup> a <sup>1</sup>	<i>ear</i>	i <sup>1</sup>	<i>frog</i>
mia <sup>1</sup>	<i>hand</i>	ʔjɔ <sup>1</sup>	<i>socks</i>
tɕoj <sup>1</sup>	<i>plow</i>	ʰbia <sup>1</sup>	<i>to transplant</i>
ha:m <sup>1</sup>	<i>three</i>	ɕia <sup>1</sup>	<i>sharp</i>

Words elicited for T2:

ma <sup>2</sup>	<i>tongue</i>	loŋ <sup>2</sup>	<i>stomach</i>
mən <sup>2</sup>	<i>oil</i>	ŋɔ <sup>2</sup>	<i>spider (North)</i>
lən <sup>2</sup>	<i>behind</i>	nien <sup>2</sup>	<i>moon</i>
ŋəm <sup>2</sup>	<i>a vegetable</i>	mie <sup>2</sup>	<i>to transplant (North)</i>
lia <sup>2</sup>	<i>face-up</i>	fa <sup>2</sup>	<i>sheep</i>
ju <sup>2</sup>	<i>1<sup>st</sup> Sg.</i>	nia <sup>2</sup>	<i>2<sup>nd</sup> Sg.</i>
tɕia <sup>2</sup>	<i>tea</i>	tɔ <sup>2</sup>	<i>one</i>
ɣa <sup>2</sup>	<i>two</i>		

Words elicited for T3:

nəm <sup>3</sup>	<i>water</i>	lɔ <sup>3</sup>	<i>bald</i>
ju <sup>3</sup>	<i>catfish</i>	ljom <sup>3</sup>	<i>to fold</i>
lian <sup>3</sup>	<i>mosquito</i>	fa <sup>3</sup>	<i>cloud</i>
ku <sup>3</sup>	<i>head (North)</i>	ti <sup>3</sup>	<i>small</i>
ʔdia <sup>3</sup>	<i>seedling</i>	tua <sup>3</sup>	<i>Sui New Year</i>
tɕu <sup>3</sup>	<i>nine</i>	fia <sup>3</sup>	<i>lint</i>

Words elicited for T4:

law <sup>4</sup>	<i>large</i>	ma <sup>4</sup>	<i>horse</i>
nan <sup>4</sup>	<i>meat</i>	ni <sup>4</sup>	<i>mother</i>
mew <sup>4</sup>	<i>cat</i>	mom <sup>4</sup>	<i>tiger</i>
mej <sup>4</sup>	<i>tree</i>	liem <sup>4</sup>	<i>sickle</i>
ɲɔn <sup>4</sup>	<i>hat</i>	ŋɔ <sup>4</sup>	<i>five</i>
qəm <sup>4</sup>	<i>head</i>	qe <sup>4</sup>	<i>market</i>

Words elicited for T5:

lɔ <sup>5</sup>	<i>breath</i>	jen <sup>5</sup>	<i>sneeze</i>
lian <sup>5</sup>	<i>hot pepper</i>	lua <sup>5</sup>	<i>rest</i>
qu <sup>5</sup>	<i>knee</i>	ʔya <sup>5</sup>	<i>paddy field</i>
gwən <sup>5</sup>	<i>bracelet</i>	hi <sup>5</sup>	<i>five</i>

Words elicited for T6:

mom <sup>6</sup>	<i>fish</i>	mən <sup>6</sup>	<i>monkey</i>
ŋan <sup>6</sup>	<i>goose</i>	tej <sup>6</sup>	<i>backpack</i>
tsu <sup>6</sup>	<i>chopsticks</i>	tɕuj <sup>6</sup>	<i>wardrobe</i>
fan <sup>6</sup>	<i>thread</i>	nij <sup>6</sup>	<i>two (in 12, 20, 22, 32, 42, ...)</i>

Note: Speakers' recordings sometimes also contained other words in the same speech style which could be used for a given tone, such as *ʔbən'* 'sky' for Tone 1.

#### 3.2.4.2 Lexical Variables

Lexical items were chosen which had been shown to have dialect variation in the author's prior investigation, as well as some reference to *Shuiyu Diaocha Baogao* (1956). As noted above, for ease of data elicitation in this situation with an unwritten language, concrete objects and activities were necessarily favored when choosing lexical items to study. The cognate and non-cognate lexical variables are listed below in (3-4).

### (3) Cognate Lexical Items<sup>1</sup>

<u>South</u>	<u>North</u>	
qɛ <sup>4</sup>	tɛ <sup>4</sup>	<i>market</i>
qəŋ <sup>1</sup>	kɪŋ <sup>1</sup>	<i>gruel</i>
fən <sup>6</sup>	fuən <sup>6</sup>	<i>thread</i>
tɕuj <sup>6</sup>	kuj <sup>1</sup>	<i>wardrobe</i>
fa <sup>2</sup>	fuə <sup>2</sup>	<i>sheep</i>
nia <sup>2</sup>	ɲɛ <sup>2</sup>	<i>2<sup>nd</sup> Singular</i>
m <sup>h</sup> bia <sup>1</sup>	miə <sup>2</sup>	<i>to transplant (e.g. a rice seedling)</i>
ɣɔ <sup>1</sup>	ŋɔ <sup>2</sup>	<i>spider</i>

### (4) Non-Cognate Lexical Items

<u>South</u>	<u>North</u>	
qəm <sup>4</sup>	ku <sup>3</sup>	<i>head</i>
ju <sup>2</sup>	ɛj <sup>2</sup>	<i>1st Person Singular</i>
ɲɔn <sup>4</sup>	maw <sup>1</sup>	<i>hat</i>
tɕoj <sup>1</sup>	li <sup>4</sup>	<i>to plow</i>
jɔ <sup>1</sup>	ma:t <sup>8</sup>	<i>socks</i>
ja <sup>6</sup>	tsa <sup>5</sup>	<i>Discourse Marker (see explanation below)</i>
jam <sup>1</sup>	k <sup>h</sup> jɛŋ <sup>1</sup>	<i>to borrow/loan</i>
qop <sup>7</sup>	i <sup>1</sup>	<i>frog</i>

The discourse markers (see (4)) serve a variety of functions comparable to English ‘so’, ‘then’, ‘afterwards’, ‘like this’, ‘like that’, ‘in this way’. Specific examples from discourse samples are given in (5-6) below. There is no direct lexical equivalent of the South discourse marker *ja<sup>6</sup>* found in the North dialect. The closest equivalent is the discourse marker *tsa<sup>5</sup>*, which is often used by North speakers but also by South speakers as well.

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<sup>1</sup> The [fa-] ~ [fuə-] variation in ‘thread’ and ‘sheep’ bears some possible resemblance to the (ua) diphthong variation (Section 3.3.3), and future phonological analysis may view it as a case of coalescence in the South dialect for some labial onsets (/fua/ → [fa]). For the current study, it is included among the cognate lexical variables.



Thus, there doesn't appear to be lexical symmetry between *ja'* and *tsa'* in the two regions; North speakers never use *ja'*, but South speakers may use *tsa'* occasionally. Therefore, *ja'* seems to be a unique mark of the South.

### **3.3 Results for Married Women and Baseline Speakers**

#### **3.3.1 Lexical Variables for Married Women and Baseline Speakers**

For the most part, the immigrant married women still used the same lexical items (both the variables in the cognate set as well as the non-cognate set) as the men and teenagers back in their home regions, i.e., their patrillects. This was the case for the lexical items in the list regardless of frequency of use, e.g., common words like 'head' corresponded to the speakers' home regions just like less common words like 'frog.' Furthermore, the lexical items corresponded to home region regardless of whether or not speakers had a conscious awareness of lexical difference. For example, speakers have been observed to have declarative knowledge of certain dialectal differences such as 1<sup>st</sup> Person Singular, but not of the dialectal differences for 'socks' or 'frog,' even though they showed procedural knowledge of all the variants of their home regions.

The specific results from the "flexible phrase list" style recordings are given in Table 4 below according to type of speaker (see Table 3 above for speaker demographics). The results are given as a set of two numbers which indicate how many of the North and South variants were used. The number before the colon indicates the number of North variants, while the number after the colon indicates the number of South variants. Thus, "12:3" in the *Words* column indicates that, for a total 15 words, the North pronunciation

was used for 12 words, and the South pronunciation was used for 3 words. The *Tokens* column uses the same colon format and indicates the specific number of tokens (since speakers were occasionally observed to pronounce a word in one dialect and then switch to the other dialect's variant later in the interview). The two South married women living in Midlands (Speakers #24 and 26) are not shown since South and Midlands have very little lexical contrast; among the lexical variables introduced above, those two regions differ only in 1<sup>st</sup> Singular and the discourse marker *ja'*. The two South women in Midlands produced both 1<sup>st</sup> Singular and *ja'* as the South baseline speakers.

Table 4. Results for Lexical Variables (Cognate and Non-Cognate).

<i>Speaker Number</i>	<i>Words North:South</i>	<i>Words Pronounced Outside of the Speaker's Patrilect</i>	<i>Tokens North:South</i>
<b>South Baseline Speakers:</b>			
#1	0:12		0:52
#2	0:12		0:63
#3	0:14		0:87
#4	0:14		0:75
#35	1:13	1 <sup>st</sup> Sg.	1:30
#36	0:13		0:31
#37	0:14		0:30
#38	0:11		0:23
<b>South Married Women:</b>			
#5	0:16		0:69
#6	0:14		0:85
#7	0:15		0:60
#8	0:15		0:59
#11	0:14		0:68
#13 (mixed clan origin)	4:10	gruel, plow, hat, 1 <sup>st</sup> Sg.	17:66
#15	1:13	head	1:62
#41	0:13		0:29
#42	0:13		0:28
#43	0:12		0:28

Table 4 continued.

<b>North Baseline Speakers:</b>			
#17 (Teenager with South mother)	12:1	wardrobe	53:4
#18 (Teenager with South mother)	14:0		64:0
#20 (Teenager with South mother)	12:1	head	48:8
#21 (Teenager with South mother)	14:0		61:0
#22 (Teenager with Northeast mother)	11:1	frog	46:4
#23 (Teenager with South mother)	11:2	wardrobe, plow	60:12
#30	13:1	transplant	62:1
#31	13:0		28:0
#32	13:1	wardrobe	28:1
#33	12:0		23:0
#34	11:0		22:0
<b>North Married Women:</b>			
#39	11:0		26:0
#40	13:0		28:0
#44 (Northeast clan)	12:0		24:0

First of all, note in Table 4 that with only one exception, the South married women and the North married women adhere to their patrillects with great precision for these lexical items. The exception is Speaker #13, a woman with a mixed clan childhood who married into the North clan. The variation in her lexical responses appears to point to a significant lack of consistency with her patrillect. In addition, as reported below in more detail (Section 3.3.4 and Section 5.2.1), her other dialect features show a similar trend. Why would this woman, in contrast to all the other married women, show significant evidence of exolectal lexical variants? It turns out that Speaker #13 is from a mixed clan background. After the recording, the author inquired about this woman's background and found that

she had actually moved away from her home South clan during her childhood, and she is well known in the community as someone who has a mixed dialect. Her father is a South clan man (so she has the South surname), but she lived with a relative in the North clan from birth until about 12 years of age. She then moved back to her original clan (South) and remained there until marriage. She eventually married a North clan man and moved back to the North where she was living at the time of the interview. It is not surprising, then, that the results of this study of her dialect features would show significant deviation from the pattern observed in the other married women.

Secondly, the baseline speakers responded with the variants expected of their clan dialects in a largely consistent manner. But note the occasional exceptions, especially among some of the baseline teenage speakers. As explained in Section 3.1, teenagers were included as part of the baseline in order to control for the possible normalization effects that might occur if only men were used as baseline speakers. Yet it is understood that the tradeoff involved in this approach is that such teenagers' speech may show some effects of their mothers' speech. In fact, the term *baseline* should actually be read in quotes, as "baseline" dialect. After all, each Sui generation is in constant contact with incoming married women from other clans, so there is no definitive baseline dialect. Nonetheless, the teenagers are seen to be following their patrilects with only limited exceptions in dialect features, and their definition here as baseline speakers is considered practical and effective for the purposes of the study.

## Free Speech

In addition to the lexical variables elicited as targeted words in the “flexible phrase list” style portion of the interview, other lexical variables were recorded in less structured speech. Since these data were produced with less attention to speech, they provide even greater evidence for the conclusions above.

First, the discourse marker *jaʔ* was observed in the speech of South speakers in the study, but the North speakers never used *jaʔ*, choosing instead from among other available discourse markers, such as *tsaʔ*, *niʔ*, or *aʔ* (all of which are common to both regions). Thus the choice of discourse marker corresponded to the speakers’ home dialect regions even though each married woman had been living in the opposite dialect region for more than a decade and even though the discourse markers occurred in free speech and are relatively unmonitored words with diverse discourse functions.

Specifically, *jaʔ* was noted 107 times in the free speech of the South group (South baseline speakers and South married women) but zero times in the free speech of the North group (North baseline speakers and North married women). Not all South speakers used *jaʔ*, but no North speakers used *jaʔ*. One South married woman (Speaker #6) used *jaʔ* 23 times in a span of just six minutes of free speech. Three other South married women (Speakers #5, #7, and #15) each used *jaʔ* twelve or more times in stretches of a few min-

utes of free speech. Two free speech samples are given below in (5-6) as illustrations (DM=Discourse Marker).

(5) Sample from a South Woman (Speaker #42)

ja<sup>6</sup> ka<sup>4</sup> jəm<sup>6</sup> fən<sup>2</sup> ja<sup>6</sup> si<sup>3</sup> tɔ<sup>5</sup> pən<sup>3</sup> nu<sup>1</sup> ju<sup>5</sup>hɛ<sup>4</sup> ni<sup>4</sup>maŋ<sup>4</sup> ɑ<sup>3</sup>  
*DM foreigner ask say DM is teach Cl which call what DM*

haj<sup>1</sup> ja<sup>6</sup> ju<sup>2</sup> qɔ<sup>3</sup> fən<sup>2</sup> pən<sup>3</sup> tsa<sup>5</sup> ju<sup>5</sup>hɛ<sup>4</sup> ni<sup>4</sup>maŋ<sup>4</sup> ɑw<sup>1</sup> fən<sup>2</sup> ja<sup>6</sup>  
*give DM ISg just say Cl that call what should say DM*

me<sup>2</sup> ɕow<sup>3</sup> fən<sup>2</sup> ni<sup>4</sup>maŋ<sup>4</sup> ha<sup>1</sup> liɛw<sup>2</sup> [laughs]  
*not know say what not ASP*

“So this foreigner is asking me, like, tell me how to say certain things. So I just say, ‘That thing should be said like this.’ I don’t know what else to say.” [laughs]

In the free speech sample in (5), note that this South woman uses ja<sup>6</sup> and also the South 1<sup>st</sup> person singular (ju<sup>2</sup>).

(6) Sample from a North Woman (Speaker #40)

vən<sup>1</sup> ʔɣaj<sup>3</sup> qɔ<sup>3</sup> paj<sup>1</sup> daw<sup>3</sup> qom<sup>4</sup> ɛj<sup>5</sup> qɔ<sup>3</sup> paj<sup>1</sup> ʔniŋ<sup>5</sup> hɛ<sup>1</sup> ʔniŋ<sup>5</sup> ma<sup>4</sup> ɛj<sup>5</sup>  
*day long just go gather hill DM just go look others look horse DM*

hɛ<sup>1</sup> tsi<sup>5</sup> ma<sup>4</sup> q<sup>h</sup>a<sup>1</sup>na<sup>1</sup> pjaw<sup>5</sup> ma<sup>4</sup> tsa<sup>5</sup>  
*others ride horse play race horse DM*

qɔ<sup>3</sup> paj<sup>1</sup> ʔniŋ<sup>5</sup> ma<sup>4</sup> ɛj<sup>5</sup> ljaw<sup>3</sup> qɔ<sup>3</sup> təŋ<sup>1</sup> ɣan<sup>2</sup> ni<sup>3</sup> tsa<sup>5</sup>  
*just go look horse DM awhile just come home DM DM*

tɕa<sup>5</sup> qɔ<sup>3</sup> liw<sup>4</sup> ljew<sup>2</sup>  
*DM just gone ASP*

“On the long day [of the festival], we all go to the hill. So we just go watch people -- watch the horses -- watch people riding horses -- playing -- racing horses, like that. We just go watch the horses, and then after awhile, we just come home like that. So that’s all.”

For the North woman in (6), the salient South discourse marker *jaʔ* never appears; she opts instead for *tsaʔ*.

In addition to *jaʔ*, pronouns and other lexical variables were observed in free speech and in the “flexible phrase list” style portions of the interviews, and they serve to confirm baseline variants as well as to show the dialect maintenance of the married women. In free speech, both the married women and the baseline speakers consistently used the 1<sup>st</sup> and 2<sup>nd</sup> Person Singular variants of their respective home regions. During the “flexible phrase list” style portion of the interview, speakers also used the pronouns expected of their home regions as they produced sentence frames such as “Now I see a \_\_\_\_.” One minor exception was a South baseline man (Speaker #35) who momentarily used the North variant *εjʔ* as 1<sup>st</sup> Singular in one of the carrier phrases. However, he used the South variant *juʔ* many other times in the interview, and the lone instance of *εjʔ* was probably due to the fact that he had just heard the interviewer ask him to frame a word in a phrase that included 1<sup>st</sup> Singular (the interviewer used *εjʔ*).

Other lexical variants observed in free speech were a North baseline man’s (Speaker #31) use of the North variant *tʃεʔ* ‘market’. A South baseline man (Speaker #1) and a South married woman (Speaker #42) were both observed in free speech saying *qowʔ*, ‘to look’,

which is a South variant (the North variant is *ʔniŋʔ* or sometimes *tɕowʔ*). A South married woman, Speaker #15, used *ɕanʔ* in free speech, which is a South word for ‘to play’.

### **Conclusion for Lexical Variables**

In sum, the lexical results of the baseline speakers and married women show consistency with the variants of their respective home clan dialects. The case of Speaker #13 was explained as the result of her mixed clan childhood. A particularly stark North-South distributional contrast in the discourse marker *jdʰ* was presented as additional evidence that the South women use their patrillects even in relatively unmonitored speech.

In fact, although lexical variables are quickly quantified and therefore occupy much less space than the phonetic variables in this study, the significance of the women’s dialect maintenance of lexical variables should not be overlooked. Everyday, for years and years, these women maintain the pronouns and other lexical variables of their patrillects, even though the village is filled with exolectal speakers who use other signifiers for the same signifieds (de Saussure 1993[1910-11]). These “sore thumb” linguistic features used frequently in daily speech clearly mark a woman as a member of her father’s clan. Such behavior is in tension with the more natural tendency to accommodate, and the author can attest to a strong urge to change pronouns after just an hour or so in another clan.



### **3.3.2 Tone Variables for Married Women and Baseline Speakers**

#### **3.3.2.1 Introduction**

As discussed above, two types of data were elicited in this study: free speech and “flexible phrase list” style. In addition, a set of tones was elicited in citation style. Free speech tones were considered briefly but then rejected due to phonetic effects of adjacent tones. Tone sandhi has not been reported in Sui phonology (e.g., Zeng & Yao 1996, J. Zhang 1980, Edmondson et al. 2004). However, adjacent tones in fast connected speech sometimes affect each other, although such phonetic effects are not observed in slower speech. In the free speech data collected here, for example, some high tone words were observed to become slightly lower when followed by a low tone and vice versa. For this reason, free speech tone data was not used in the acoustic analysis here.

On the other hand, word list style (citation style) can create false pitch contrasts due to artificial intonational patterns (Ladefoged 2003:83-103). And, of course, such formal speech styles reduce the naturalness of the speech (cf. the Observer’s Paradox, Labov 1972:209). Therefore, the variationist interested in acoustic tone needs to find a happy medium somewhere between free speech and citation style. It turns out that eliciting tones in positions of prosodic focus in “flexible phrase list” style (Section 3.2.1) is just such a happy medium. This speech style helps to reduce the problems of formality and the artificial intonational effects that occur with citation style, while still obtaining clear tone samples that aren’t blurred by adjacent tones in fast connected speech. (But note that “flexible phrase list” style can still be susceptible to some intonational effects, especially if a speaker begins to use a single carrier phrase mechanically. In that case, the inter-

viewer may want to pause and ask the speaker to vary the carrier phrase, or the interviewer could produce some small distraction to interrupt the speaker's recording pattern before continuing with the interview.)

Thus, in methodology and goals, this socio-tonetic study differs from the Edmondson et al. (2004) tonetic study of one Sui dialect. Edmondson et al. provide a valuable investigation of the Miaocao (a North dialect) by interviewing one speaker in a formal citation style (the speaker helped select words to record for each tone). By contrast, the current study has variationist goals, so speakers were interviewed representing different regions, ages, sexes, immigration experiences, and different L1 environments (bidialectal children). For such a study, the "flexible phrase list" recording method moves the tone data somewhat in the direction of the vernacular speech coveted by sociolinguists, while also providing clear tone data for the acoustic phonetic analysis.

### **Tone T6**

In *Shuiyu Diaocha Baogao* (1956) and other previous studies discussed in the introduction on Sui tone above (Section 2.1.1), a North-South dialectal difference in T6 is noted. In the Sandong dialect region (i.e. the South dialect), T6 has a value of 55. But in all North dialect regions, T6 is given a lower value, usually 24. This difference is perceived as a striking pitch distinction between dialects (see also Section 4.2.2.1 for a folk linguistic perspective on this tone).

## **Tone T1**

As for tone T1, *Shuiyu Diaocha Baogao* (1956) lists T1 with a value of 13 in both the North and South dialects (Table 1 above). But the current study finds a subtle North-South dialect difference in T1 both perceptually and acoustically. In the North dialect, T1 is a low tone that falls slightly, but it is a low rising tone in the South dialect. This result is consistent with Edmondson et al. (2004) who also find T1 to be a falling tone in the North (Table 2) rather than a rising 13. Note, however, that this difference is limited to contour and is below the level of conscious awareness for most speakers.

### **3.3.2.2 Tone Results for Married Women and Baseline Speakers**

Prior to acoustic analysis, the level of dialect acquisition in the tones of the immigrant married women was unclear, thus showing the importance of instrumental analysis in the study of tone variation. The married women's tones were generally perceived to correspond to the expected features of their home dialect regions, but it was unclear whether or not there might be a subtle lowering of T6 by South women who had moved to the North, and/or a subtle raising of T6 by North women who had moved to the South. As for T1, since the dialect variation in that tone is not at all salient, impressionistic analysis could not determine whether the women's T1 had diverged from the men's T1 of their respective regions. Thus, acoustic analysis is needed to determine the level of dialect acquisition, if any.

Acoustic results are given here for the immigrant married women and baseline men and teenagers who originated in the North and South clans. Results of tone data from 35

speakers are examined acoustically here: 5 South men, 5 North men, 3 South teenagers, 6 North teenagers, 2 Midlands teenagers, 9 women who had emigrated from South to North, 3 women who had emigrated from North to South, and 2 women who had emigrated from South to Midlands. In addition, 8 children of immigrant women are analyzed separately in Section 3.4.2.2.

#### **3.3.2.2.1 Extracting the Raw Tone Data**

The data sets were recorded on high bias analog cassette tapes with a Marantz tape-recorder, and each speaker's analog recording was then digitized in Praat (versions 4.4.18 and 4.1.28). A total of 4,004 tone tokens were extracted from Praat. The extractions proceeded as follows. For each tone token, a list of pitch samples and times was extracted from Praat using the "pitch listing" feature with a sampling rate of 10 milliseconds. Each such list was moved into a text file (in Macintosh OS X) and formatted as a table of raw F0 frequency (Hz) versus raw time (msec). Thus, for each tone token, there was a data table with a column for raw time and a column for F0. Each such table contained about 20-60 rows depending on the duration of the syllable (amounting to around 150,000 individual sample points in the 4,004 token set). These data tables were then exported to R 2.4.1 for the normalization procedures and analyses described below.

#### **3.3.2.2.2 Time Normalization**

The overall approach in this tone analysis follows the methodology of prior tonetics research, including Richard Wright (p.c.), Zhu (1999), Rose (1987, 1991, 1993, 1994, 1997), and Edmondson et al. (2004), where tone syllable tokens are normalized for time

duration and then compared using mean pitch values at selected relative time points. However, within that overall approach, researchers have adopted different strategies as appropriate to their topics of research, and a variety of software is used as well (Edmondson et al. 2004, for example, develops software in CECIL). As described below, the current study develops methods that are effective for Sui and creates functions in R 2.4.1 since that statistical software platform proves to be flexible and convenient for tone normalization and graphical/statistical analysis of both tones and vowels.

First, since the total duration of a tone varies between speakers and also varies between tokens of a single speaker, a necessary first step is to normalize the time duration. In Figures 4-5 below, Speaker #35 produced a token of the T1 word *lua'* 'boat' in 0.36 seconds (Fig.4), but the same speaker also produced another token of a T1 word, *ham'* 'three', in 0.59 seconds (Fig. 5).

Figure 4. *lua'* 'boat'

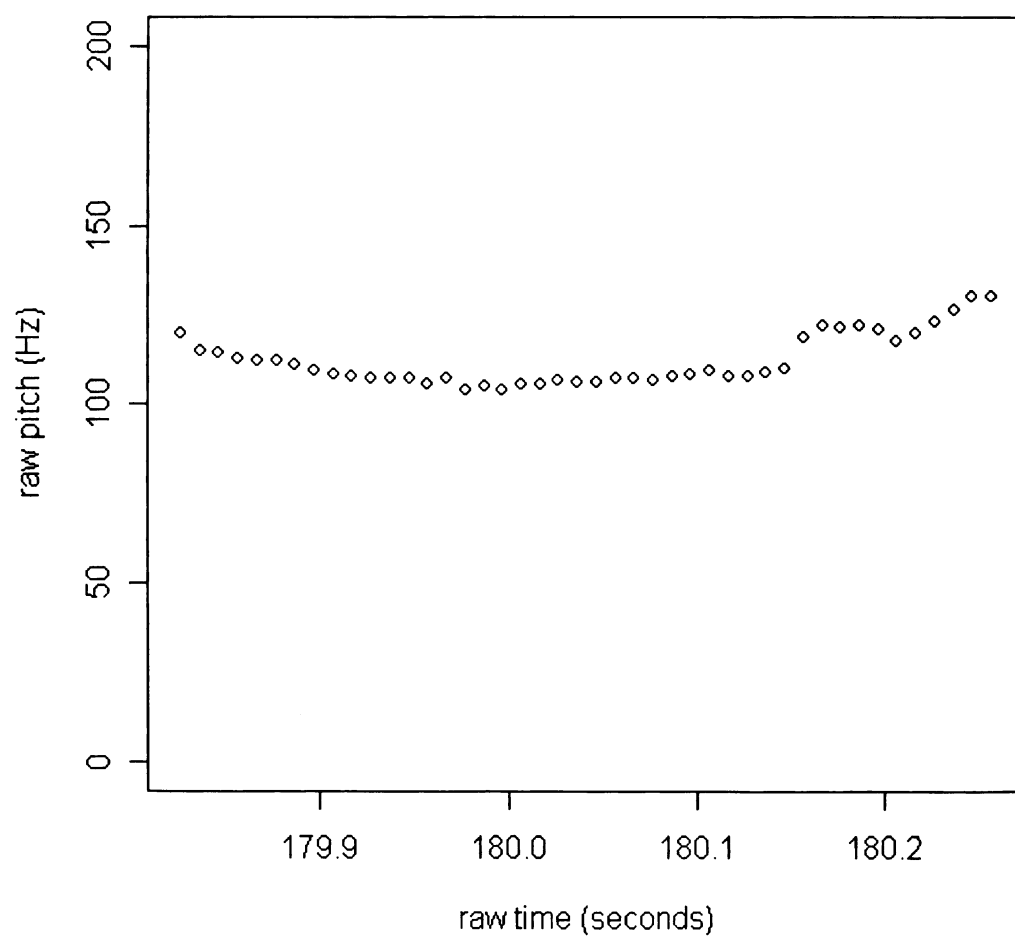
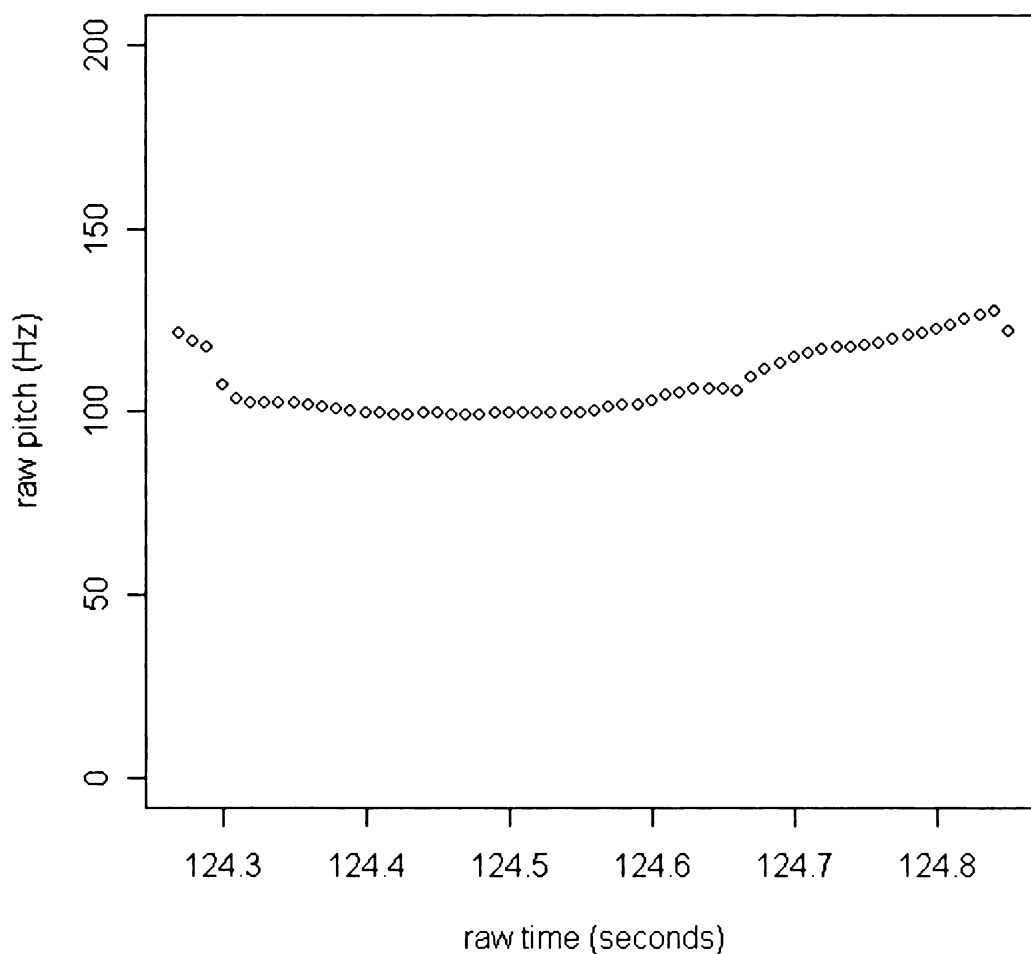


Figure 5. *ham*<sup>1</sup> ‘three’



Praat reports the pitch<sup>2</sup> at consistent intervals of 10 msec, so for fast tone tokens, the number of measured pitch values from Praat is less than the number measured for a slow tone token, making it difficult to compare pitch values individually. Therefore, in order to make it possible to compare such tone tokens in a convenient way, a time axis of 600 “relative time” points<sup>3</sup> was created using a function written for R (the function *con-*

<sup>2</sup> For convenience, the same term “pitch” is used for discussion of auditory perception as well as for acoustic F0 values in Hz; the context makes the distinction clear. Although some other studies write “pitch” when strictly referring only to auditory perception and write “F0” when referring to acoustic Hz measurements, the author finds the terminology distinction unnecessary in this particular study. Moreover, the author’s practical usage follows Praat’s use of the term (e.g., “pitch listing”).

<sup>3</sup> The number 600 was chosen as follows: The author wanted to have a large number of data points for fine-grained analysis, and having such a large number of points relative to the number of raw sample points (20-

*vert.time* in the Appendix). The full duration of each tone track is spread across the time axis of 600 relative time points. Next, another R function was written for this study, *smooth* (see Appendix), which fits an appropriate pitch value to each of the 600 relative time points. (Specifically, for every two adjacent raw pitch values originally reported from Praat for a given tone track, the local slope between those two raw pitch values is computed. Pitch points between those two raw pitch values are computed according to the local slope between them. This is repeated along the entire tone track until there are 600 pitch points. See Appendix for further details.)

The final result is that the raw tone token is now a tone track with 600 pitch values corresponding to 600 relative time points. This tone track may now be easily compared to other tone tracks regardless of differences in raw duration. Examples are given in Figures 6-7 below.

### **3.3.2.2.3 Syllable Edge Effects**

Possible syllable edge effects make it advisable to use caution with pitch samples taken from the beginning and end of each pitch track. Rose (1993:197) points out the possibility of “F0 perturbations” caused by consonants. He therefore omits the first 10% and the last 10% of the duration of each tone track (Rose 1987:349). Richard Wright (p.c.) points out that sonorants produce the most reliable tone tracks, while obstruents sometimes cause changes in tone pitch value and can therefore imply tone contrast where none is actually present (see Maddieson 1984 and Hombert et al. 1979 for the relationship be-

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60 per token) also improves the accuracy of the “*smooth*” function written for R (see Appendix). On the other hand, 600 points per token requires a rather large amount of computer memory for the data set as a whole. It may be that 300 points would be sufficient in future studies.



tween such sonority contrasts and tonogenesis). Wright suggests disregarding the first 25% of the pitch track in cases where obstruent onsets may be present in the data. As explained in Section 3.2.1, in the current Sui study the lack of a written language limited the number of words available for each tone measurement in the field. Traditional field techniques such as word lists could not be used, so it was necessary to elicit data by other means; tone tokens were collected on the basis of readily available words, namely simple everyday objects and actions which could be physically observed. As a result, the tone tokens in this study contain a mix of sonorant and obstruent onsets, and so the first 25% of the tone track is considered to be outside the analysis window.

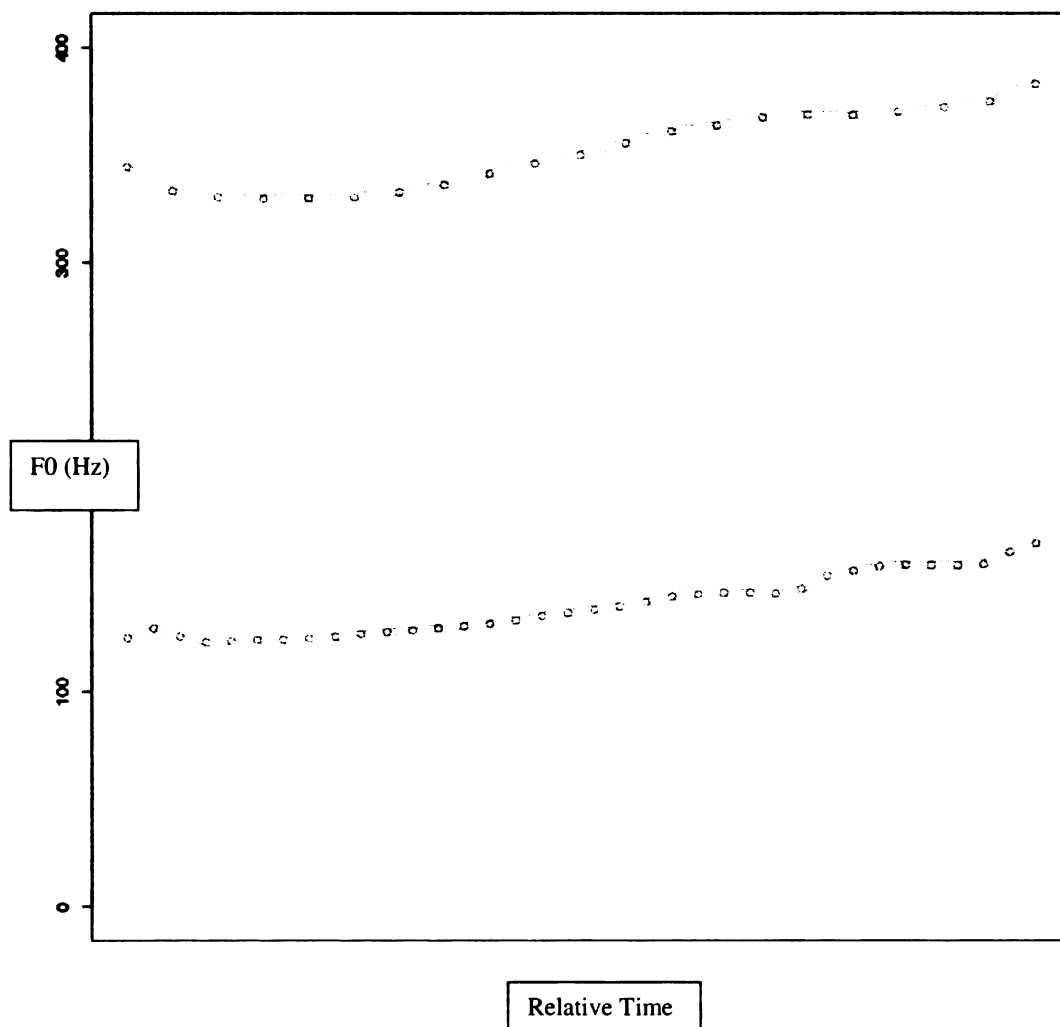
It turns out, however, that the first 25% of the tone is largely irrelevant in the current study anyway. For T1 (Section 3.3.2.2.7) the relevant dialect contrast in contour occurs in the last one-third of the syllable. For T6 the significant dialect contrasts in pitch are easily evident in the last one-half of the syllable (Section 3.3.2.2.8).

Similarly, although all tone tokens in this study are unchecked monosyllables, it is also possible that boundary effects at the end of the syllable could give misleading results. So the last 10% of the tone track is also excluded in this analysis, following Rose (1993:197) and also Ladefoged (2003:87-88), who notes that the pitch measurement at the end of the tone pitch track may have “a rise which is not due to phonological tone but just due to an increase in the airflow as the speaker’s vocal folds come apart.” Thus, the tone track of 600 relative time points is shortened by removing the first 150 points (25%) and the last

60 points (10%), leaving a final total of 390 points (using the function *smooth.and.chop* in the Appendix).

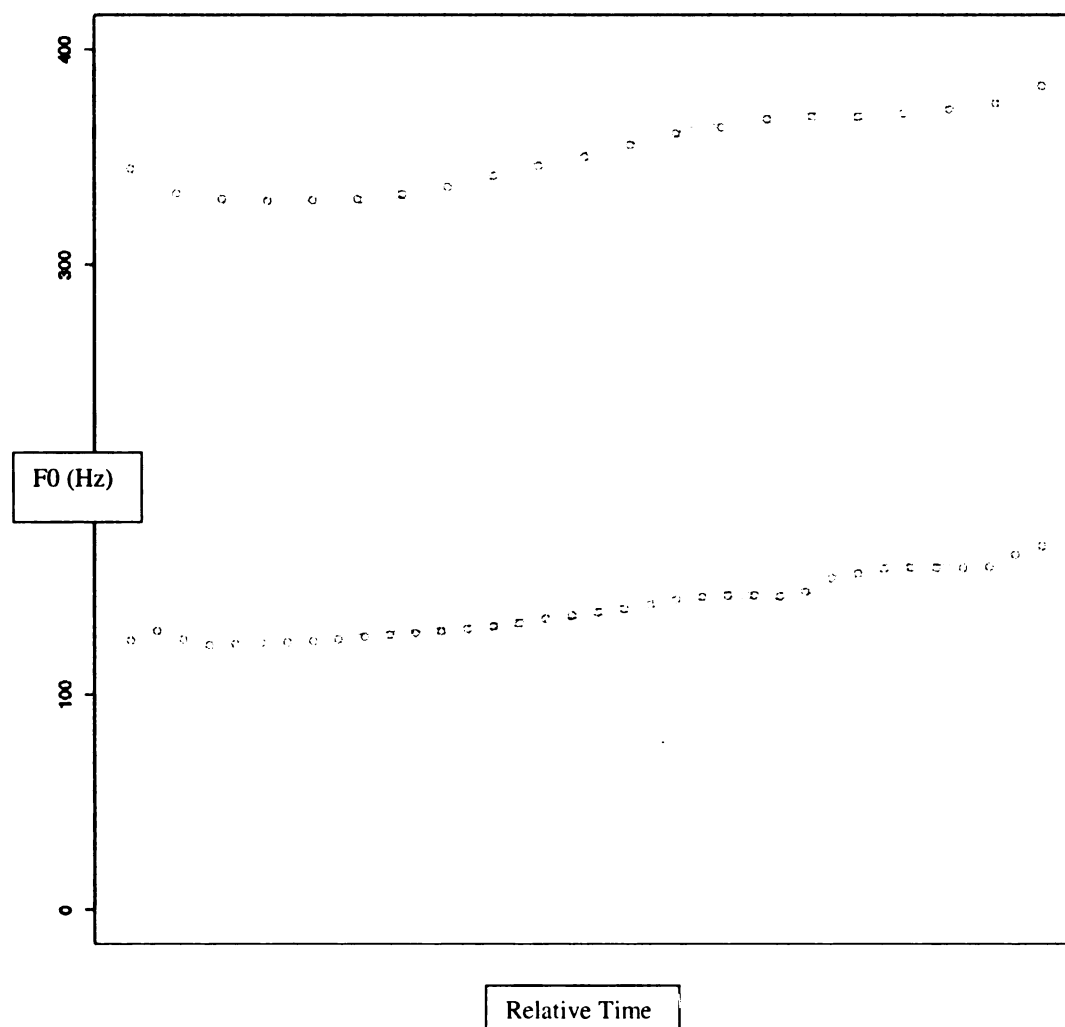
An example is given below (Figure 6). In Figure 6, two South speakers, Speaker #43 (upper tone track) and Speaker #1 (lower tone track), have both produced a T6 token. First note that the tokens have different raw durations. The small circles represent the 10 millisecond-interval Praat pitch measurements. Thus in the raw data, the lower syllable was longer in duration than the upper syllable. But the tone tokens were then transformed into tracks of 600 relative time points, namely, the two solid tracks, which accurately fit on top of the raw data points. The two tokens can now be directly and conveniently compared at any point in relative time regardless of the difference in raw duration.

Figure 6. Two T6 Tokens Normalized for Time. In Hertz. Small circles represent the original raw data. Solid lines represent the 600-point relative time tracks fitted on the raw data.



Finally, Figure 7 below shows the same tone tokens after the first 25% and last 10% have been omitted from the portion to be analyzed.

Figure 7. Two T6 Tokens with Edge Effect Regions Removed. In Hertz. Small circles represent the raw data. Solid lines are the tones as normalized for duration into 600 relative time points with the first 25% and last 10% omitted.



### 3.3.2.2.4 Mapping Sui Tone Inventories

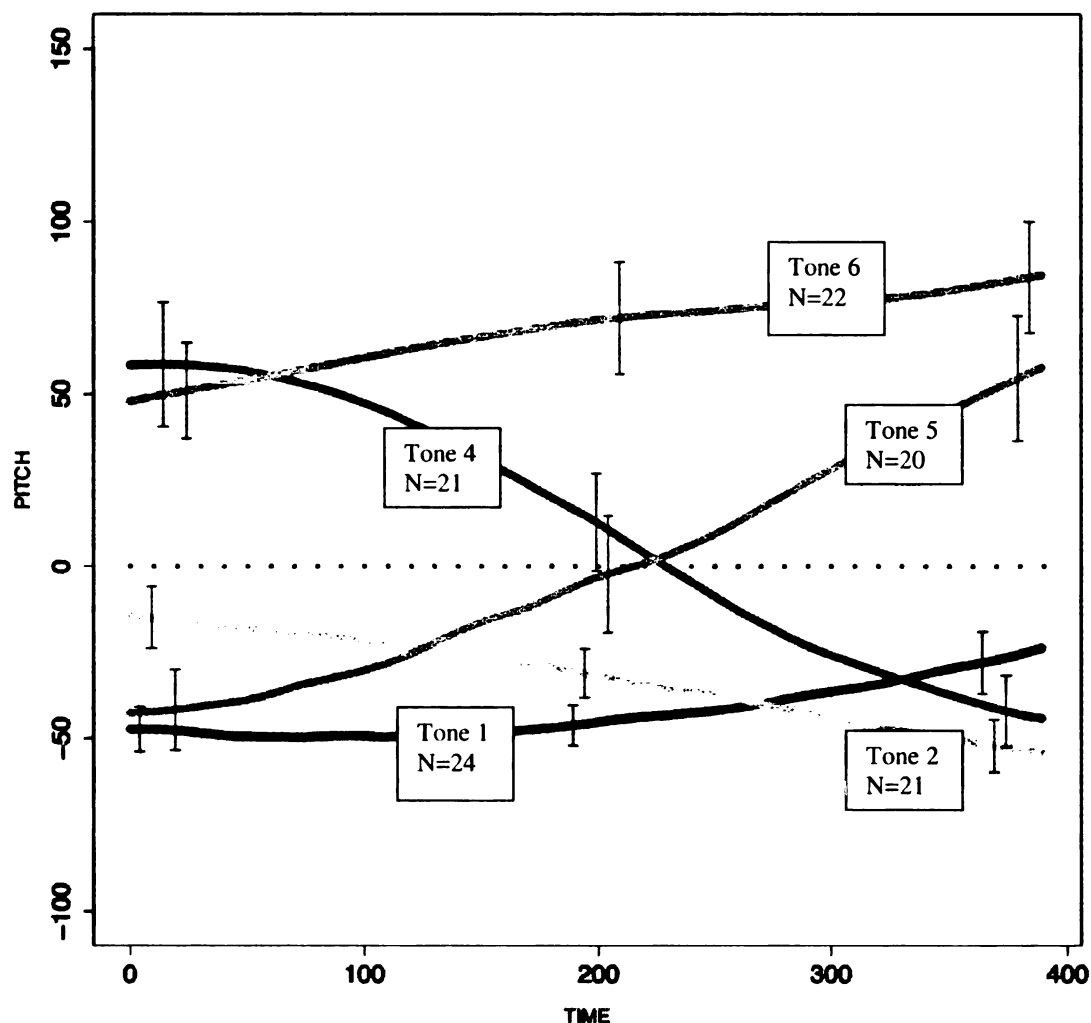
After just a couple more steps, it will be possible to view the six Sui tones in the two dialect regions. First, it's necessary to normalize the speaker's tokens for pitch. As it happens, Sui has a fortuitous mid-range level tone, T3, which has a value 33, and so the mean of T3 can serve as a benchmark in the F0 normalization process (in the R functions in the Appendix, the T3 mean is an argument of the function *tone.normal*). Thus, these

procedures produce a 390-point tone track that is normalized for duration and pitch and also protected from boundary effects. (In Section 3.3.2.2.6 where detailed between-speaker variation is analyzed, an additional pitch normalization step is conducted (converting to semitones) to establish a higher degree of between-speaker accuracy, especially with respect to gender differences.) Secondly, normalized mean pitch tracks of a speaker can be created using the mean pitch values of all the tokens at each relative time point for a given tone.

### **The Fruits of the Labor**

The mean pitch tracks for the six Sui tones can now be plotted for Speaker #3 (a South baseline teenage girl) in Figure 8 below. The pitch tracks of mid-level tone T3 are also included in the normalization (characterized by the dotted line at 0.0 Hz), so this plot represents a total of 124 pitch track tokens of Speaker #3.

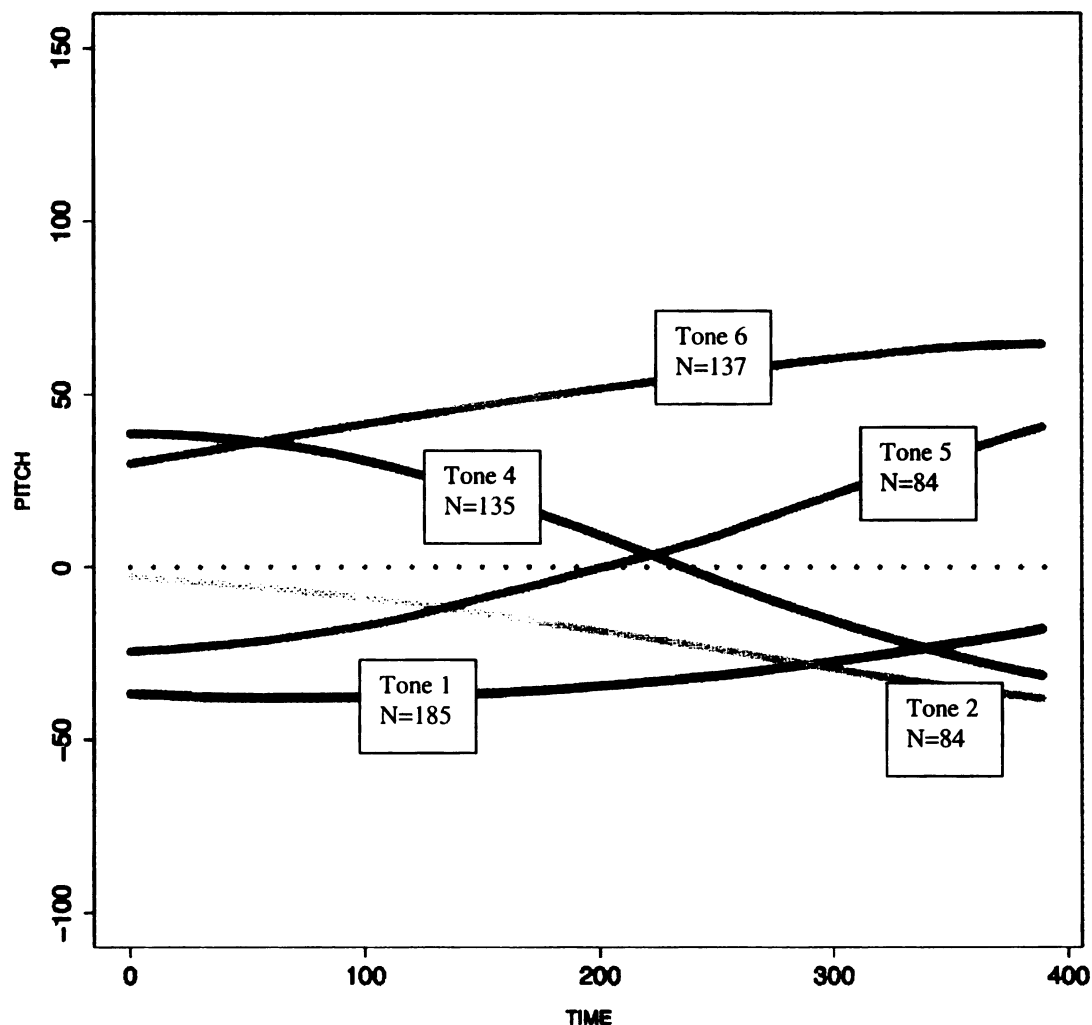
Figure 8. Tone Inventory of Speaker #3 (a South baseline teenage girl). Each line represents the mean of each given tone for that speaker (total N=124, including T3 whose mean is represented by the dotted line). In Hz normalized for duration and mean T3 pitch. Standard deviations are indicated at three points along each mean tone track.



It is now possible to compare the North and South tone inventories. In Figures 9-10 below, each track represents the mean of all baseline speakers' mean tone tracks for the given tone (with the exception of the T2 and T5 mean tracks that do not include the 2005 group of speakers (Speakers #30-38); their data contributes to the primary tones of inter-

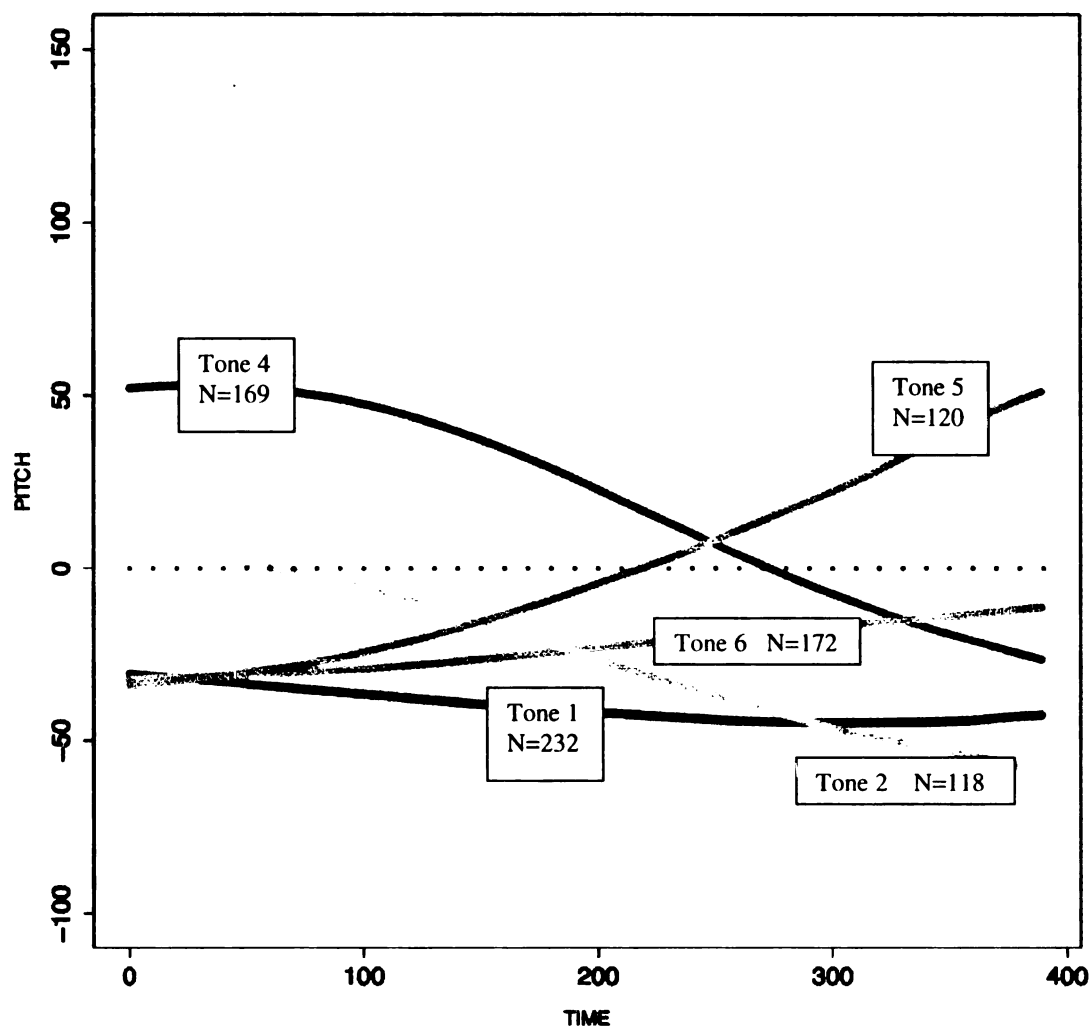
est: T1, T4, and T6 but not T2 and T5). First, Figure 9 plots the mean tone tracks for the South baseline speakers, representing 765 tokens.

Figure 9. Mean Tones of South Baseline Speakers. In Hz normalized for duration and mean T3 pitch. N=765 (including T3 whose mean is represented by the dotted line).



Now compare the tone inventory of the South with the North. Figure 10 plots the North baseline speakers' mean tone tracks, representing 1,018 tokens.

Figure 10. Mean Tones of North Baseline Speakers. In Hz normalized for duration and mean T3 pitch. N=1,018 (including T3 whose mean is represented by the dotted line).



A comparison of Figures 9-10 makes the tone variants that were previously described impressionistically in Tables 1-2 (Section 2.1.1) quite clear. First, note the drastic North-South contrast in T6 in Figures 9-10. In the South (Figure 9), it is far above the midpoint of the tone space (0.0 Hz, the normalized mean of T3). In the North (Figure 10), T6 begins very low, then rises slightly and approaches the midpoint from below.



Secondly, consider the subtle variation in T1. In Figures 9-10, notice that T1 is clearly a low tone in both regions, having a starting point significantly below the midpoint. But T1 falls slightly in the North while in the South it rises toward to the midpoint. Although the distinction can also be detected auditorily (even by non-native speakers), it is a subtle contrast, and folk consultants do not usually show evidence of a declarative knowledge of the difference. It's not surprising, then, that the linguists of the otherwise accurate *Shuiyu Diaocha Baogao* (1956) apparently didn't find this North-South T1 contrast during their survey and instead reported both regions' T1 with a value of 13 (Table 1, Section 2.1.1).

Future research on Sui tonetics and tonology may benefit from acoustic tone comparisons such as those presented here. There had been no previous acoustic analysis of South dialect tones, and so this study serves as the first opportunity for an acoustic comparison between two Sui dialects. The other acoustic study of Sui tones is Edmondson et al. (2004), which gives results for one speaker from Miaocao (North region). In agreement with the current study, Edmondson et al. also find that North T1 is a low falling tone (see Table 2, Section 2.1.1). Now that the current study provides acoustic results for South tones as well as North tones, there is strong evidence of a North-South T1 dialect contrast. (Note: The current study also gives acoustic tone results for a third dialect region, Mid-lands; see Section 3.3.2.2.5.)

These two differences, one salient and reported by the speakers (T6) and the other one subtle and unreported (T1), will be used below to examine possible changes in the immi-

grant women's speech. Note that the other tones (T2, T3, T4, T5) are not contrastive between the two dialects.

### **3.3.2.2.5 A Brief Venture into Sui Tonology**

Although a detailed investigation of Sui tonal phonology goes beyond the scope of this socio-tonetic analysis, one can't help but make some initial observations on the basis of Figures 9-10. Moreover, a tonological model of Sui can provide valuable perspective on the two tone variables (T1 and T6) that are used in the socio-tonetic analysis of this study.

From Figures 9-10, it appears that T4 and T5 might be viewed tonologically as symmetrical opposites. T4 starts at or near the top of the tone space and falls down to the bottom of the tone space. Its counterpart, T5, starts near the bottom of the tone space and rises up to near the top of the tone space. T2 starts at the midpoint and falls to the bottom of the tone space. T1 might be considered a low tone whose contour is slightly affected by those around it. As for T6, in the North, T6 starts low and rises toward the midpoint. In the South, T6 starts at the top of the pitch range and may rise beyond that, although the perceptual effects of this rise are tempered by the high pitch (see Section 3.3.2.2.6).

Figures 11-12 give tentative tonological models of the South and North tone spaces based on the acoustic data presented above (Figures 9-10).

Figure 11. South Clan: A Possible Tonological Model.

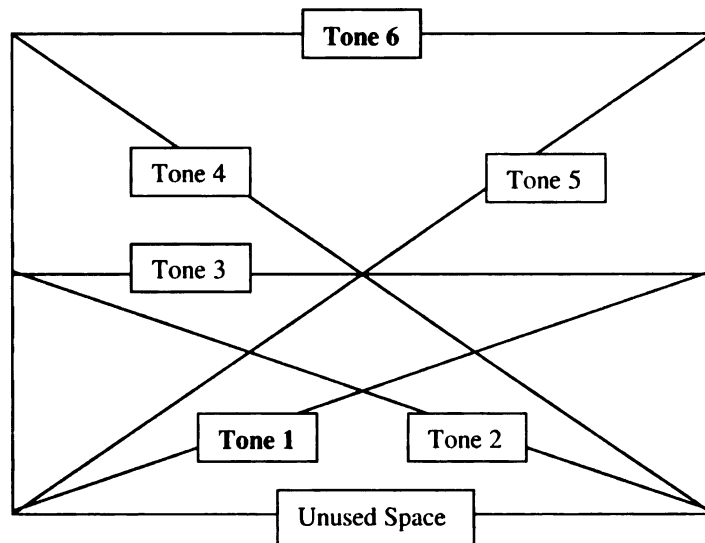
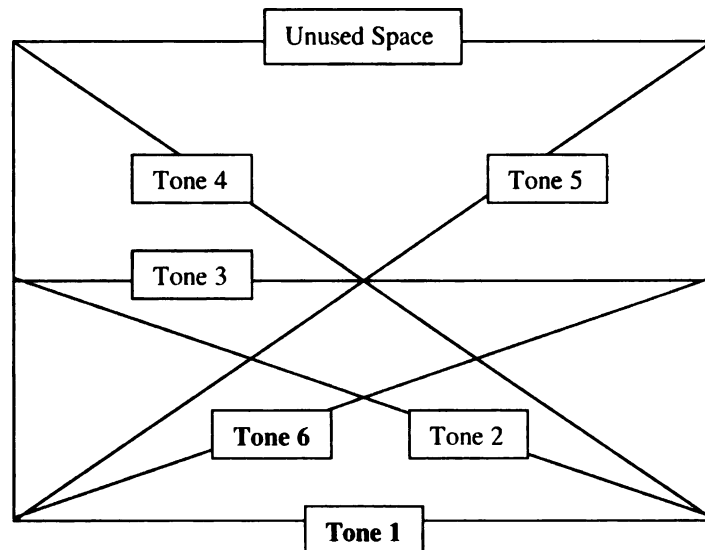


Figure 12. North Clan: A Possible Tonological Model.



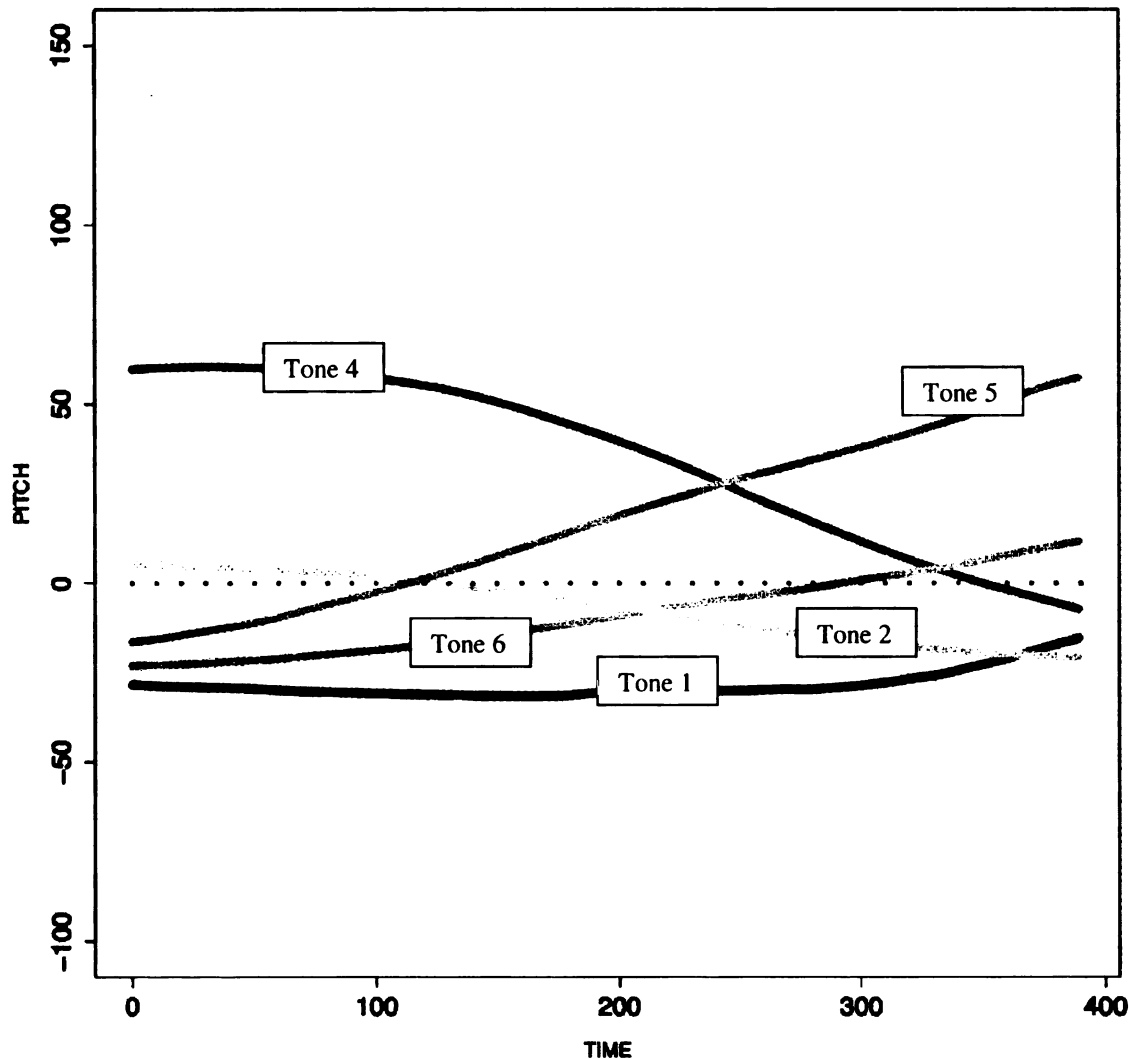
While Figures 11-12 give a somewhat idealized view of the tone space (for example, the slight fall in North T1 is ignored), the ease in which the tones can be naturally and symmetrically organized suggests that this may be a reasonable initial model. If so, then these

figures show the dramatic tonological change that occurs in the 10 miles from the North clan to the South clan.

On this basis, it is not hard to imagine a tone chain shift involving T1 and T6. Although the historical origins of the synchronic contrasts discussed here are unknown, it appears that T1 is affected by the placement of T6 or vice versa. Note that when T6 is low (North dialect), T1 is not a rising tone, but when T6 is high (South dialect), T1 is a rising tone. If North T1 was a rising tone, it would be very similar to North T6 (see Figure 10). In fact, the author attests that North T6 and the rising T1 of South are similar enough to be often confused during his early Sui acquisition. One possibility, then, is that North T6 “presses down” on T1, eliminating its rise in order to maintain contrast.

It would be helpful to see if there is a transitional zone between the two regions. Fortunately, a set of data from two baseline Midlands speakers was acquired as part of the current study (Figure 13).

Figure 13. Mean Tones of Two Midlands Baseline Speakers. In Hz normalized for duration and mean T3 pitch. N=246 (including T3 whose mean is represented by the dotted line).



While Figure 13 only represents two speakers, it does appear that Midlands T6 is in a transitional stage between North and South (compare with Figures 9-10). As for T1, Midlands T1 appears to be about the same as South T1. If a larger sample size can be acquired in the future that shows that Midlands T1 rises a bit less than South T1, then such a result could be viewed as evidence for the tone chain shift suggested here. Regardless, the Midlands data strongly suggests different stages of T6 height occur along a

geographic (and clan-graphic) line moving from North to Midlands to South. In this way, the Midlands data appears to show a transitional phase between Figures 9-10 and between the two tonological models given in Figures 11-12.

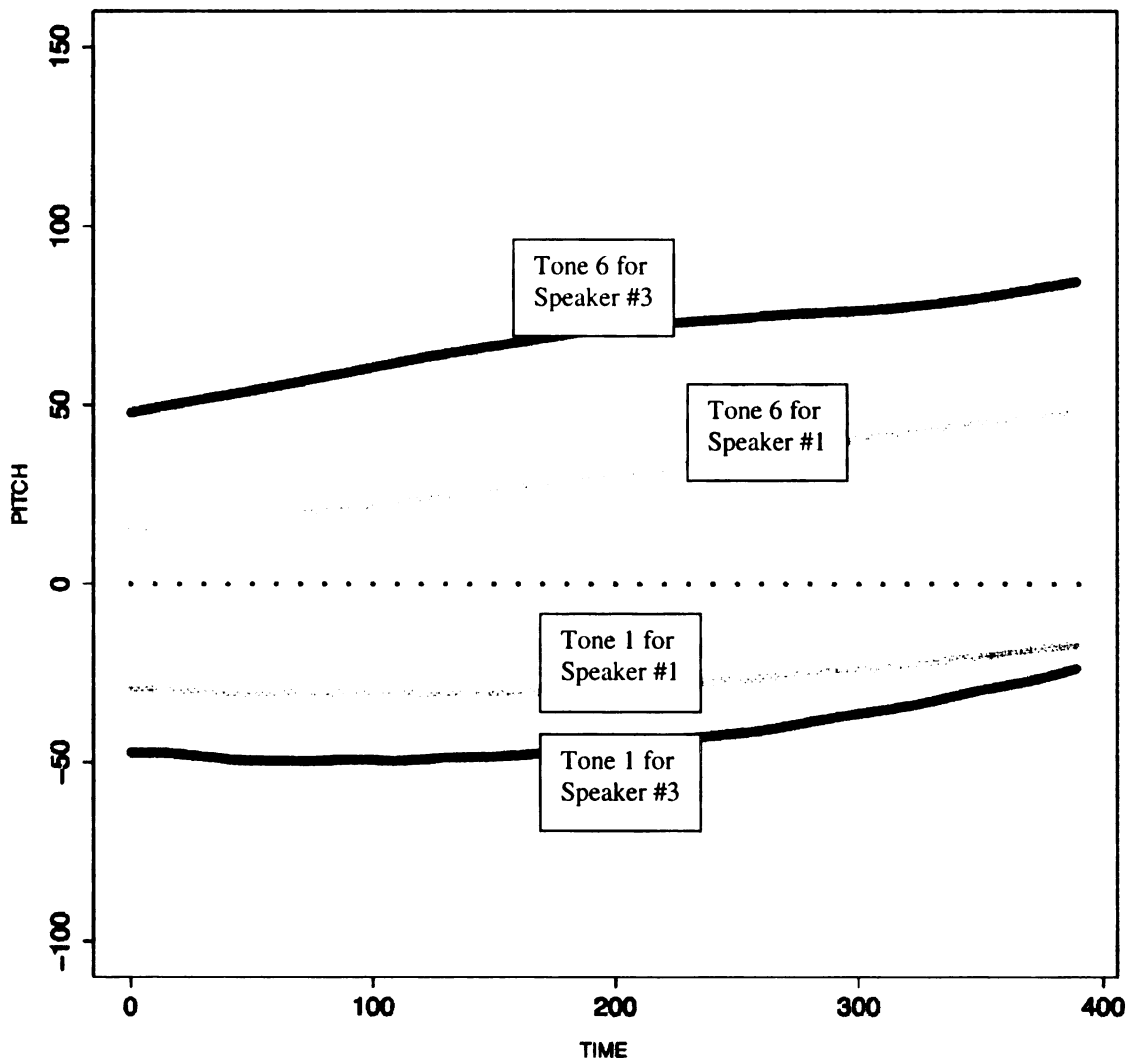
In light of this brief tonological analysis, it is not surprising that key sociolinguistic variation is found in T1 and T6. Like their segmental counterparts, tone variation and chain shifts would be likely in regions of instability in phonological space. Whether T1 influences T6 or vice versa, movement of either tone would cause instability in the symmetry of the tone space. The perfectly symmetrical North tone space (Figure 12) would be disrupted if T1 were to start rising enough to affect the perceptual contrast needed to keep it distinct from T6. Perhaps that would lead such speakers to find another place for T6 words, namely, the unused area in the high-level region of the North tone space. Or the shift could work in the opposite direction as well.

#### **3.3.2.2.6 Pitch Normalization: The Problem of The Baby and The Bathwater**

The normalization techniques described to this point make it possible to compare different tokens, combine them into mean tone tracks, and make numerous dialect observations -- even tonological observations. However, when considering subtle between-speaker or within-speaker variation, which is needed in a socio-tonetic study, an additional normalization step is needed to account for pitch range differences. The simple linear F0 normalization (i.e., defining the mean of T3 as 0.0 Hz) used to this point serves as a useful basic framework for tone comparison. But this approach is insufficient at a more detailed level of comparison, especially when two speakers have different tone ranges, as com-

monly occurs between sexes. An example of the problem is given in Figure 14 below where the mean T1 pitch and mean T6 pitch of a South man (Speaker #1) and a South teenage girl (Speaker #3) are contrasted. The two speakers are already linearly normalized for mean T3 (represented by 0.0 Hz).

Figure 14. The Problem with Simple Linear F0 Normalization. Speakers #1 and #3 contrasted in terms of T1 and T6 ranges. Mean T1 and T6 tone tracks are shown. N=124. In Hz normalized for duration and mean T3 pitch.



One gets the initial impression in Figure 14 that the man's tones (gray) and teenage girl's tones (black) are quite different, when in fact they are actually quite similar phonologically. The situation may be compared to that of a single cylindrical object being viewed through two different lenses: one view has narrow focus (whose edges are the gray lines), and the other view has wide focus (black lines). In this way, it appears that Figure 14



represents approximately the same cognitive object with two different surface realizations due to differences in speakers' pitch ranges.

### **Finding an Effective F0 Normalization Strategy**

A dizzying variety of F0 normalization strategies have been proposed for tonal languages. Zhu (1999:46-56) outlines six different strategies which have been used in prior work with varying success (z-score transforms, fraction of range transforms, proportion of range transforms, ratio of log semitone distances transforms, logarithmic z-score transforms, and logarithmic proportion of range transforms). Rose also investigates different F0 normalization methods for tone (1987, 1991, 1993, 1994).

Keeping in mind the goal of achieving meaningful comparison between speakers, it is reasonable to expect that different languages' tone systems may respond better to different normalization techniques. After all, the goal of normalization is to filter out the less relevant differences (such as differences in mean pitch or pitch range) without losing the differences that reflect meaningful variation. The current study uses (logarithmic) semitones normalized for mean T3 pitch, finding non-logarithmic approaches to ineffective. For example, a simple non-logarithmic "fraction of range" transform (Earle 1975, Takefuta 1975, Rose 1982 inter alia, cited in Zhu 1999:47) was found to be less effective in Sui high tones, and it introduces additional sources of error due to variance in the tones used for defining the pitch range.

The normalization approach advocated here is the logarithmic scale of musical semitones (“semitone” is defined below). This approach is used by many tone researchers (see Zhu 1999: 45ff., 78ff., Edmondson et al. 2004, Baken 1987:127 (cited in Zhu 1999:47), Hart et al. 1990:24 (cited in Zhu 1999:47) inter alia), and its effectiveness is highlighted by the (fascinating) observation that men’s and women’s semitone ranges are usually about the same, even though their raw F0 frequency ranges may be very different: “...the females’ F0 range is significantly larger than the males’ in terms of absolute Hz, but the same as the males’ in semitones” (Zhu 1999:78).

A semitone is a half-step in the musical scale; there are 12 semitones in an octave. Therefore, when a given frequency is doubled, it becomes 12 semitones higher. The Hz-to-semitone conversion used here is taken from the Praat 4.1.28 manual:

(7)

$$\text{Semitones} = 12 \times \ln (H / 100)$$

---


$$\ln 2$$

where H is the raw acoustic frequency in Hz.

This semitone approach is more effective than non-logarithmic normalization techniques due to the following: (1) It accounts more accurately for the fact that higher pitches have greater variances, i.e., the auditory range is more sensitive at lower pitches (see Johnson 2003:52, Ladefoged 1996:78). (2) It doesn’t require the use of pitch range boundaries, so it is not dependent on computing those boundaries on the basis of other tones, each of which would have its own variance and other problems to worry about. Finally, (3) the

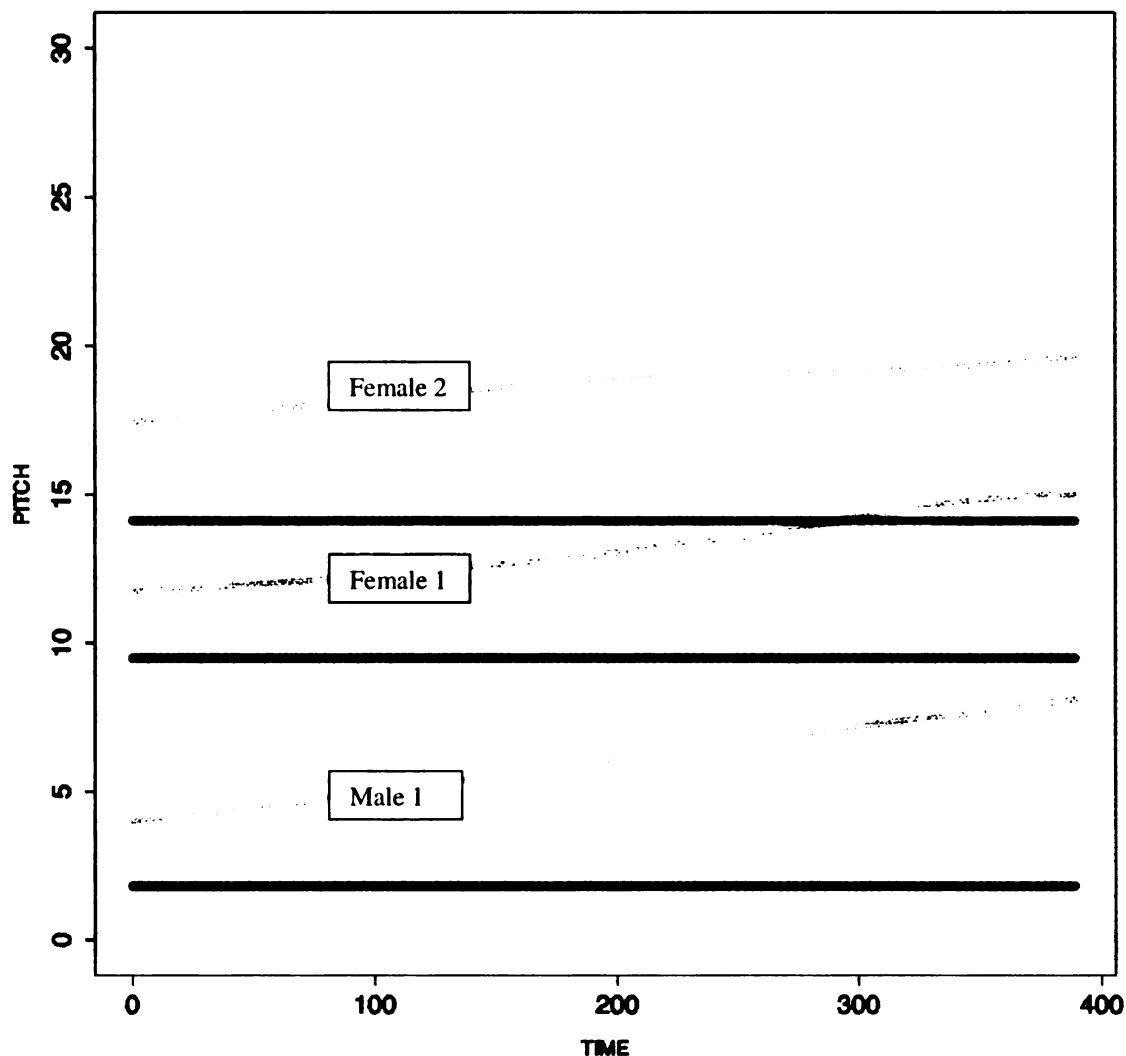
same equation can be used for both the upper and lower registers of the tone system (when the non-logarithmic “fraction of range” transform was used, a separate pitch range had to be computed for the Sui tones’ lower register and upper register since they don’t appear to be symmetrical in Hz).

In addition, strong support for the logarithmic semitone approach is found in Zhu’s (1999:75) empirical observation that men and women have very similar semitone ranges even when raw F0 ranges differ. Zhu finds that the Hz difference between the sexes in Shanghai Chinese is “eliminated” when converted to semitones: “...both male and female groups have almost the same semitone range, 9.6 and 9.5 semitones” (1999:75). While other differences besides gender occur in the current study (e.g., age), Zhu’s finding suggests that the logarithmic relationship between Hz and semitones fits the human auditory experience of tone very closely. Moreover, as noted above, semitones have been used in numerous other studies as well.

### **Using Semitones to Normalize the Pitches**

For the current study, the first step is to convert to semitones. In Figure 15, the gray lines represent the means of T6 *in semitones* for three South speakers. It is clear that the two females’ mean T6 tone tracks are higher than the male’s. Each speaker’s mean T3 value is also plotted in semitones (black lines).

Figure 15. T6 for Three South Speakers. Plotted in semitones versus relative time. Gray = mean of T6. Black = the value of the mean T3 of each speaker (a single mean value, not a mean tone track).



This figure suggests that Zhu's (1999:75, 78) observation about men's and women's semitone ranges holds true for Sui as well. The three speaker's T6 tracks are very similar when viewed in relation to their mean T3 pitches (in semitones). That is, one gets the impression that if the three pairs of gray and black lines were "stacked" on top of each other, they would look quite similar in both contour and relative height. And that is exactly the approach here; speakers' raw T6 frequencies are converted to semitones, and

their mean T3 frequencies are also converted to semitones and used to normalize each respective speaker.<sup>4</sup>

Finally, although the illustration above shows why semitones are considered the best normalization strategy for these data, converting the mean track from Hz into semitones (as above) risks the possibility that some non-linear differences in the raw Hz tone tokens could become invisible when their Hz means are converted to semitones. So it is better to take the mean of the tokens *after* they have been converted to semitones. Actually, very few differences were seen when the two methods were compared for the data in the current study, but this latter approach ensures that such uncertainties won't exist, and it is therefore more reliable for future work. Moreover, differences may arise in detailed statistical analysis if the mean is not calculated in this more precise way (i.e., computing the mean after converting individual tokens to semitones). In fact, Speaker #40's classification tree result for T1 (Section 3.3.2.2.7) was affected. Thus, for the analysis below, the mean tracks were recomputed; each raw token from each speaker's set of individual tone tokens was converted from Hz to semitones, and then the mean of each tone for each speaker was computed from each such set of semitone tokens.

---

<sup>4</sup> Note that if there is no need to compare a group of speakers against one absolute frequency, then each speaker can be normalized directly from the equation in (7) above. That equation is configured so that 100 Hz is 0.0 semitones, so the 100 Hz value in the equation can be simply replaced each time with a given speaker's mean T3 value -- rather than first using (7) as is to convert a given tone to semitones and then using (7) again to convert that speaker's mean T3 frequency to semitones and subtracting it from the first tone.

### **3.3.2.2.7 Results for the T1 Variable for Married Women and Baseline Speakers**

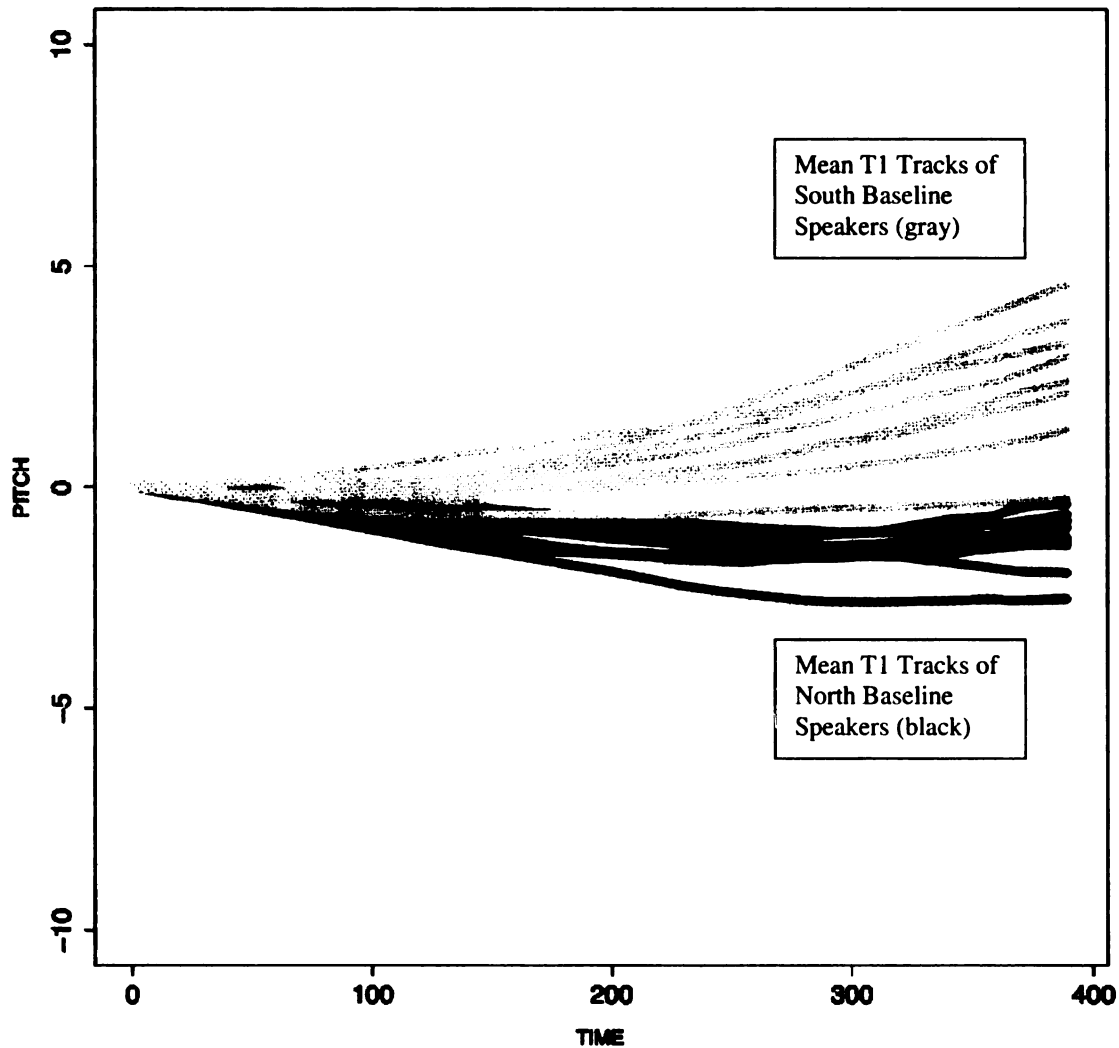
With these technicalities out of the way (see above), it is now possible to look at some real results. The goal is to determine whether or not the immigrant women have acquired exolectal tone features. The first tone to be examined here is the low tone, T1. Has T1 changed significantly in the women's speech? As seen in Figures 9-10 above, T1 is low and slightly falling in the North, and it is low and slightly rising in the South. T1 involves a very subtle dialect variation that consultants do not report, unlike T6 which has a dramatic pitch difference.

For T1, the locus of variation is contour. A graphical representation of the North-South baseline contrast in T1 contour is provided, and then the immigrant married women's T1 tones are shown graphically. Results of a classification tree analysis are then presented which classify the immigrant women's T1 as either North or South. Finally, results of linear regressions performed on the data are presented, as well as an ANOVA performed on the slopes that were computed by the linear regressions.

In Figure 16 the baseline mean T1 tracks are compared by region to show the baseline dialect variation. Each black line represents the mean T1 pitch track taken from all the tokens of one individual North baseline speaker. The whole group of black lines represent the mean T1 tracks for all the North baseline speakers, namely, Speakers #17,18, 20, 21, 22, 23, 30, 31, 32, 33, 34 (see Table 3 for description of the speakers). Likewise, each gray line represents the mean T1 pitch track taken from all the tokens of one individual South baseline speaker. The group of gray lines therefore represents the South baseline

speakers: Speakers #1, 2, 3, 4, 35, 36, 37, 38. The tones are normalized using the semitone procedures described above. To maximize the contour contrast in the figure, the tone tracks are plotted on the basis of a pitch of 0.0 semitones at time=0.

Figure 16. Baseline North and South Speakers' Mean T1 Tracks. N=417. Plotted in semitones. Pitch=0.0 semitones at time=0. Gray=South; Black=North.



Standard deviations at t=390 (i.e., the far right side of Figure 16) are given in Table 5 below.

**Table 5. Standard Deviation at t=390 for T1 for Baseline Speakers.**

South		North	
Baseline Speaker #	Std. Dev. at t=390 (semitones)	Baseline Speaker #	Std. Dev. at t=390 (semitones)
#1	0.8706668	#17	0.5990332
#2	0.6162398	#18	0.4995943
#3	0.8800699	#20	1.011651
#4	1.771535	#21	0.6658991
#35	2.064549	#22	1.016327
#36	2.201185	#23	1.220451
#37	2.370386	#30	1.625821
#38	1.730728	#31	0.6393213
		#32	1.740269
		#33	1.883601
		#34	0.8530562

Since the main locus of variation for T1 is the rise at the end of the tone, Figure 17 gives a closer view of the variation by zooming in on the right side (from t=200 to t=390). This portion is also more useful for quantitative analysis since linear regression is more accurate in this region of largely straight lines (before t=200, speakers in both regions sometimes have a slight dip or curve in their T1 tone tokens).



Figure 17. Mean T1 Tracks from t=200 to t=390 for Baseline Speakers (Gray=South, Black=North). N=417. In semitones. Pitch = 0.0 semitones at t=200.

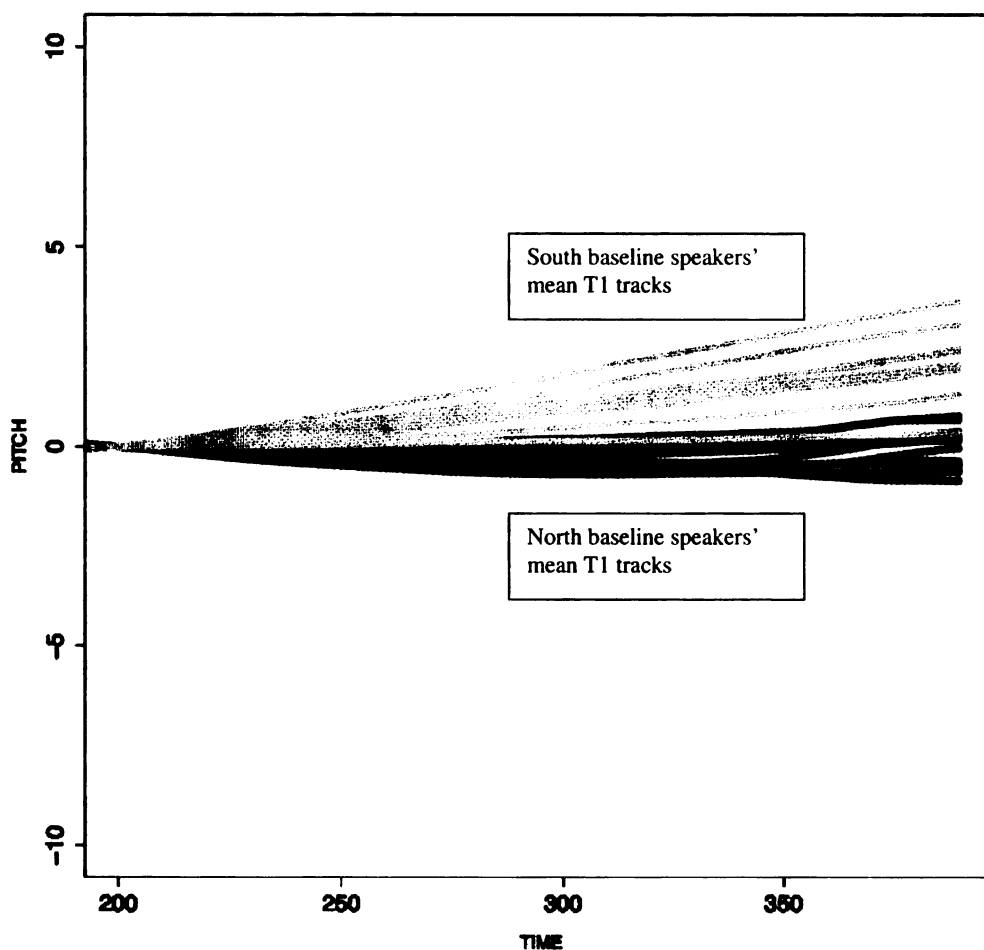


Figure 17 shows a distinct North-South contour contrast in T1. Only one of the South baseline speakers overlaps with the group of North speakers, Speaker #2 (lowest gray line), a shy 16 year-old girl. As discussed below when the immigrant married women's T1 results are described, T1 is very susceptible to subtle intonation differences or differences in speaker style. If a speaker tends to end his or her phrases with a slight falling intonation, then the rising component of South T1 will be less apparent. Speaker #2 was

noted to have a shy, quiet speaking style, and therefore her slightly lower T1 is not surprising.

Linear regressions are now performed on the slopes of each baseline speakers' mean T1 tone tracks. The slope is taken from  $t=200$  to  $t=390$ , i.e., the full duration of Figure 17 above. The results are given in Table 6. (Units of slope are semitones per relative time point.)

Table 6. Mean T1 Linear Regression Results (slopes) for Baseline Speakers.

Speaker	T1 Slope	Clan
#1	0.01266	South
#2	0.001891	South
#3	0.01014	South
#4	0.006537	South
#35	0.0168	South
#36	0.01273	South
#37	0.01962	South
#38	0.01143	South
<i>South Mean = 0.011476</i>		
#17	-0.002712	North
#18	-0.005111	North
#20	0.001140	North
#21	-0.002011	North
#22	0.0007025	North
#23	-0.001298	North
#30	0.004044	North
#31	-0.00239	North
#32	0.003865	North
#33	0.00239	North
#34	0.001027	North
<i>North Mean = - 0.0000403</i>		

The linear regression results quantify the observation from Figure 17 that South T1 has a higher slope; the slope is positive for all South baseline speakers (Table 6). North T1 has little or no positive slope, and the mean is practically zero (Table 6).

### **Married Women's T1**

With the baseline T1 contour contrast established, the immigrant married women's T1 tones can now be compared to their original dialect regions to see if they have acquired traits of T1 in the husband's region. First, the South married women are plotted with the North baseline speakers to see whether the South married women have acquired the North T1 variant. In Figure 18, each black line represents the mean T1 tone track for one of the North baseline speakers. The group of black lines represents the mean T1 tracks for all of the North baseline speakers. Each gray line is the mean T1 track for one of the South married women. Standard deviations at  $t=390$  are given in Table 7 (below the figure).

Figure 18. North Baseline Mean T1 Tracks (black) and South Married Women's Mean T1 Tracks (gray). N=435. Plotted in semitones. Pitch = 0.0 semitones at t=200.

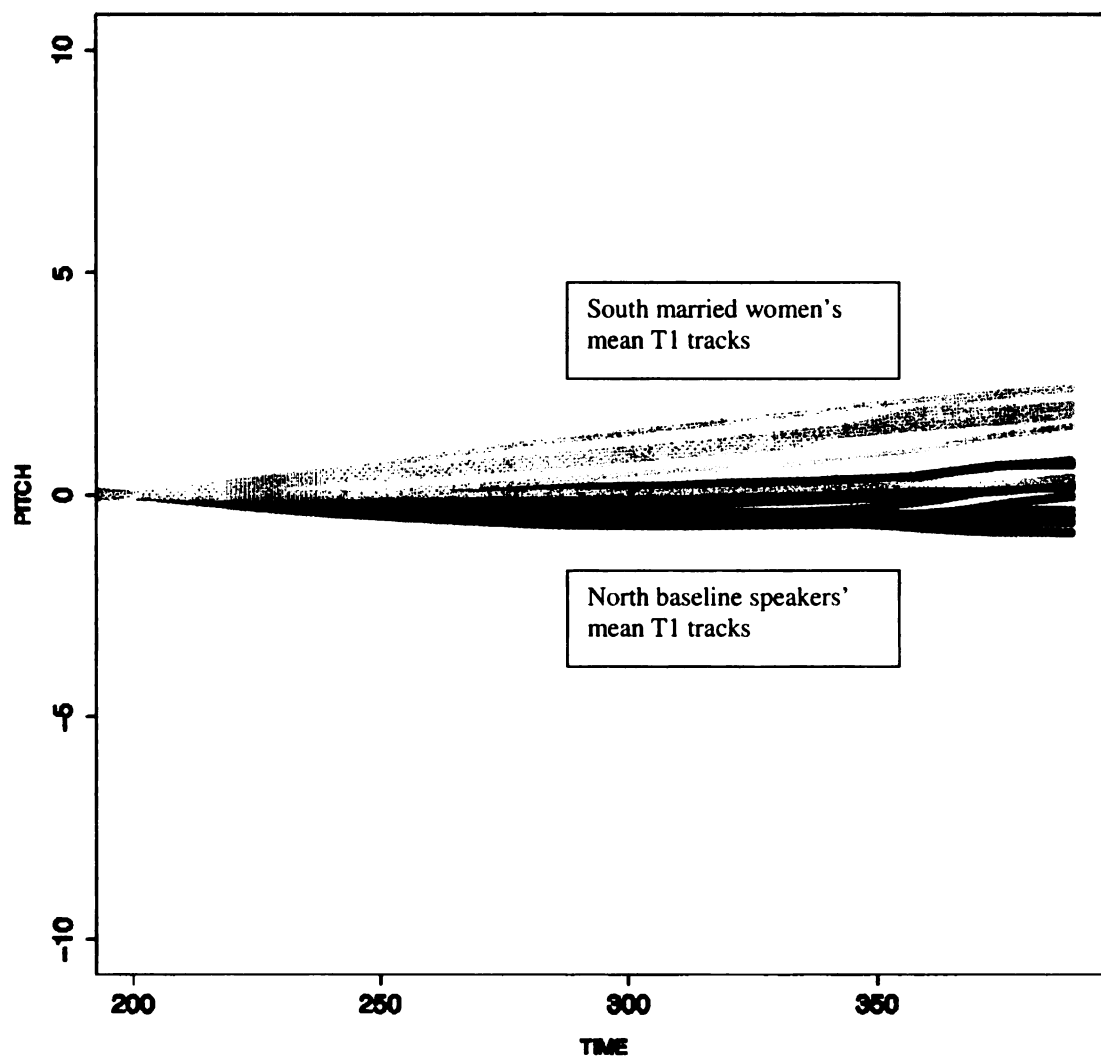


Table 7. Average Standard Deviation at t=390 for T1 for South Married Women.

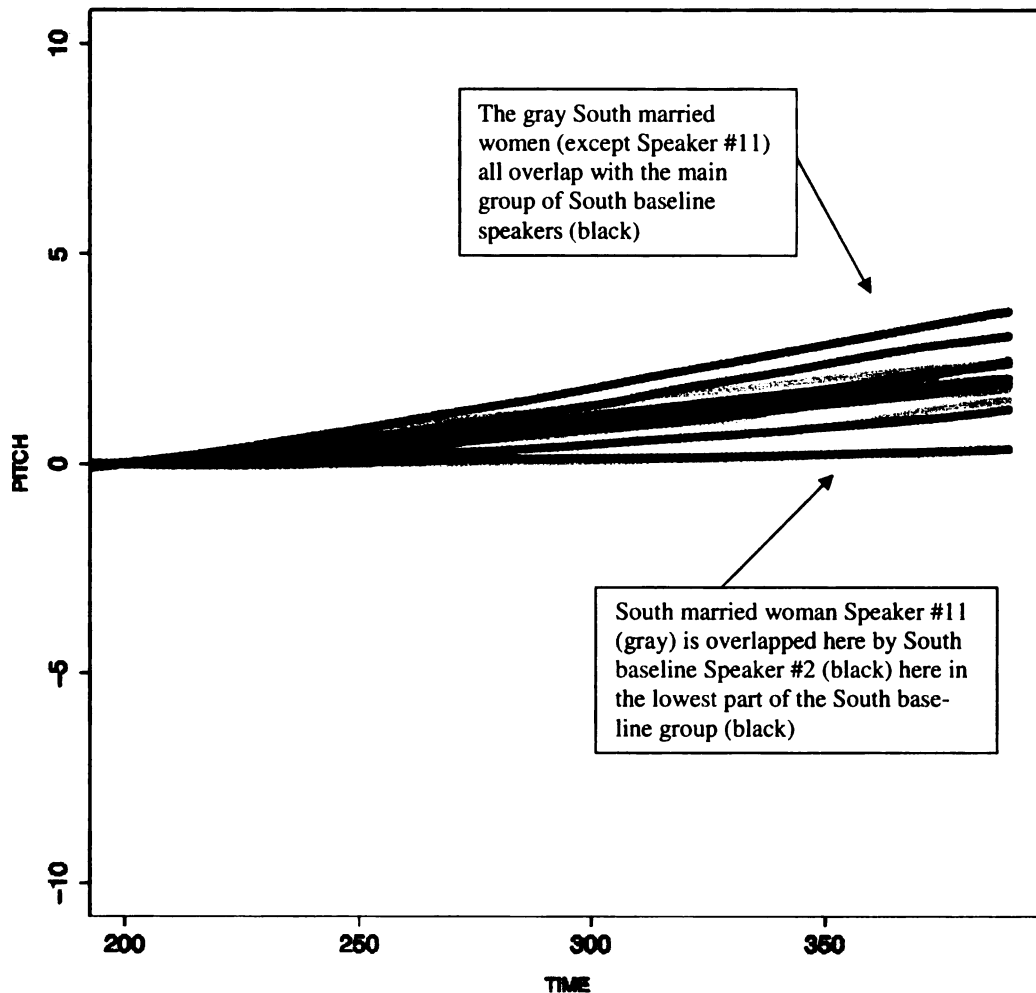
Speaker #	Avg. Std. Dev. at t=390 (semitones)
#5	1.493031
#6	1.165251
#7	1.070102
#8	1.096328
#11	0.781126
#15	2.606924
#41	1.452308
#42	2.045086
#43	1.841444

With the exception of Speaker #11, (the lowest gray line in Figure 18), the South married women are all clearly separated from the North baseline group. That is, they maintain their original clan's T1 rather than acquiring the exolectal T1.

Speaker #11 is a 29 year-old South woman who had been married for 10 years in the North region. In the original tone data extraction, the author made a note that this speaker had a tendency to emphasize words by adding a non-lexical particle *-a* which had falling intonation. This was observed to affect her T1 contour, and so her low mean T1 contour is attributed to this particular personal mannerism rather than acquisition of North T1. This analysis is supported by the fact that she shows no sign of North acquisition in any of her other variables (see her lexical results in Section 3.3.1 above, T6 results in Section 3.3.2.2.8, and segmental results in Section 3.3.3.2.2). In addition, recall from Figure 17 above that a very similar individual T1 difference was observed among the South baseline speakers, too (i.e., Speaker #2).

Next, the same South married women are now plotted against the South baseline speakers (Figure 19). Here black lines represent the mean T1 tracks of South baseline speakers, and gray lines represent the South married women's mean T1 tracks.

Figure 19. South Baseline Mean T1 Tracks (black) and South Married Women Mean T1 Tracks (gray). Plotted in semitones. Pitch = 0.0 semitones at t=200. N=388.

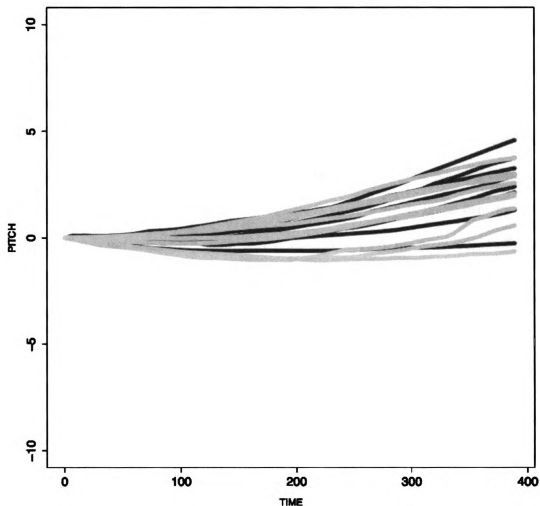


The South married women are well within the contour range expected for South T1. The lowest South married woman, Speaker #11, overlaps with the lowest South baseline speaker, Speaker #2, who was discussed above with the baseline data. Speaker #2 shows that although most baseline speakers show the T1 contrast, some speakers do not always have a distinct contrast in this subtle tone, especially given that T1 is susceptible to word-final intonation effects.

The overall result of the graphical analysis of the South married women is quite apparent; for the most part, the South married women's T1 tracks closely resemble the contour of their original South dialect (i.e., Figure 9) and not the T1 contour of the exolect, North (i.e., Figure 10). Recall that the T1 contour variable is a subtle distinction for which the consultants do not have declarative knowledge (no T1 words have ever been offered as examples of the North/South dialect contrast even though T6 words are commonly offered). Thus, the graphical results here suggest that the South women are maintaining the patrulect at a very sensitive level.

For an additional perspective, the South married women's T1 tracks are plotted (Figure 20) starting from  $t=0$ , rather than  $t=200$  (recall that  $t=200$  to  $t=390$  has been used above due to the fact that it appears to be the portion of the syllable that provides the best contour contrast and because it provides a better straight-line region for linear regression).

Figure 20. South Baseline Mean T1 Tracks (black) and South Married Women Mean T1 Tracks (gray). Plotted in semitones. Pitch = 0.0 semitones at  $t=0$ .  $N=388$ .



From Figure 20, it is apparent once again that the South married women's T1 (gray) closely resembles the South baseline T1 (black) (compare also the North and South baseline data in Figure 16 from the same vantage point of  $t=0$  to  $t=390$ ). As before, the lowest black track is Speaker #2 as discussed above, and the lowest gray track is Speaker #11, also discussed above. But notice that from this vantage point, two other gray tracks can be seen dipping into the lower side of South T1, namely, South married women Speakers



#8 and #15. Yet both of these speakers finish their T1 syllables with slopes that are very similar to the other South speakers, and they are considered to have South T1 contours for that reason. The fact that these two women have a slight dip earlier in the syllable (around  $t=200$ ) is not considered to be a dialect contrast but rather a difference due to individual variation. It may reflect the fact that T1 is the lowest tone in the inventory, and speakers may vary their articulation of the lowest end of the pitch range. For example, T1 is often produced with creaky voice (cf. Mandarin Chinese Tone 3), and sometimes voicing even completely stops during the tone, making Praat pitch-tracking impossible for such tokens. Thus, the dip in T1 for Speakers #8 and #15 is noted here for future reference but is not considered significant since their slope in the main region of dialect contrast ( $t=200$  to  $t=390$ ) is very South-like and leaves them well within the South T1 pitch range by the end of the syllable.

### **North Married Women**

Although results from North married woman are limited, three women (two North clan women and one Northeast clan women (see Section 3.1)) can be investigated as a control group in order to show that the South women's dialect maintenance is not unique to the South clan for some linguistic or social reason (i.e., markedness or prestige). First, the two North married women's mean T1 tracks are plotted with the North baseline speakers in Figure 21. The women's standard deviations are listed in Table 8 below.

Figure 21. North Baseline Mean T1 Tracks (black) and North Married Women Mean T1 Tracks (gray). Plotted in semitones. Pitch = 0.0 semitones at t=200. N=281.

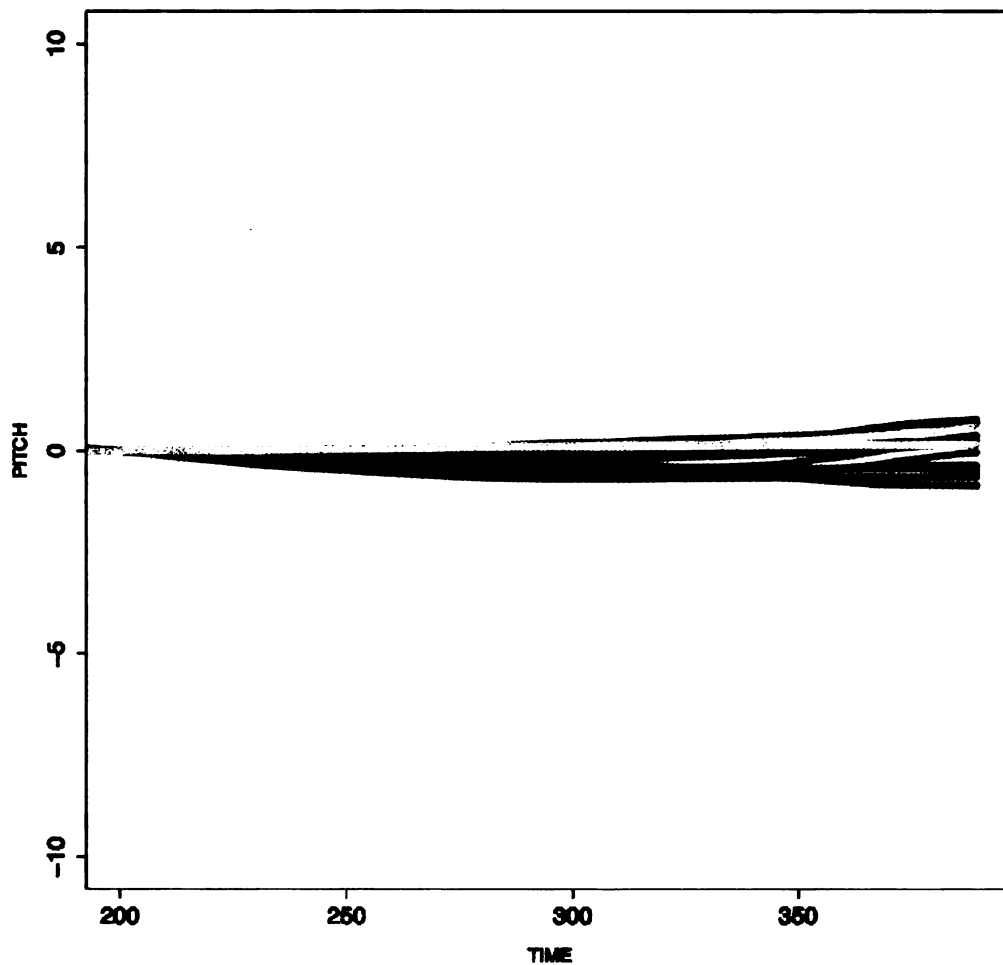


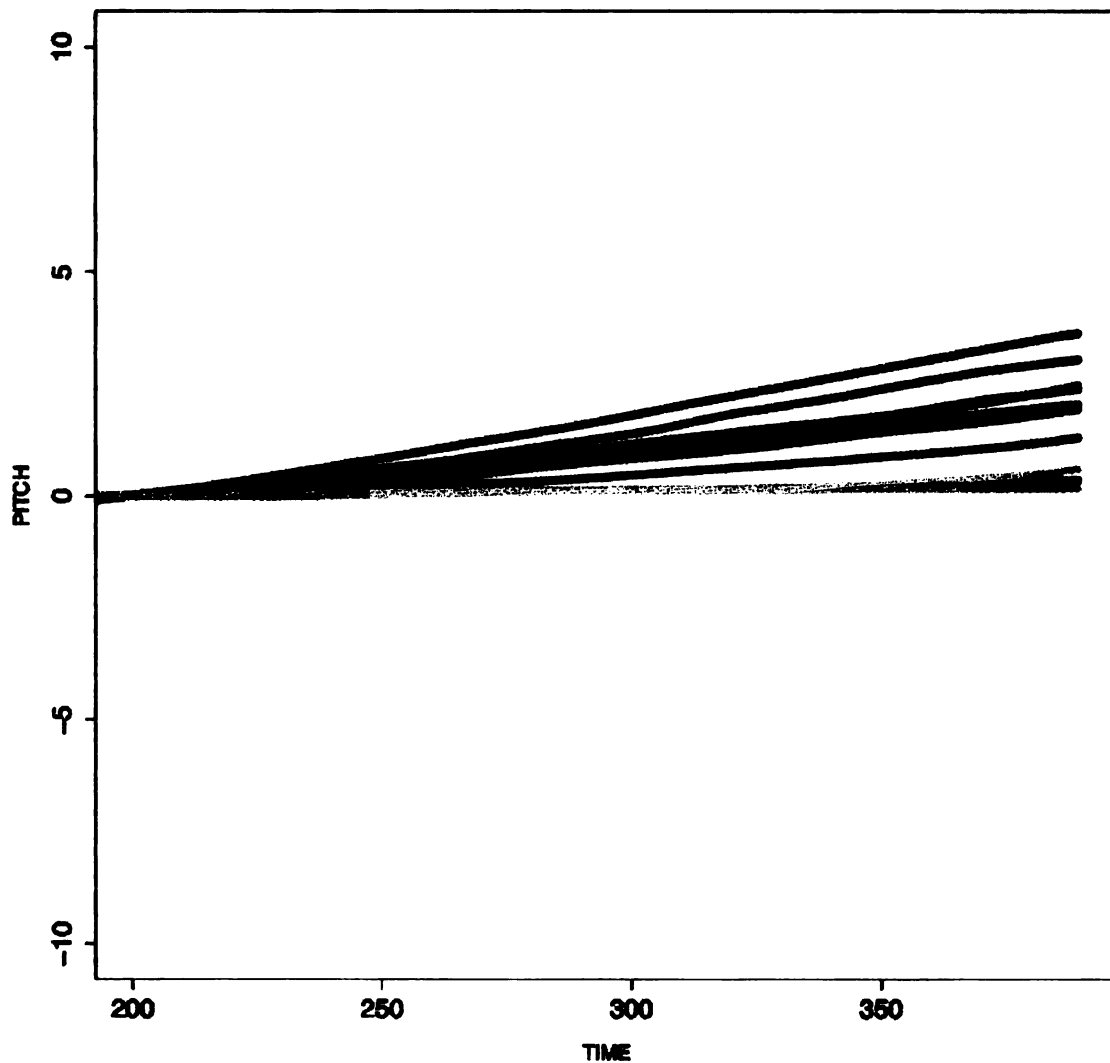
Table 8. Standard Deviations at t=390 for North Women's T1.

Speaker #	Std. Dev. at t=390 (semitones)
#39	1.065630
#40	1.437598

Figure 21 above shows that the married women of the North clan have maintained their original North T1 variants just as the South married women maintained the South T1.

Now contrast the North women with the South baseline speakers (Figure 22).

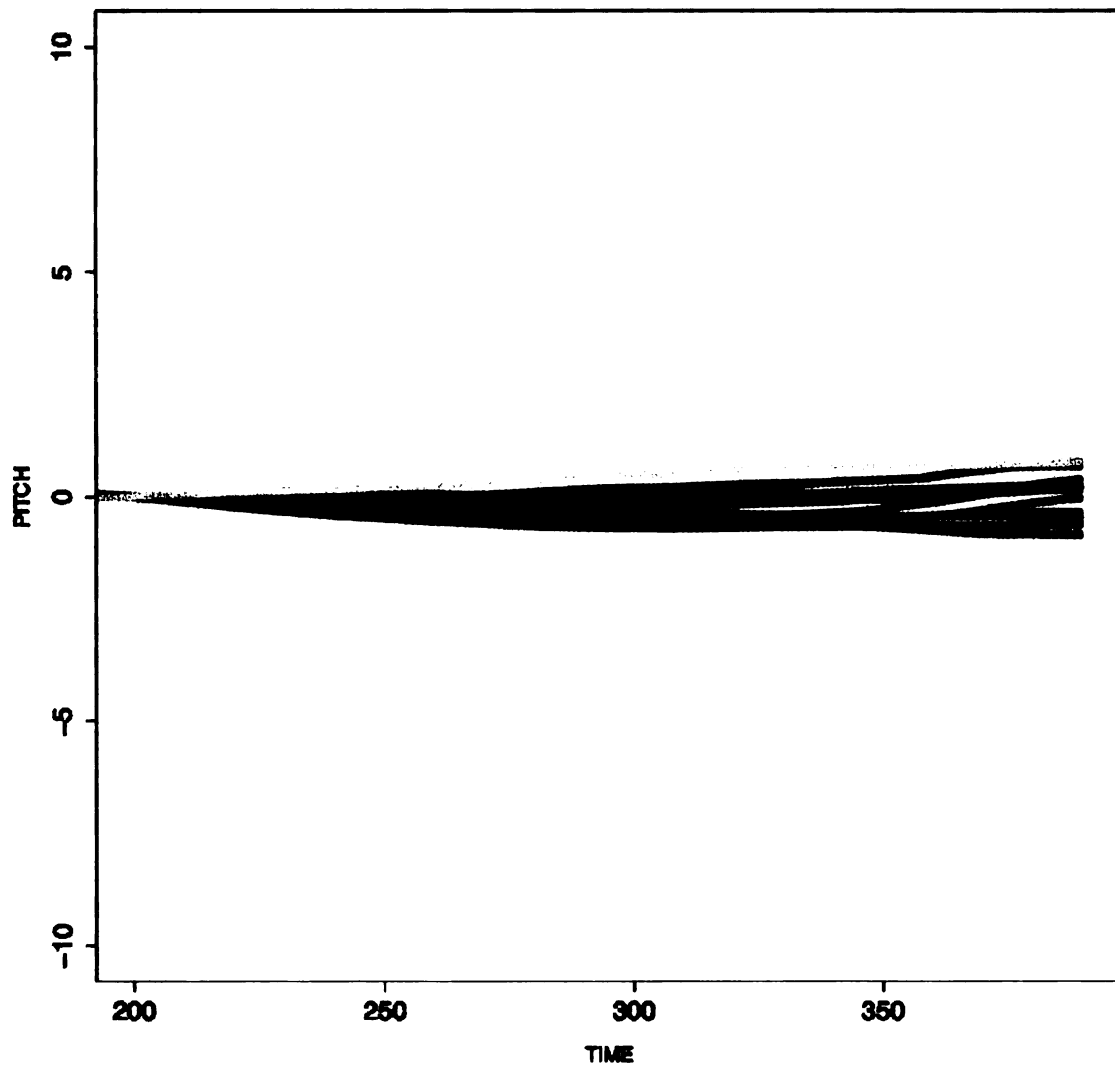
Figure 22. South Baseline Mean T1 Tracks (black) and North Married Women Mean T1 Tracks (gray). Plotted in semitones. Pitch = 0.0 semitones at t=200. N=234.



For the two North clan married women, represented by the lower two gray lines, it is clear that they do not fit in with the bulk of the South T1 tracks. Their slopes are much lower than most of the South speakers, i.e., they differ from the exolect. (Note: the lowest black line is South baseline Speaker #2 discussed above with Figure 17). Instead, the North women's T1 contours are more like their patrilect, North, shown in Figure 21 above.

Finally, the Northeast clan married woman, Speaker #44, is plotted. As discussed in Section 3.1, this speaker has a different surname and originated in a different clan than the North clan speakers in the study. Her home clan is located to the east of the North clan. Although the Northeast clan shares general northern features, it has its own dialect differences, including suspicious differences in the tone system. Therefore, Speaker #44's tone data should be taken with a fairly large grain of salt. Her mean T1 track is plotted separately in Figure 23 with the North baseline speakers. Her standard deviation is 1.105996 at  $t=390$ .

Figure 23. North Baseline Mean T1 Tracks (black) and Speaker #44 (Northeast Married Woman) (gray). Plotted in semitones. Pitch = 0.0 semitones at  $t=0.0$ .  $N=255$ .



Speaker #44's mean T1 track lies in the range of the North baseline but on the high side, so that she is essentially at the boundary of the two regions. Further research of the Northeast clan would be necessary to determine whether this T1 is typical of a baseline dialect in that region.

## Linear Regression for T1

When linear regression was performed (in R 2.4.1) on the married women's mean T1 slopes, the following results were obtained (Table 9). Baseline results are repeated from Table 6 above so that they can be compared with the married women.

Table 9. Linear Regression Results for Mean T1 (Pitch in semitones versus relative time for t=200 to t=390)

Speaker #	Slope (in semitones per relative time point)
South Baseline Speakers:	
#1	0.01266
#2	0.001891
#3	0.01014
#4	0.006537
#35	0.0168
#36	0.01273
#37	0.01962
#38	0.01143
<i>South Baseline Mean = 0.011476</i>	
South Married Women:	
#5	0.00957
#6	0.01110
#7	0.00981
#8	0.008
#11	0.002012
#15	0.01222
#41	0.01027
#42	0.009972
#43	0.01313
<i>South Married Women Mean = 0.009564889</i>	

Table 9 continued.

North Baseline Speakers:	
#17	-0.002712
#18	-0.005111
#20	0.001140
#21	-0.002011
#22	0.0007025
#23	-0.001298
#30	0.004044
#31	-0.00239
#32	0.003865
#33	0.00239
#34	0.001027
<i>North Baseline Mean =</i> <i>-0.0000403</i>	
North Married Women	
#39	0.0007832
#40	0.002585
#44	0.004254
(Northeast)	
<i>North Married Women Mean:</i> <i>Without Speaker #44:</i> <i>0.0016841</i> <i>With Speaker #44:</i> <i>0.002540733</i>	

From the slopes given in Table 9, both the South baseline speakers and the South married women have notably positive mean T1 slopes, while the North baseline speakers' slopes hover around zero. The North women's T1 slopes are considerably lower than the South speakers. Of the two North women, Speaker #40 has a slightly more positive slope, yet note that several North baseline speakers have positive slope, too, including two that are even higher than Speaker #40. Moreover, Speaker #40 has a negative T1 slope if considered from  $t=0$  to  $t=390$ : -0.001573.

The North women's mean T1 slope is 0.0016841, which is 6.8 times lower than the South baseline speakers and 5.7 times lower than the South married women. This shows that the North women have not adopted the exolectal T1 slope. However, when the two North women's results are combined with the Northeast clan woman (Speaker #44), the mean T1 slope is somewhat higher (0.002540733), although it's still 4.5 times lower than the South baseline speakers and 3.8 times lower than the South married women. Since Speaker #44 is from the Northeast clan, which appears to have some (unknown) differences in the tone system, her result should be considered with a great deal of caution. It should also be noted that although Speaker #44's slope is not too far out of the range of the other North speakers in this part of the syllable ( $t=200$  to  $t=390$ ), when the range from  $t=0$  to  $t=390$  is considered, her slope is considerably higher, probably reflecting a North-east tonal trait.

### **ANOVA Results for Mean T1 Slopes**

ANOVA confirms these interpretations of the slope data (significance at  $p \leq 0.05$ ; conducted in R 2.4.1). First of all, the North and South baseline groups were found to be significantly different in mean T1 slope:  $F=34.706$ ,  $p=0.00001778$ . Thus, the dialect contrast observed graphically in the baseline speakers (Figure 17) is confirmed. Similarly, the North married women and South married women were found to be significantly different in slope:  $F=12.564$ ,  $p=0.005317$ . This result shows that the married women maintain the T1 slope contrast of their patrillects.



Secondly, if the North women haven't changed their T1 slopes significantly, than one would expect the North married women and the North baseline speakers *not* to be significantly different with respect to the mean T1 slopes, and ANOVA shows this to be the case:  $F=2.0625$ ,  $p=0.1765$ . Similarly, the South married women were found not to differ significantly from the South baseline speakers:  $F=0.7785$ ,  $p=0.3915$ . Therefore, these results confirm the conclusions reached on the basis of the graphical evidence: (1) the two dialects are significantly different in T1 slope, and (2) the married women (both North and South) have maintained that subtle T1 contour variant of their respective home clans.

### **Classification Trees for T1**

Additional evidence for this analysis can be gained through a classification tree analysis (Breiman, Friedman, Olshen, & Stone 1983; configured for R in Atkinson & Therneau 2000). The classification tree procedure (conducted in R 2.4.1) clusters the data according to their similarity. If the computation determines that a given speaker's mean T1 slope clusters more with the North baseline group than the South baseline group, then "N" is listed for that speaker below. If a given speaker clusters more with the South baseline group, then "S" is listed. Baseline speakers are checked as well.

As Table 10 shows, the classification tree procedure largely confirms the conclusions reached on the basis of the graphical evidence and ANOVA above.

**Table 10. Classification Tree Results for Mean T1 Slope (in the range t=200 to 390). “S” indicates the speaker clustered with the South baseline, and “N” indicates the speaker clustered with the North baseline.**

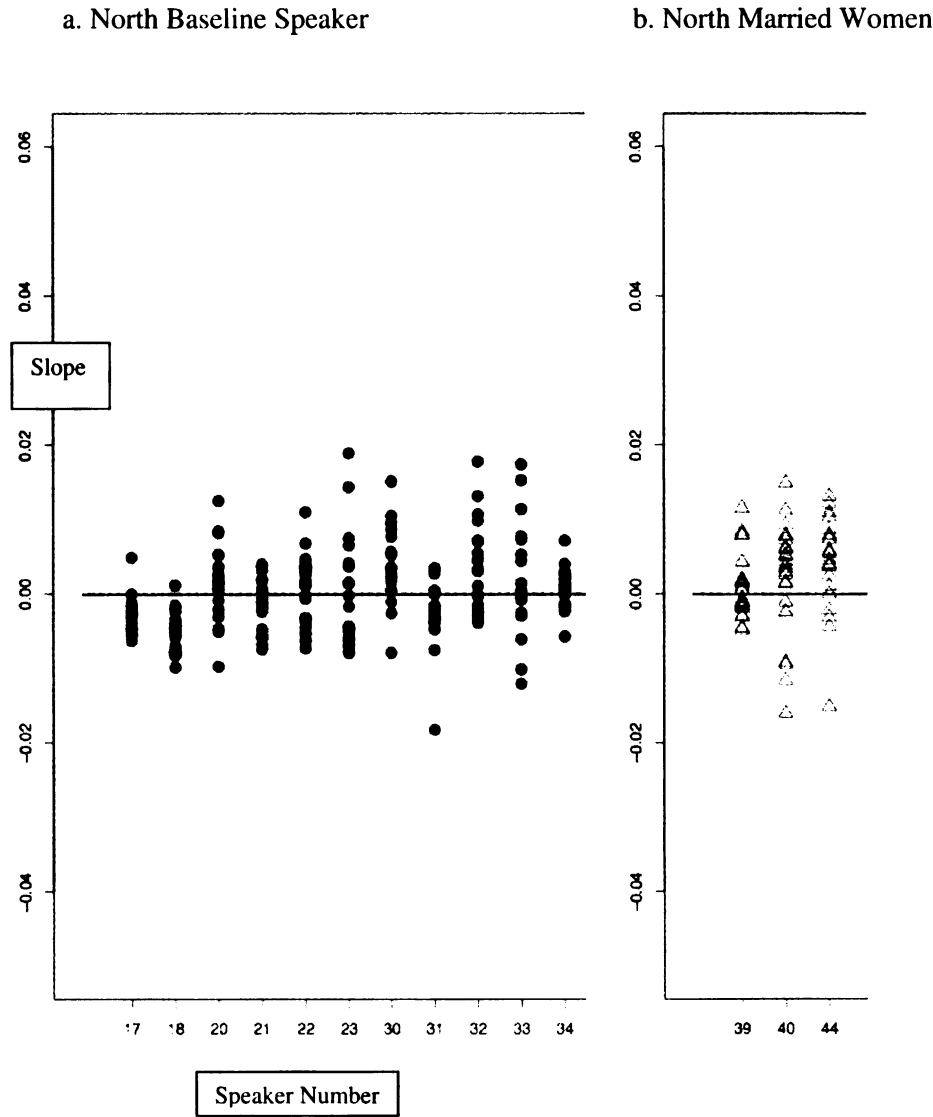
Speaker #	Result for Mean T1 Slope (t=200 to 390)
<b>South Baseline Speakers:</b>	
#1	S
#2	N
#3	S
#4	S
#35	S
#36	S
#37	S
#38	S
<b>South Married Women:</b>	
#5	S
#6	S
#7	S
#8	S
#11	N
#15	S
#41	S
#42	S
#43	S
<b>North Baseline Speakers:</b>	
#17	N
#18	N
#20	N
#21	N
#22	N
#23	N
#30	N
#31	N
#32	N
#33	N
#34	N
<b>North Married Women:</b>	
#39	N
#40	N
#44 (Northeast clan)	N

Considering the subtle nature of the T1 variable, these results are strikingly consistent with the graphical analysis and ANOVA results above. In the classification tree output, only Speaker #2 (one of the baseline South speakers) and Speaker #11 (one of the South married women) were computed to cluster with a group other than their own patrulects. Those are exactly the same two speakers that were singled out for individual discussion above on the basis of the graphical evidence (Speaker #2 is a shy North baseline teenager, and Speaker #11 is a South married woman who added an *-a* particle to her T1 words and the intonation apparently affected T1.)

### **Linear Regression on Individual T1 Tokens**

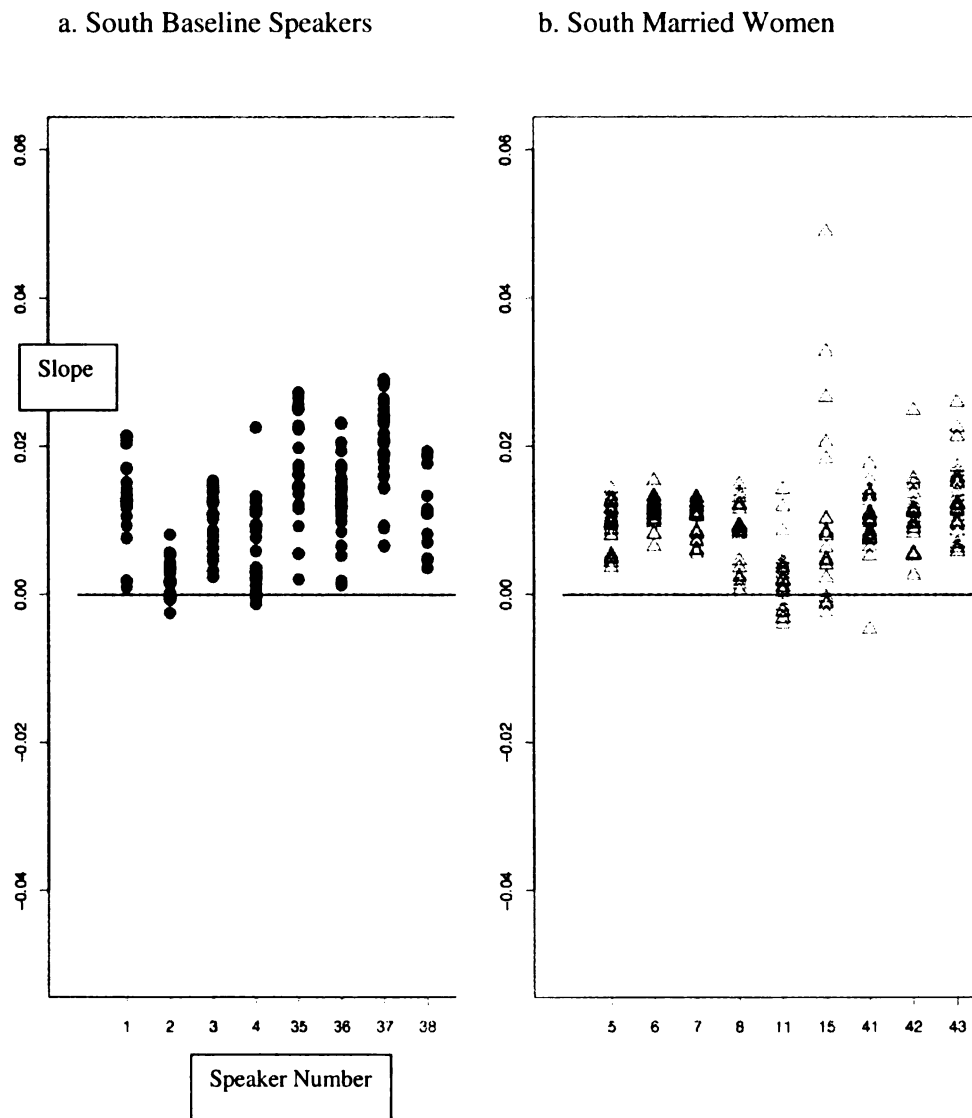
The ANOVA computations above were performed on the linear regressions of the mean T1 tracks of the speakers. As a further check on that result, a more fine-grained perspective was gained by running linear regressions on each of the individual tokens of the speakers. The slopes of the individual T1 tokens are plotted below. In Figure 24, the horizontal axis is organized by Speaker Number, i.e., North Baseline Speakers #17-18, 20-23, 30-34, and North Married Women Speakers #39-40, 44. Each dot represents the slope (computed by linear regression) of an individual T1 tone token of the North baseline speakers (for  $t=200$  to 390). The triangles are the slopes of each individual T1 tone token of the North married women. Notice that the T1 slopes of both the North baseline speakers and the North immigrant women are clustered around zero (and therefore considerably lower than the South speakers in Figure 25 below).

Figure 24. Slopes of Individual T1 Tokens of North Baseline and North Married Women. Organized by Speaker Number on the Horizontal Axis.



Next, Figure 25 shows the South T1 slopes. As before, the horizontal axis is organized by Speaker Number (South Baseline Speakers #1-4, 35-38, and South Married Women Speakers #5-8, 11, 15, 41-43). The dots are the slopes of each individual T1 token (for  $t=200$  to 390) of the South baseline speakers. The triangles are the slopes of each T1 token of the South married women.

Figure 25. Slopes of Individual T1 Tokens of South Baseline and South Married Women. Organized by Speaker Number on the Horizontal Axis.



In Figure 25, notice that both groups, the South baseline speakers and the South immigrant women, have mostly positive T1 slopes, except for Speaker #11 (see Figure 18 and following discussion). Within-speaker variance of speakers in the two groups appear to be comparable except for Speaker #15. But note that the only tokens that show large

variance in Speaker #15's data are tokens that are actually higher than the South baseline speakers (and therefore in the opposite direction of any possible acquisition of the exolectal low North T1 slope).

When ANOVA was performed on these tokens, the North and South baseline regions were found to be significantly different as before:  $F=298.75$ ,  $p < 0.000001$ . The North and South married women were found to maintain that same North-South dialect contrast:  $F=62.517$ ,  $p < 0.000001$ . However, when the North baseline and North married women were compared, they were found to be significantly different ( $F=9.9467$ ,  $p = 0.001782$ ), but they were not significantly different if Speaker #44 was removed:  $F= 3.6469$ ,  $p=0.05725$ . As noted above, Speaker #44's tones have been under suspicion from the beginning since she is from a different clan (the Northeast clan), so this result is consistent with the conclusion that North clan women have not significantly adapted toward the South clan T1.

Similarly, the South baseline and South married women were significantly different ( $F=8.4486$ ,  $p=0.003874$ ) unless Speaker #11 was excluded (see Figure 18 and the discussion of her particular intonational speech style which affected her T1 words). Without Speaker #11, the South married women and South baseline were not significantly different:  $F=2.34$ ,  $p = 0.127$ . Thus, it appears that, like the North women, the South women have maintained the T1 contour of their patrillect (South).

### **Conclusions for the Married Women's T1**

In conclusion, the North-South dialect contrast in T1 contour is maintained in the married women according to their respective patrilects. Graphical analyses (mean tone tracks and individual slopes) and statistical analyses (linear regression on the mean T1 tracks, ANOVA on the mean slopes, linear regression on the individual T1 tokens, ANOVA on the slopes of the individual tokens, and classification tree analysis) were conducted to show that the married women have not acquired exolectal T1 but rather have maintained patrilectal T1.

The results of these analyses were quite consistent despite the fact that the T1 contour contrast is very subtle (speakers do not have declarative knowledge of this dialect contrast, and some prior dialect studies overlooked this dialect variable), and this subtle contrast in T1 is very sensitive to slight changes in intonation and speaker style.

A few idiosyncratic results were described. South baseline Speaker #2 had a T1 that was somewhat lower than the rest of the South baseline group. She is a shy teenager, and her speaking style her account for the lower T1 slope. Speaker #11 is a South married woman who added an *-a* particle to the words being elicited in the recording. This particle appears to have affected the intonation of her T1, giving her a lower slope. Speaker #44 is a Northeast clan women whose tones appear to be slightly different from the North clan women. Her results matched the other North women in most respects, but her T1 appears to be slightly higher in slope.

### **3.3.2.2.8 Results of the T6 Variable for Married Women and Baseline Speakers**

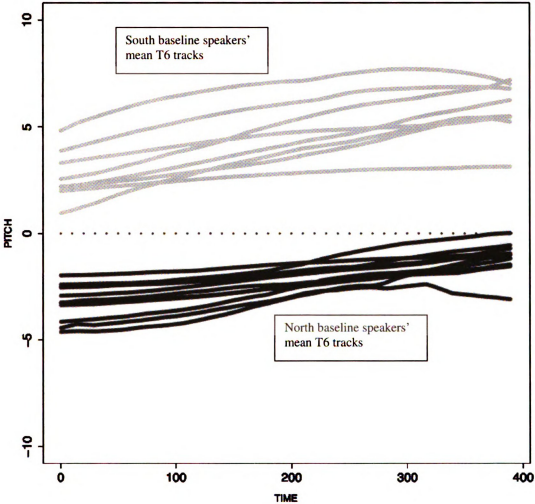
Recall from Figures 9-20 that Tone T6 has a dramatic North-South contrast. The contrast is observed as a salient difference in pitch. In the South, T6 is very high, starting near the maximum of T4. In the North, T6 starts below the midpoint (T3) and rises slightly, staying below the midpoint. T6 contour does not appear to contrast significantly in these dialect regions, so pitch is the variable analyzed here.

#### **T6 for Baseline Speakers**

The mean T6 tracks for each baseline speaker are plotted below. In Figure 26 below, each black line represents the mean T6 track of a baseline North speaker, while the gray lines are the South baseline speakers' mean T6 tracks.



Figure 26. North (black) and South (gray) Baseline Speakers' Mean T6 Tracks. In semi-tones; normalized for mean T3 and duration. N=309.



Standard deviations at t=390 (i.e., the far right side of Figure 26) are given in Table 11 below.

**Table 11. Standard Deviations at t=390 for T6 for Baseline Speakers**

South		North	
Baseline Speaker #	Std. Dev. at t=390 (semitones)	Baseline Speaker #	Std. Dev. at t=390 (semitones)
#1	1.132657	#17	0.535609
#2	0.8927766	#18	0.2991411
#3	0.8936832	#20	2.238058
#4	1.071809	#21	0.4973609
#35	1.968420	#22	0.9238374
#36	1.612006	#23	0.5712596
#37	1.779170	#30	2.298187
#38	3.867403	#31	0.7093918
		#32	0.8191314
		#33	0.9820417
		#34	1.122401

In Figure 26 notice the stark pitch contrast in T6 between the two dialects. The South speakers' T6 remains far above the midpoint (a dotted line representing the mean of T3), while the North speakers' T6 are almost all below the midpoint. Only one North speaker (Speaker #18) just barely crosses the midpoint. Thus, the categorical differences between the two regions' T6 variants is clear. Observe, however, that there is within-group variation as well. In particular, Speaker #4, a South teenage girl whose T6 is the lowest gray line in Figure 26, had a lower set of T6 tokens than the other South baseline speakers. The reason for her T6 variation is probably related to her speech style during the interview. She spoke quickly and often indistinctly, and the author had the impression that she was hurrying the interview. The T6 result for Speaker #4 is important since it shows that a South baseline speaker may be slightly lower than the rest, probably due to differences in personal intonation style in general or specific differences in speech style such as rate of speech or attention to speech. As explained below, a few of the South married women also have T6 tracks in the vicinity of baseline South Speaker #4, so Speaker #4's mean tone track serves notice that some slight T6 lowering due to speech style may occur.

### T6 for the Married Women: The South Women

In Figure 27, the South married women's mean T6 tone tracks are plotted in contrast to the North baseline speakers. A categorical difference is observed; the North baseline speakers' T6 tracks are lower in pitch than the South married women's. Standard deviations are given in Table 12.

Figure 27. North Baseline Speakers' Mean T6 Tracks (black) and South Married Women's (gray). In semitones; normalized for mean T3 and duration. N=326.

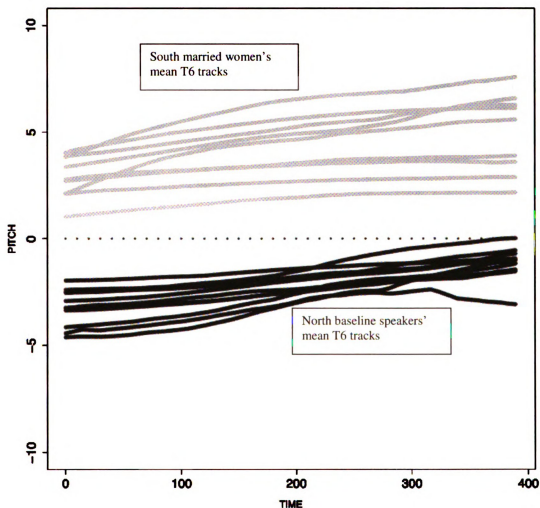
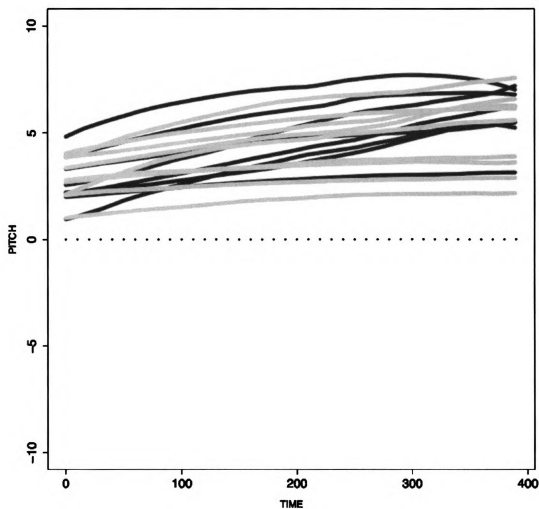


Table 12. Standard Deviations at t=390 for T6 for South Married Women

Speaker #	Std. Dev. at t=390 (semitones)
#5	1.047064
#6	0.6657559
#7	1.058121
#8	1.479066
#11	1.085712
#15	1.926102
#41	1.526946
#42	2.248520
#43	2.020118

Figure 27 shows that the South married women have T6 tracks that are considerably higher than the exolectal North baseline speakers, who are almost all below the midpoint. Next, the South married women's mean T6 tone tracks are plotted with the South baseline speakers in Figure 28.

Figure 28. South Baseline Speakers' (black) and South Married Women's (gray) Mean T6 Tracks. In semitones; normalized for mean T3 and duration. N=326.



In Figure 28 the South married women lie within or very near the South baseline group. A few South married women are in the lower area occupied by the South baseline Speaker #4, who is discussed above. When standard deviations are considered (Tables 11-12), the gap between the main group and the lower is bridged to a large extent. For example, the lowest gray line of the upper group, Speaker #43, has a standard deviation of 2.020118 at  $t=390$ , and the lowest black line of the upper group, Speaker #35, has a

standard deviation of 1.968420, while the highest gray line of the lower group, Speaker #7, has a standard deviation of 1.058121, and the second highest gray line of the lower group, Speaker #5 has a standard deviation of 1.047064. However, individual cases are discussed below, in particular, Speaker #15, whose T6 is represented by the lowest gray line in Figure 28.

Overall, the graphical evidence suggests that the South married women have maintained the T6 North-South dialect contrast rather than acquiring the low T6 variant of the ex-lect, with the possible exception of South married woman Speaker #15 discussed below.

#### **T6 for the Married Women: The North Women**

In Figure 29 the North married women's mean T6 tone tracks (gray), including Northeast woman Speaker #44, are plotted in contrast to the South baseline speakers (black). Standard deviations are given in Table 13.

Figure 29. South Baseline Speakers' Mean T6 Tracks (black) and North Married Women's (gray). In semitones; normalized for mean T3 and duration. N=172.

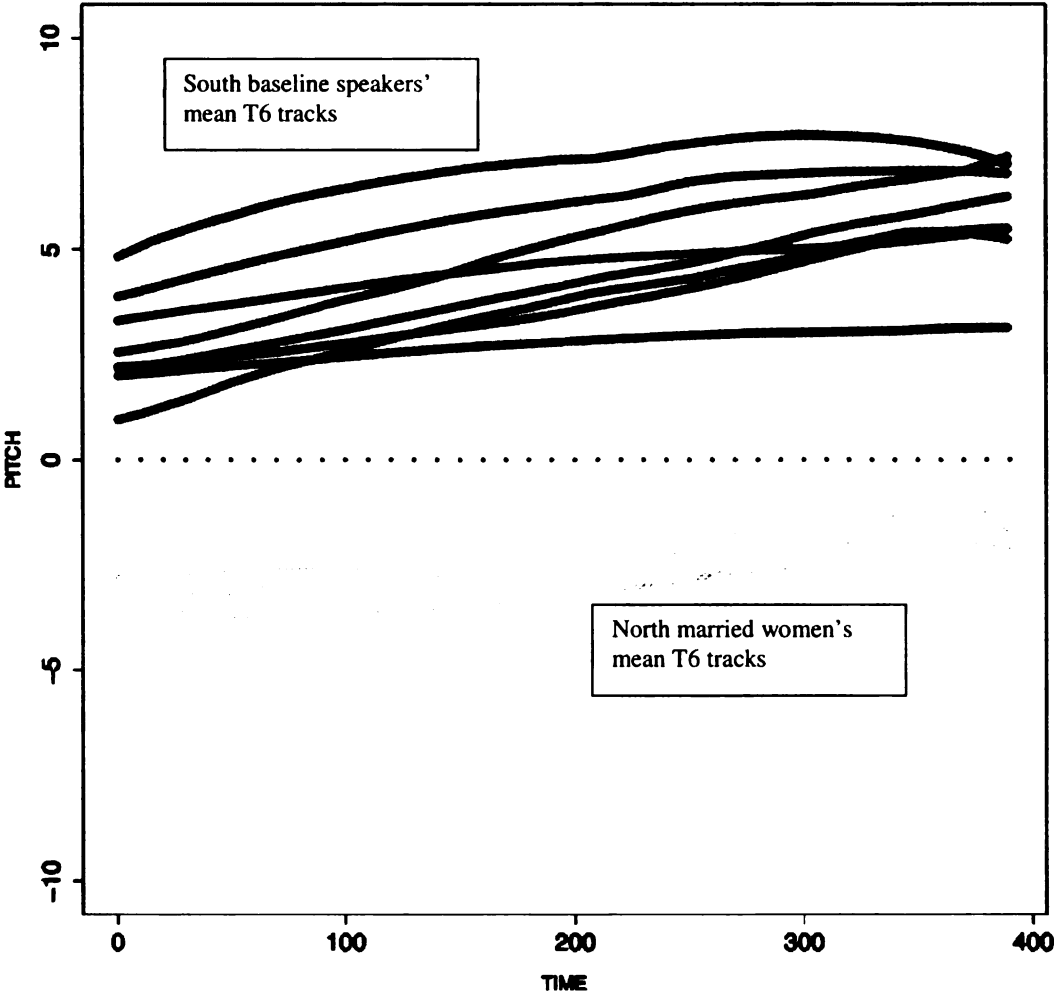
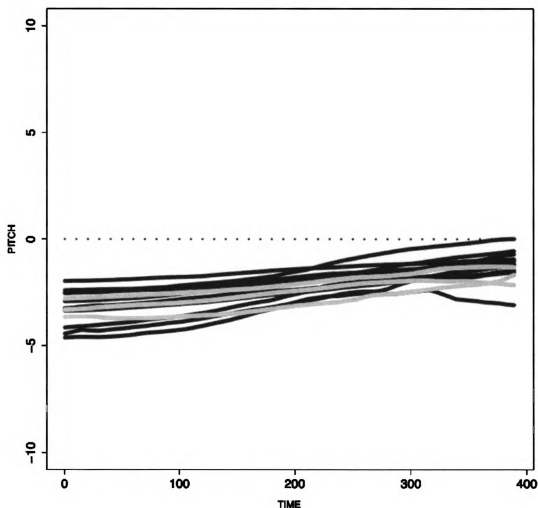


Table 13. Standard Deviations at t=390 for T6 for North Married Women

Speaker #	Std. Dev. at t=390 (semitones)
#39	1.263362
#40	1.707661
#44 (North-east clan)	1.072966

In Figure 29 the North married women's mean T6 tone tracks are all well below the midpoint, showing a dramatic contrast with the South baseline speakers. Next, the North married women (gray) are plotted with the North baseline speakers (black) in Figure 30.

Figure 30. North Baseline Speakers' Mean T6 (black) and North Married Women's (gray). In semitones; normalized for mean T3 and duration. N=207.



In Figure 30, the North married women have mean T6 tone tracks that closely correspond to the North baseline speakers. Thus, the graphical evidence for the North married women strongly suggests that they have not acquired the South clan T6 variant.



## **Going Deeper**

Despite overall result obtained from the graphical analysis that both the North and South married women have maintained their respective home clans' T6 variants, the data show some nuances at an individual level. Recall from Figure 28 that some South speakers were somewhat lower than others. This situation is discussed in more detail here.

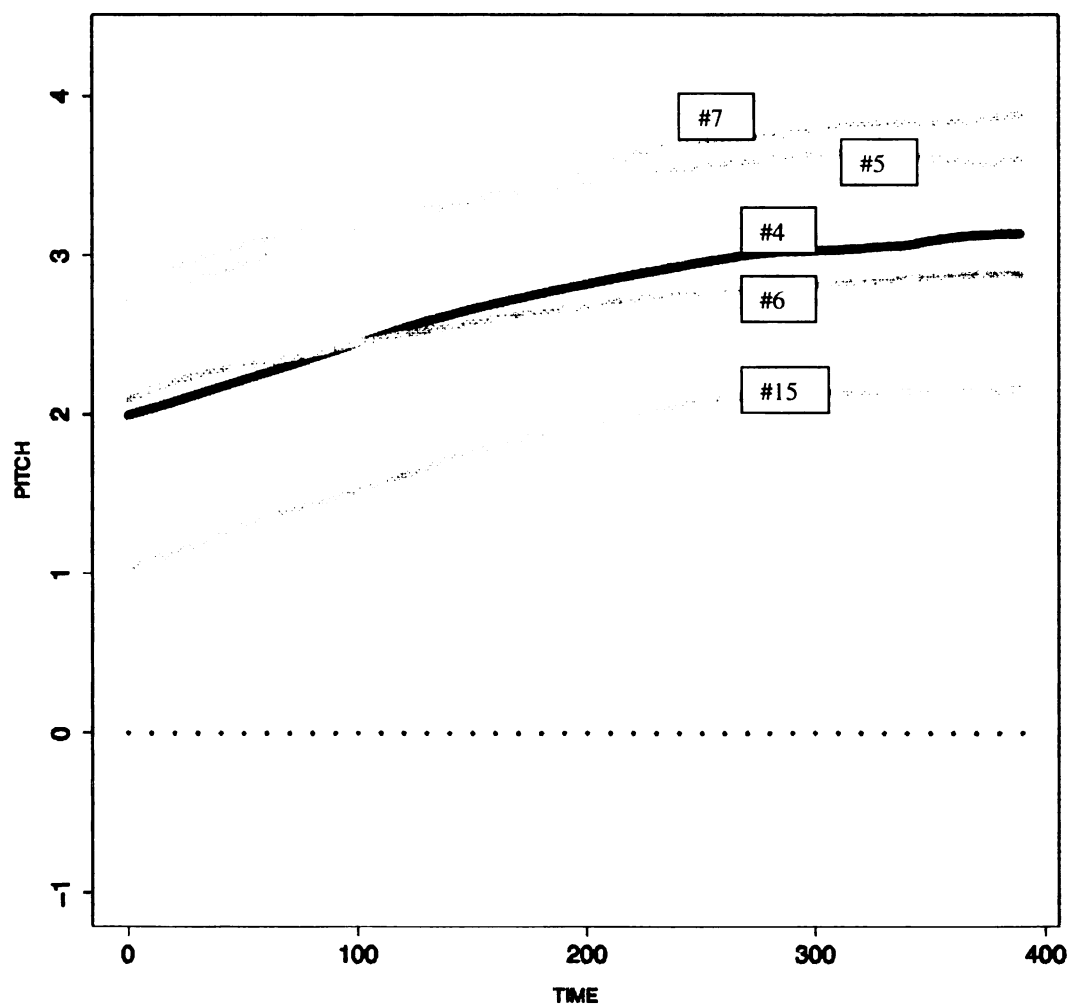
First, a classification tree computation was conducted which clusters the speakers' T6 results into two groups (see the general description of classification trees in Section 3.3.2.2.7). Two classification tree runs were performed: one run using each speakers' mean T6 pitches at t=390 and one run using each speakers' individual pitch tokens at t=390. The results (Table 14) precisely confirm the analysis above; the North and South baseline speakers cluster according to their respective home clans, and the two sets of married women cluster with their original clans, with the only exception being Speaker #15, whose case is discussed below.

Table 14. Classification Tree Results for T6 at t=390 (both for mean T6 and individual T6 tokens). “S” indicates the speaker clustered with the South baseline, and “N” indicates the speaker clustered with the North baseline.

Speaker #	Result for T6 Pitch at t=390
South Baseline Speakers:	
#1	S
#2	S
#3	S
#4	S
#35	S
#36	S
#37	S
#38	S
South Married Women:	
#5	S
#6	S
#7	S
#8	S
#11	S
#15	N
#41	S
#42	S
#43	S
North Baseline Speakers:	
#17	N
#18	N
#20	N
#21	N
#22	N
#23	N
#30	N
#31	N
#32	N
#33	N
#34	N
North Married Women:	
#39	N
#40	N
#44 (Northeast clan)	N

Next, recall from Figure 28 that a small group of South speakers' mean T6 tracks are somewhat lower than the main group. A close-up view of that lower group of five South speakers is shown in Figure 31.

**Figure 31. Close-up of the Set of Low T6 Tone Tracks: Four South Married Women (gray) and One South Baseline Speaker. In semitones; normalized for mean T3 and duration. N=221 (including T3).**



The black line in Figure 31 represents Speaker #4's mean T6 track. Recall from the discussion above that Speaker #4 is a South baseline teenage girl whose low T6 appears to be the result of individual speech style. In this way, Speaker #4 shows the possibility that

South baseline T6 tone tracks may lie in this region, so South married women Speakers #5, #6, and #7, may also be reasonably considered to be of this type, especially since they all clustered with the South in the T6 classification tree analysis above. In addition, there is no evidence in other variables, such as T1, that Speakers #5, #6, and #7 have exolectal tendencies. Given their proximity to a South baseline speaker (#4) and also considering standard deviations (Table 11-12), there does not appear to be evidence that these South married women have significantly lowered their T6 toward the North variant.

By contrast, South married woman Speaker #15 is worthy of more discussion. Her T6 is notably lower than the rest of the Southerners, and she was clustered with the North by the classification tree computation (Table 14).

#### **Speaker #15: An Exception That Highlights the Rule**

Speaker #15 is a 59 year-old South woman who married into the North region 40 years ago. During data extraction, a North influence in her T6 words was noticed impressionistically. For example, of six tokens of the T6 word *huj*<sup>6</sup> ‘to sit’, two tokens were obviously pronounced as the North variant (very low). Just as importantly, she self-reported that she has noticed some North features coming into her speech during her 40 years in the North region, and another resident of that village reported that Speaker #15 has acquired some North traits. Here are some excerpts from the interview with Speaker #15 (translated from Sui to English).

*Interviewer: Has your speech changed since you came to live in Ljong (North region)?*

*Speaker #15: Now I don't know Dong [South dialect] completely anymore. I've forgotten some words [because] I'm always talking to Ljong kids.*

*Interviewer: Then is your speech now more like Dong or more like Ljong?*

*Speaker #15: Dong. I haven't forgotten [the] Dong [dialect].*

*Interviewer: Why haven't you changed?*

*Speaker #15: Oh, I miss/think of our original home, Dong. But when I'm talking to kids--grandchildren--sometimes I forget some [South] words because I'm following the kids' [speech]. I don't know. I always remember how to talk like my home [clan], but when I'm with kids, I forget some words.*

When viewed in relation to the interview responses of other married women (Section 4.2.2), Speaker #15's response is quite unusual. Most married women reported no acquisition of the exolect in their speech at all -- "Not even a little," they often said. This information, coupled with the empirical T6 results, draws a picture of Speaker #15 as a rare case where a married woman has begun to acquire some dialect features of her husband's clan.

In Section 3.3.3.2.2, it is also noted that Speaker #15's (-a) vowel variable is clustered with the North group for F1 the classification tree analysis. But her F2 of that vowel clustered with the South. Moreover, even a few of the baseline speakers were clustered in the opposite region in that classification tree for the (-a) vowel, so Speaker #15's F1 result in the classification tree may not indicate a significant change in (-a).

As for lexical variables, Speaker #15 showed little acquisition of the exolect. For example, out of 13 lexical variables tested, she only pronounced one with the North variant,

and she self-corrected that word (so that there was only one North token out of her 62 tokens of lexical items (Section 3.3.1)). Furthermore, she used South 1<sup>st</sup> Singular pronoun in free speech, and she used the distinctly South discourse marker *jaʔ* twelve times in a stretch of just three minutes of free speech. She also used the word *ɕanʔ* ‘to play’ in free speech, which has only been attested among South speakers by the author.

Nonetheless, Speaker #15’s lower T6 pitch, her self-reporting of some exolect acquisition, and the report of another speaker about her speech, all point to someone who may have begun to acquire a slight amount of dialect features of the husband’s village. In this way, Speaker #15 seems to pattern somewhat like speakers in the prior dialect acquisition studies discussed in Section 2.2.1, or at least she may be on the way toward such acquisition. In fact, the acquisition tendencies found in Speaker #15 are what the author originally expected to find among all Sui immigrant married women, but that hypothesis has been shown to be false overall (see conclusions in Section 3.3.4 and Section 5.3).

Thus, Speaker #15 is an exception that highlights the rule; unlike the other Sui women, she patterns slightly like the immigrants in other studies who acquired a new dialect to a significant extent (e.g., Munro et al. 1999). Her relatively long period of time in the North (40 years) may be a factor, but another South woman (Speaker #43) had lived in the North for 43 years and yet maintained a very high pitch in T6 (South variant). The question remains about what specific aspects of Speaker #15’s life would cause her to be affected more than other married women. Since she reports that the local children have influenced her speech, it may be that she spends more time in child-rearing activities than

typical Sui women or that the children have a stronger influence on her for some other reason.

### **ANOVA for T6**

The results of ANOVA tests on the T6 data are now reported. First, the mean T6 pitches of the North baseline speakers and South baseline speakers were compared at  $t=390$  and found to be significantly different:  $F=210.42$ ,  $p < 0.000001$  (significance at  $p \leq 0.05$ ). The North married women and South married women were also significantly different:  $F=35.223$ ,  $p=0.0001441$ . The means of the North married women were then compared with the North baseline speakers to see if they were significantly different. They were not different:  $F=1.4098$ ,  $p=0.2581$  (i.e., the North women have maintained the patirlectal T6 pitch). Finally, the South married women were compared with the South baseline speakers to see if they were significantly different. As with the North married women, the South women had no significant acquisition of the North T6 variant:  $F=1.1629$ ,  $p=0.2979$ .

Thus, the ANOVA results for mean T6 pitches at  $t=390$  show that (1) the two dialects have a significant difference in pitch, and (2) neither set of married women (North and South) had acquired their respective exolect to any significant degree. However, when ANOVA was conducted on the individual T6 tokens of each speaker (rather than the mean of each speaker's T6 tokens as above), then the results were more nuanced.

First, the expected dialect contrast in T6 is confirmed since the North and South baseline groups were significantly different:  $F=1226.5$ ,  $p < 0.000001$ , and the North and South married women were significantly different:  $F=256.57$ ,  $p < 0.000001$ . This shows, once

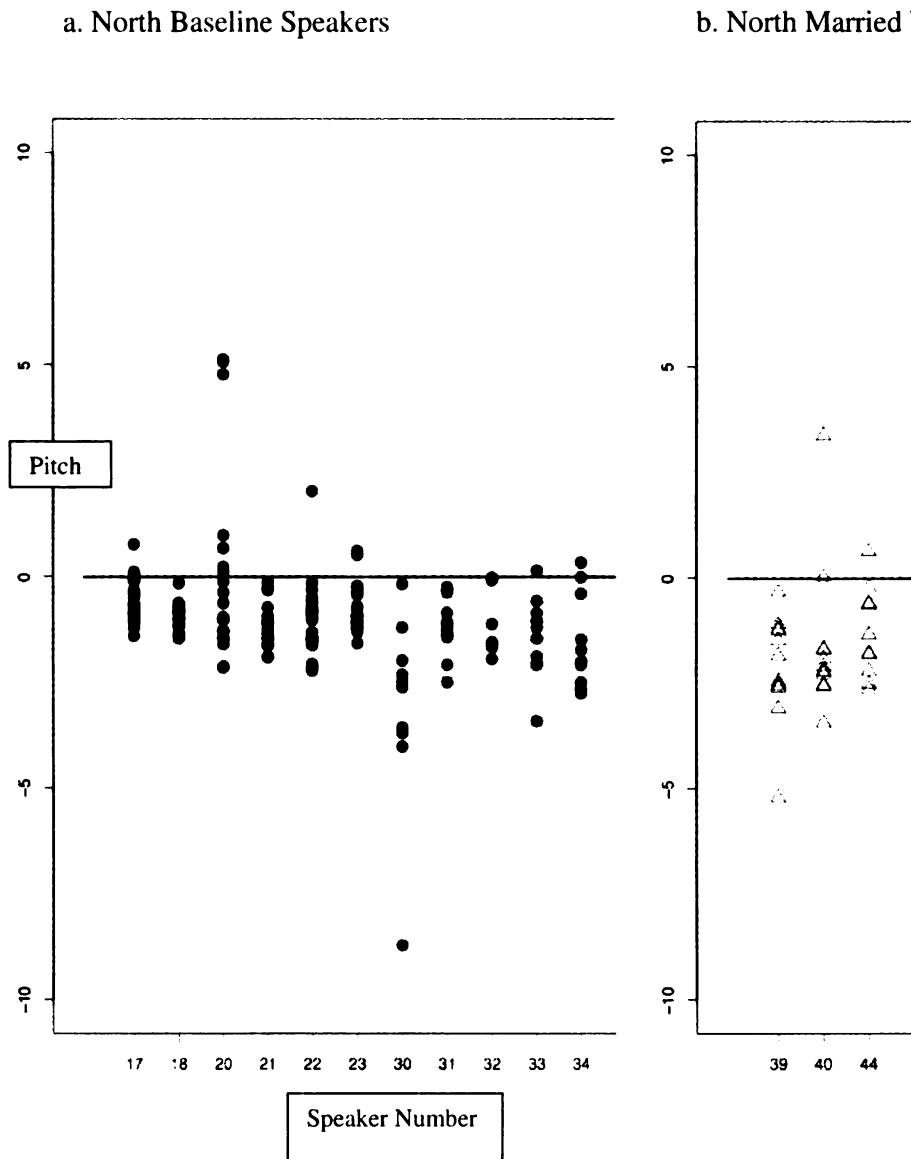
again, that the married women had maintained the T6 dialect contrast found in the baseline speakers of their home regions.

But in this ANOVA on individual T6 tokens, the North married women and North baseline speakers were found to be significantly different:  $F=9.0957$ ,  $p=0.002886$ . The South married women and South baseline speakers were also significantly different:  $F=13.178$ ,  $p=0.000335$ . The North women's ANOVA result is due to the fact that the North married women's tokens were actually somewhat lower (and therefore even farther from the South) than some of the North baseline speakers, as shown in Figure 32 below.

The individual tokens of T6 for the North women are plotted in Figure 32 along with the North baseline speakers. The horizontal axis is organized by Speaker Number (North Baseline Speakers #17-18, 20-23, 30-34, and North Married Women Speakers #39-40, 44). The dots represent the pitch at  $t=390$  for each individual token of the North baseline speakers. The triangles are the pitches for the individual tokens of the North married women.



**Figure 32. Individual Tokens of T6 Pitch at t=390 for North Baseline Speakers (dots) and North Married Women (triangles). Organized by Speaker Number along the Horizontal Axis.**

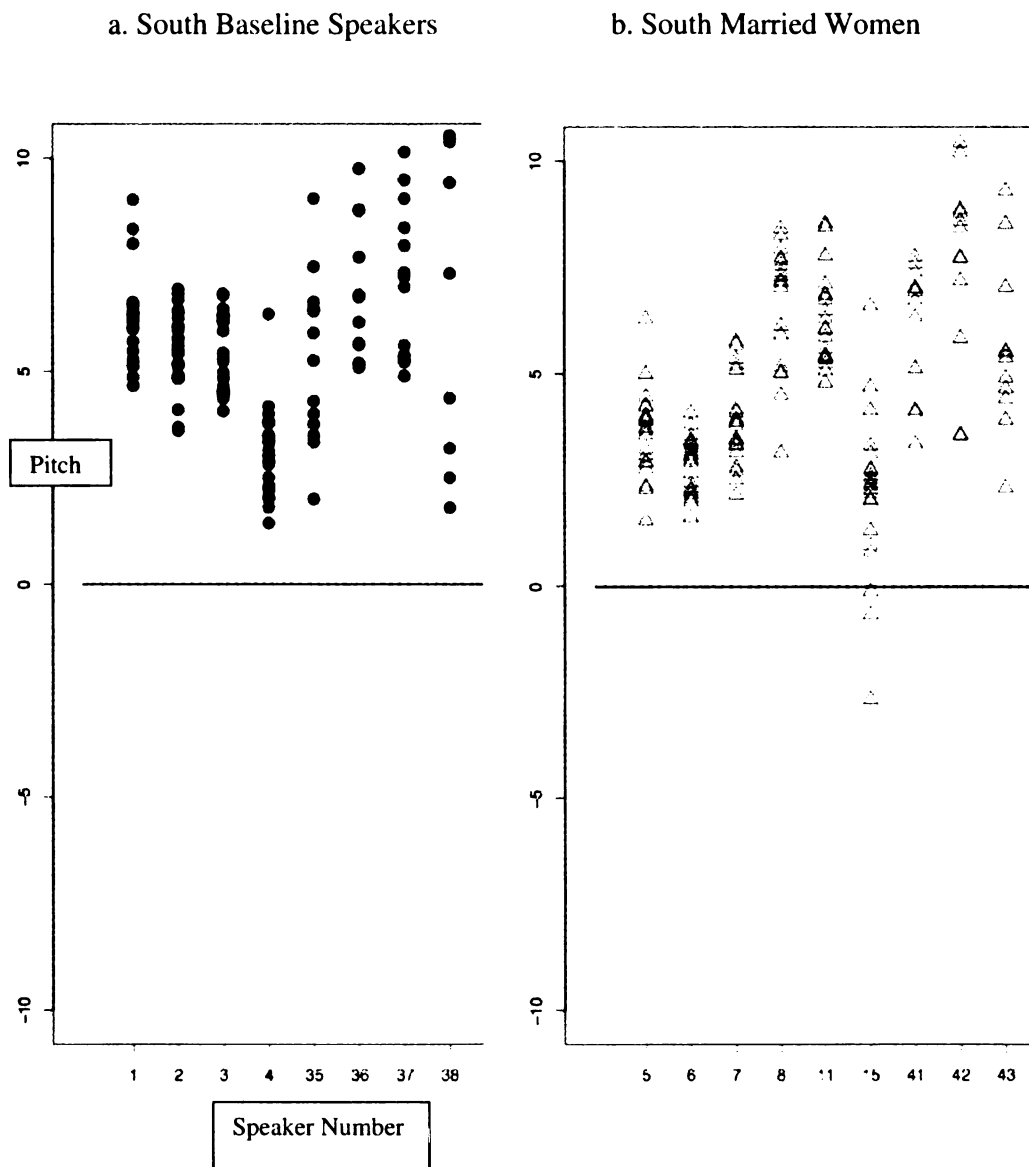


In Figure 32, notice that most tokens are below the midpoint for both the North baseline speakers and the North married women. By looking at these individual pitch tokens of T6 at t=390, it is very evident that the North married women have not moved in the direction of a South T6 pitch. If anything, they are lower than the North baseline, and thus even

farther from the high South T6 variant (also compare Figure 32 with the mean T6 tracks plotted in Figure 30).

Next, in order to analyze the ANOVA result presented above for the individual T6 tokens of the South speakers, the South baseline speakers and South married women's individual T6 tokens at  $t=390$  are plotted in Figure 33. The dots represent the pitches of the individual T6 tokens of South baseline speakers; the triangles represent the South married women. The horizontal axis is organized by speaker number.

Figure 33. Individual Tokens of T6 Pitch at t=390 for South Baseline Speakers (dots) and South Married Women (triangles). Organized by Speaker Number along the Horizontal Axis.



In Figure 33, notice that there is only one South married women whose T6 pitches are noticeably lower than the baseline speakers. That, of course, is Speaker #15, whose situation is described above as a rare case of a married women who may have significant signs of dialect acquisition. But when ANOVA was conducted without the exceptional Speaker #15, there was still evidence that the set of South married women was different from the

South baseline speakers:  $F=4.3677$ ,  $p=0.03757$ . However, recall from Figure 31 that another South woman's T6 was slightly below the expected range of the baseline speakers: Speaker #6. When that other married woman (Speaker #6) with a relatively low T6 is removed, ANOVA results show that the remaining seven South women are not significantly different from the South baseline speakers:  $F=0.2439$ ,  $p=0.6218$ . On the basis of the other linguistic results and Speaker #6's ethnographic interview, there is no indication that Speaker #6 patterns like the more exceptional Speaker #15, i.e., it does not appear that Speaker #6 should be viewed as having acquired some of the exolect.

After all, even though Speaker #6's T6 was low enough to affect the individual-token run in ANOVA, she is actually quite close to one of the South baseline speakers, Speaker #4 (see Figures 31 and 28). In addition, she was clustered with the South group in the classification tree analysis (Table 14), unlike the more exceptional Speaker #15 who was clustered with the North group. Moreover, in the graphical representation in Figure 33, Speaker #15 is clearly the only speaker who significantly differs from the other South speakers. Finally, other factors contribute variance besides these individual T6 tokens, namely, the mean of T3 was used in the normalization, and it has variance of its own. For these reasons, it would be unwise to consider Speaker #6's T6 to be significantly different than the nearby South Baseline Speaker #4. Rather, Speaker #15 is considered to be the only married woman who has evidence of significant change in T6.

### **Conclusions for the Married Women's T6**

The overall conclusion after analysis of the 12 married women's T6 pitches both graphically and statistically (ANOVA and classification trees both with mean T6 pitches and

with pitches of individual T6 tokens) is that most women (11 of 12) had not acquired the T6 pitch of their exolects. Graphically, the women were shown to pattern closely with their home dialects when their mean T6 tone tracks were compared, with the exception of South woman Speaker #15 who was lower than the other South speakers. Statistically, ANOVA showed a significant dialect difference between the two regions' baseline speakers in terms of mean T6 pitch at  $t=390$ , and there was no significant difference between the married women and their respective baselines (thus showing that the women had maintained the T6 of their home clans). A classification tree analysis of the T6 pitches (at  $t=390$ ) showed that all of the women clustered with their home clans except Speaker #15.

When individual T6 tokens were considered with ANOVA, the North and South baseline speakers had a significant contrast as expected, but the married women were also found to contrast with the respective baselines of their home clans. It was then noted that the North women were actually lower than the North baseline speakers, so the North women had clearly not acquired the high pitch South T6 (thus explaining the ANOVA result).

For the South women, when two relatively low T6 speakers were removed (Speaker #15 and Speaker #6), the individual-token ANOVA showed that the remaining seven South women were not different from the South baseline speakers. Graphical analysis of those individual tokens at  $t=390$  (and the earlier classification tree results) suggested that Speaker #15 was the only woman who had moved her T6 significantly in the direction of her exolect. Speaker #15 self-reported some change in her dialect due to interaction with

local children. She had also been living in the North relatively long (40 years), although another South married woman had lived 43 years in the North with no significant change. Speaker #15's case is viewed as an exception that highlights the rule. These results also correspond to the folk consultants' reports that although married women do not normally acquire the exolect, in a few rare cases an older woman may begin to absorb some exolectal features after she has been married a long time (Section 1.1).

#### **3.3.2.2.9 Conclusions from Tone Results for Married Women and Baseline Speakers**

Overall, this study finds that for the most part, the immigrant married women maintain both the T1 and T6 variants of their home dialect regions with a very high degree of precision. This overall finding holds true regardless of whether the tone variant is subtle (T1) or salient (T6). T1 appears to be below the level of conscious awareness since speakers do not report it; furthermore, prior Sui dialect studies overlooked this subtle feature. T6 has a salient dialect contrast in pitch which consultants often report (in the form of T6 words).

#### **Two South Married Women Living in Midlands**

Finally, besides the main set of South women recorded in the North clan, additional recordings were conducted with two South women who had married into the Midlands clan. These women's tones are presented separately here since they were living in the Midlands region (which may have a slightly different tone system, as discussed in Section 3.3.2.2.5) rather than living in the North clan like the other South women. Figures

34-35 show these two women's T1 and T6 variables with respect to tones that do not have North-South dialect variation, T4 and mean T3.

Figure 34. Speaker #24, a South Married Woman in Midlands. In semitones; normalized for duration and mean of T3. N=83. Dotted line represents the mean of T3.

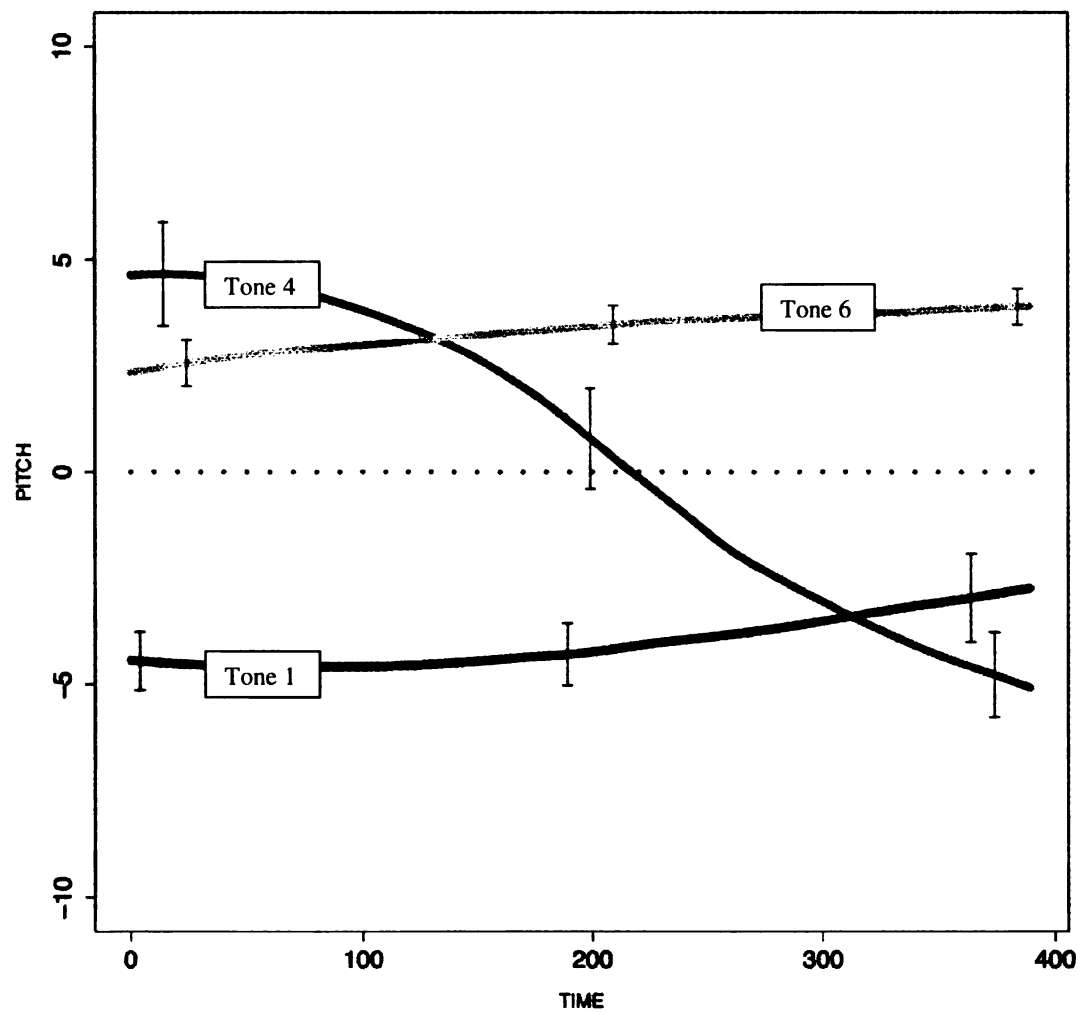
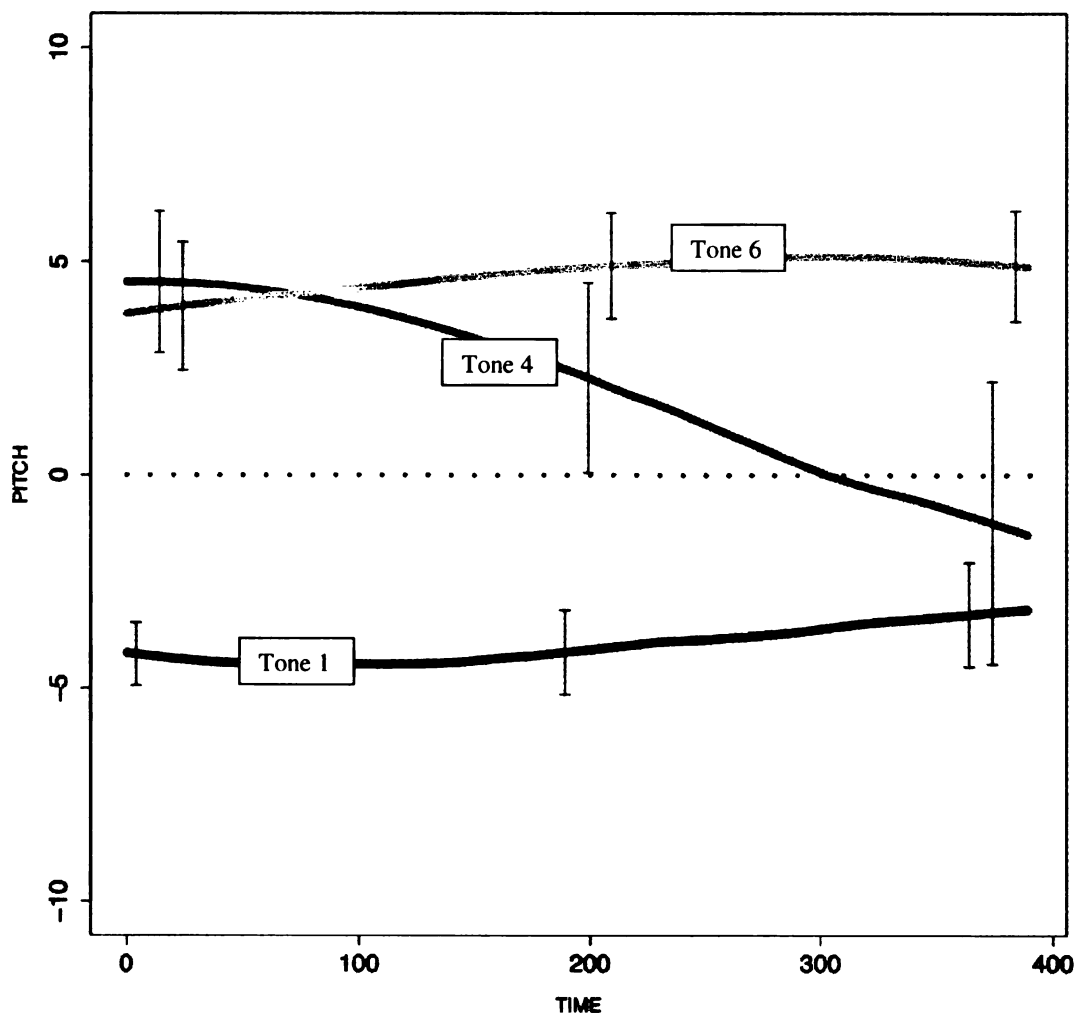


Figure 35. Speaker #26, a South Married Woman in Midlands. In semitones; normalized for duration and mean of T3. N=84. Dotted line represents the mean of T3.



Both Speakers #24 and #26 have T1 and T6 variants which mark them as South clan members, which is their clan of origin. Their mean T1 tracks are low and slightly rising, as expected of South speakers. Their T6 tracks are quite high, well above the midpoint as expected of South speakers.



### **Additional Areas of Progress**

In addition to exploring the dialect acquisition issues that are the focus of this study, this section has also provided the first acoustic analysis of South tones, including the first acoustic evidence for T1 as a North-South dialect variable, acoustic confirmation of the previously reported T6 dialect contrast, and acoustic confirmation of earlier reports that T2, T3, T4, T5 do not vary between these regions. The study has also provided the first acoustic analysis of Midlands tones, showing the possibility that Midlands is a transition zone for T6 between North and South. Initial tonological models were proposed by comparing acoustic data from differing regions, and the tantalizing possibility of a tone chain shift involving T1 and T6 was proposed as well.

Moreover, this section has served as the first acoustic socio-tonetic investigation of Sui (including factors of region, age, gender, immigration, and marital status). This section introduced variationist field methodology for collecting tone data appropriate for socio-tonetics, namely, a “flexible phrase list” style where words are elicited in positions of prosodic focus in phrases that are allowed to vary slightly. Methodologies for Sui tone normalization and graphical and statistical analysis were developed and implemented as well.

In conclusion, the overall within-speaker and between-speaker consistency of the socio-tonetic data is quite satisfying, especially considering that the tones are not taken from citation forms. Despite differences in rate of speech, gender, and age, as well as intonation and other speech style intangibles, speakers’ mean tone tracks were found to be quite

consistent in slope and pitch, reliably reflecting their phonemic categories. In fact, the author gained deeper respect for the cognitive reality of tonal categories and the underlying regularity of acoustic tone data. From the apparent chaos of raw socio-tonetic data, a set of consistent and identifiable phonemic tones will faithfully emerge in speakers' mean tone tracks as long as the researcher carefully normalizes for pitch and duration.

### 3.3.3 Segmental Variables for Married Women and Baseline Speakers

Two diphthongs vary between the North and South regions, designated (ia) and (ua) in this text for orthographic simplicity. The phonetic variants of (ia) and (ua) in the two dialect regions are given below:

(ia):

<u>North</u>		<u>South</u>
[-iə]	~	[-ia]

(ua):

<u>North</u>		<u>South</u>
[-uə]	~	[-ua]

Words containing these diphthongs are listed in Section 3.2.4.1. As with Tone T1 (Section 3.3.2), these diphthong variables do not appear to be on the level of declarative knowledge. In discussion of dialect differences, speakers never mentioned words containing these diphthongs. However, once the author gave a few examples, speakers agreed that such words do vary between the regions.

Impressionistic results from both the (ia) and (ua) variables are given. As for acoustic analysis, the (ua) diphthong was selected for detailed acoustic analysis since the 2006

data included an emphasis on words that contained (ua). The (ua) variable is found in four common open-syllable words that could be elicited in large enough numbers for quantitative acoustic analysis. As discussed in Section 3.2.1, since words had to be elicited through picture description or pantomime, there were limitations on the choice of words to be elicited. Moreover, for the children to quickly understand the picture or pantomime, concrete everyday concepts were necessary. There are not enough stop-final words available for practical elicitation of either diphthong variable (stop-final words are less common in the language as a whole), so open-syllable words were selected that contained the diphthongs. There are nasal-final words containing these diphthongs, but nasals are well-known as having the potential to influence adjacent vowels, so only the open-syllable words were used in the acoustic analysis.

The two dialect variables (ia) and (ua) may turn out to represent a single dialect contrast affecting glides. However, the phonemic status of Sui onset glides is not yet resolved. Sui phonemic inventories (e.g. Zeng & Yao 1996, J. Zhang 1980, Li 1948) have included sequences such as /mj-/ , /lj-/ , /tw-/ , /lw-/ , etc. in their lists of phonemic “initials,” but it is not clear whether these sequences should be viewed as single-segment onsets (e.g., /t<sup>w</sup>-/) or consonant-glide clusters. Similarly, the consonantal status of these glides is not well established. It may well be that words that have been traditionally transcribed as /twa/ (in the studies mentioned above) would be better analyzed as /tua/. South words with (ua) have been previously transcribed with a glide, e.g., /twa/. However, in relatively slow speech, South speakers were sometimes found to be pronouncing these words with the

first element ([w-] or [u-]) as long or longer than the second element [-a], suggesting that a diphthongal transcription might be appropriate. Additional support for this approach is found in an initial phonological comparison of Sui (ua) words in the Appendix.

Regardless, in what follows, treating (ua) and (ia) as a pair of diphthong variables is a useful way of comparing the two dialects sociophonetically and is also consistent with the acoustic data. In this way, the North-South contrasts are viewed as [ua] ~ [uə] and [-ia] ~ [-iə]. Further research may clarify this point, but for the purposes of this dialect acquisition study, the diphthong analysis seems reasonable.

### **3.3.3.1 Impressionistic Results for Married Women and Baseline Speakers**

Impressionistic results are given below for (ia) and (ua). First, baseline speakers of both the North and the South regions are examined, and then the immigrant married women's results are given. Midlands speakers were not investigated for (ia) or (ua) since there is no observed dialect contrast in (ia) or (ua) between Midlands and South (and the married women who had immigrated to Midlands were from the South clan).

#### **Baseline Speakers' Results**

In the impressionistic analysis, the North and South baseline speakers showed very precise correspondence to the (ia) and (ua) variants expected of their respective regions. In fact, there was only one instance where a baseline speaker was observed not using the diphthong variant of the home clan; Speaker #17 (a 16 year-old North girl) pronounced

‘female’ *?biak* with the South variant five times and with the North variant four times.

No other speaker was impressionistically observed to deviate from the patrilect, regardless of how many tokens were produced. In the 2006 data (baseline Speakers #1-4, 17-23), each baseline speaker produced approximately 70-80 tokens of words with (ia) or (ua). In the 2005 data (baseline Speakers #30-38), each baseline speaker produced approximately 15-20 tokens of words with (ia) or (ua). Since the baseline results are so overwhelmingly categorical, a table of results is not provided.

### **Married Women’s Results**

Likewise, the impressionistic analysis of (ia) and (ua) for the immigrant married women showed perfect correspondence with each speaker’s home clan. The North married women’s diphthongs were all realized as the expected North variants, and the South married women’s diphthongs were all realized as the South variants. However, one other married woman did show significant variation in these diphthongs: Speaker #13, a married woman without a stable home clan dialect who moved during her childhood from South to North, then back to South, and then married into the North. Her unusual but illuminating case of a person with no stable patrilect is discussed in Section 3.3.4 and Section 5.2.1.

As with the baseline speakers, the North and South married women in the 2006 data (Speakers #5-8, 11, 15) had approximately 70-80 tokens of (ia) and (ua) words, while the married women in the 2005 data had approximately 15-20 tokens of such words (Speakers #39-44).

In addition to the words targeted in the “flexible phrase list” style portion of the interview, speakers were also recorded using the (ia) and (ua) variants of their patrilects in free speech. For example, South married woman (Speaker #11) said *lianʹ* ‘hot pepper’, and another South married woman (Speaker #8) said *ɕiaʹ* ‘daughter-in-law’, both of which are the South variant of (ia). The word ‘salt’ *?duaʹ* and ‘Sui New Year Festival’ *tuaʹ* also occurred in free speech according to speakers’ patrilectal variants.

### **Conclusions from Impressionistic Results**

The impressionistic analysis of the (ia) and (ua) variables finds that (1) there is a distinct dialect contrast between the North and South baseline speakers, and (2) the immigrant married women pronounced (ia) and (ua) words with the variants of their respective home clans. But this result, however tidy it may be, is tempered by the limitations of any impressionistic analysis of vowel quality. For one thing, when the researcher has already heard a speaker produce a diphthong in a certain way dozens of times, he or she may be less likely to observe subtle deviation in other tokens of that speaker. Moreover, auditory judgments usually cannot provide the level of consistency and the ease of quantification of subtle variation that acoustic measurements can provide. (For example, Ladefoged (1967:132-42) shows the limits of auditory judgments in his study of different phoneticians giving judgments on the same set of Gaelic vowels.) Thus, in the following section, the Sui diphthong contrasts are analyzed acoustically.

### **3.3.3.2 Acoustic Results for Married Women and Baseline Speakers**

In this section, the diphthong variation in (ua) is analyzed acoustically. To the author's knowledge, this investigation provides the first acoustic analysis of a Sui vowel, as well as the first acoustic study of dialect variation in Sui vowels (Edmondson et al. (2004) provide an excellent acoustic study of a set of Sui consonants in Miaocao (North region)).

As with the tone data (Section 3.3.2.2.1), the words containing this diphthong were digitized in Praat 4.4.18 and 4.1.28. The words were taken from the "flexible phrase list" speech style as well as a smaller portion (about 1/6<sup>th</sup> of the total for each speaker) of words recorded in citation form in order to have enough tokens for analysis. The targeted vowels were then extracted from Praat to Macintosh OS X in the form of lists of frequency measurements (Hz) of F1 and F2 for each vowel of each speaker. These F1 and F2 frequencies were then normalized in R 2.4.1 with Nearey's (1977) log mean normalization (an R function was written that uses the equations given in William Labov's Plotnik05 Documentation, p. 26).

A total of 1,326 vowel tokens were extracted: 661 tokens of the /u-/ element and 675 tokens of the /-a/ element, henceforth written in the text in variable notation as the variables (u-) and (-a).

Spectrogram examples of the diphthong in the two dialects are given in Figure 36 below. The formants for (u-) were measured at a stable point after the region of onset effects but before the region of transition toward the next vowel. (u-) is often relatively short, espe-

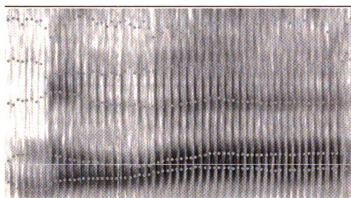
cially in the South dialect, so the stable measurement region was not always as wide as might be hoped for an ideal formant measurement. Formants for (-a) were measured at a stable point at the end of the syllable, a point which was usually readily available. Formant measurement locations were also confirmed by auditory sampling.

In Figure 36(a-b), typical spectrograms are shown for the two dialect regions. The vertical and horizontal index lines provide a frame of reference for comparison between the first and second elements of the diphthong.

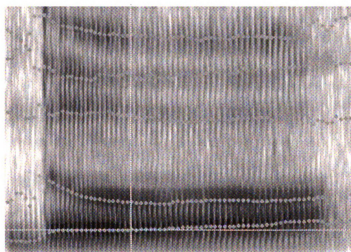


Figure 36. Examples from South and North for the word 'salt' ?*duɹ*?

(a) South Dialect (Speaker #36)



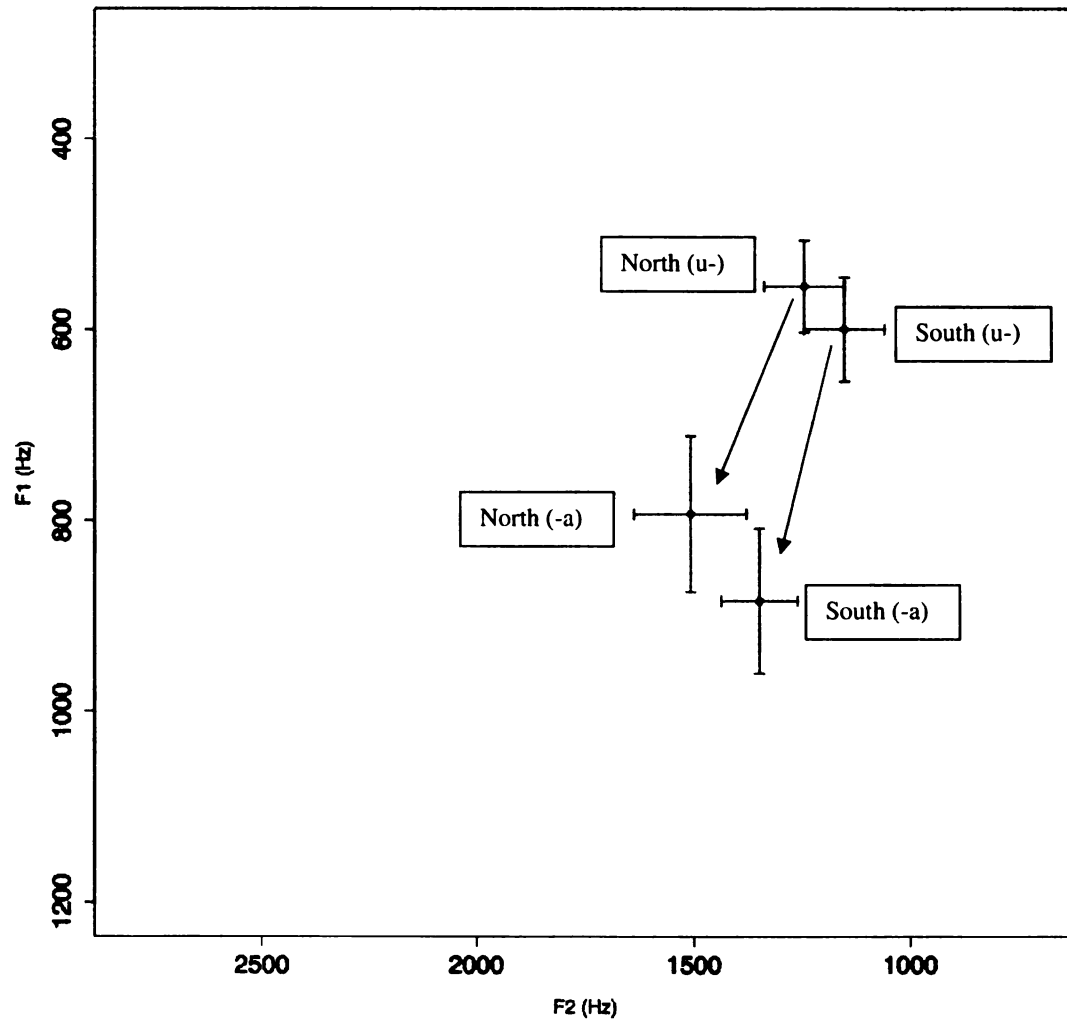
(b) North Dialect (Speaker #34)



In Figure 36a, notice that the South variant increases significantly in both F1 and F2 across the duration of the diphthong. By contrast, in the North variant (Figure 36b), F1 increases only slightly and F2 even less so. Such contrasts are evident in the plot of the means of baseline speakers below (Figure 37). The crossbars represent the mean and standard deviation of (u-) and (-a) for each of the two regions. The arrows represent the trajectories of the diphthong in the two regions as it moves from (u-) to (-a). Note that the

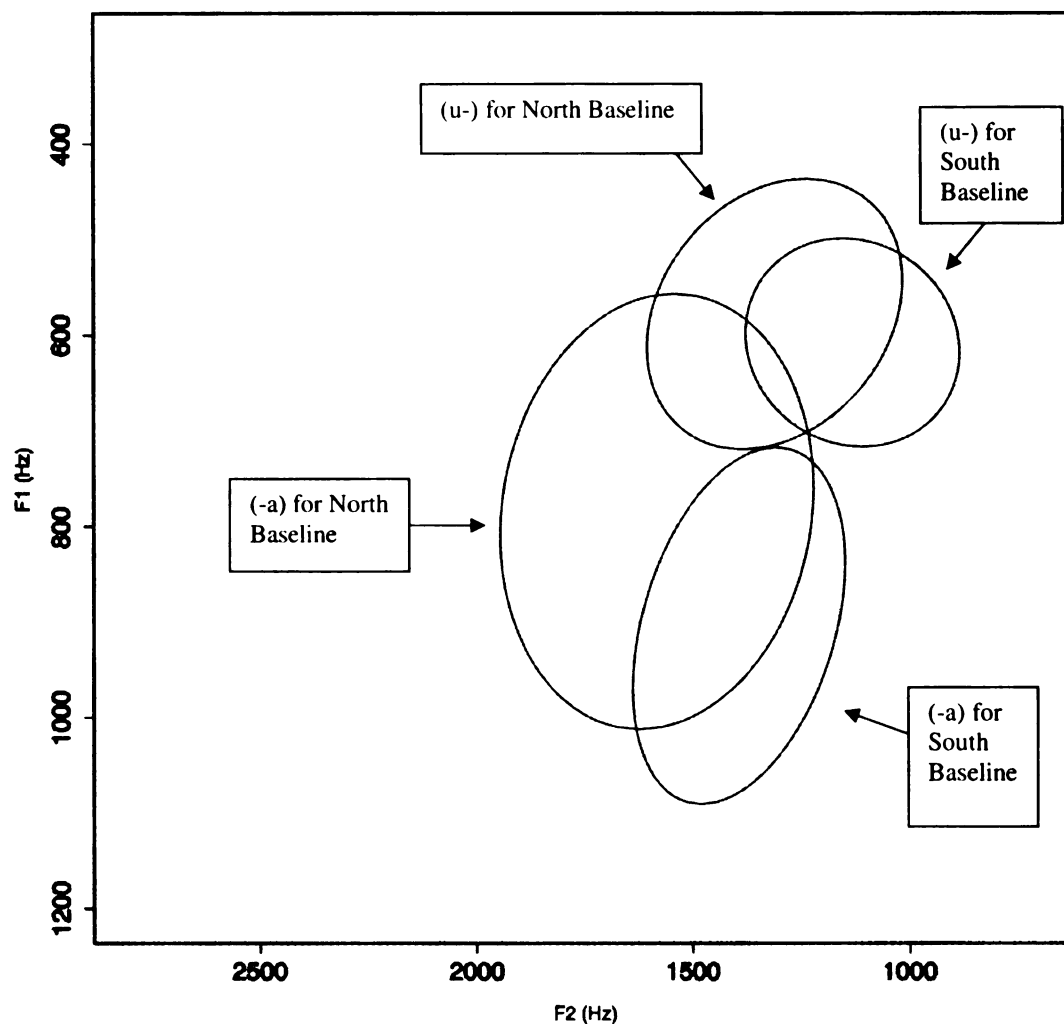
standard deviations are slightly greater in (-a) than (u-), which is expected since (-a) is more lax and less peripheral.

Figure 37. The (ua) Diphthong Variable for North and South Baseline Speakers. In Hz.



The diphthongs are plotted again in Figure 38 with ellipses showing the ranges of data.

Figure 38. The (ua) Diphthong Variable for North and South Baseline Speakers with Ellipses. F2 versus F1 (Hz).



The clearest dialect contrast is found in (-a) rather than (u-), so the acoustic analysis focuses on (-a). It turns out that the two dialects are quite similar in (u-), so the “signal-to-noise ratio” would be high for (u-), i.e., speakers whose (u-) is actually between the two regions could be overshadowed by the variance of the baseline speakers. Furthermore, formants in the (-a) region of the (ua) diphthong are much more stable; as noted

above, the (u-) region is often short in duration and possibly glide-like in some instances, especially in the South where most prior work has transcribed it as a glide (e.g., Zeng & Yao 1996). In addition, a number of the words elicited for (ua) were T1 words; since T1 is very low in pitch, such words often invoke creaky voice, which influences the formant extraction (loss of bandwidth precision in the Praat formant extractions, and, in some cases, complete cessation of voicing during that part of the syllable). The initial half of the T1 syllable, i.e., (u-), of such words is often affected by creaky voice more than the second half. Finally, there is some question about the 2005 baseline speaker's (u-) formants. The South baseline speakers differ slightly in (u-) from the 2006 South baseline set, diverging slightly more from the North variant in F1 and F2 than the 2006 South baseline set does. However, the 2005 set contained only 4-6 (ua) tokens per speaker, so the lack of tokens may account for the difference, and more tokens in the future would probably resolve the issue. But it is acknowledged that is possible that there could be a slight intra-clan difference in the (u-) element (but not in (-a)) between the 2005 and 2006 South baseline speakers. This seems quite unlikely since no such variation has been observed in other evidence to date. The more likely explanation is the dearth of 2005 (ua) tokens and the slippery nature of (u-) (short duration, possible glide-like tendencies, creaky voice in T1 words). For the above reasons, (-a) is selected for the acoustic analysis that follows.

#### **3.3.3.2.1 Baseline Speakers' Results**

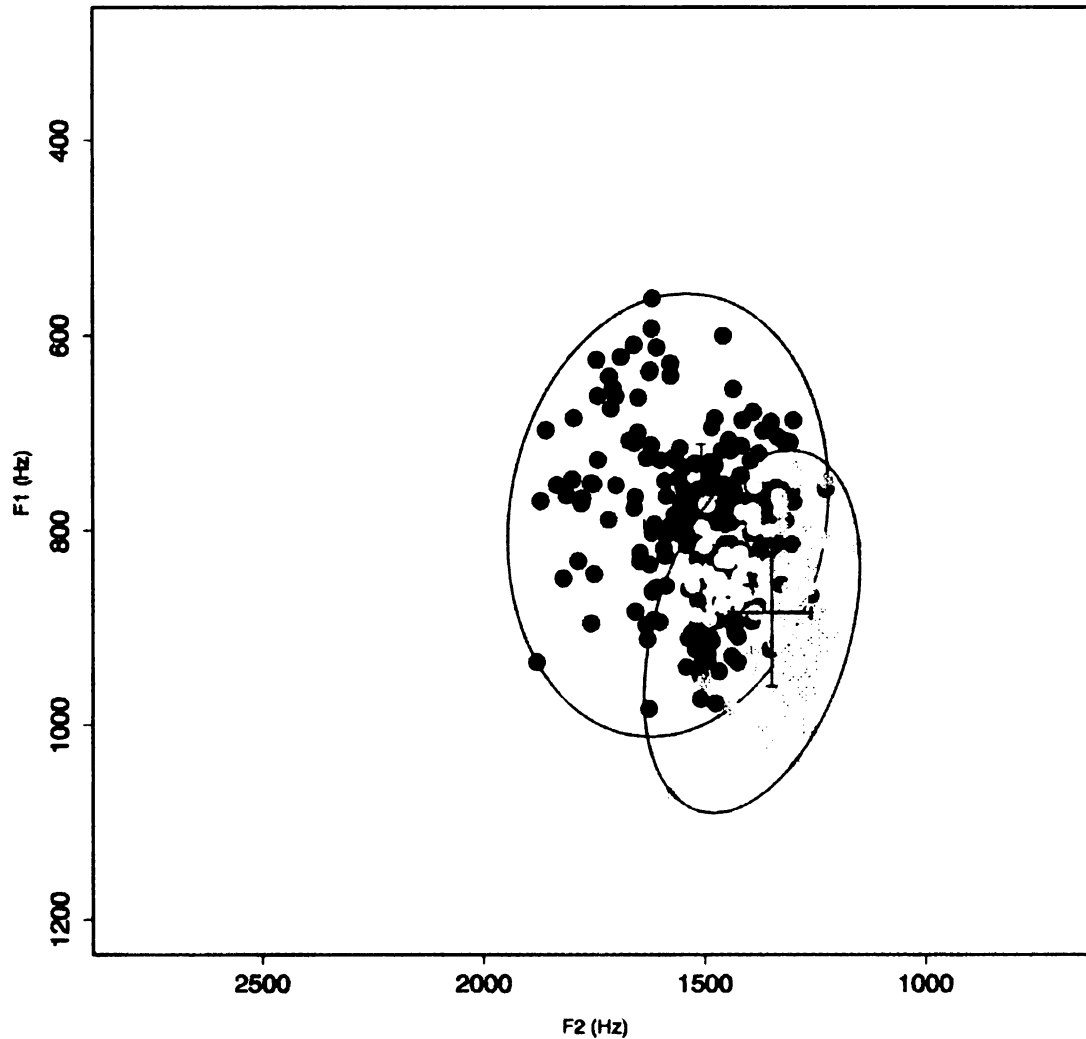
In the 2005 data set (Speakers 30-44), speakers provided approximately 4-6 (ua) tokens. For the 2006 data set (Speakers 1-29), the (ua) variable was specifically targeted, so

speakers provided approximately 20-40 tokens of (ua) words, but there were two exceptions: two South teenagers whose data only includes 6 and 10 usable (ua) tokens. Those two speakers used a great deal of breathy and creaky phonation that limited the number of tokens with formants that were distinct enough to be extracted in Praat.

In fact, as an aside, this study makes the observation that Sui teenage girls in general have a tendency to use breathy and/or creaky voice. Perhaps future investigation can confirm this observation among other Sui teenagers, but it certainly holds true for most of the teenage girls in the current study (in all three regions). It may be an interesting age and gender related sociolinguistic trait to explore in future research.

The North and South baseline speakers' (-a) tokens are plotted in Figure 39. The black circles represent F1 and F2 for each token from all of the North baseline speakers (Speakers #17, 18, 20-23, 30-34). The gray circles represent F1 and F2 for all of the South baseline speakers (Speakers #1-4, 35-38). The mean and standard deviations are given as well.

Figure 39. (-a) for North and South Baseline Speakers. F2 versus F1 (Hz). N=333.



ANOVA is now used to show that there is a significant difference in (-a) between the two dialect regions. When the baseline speakers' F1 values are compared,  $F=92.56$  and  $p < 0.000001$ . Therefore, the North and South dialects are significantly different in F1 for this vowel (significance at  $p \leq 0.05$ ). When the baseline speakers' F2 values are compared,  $F=129.22$  and  $p < 0.000001$ . Therefore, the North and South dialects are significantly different in F2 as well.

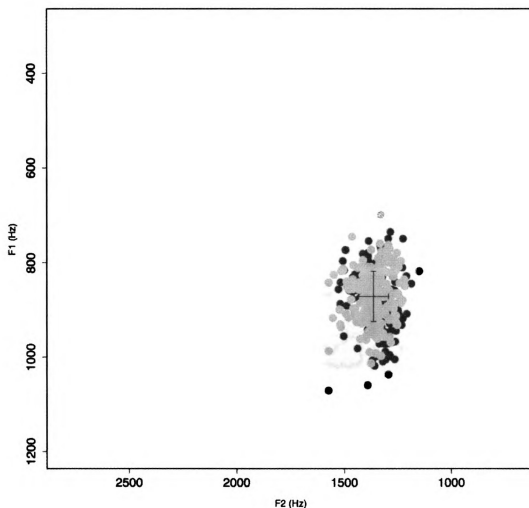
### **3.3.3.2.2 Married Women**

Now that a significant North-South (-a) dialect contrast has been shown, the immigrant married women's can be compared with the baseline speakers.

#### **The South Women**

In Figure 40, the gray circles represent the South married women's (-a) tokens. The black tokens represent the South baseline speakers.

Figure 40. "Bull's-eye": South married women's (-a) (gray) plotted with South baseline speakers' (-a) (black). F2 versus F1 (Hz). N=324.

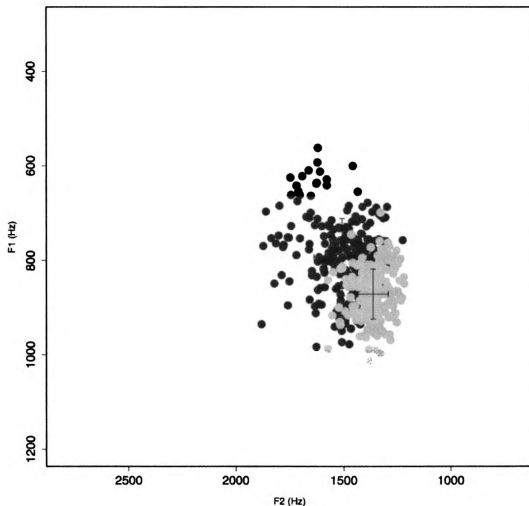


Note that the immigrant South married women's vowel tokens are located on top of the South baseline speakers with bull's-eye accuracy, showing that the South women have maintained the patrillectal variant very precisely.



Finally, consider the South married women's (-a) in contrast with the North baseline speakers. In Figure 41, the gray circles represent (-a) for the South married women, and the black circles represent the North baseline speakers.

Figure 41. South married women's (-a) (gray) plotted with North baseline speakers' (-a) (black). N=449.



Notice that the South married women's (-a) tokens in Figure 41 are positioned in relation to the North baseline speakers in much the same way that the South baseline speakers are positioned in relation to the same North baseline speakers in Figure 39. Thus, the evi-

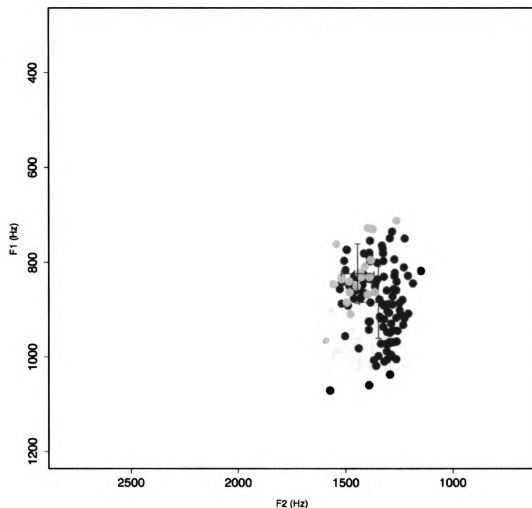
dence seems quite strong that the South married women have not acquired the North variant.

### **The North Women**

As explained in Section 3.1, the current study focuses primarily on the South women, with a small control group of North women also recorded to ensure that there is nothing particular to South clan that would account for the South women's maintenance of the patrilect. While this approach is effective in the tone study since the North married women had a good number of tokens to analyze, the North married women's recordings for (ua) tokens were limited (they were recorded in the 2005 sample when (ua) was not emphasized). Therefore, the North women's vowel results presented in this section can only serve to provide a general perspective on the more robust data in the South women's vowel sample. Nonetheless, in the vowel plots described below, the North women show the same tendency to maintain their home clan's dialect, and this suggests that such behavior is true of Sui women as a whole, not simply the South clan.

First, the (-a) tokens of the three North women's (including the Northeast clan woman, Speaker #44 (see section 3.1)) are plotted against the South baseline speakers. In Figure 42, the gray circles represent the North married women's (-a) tokens, and the South baseline speakers' (-a) is represented by black circles.

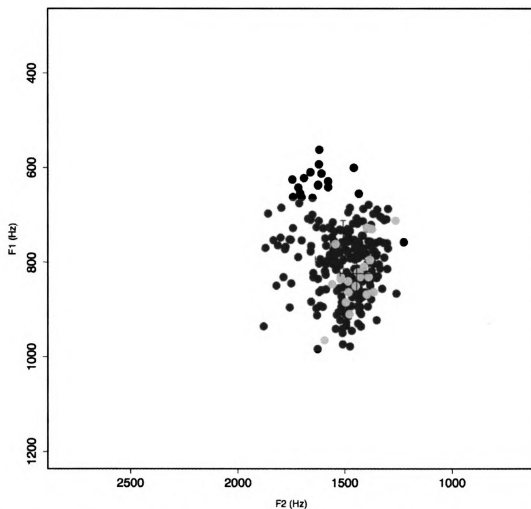
Figure 42. North married women's (-a) (gray) plotted with South baseline speakers' (-a) (black). N=128.



In Figure 42, the North married women's (-a) tokens appear to diverge from the South baseline speakers in both F1 and F2 in a similar way that the North and South baselines diverge (Figure 39), thus showing that the North women have not acquired the South vowel.

Secondly, the North women's (-a) tokens are plotted with the North baseline speakers. In Figure 43, the gray circles represent the North married women's (-a) tokens, and the black circles represent the North baseline speakers' (-a) tokens.

Figure 43. North married women's (-a) (gray) plotted with North baseline speakers' (-a) (black). N=251.



In Figure 43, the North married women's (-a) tokens fall within the expected range of the North baseline speakers, although this limited sample is clustered on the lower right side of the North baseline distribution.

## **ANOVA**

ANOVA is now conducted on the married women's (-a) data in order to confirm the graphical analysis above. First, ANOVA is performed for the North married women and South married women to show that they are significantly different in (-a) in F1 ( $F=15.787$ ,  $p<0.000001$ ) and also in F2 ( $F=25.947$ ,  $p<0.000001$ ). Therefore, the dialect contrast found in (-a) for the baseline speakers is maintained as a contrast between the immigrant married women of the two regions. Secondly, ANOVA confirms the graphical result that South women's (-a) vowels have not moved away from the South baseline speakers in either F1 ( $F=3.0981$ ,  $p=0.07933$ ), nor in F2 ( $F=3.2006$ ,  $p=0.07455$ ). Thirdly, ANOVA shows that the North married women and North baseline speakers are not significantly different in F1 ( $F=2.8602$ ,  $p=0.09205$ ). For F2, however, a difference is found:  $F=4.9141$ ,  $p=0.02754$ . Comparing Figure 43 with this ANOVA result, the North women's tokens are all within the range of the North baseline, but more tokens would be needed to confirm that the women's (-a) is not slightly offset in F2. See above where the limitations of the North women's data are discussed.

## **Classification Tree Analysis**

Another statistical perspective, which is especially useful when the children's vowels are added into the mix (Section 3.4.3), is a classification tree analysis (Breiman, Friedman, Olshen, & Stone 1983; configured for R in Atkinson & Therneau 2000). Table 15 shows the results of a classification tree analysis for the baseline speakers and married women (using R 2.4.1). "N" indicates that a speaker's (-a) formants clustered with the North baseline group; "S" indicates a clustering with the South baseline group.

Table 15. Classification Tree Results for Baseline and Married Women's (-a).

Speaker #	F1 Result	F2 Result
South Baseline Speakers:		
#1	S	S
#2	N	S
#3	S	S
#4	N	N
#35	S	S
#36	S	S
#37	N	N
#38	S	S
South Married Women:		
#5	S	S
#6	S	S
#7	S	S
#8	S	S
#11	S	S
#15	N	S
#41	S	S
#42	S	S
#43	S	S
North Baseline Speakers:		
#17	N	N
#18	N	N
#20	N	N
#21	N	N
#22	S	S
#23	N	N
#30	N	N
#31	N	N
#32	S	S
#33	N	N
#34	N	N
North Married Women:		
#39	N	S
#40	N	N
#44	N	N
Northeast clan		

The results in Table 15 are not without some individual variability, as one might expect when the vowels of 31 speakers (675 data points) are sharply divided into two categorical groups by a computational process, but overall the results provide a fairly accurate confirmation of the findings from the graphical and ANOVA analyses above. The classification tree computation process clustered them close to the expected results for most baseline speakers and married women of those clans. 25 of 31 speakers clustered in the expected direction with respect to F1, and 26 of 31 speakers clustered as expected with respect to F2. Among the unexpected clusterings, there were five (of 19) baseline speakers that clustered with the other baseline for F1. For F2, four (of 19) baseline speakers clustered with the other baseline. (None of these speakers' (-a) formants were impressionistically different from the other baseline speakers.)

Most notably, only one of the 12 married women clustered with the opposite clan in F1 (Speaker #15), and only one of 12 married women clustered with the opposite clan in F2 (Speaker #39). (There was no impressionistic contrast in (-a) in those two women's vowels with the baseline speakers of their home clans.) Thus, the married women once again prove their mettle as lifelong representatives of their respective home clans' dialects.

### **3.3.3.2.3 Conclusions for the (ua) Diphthong**

Through impressionistic analysis and acoustic analysis, including both graphical and statistical aspects (ANOVA and a classification tree), the overall results indicate that (1) a distinct dialect contrast occurs in both F1 and F2 of the (-a) element of the (ua) diphthong between the North and South clans, and (2) the immigrant married women maintained the

(-a) variant of their respective patrulects quite accurately, while showing a contrast with the (-a) variant of their respective exolects.

### **3.3.4 Conclusions from the Linguistic Results of the Married Women and Baseline Speakers**

The linguistic results presented in this section show two clans that have distinct, though mutually intelligible, phonetic variables. The married women of the two clans do not acquire the exolect, despite a decade or more in the husband's region. Rather, they maintain the dialect of their respective home clans very accurately (but see discussion of Speaker #15 below).

Specifically, both the impressionistic analysis as well as the extraction of acoustic data for graphical and statistical analysis (linear regression, ANOVA, and classification trees) show that:

- A North-South dialect contrast exists for the subtle T1 contour variable and the salient T6 pitch variable.
- The married women accurately maintain the T1 and T6 variants of their home clans in contrast to speakers of the opposite clan, with the exception of Speaker #15's T6. Speaker #15, a South married woman, showed signs of lowering of T6 in the direction of the exolect (North). Interview data confirmed this observation since, unlike most other women, she self-reported some acquisition of exolectal features, and another member of the community concurred that she has some North features. Her result is consistent with folk consultants' claims that most of the immigrant women do not adapt to the exolect, but in a rare case where exolectal features are acquired, it would be an older woman who



had been married a long time. Speaker #15 was 59 years old and had been married 40 years in the North region.

- A North-South dialect contrast exists in (-a) of the (ua) diphthong along both the F1 and F2 dimensions.

- The married women accurately maintain the dialects of their home clans in (-a) in contrast to speakers of the opposite clan.

- A set of lexical items was shown to show dialect contrast between the two regions.

- The immigrant women accurately used lexical variants that corresponded to their home regions.

- The women maintained the above dialect variants regardless of formality (free speech, “flexible phrase list” style, and citation style), regardless of linguistic level (cognate lexical variables, non-cognate lexical variables, diphthong variables, and tone variables), and regardless of the saliency of the items (salient T6 versus subtle T1, salient pronouns versus words which the consultants had never raised as examples of dialect contrast). Lexical examples include 1<sup>st</sup> Singular, which sharply followed patrilectal lines, and the salient South discourse marker, *jaʔ*, which was only used by South speakers. Even though *jaʔ* was produced in relatively unmonitored free speech, its usage precisely followed clan lines.

### **Speaker #13 (“Lucky #13”)**

The results above show how each person adhered to the dialect of their home clan. But if a person moves at critical points during childhood, the patrilect may be unstable. Speaker #13 provides an example of what happens when a speaker doesn’t have a clearly defined

patrilect due to migration during childhood. Speaker #13 was a 34 year-old woman who married into the North clan and had been living there for 16 years. Her childhood clan experiences were mixed; she was born to a South clan family but was raised by a relative in the North clan until she was 12 years old. At that time, she moved to the South clan and remained there about six years until marriage. She then married a North clan man and moved back to the North region.

Not surprisingly, Speaker #13's dialect variants show a mix of North and South. For the (ua) variable, she produced 11 tokens with the North variant but 25 tokens with the South variant, and five tokens were perceived as halfway between North and South. For the (ia) variable, she produced 14 North tokens and 49 South tokens. Evidence of mixing was observed in T6 as well; two tokens were produced in the low North variant while the majority of the T6 tokens had the higher pitch of a South T6. She also showed significant mixing in lexical variables; 4 words (17 tokens) were produced in the North variant, while 10 words (66 tokens) were produced in the South variant. There was even a mix of the North and South variants of the 1<sup>st</sup> Singular pronoun in free speech. She primarily used the South variant *ju*<sup>2</sup>, but one token of the North variant *εj*<sup>2</sup> was observed in free speech, and in "flexible phrase list" style, she produced three more tokens of *εj*<sup>2</sup>. Five tokens of the South discourse marker *ja*<sup>6</sup> were observed.

Thus, Speaker #13's data show that in the absence of a clearly defined patrilect gained during childhood, the speaker may have a great deal of mixing among the linguistic variables investigated here (see further discussion of Speaker #13 in Section 5.2.1).

### **3.4 Linguistic Results of the Children of Immigrant Married Women**

A natural question arises from the above results for married women: What about the children? Do the children of the immigrant married women speak the matrilect or the patrilect? If they speak the patrilect, does the matrilect affect their speech and at what point do they lose matrilectal features? The following sections provide data and discussion to address these questions.

In the local Sui folk understanding, all grown children speak the patrilect exclusively. The author's observations confirm that the male adults of each village speak a homogeneous variety, although, as in any speech community, the notion of a homogeneous variety is an idealization -- perhaps even more so in the Sui situation of constant matrilect-patrilect contact in a village. Due to clan exogamy, many grown children in a village were raised in homes where the parents had significant dialect differences (other children are raised in homes where the parents' two clans do not have significant linguistic differences of the type studied here). In the current study, a set of North children with immigrant South mothers as well as a smaller set of Midlands children with immigrant South mothers were investigated in terms of the same dialect features used in Section 3.3 for the married women and baseline speakers. The results are described below (Section 3.4.1-3.4.3).

## Children in the Study

Table 16 provides a list of the children in the study. If the child's mother also participated in the study, the mother's reference number is listed in parentheses. Six of the children recorded had a mother who also participated in the study, so a comparison between mother and child is possible for these speakers.

Table 16. Children in the Study.

Speaker Number	Clan of Residence	Sex	Age	Mother's Clan	Father's Clan
#9	North	Girl	3	South (Speaker #7)	North
#10	North	Boy	4	South (Speaker #13)	North
#12	North	Boy	10	South (Speaker #5)	North
#14	North	Girl	12	South (Speaker #5)	North
#16	North	Girl	10	South	North
#19	North	Boy	9	South	North
#25	Midlands	Boy	5	South (Speaker #24)	Midlands
#27	Midlands	Girl	4	South (Speaker #26)	Midlands

The focus of the current study is the North region, but it would be useful in the future to compare the results of the current study with a group of South children with North mothers since such children were not available to participate during this study. However, two Midlands children with South mothers were recorded, and their results are compared with North children. In addition, as discussed in Section 3.4.2.2.2, in order to control for the possibility that developmental issues--rather than differences in clan dialect--are affecting a child's tones, non-variable tones (T2, T4, and T5) are used to show that children have fully acquired tones that are equally as complex as the tone variables under investigation. Furthermore, the baseline Midlands speakers' T1 has a slight rise like the South T1, so the Midlands children's rising T1 can be shown as evidence that very young children are able to acquire this feature.

### **Mothers' Influence During the Interview**

For some of the children's interviews, the mother chose to be present during the interview. In fact, the very young children sat on their mothers' laps during the interview. This was socially and culturally appropriate, although it wasn't the interviewer's preference in terms of dialect research; some mother-child interaction occurred during the recording that sometimes influenced the child's speech. When the interviewer provided pictures and pantomimes to elicit the data (Section 3.2.1), some mothers, out of a genuine desire to assist the interviewer, sometimes told the child what to say before the child could speak. While every attempt was made to ensure that the child spoke before the mother, the mothers were not familiar with this type of research, and it is natural that they would assume that this would be a helpful way to participate. Such instances are noted specifically below in the impressionistic analysis. In the acoustic tone analysis, such tokens are not included. In the acoustic diphthong analysis, it is necessary to use such tokens since the child diphthong data set is more limited.

On the other hand, this turn of events provided a valuable opportunity to observe the mother-child interactions that occur with children being raised in bidialectal homes. After all, such matrilect-patrilect interactions represent a very real aspect of the child's actual language acquisition environment. As discussed below, interesting cases arose where a child pronounced the word in the patrilect even after hearing the mother prompt him or her with the matrilectal variant a moment before. Such situations provide a glimpse into the child's bidialectal ability to filter out the matrilect.

Note that the emphasis in the current study on the mother's role in L1 acquisition does not imply that the mother is the only person involved in child-rearing. It is recognized that other family members and community members interact with such children as well (see also Section 5.2.2). Nonetheless, Sui mothers are observed to be actively involved in child-rearing in general, and so matrilectal influences in the speech of their children are examined in this study. Finally, even though all the children were living in the father's clan (where they were recorded), at least one child (Speaker #16, a 10 year-old North girl) had spent some time in the South at an earlier point in her childhood. She recalled spending an unspecified length of time in the South when she was under six years old.

### 3.4.1 Lexical Variables for Children

The lexical variants used by children in the “flexible phrase list” style (Section 3.2.1) are discussed below. The children are discussed individually rather than in a table since some of their responses include complex mother-child interactions. The children are discussed below in order of age.

**Speaker #9** (3 year-old North girl) had a mix of North and South variants. She used the North variant for 1<sup>st</sup> person singular, *ɛʃ*<sup>2</sup>. She used the North variant *ku*<sup>3</sup> for head five times, but used the South variant *qəm*<sup>4</sup> twice after hearing her mother's South prompting (her Mother is a South married woman, Speaker #7). She produced ‘frog’ twice as the South variant *qop*<sup>5</sup> after hearing her mother, but several minutes later she produced it as *qop*<sup>6</sup> again on her own. She said ‘spider’ with the South variant *ɣɔ*<sup>7</sup> following the

mother's prompt. However, she also shows her independent dialect choices in the excerpt below (translated from Sui to English).

*Interviewer: What is this called? [points to a sock]*

*Mother: Say it...*

*Speaker #9: ma:tʰ* ['sock', North variant]

*Interviewer: Say it again...?*

*Mother[whispering into child's ear]: jɔʔ* ['sock', South variant]

*Speaker #9: ma:tʰ* ['sock', North variant]

Thus, in spite of her mother's direct intervention (whispering the South variant into her ear), Speaker #9 still used the patrillect for 'socks'. Then several minutes later, she said that patrillectal variant for 'socks' again without any prompting from the mother.

**Speaker #10** (4 year-old North boy) produced most of the lexical items in his patrillect. But similar to Speaker #12 below, he pronounced 'to transplant' as *ˈbiɛʔ*, which is a unique combination of the South variant, *ˈbiɔʔ*, and the North variant, *ˈmiɛʔ*. Note, however, that this boy is the child of Speaker #13, a married woman whose own dialect is very mixed because she moved during childhood (Section 3.3.4; Section 5.2.1). In fact, note below that she prompted him with the North variant for 'market'.

i <sup>1</sup>	'frog'	[North]	nine tokens
ŋɔ <sup>2</sup>	'spider'	[North]	three tokens

ku <sup>3</sup>	‘head’	[North]	eight tokens
tɕɛ <sup>4</sup>	‘market’	[North]	one token (with mother’s prompt tɕɛ <sup>4</sup> )
ma:t <sup>8</sup>	‘socks’	[North]	three tokens
mbie <sup>1</sup>	‘to transplant’	[Mixed]	three tokens

**Speaker #19** (9 year-old North boy) produced seven tokens in the South variant, but the rest of the words were produced in the North variant.

i <sup>1</sup>	‘frog’	[North]	four tokens
ma:t <sup>8</sup>	‘socks’	[North]	five tokens
li <sup>4</sup> ʔya <sup>5</sup>	‘to plow’	[North]	two tokens
tɕoj <sup>1</sup> ʔya <sup>5</sup>	‘to plow’	[South]	three tokens
ku <sup>3</sup>	‘head’	[North]	five tokens
maw <sup>1</sup>	‘hat’	[North]	four tokens
tɕɛ <sup>4</sup>	‘market’	[North]	four tokens
fua <sup>6</sup>	‘string’	[North]	four tokens
tɕuj <sup>6</sup>	‘wardrobe’	[South]	four tokens
kiŋ <sup>1</sup>	‘gruel’	[North]	four tokens
ej <sup>2</sup>	1 <sup>st</sup> Person	[North]	11 tokens
je <sup>2</sup>	2 <sup>nd</sup> Person	[North]	11 tokens
ŋɔ <sup>2</sup>	‘spider’	[North]	four tokens
fuə <sup>2</sup>	‘sheep’	[North]	four tokens
ma:t <sup>8</sup>	‘socks’	[North]	five tokens

**Speaker #16** (10 year-old North girl) produced eleven of the lexical variables in her patrilect and one in her matrilect, ‘wardrobe’.

i <sup>1</sup>	‘frog’	[North]	five tokens
ma:t <sup>8</sup>	‘socks’	[North]	four tokens
li <sup>4</sup> ʔya <sup>5</sup>	‘to plow’	[North]	four tokens
ku <sup>3</sup>	‘head’	[North]	nine tokens
maw <sup>1</sup>	‘hat’	[North]	four tokens
tɕɛ <sup>4</sup>	‘market’	[North]	four tokens
fua <sup>6</sup>	‘string’	[North]	four tokens



tɕuj <sup>6</sup>	‘wardrobe’	[South]	four tokens
kiŋ <sup>1</sup>	‘gruel’	[North]	four tokens
ɛj <sup>2</sup>	1 <sup>st</sup> Person	[North]	eight tokens
fuə <sup>2</sup>	‘sheep’	[North]	four tokens
ŋɔ <sup>2</sup>	‘spider’	[North]	four tokens

**Speaker #12** (10 year-old North boy) produced nine words with the North variant and one word as a combination of the North and South; similar to Speaker #10, his pronunciation of ‘to transplant’ as *miɛ’* seemed to combine North *miɛ<sup>2</sup>* and South *mbia’*. The mother whispered *mbia’* in his ear before he produced the word as *miɛ’*.

i <sup>1</sup>	‘frog’	[North]	three tokens
ku <sup>3</sup>	‘head’	[North]	seven tokens
fuan <sup>6</sup>	‘string’	[North]	three tokens
kuj <sup>1</sup>	‘wardrobe’	[North]	three tokens
ɛj <sup>2</sup>	1 <sup>st</sup> Person	[North]	two tokens
ŋɛ <sup>2</sup>	2 <sup>nd</sup> Person	[North]	two tokens
ŋɔ <sup>2</sup>	‘spider’	[North]	three tokens
ma:t <sup>8</sup>	‘socks’	[North]	three tokens
tɕɛ <sup>4</sup>	‘market’	[North]	four tokens
miɛ <sup>1</sup>	‘to transplant’	[Mixed]	four tokens

**Speaker #14** (12 year-old North girl) produced all of her lexical variables with the North variant:

i <sup>1</sup>	‘frog’	[North]	four tokens
ma:t <sup>8</sup>	‘socks’	[North]	four tokens
li <sup>4</sup> ʔya <sup>5</sup>	‘to plow’	[North]	four tokens
ku <sup>3</sup>	‘head’	[North]	four tokens
maw <sup>1</sup>	‘hat’	[North]	four tokens
tɕɛ <sup>4</sup>	‘market’	[North]	four tokens
fuan <sup>6</sup>	‘string’	[North]	four tokens

kuj <sup>1</sup>	‘wardrobe’ [North]	four tokens
kɪŋ <sup>1</sup>	‘gruel’ [North]	four tokens
ɛj <sup>2</sup>	1 <sup>st</sup> Person [North]	four tokens

For the two Midlands children, Speakers #25 and #27, lexical variants are not available since there is very little lexical variation between their Midlands clan and their South mothers’ clan. However, there is significant tonal variation between Midlands and South, and so these children’s tones are discussed in Section 3.4.2.

### **Conclusion for Children’s Lexical Variables**

The children’s lexical variants were predominantly patrillectal (North), but a significant amount of South variants appeared as well. Speaker #9 (three year-old girl) and Speaker #19 (nine year-old boy) had the most evidence of the matrilect in their lexical variants. Two boys, Speaker #10 (age 4) and Speaker #12 (age 10), had patrillectal variants except for the word ‘to transplant’, which they both produced in a form that appears to be a phonetic compromise between North and South. Speaker #16 (a ten year-old girl) used all patrillectal variants except one word (‘wardrobe’). Speaker #14 (a 12 year-old girl) used only patrillectal variants.

## **3.4.2 Tone Results for Children**

### **3.4.2.1 Introduction**

This section provides an acoustic investigation addressing the issue of whether the children of immigrant mothers show the influence of the matrilect in their tone systems. With the methodology developed in Section 3.3.2, the T6 and T1 variables are examined in the

speech of the children of immigrant married women. The T6 variable is described first since it has salient pitch effects that clearly illustrate dialect issues particular to the children's tones. Then the subtle T1 variable is examined.

Recall from Section 2.2.2 that children in prior studies have been found to acquire tone very early (for example, a child as young as 1;10 had accurately acquired the Cantonese tone system (J.K.P. Tse 1978:199), and researchers find that children acquire tone phonology even earlier than segmental phonology (J.K.P. Tse 1978:199 and Li & Thompson 1977:185, cited in J.K.P. Tse)). Thus, it seems reasonable to assume that even the youngest set of children in the current study (3-5 years old) have reached an age where they are capable of mastering the tone system quite well. But as a check on this assumption, tones which do not vary in these dialect regions (i.e., T2, T4, and T5) are also extracted and analyzed. These tones involve the same sorts of complex contours (rising, falling) found in the varying tones (T1 and T6). This study argues that if a child's tone system accurately reflects the local adult tone system in the tones that are not dialect variables, then variation found in the (equally complex) dialect variables T1 and T6 may be considered a dialectal--rather than developmental--effect. A future project focusing on Sui children's tone development would be needed to fully confirm this approach, but it seems to be a reasonable assumption for the current analysis. In addition, the Midlands children's production of T1 can be viewed as a measure of children's ability to acquire T1 since the Midlands children's mothers were from the South clan which has a similar T1.

Finally, although the assumption in the current study is that these children were old enough to have acquired the tone system of their clan quite well, that is not to say that there are no developmentally related effects at all. In fact, a few of the tones of some children in this study had larger standard deviations than the adults, and this is presumably related to development. However, the children's mean tone tracks were quite consistent with the adults' mean tracks in most cases, thus showing that they had acquired the tone system in the sense of sharing the same mean values. Moreover, most of the children's tones had standard deviations that were quite comparable to the adults.

#### **3.4.2.2 The Children's Tones**

In the following, the children's tone systems are plotted in order of increasing age. Tokens are from "flexible phrase list" style (Section 3.2.1), except in the case of very young children (3-5 years old) whose recordings involved simple naming of objects.

First, a baseline speaker from the North clan (Figure 44) and a baseline speaker from the South clan (Figure 45) are plotted for comparison with the children. Two additional baseline speaker's tone systems are given in the Appendix for reference. See also the mean tone plots for the two baseline regions in Figures 9-10 (Section 3.3.2.2).

Figure 44. An Individual South Baseline Speaker (Speaker #3). In semitones; normalized for duration and mean of T3. N=124. Dotted line represents the mean of T3.

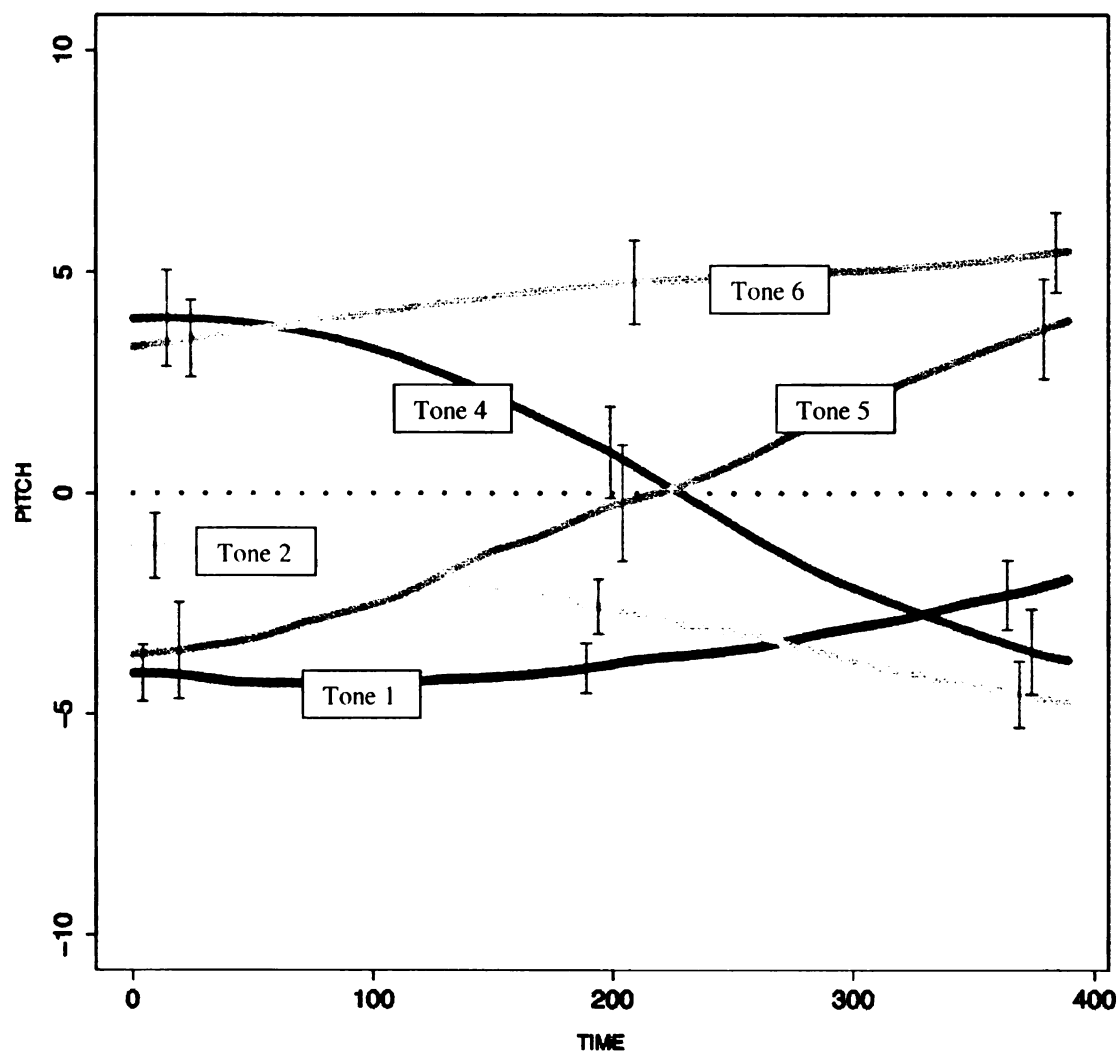
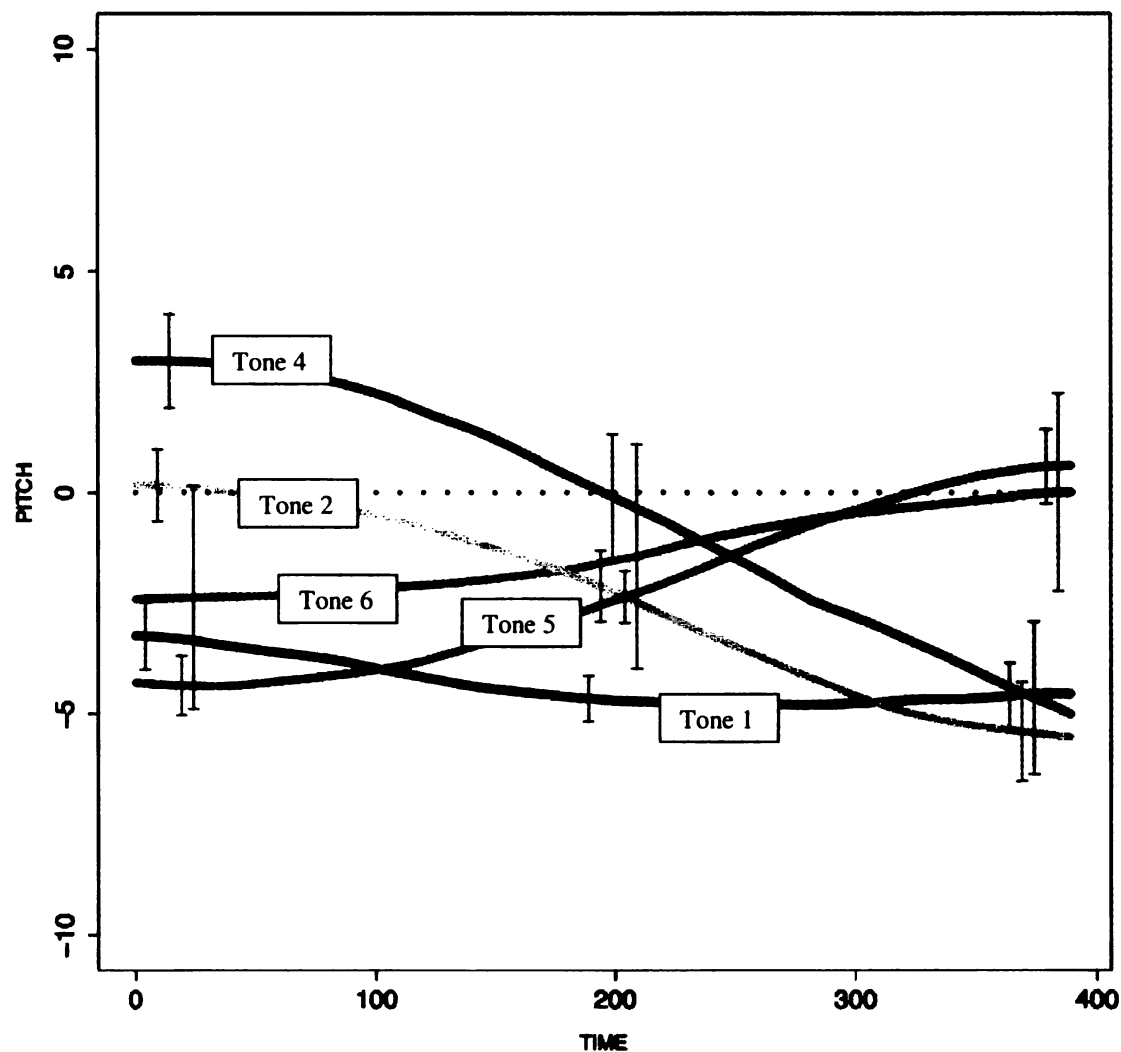


Figure 45. An Individual North Baseline Speaker (Speaker #20). In semitones; normalized for duration and mean of T3. N=122. Dotted line represents the mean of T3.



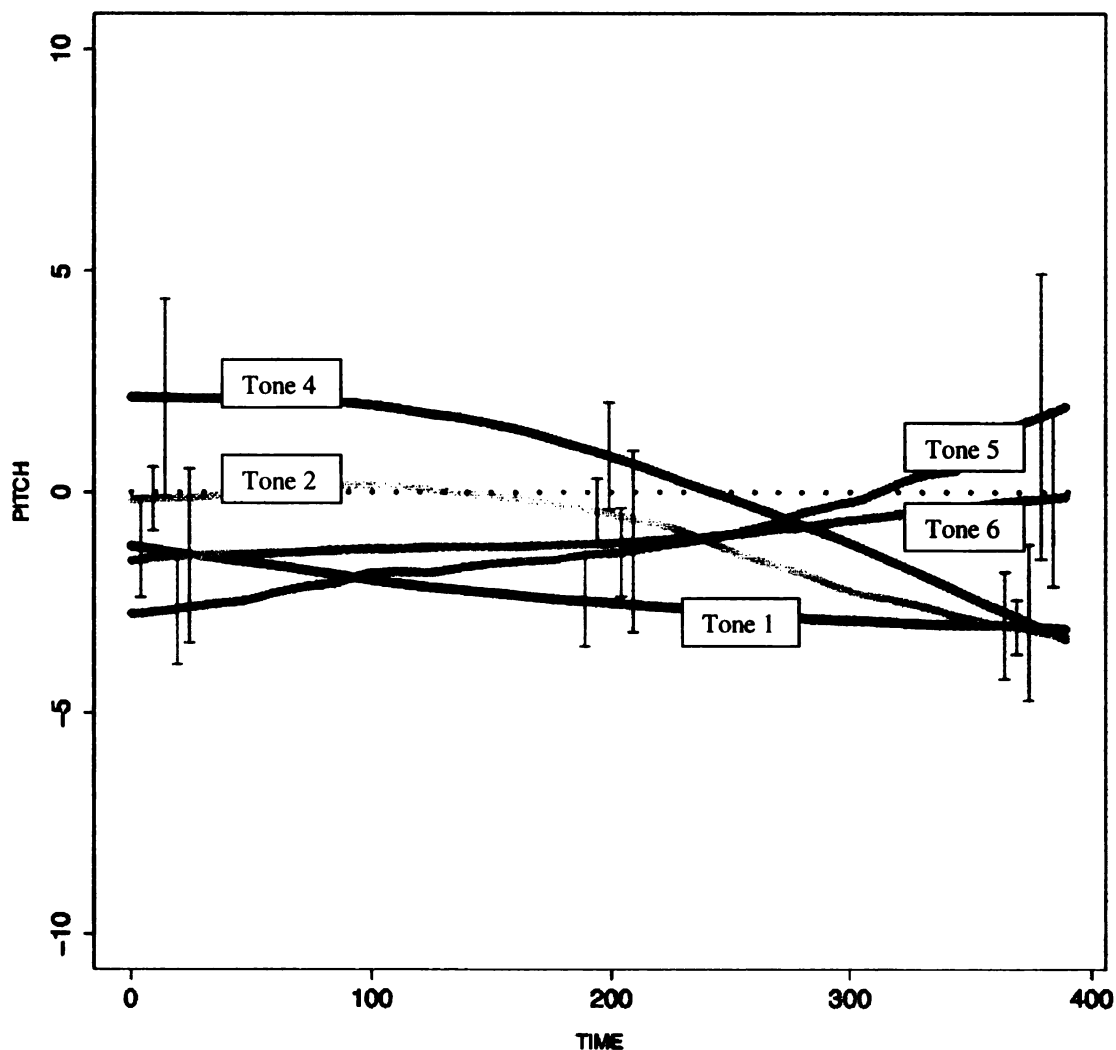
The children's tone systems are now plotted in Section 3.4.2.2.1.

### 3.4.2.2.1 The Young Children (3-5 years old)

#### Speaker #9: Initial Inspection

Speaker #9 is a 3 year-old North girl with a South mother (Speaker #7). Her tone system is plotted in Figure 46.

Figure 46. Speaker #9 (3 year-old North Girl). In semitones; normalized for duration and mean of T3. N=74. Note: T2 only has 4 tokens, and T5 only has 3 tokens.



Overall, Speaker #9's tone system appears to be quite similar to the North clan (compare the individual North baseline speaker in Figure 45 and the North baseline speakers' mean tone system in Figure 10). Despite her young age (3 years), to a large degree this North girl had already acquired her patrilect rather than her matrilect. First, note that her T1 track is low and slightly falling, as expected for North, unlike the rising T1 which is

typical of South. Secondly, her T6 tone is low and rises slightly toward the midpoint just like typical North speakers as well.

As mentioned above, children's variances are sometimes somewhat greater, and this can be seen in Speaker #9's tones in some cases, yet her mean tone tracks are quite similar to adults' mean tone tracks.

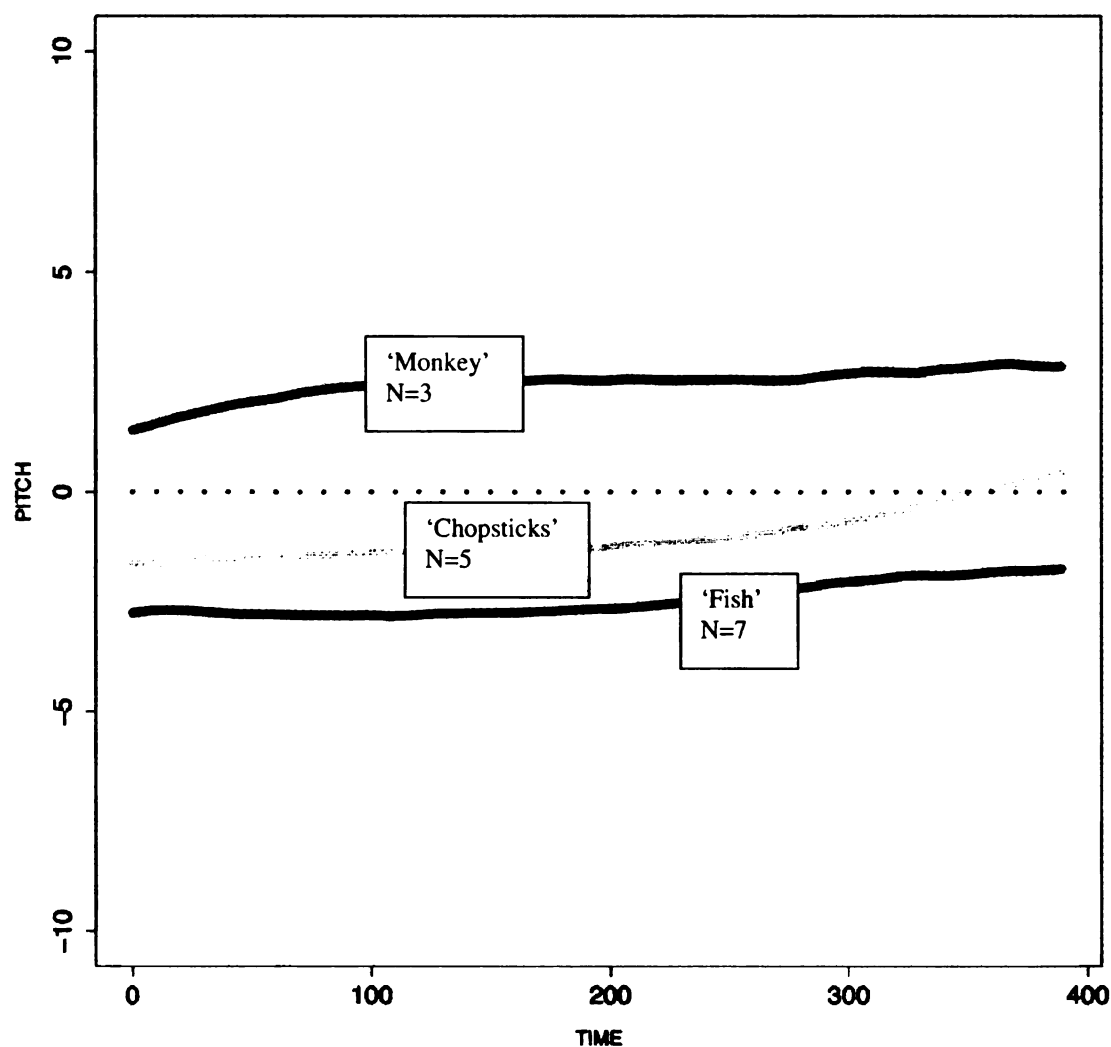
Finally, notice that Speaker #9's pronunciation of the non-varying tones, T2, T4, and T5, are all similar to the baseline forms of these non-varying tones in both regions (Figures 44-45; see also the mean tone plots of all baseline speakers in Figures 9-10), thus showing that Speaker #9 has reached an age where complex tones can be acquired (see also prior tone acquisition research in Section 3.4.2.1).

### **Speaker #9: Word-by-Word Investigation**

Despite the clear similarity of Speaker #9's tone system to that of North adults, closer inspection reveals that her T6 track plotted in Figure 46 is bimodal or perhaps even trimodal. In Figure 47, Speaker #9's T6 tokens are grouped by word. From this figure, it is apparent that Speaker #9 pronounced *mən* 'monkey' with a South T6 pitch (far above the midpoint), but she pronounced *mon* 'fish' and *tsu* 'chopsticks' with a North T6 pitch (below the midpoint for the majority of the tone's duration). Perhaps 'monkey' is a word that she had learned from her mother but hadn't heard frequently from North speakers.

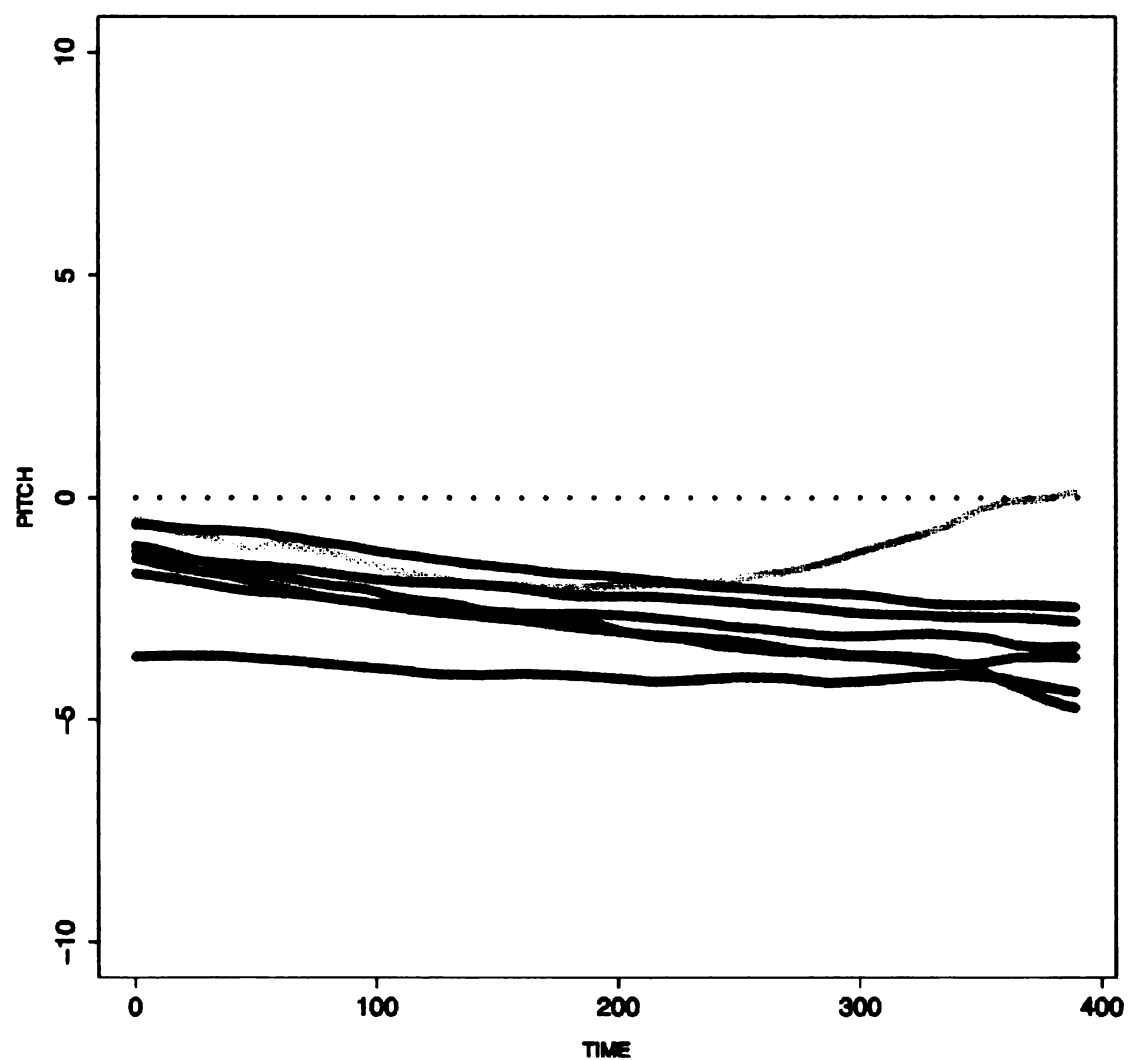


Figure 47. Speaker #9's T6 Divided by Words. In semitones; normalized for duration and mean of T3.



Since Speaker #9's T6 variable was found to be bimodal when viewed in a word-by-word manner, now Speaker #9's T1 variable is plotted in the same way (Figure 48) to check for a similar possible situation.

Figure 48. Speaker #9 T1 Words. In semitones; normalized for duration and mean of T3.



In Figure 48, each line represents the mean tracks of the tokens of each T1 word:

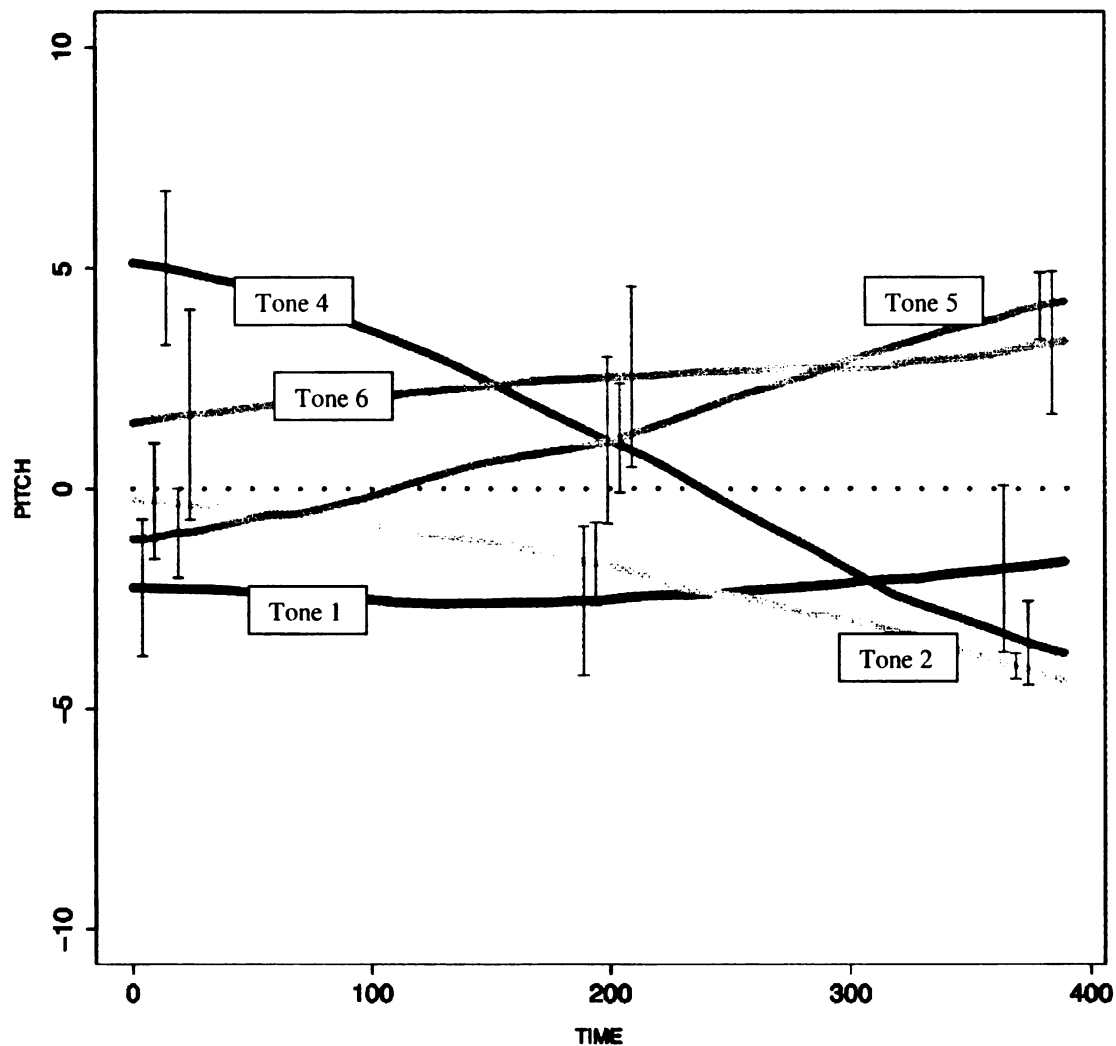
- ʔdua' 'salt' N=6
- ʔbən' 'sky' N=1
- miə' 'hand' N=6
- ˈda' 'eye' N=4
- ʔnəŋ' 'nose' N=3
- qʰa' 'ear' N=1
- təoj' 'plow (n.)' N=2

The results in Figure 48 suggest that Speaker #9 has a consistently North T1 contour. The only rising track (the gray track in Figure 48) represents *ʔbən'* 'sky', for which there is only one token. Given how susceptible T1 is to subtle intonational changes (see Section 3.3.2.2.7), it would not be wise to place too much weight on that single token of 'sky'. Thus, it seems safe to conclude that Speaker #9 produces T1 in a consistently North manner regardless of the specific word.

In conclusion, Speaker #9 shows evidence of mastery of the non-varying tones (T2, T4, T5), and she uses her patrillect (North) for T1. For T6, she used the patrillect for two words (12 tokens total) and the matrilect for one word (3 tokens).

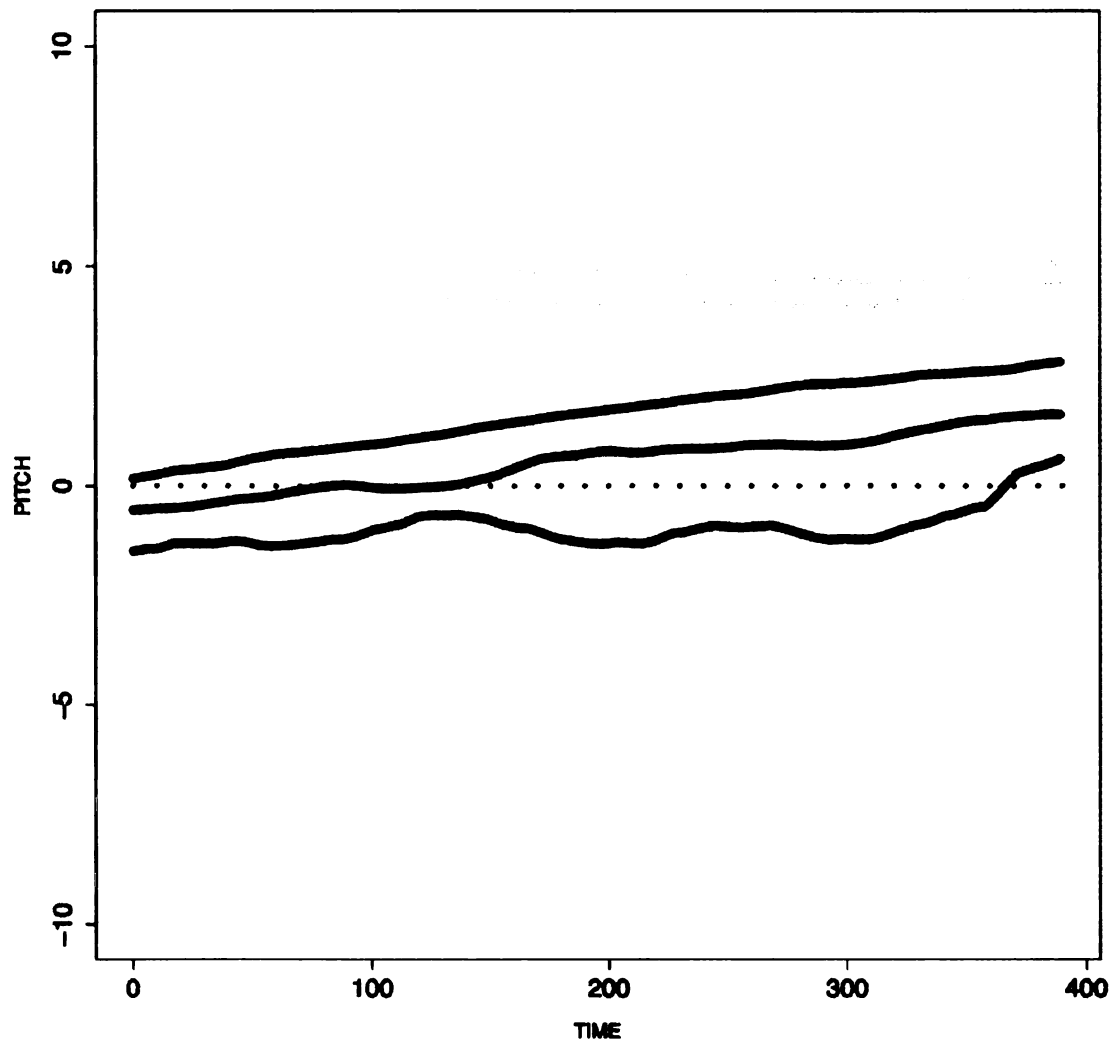
The next two speakers are Midlands clan children with South mothers. Recall that baseline Midlands speakers have a low T6 (Figure 13 in Section 3.3.2.2.5), thus resembling North T6. As discussed in Section 3.3.2.2.5, Midlands T6 may possibly be in a transitional state between North and South, but it is still very low compared to South T6. T1 in the Midlands has approximately the same pitch and contour as South T1. The tone system for Speaker #25, a 5 year-old Midlands boy with a South mother (Speaker #24), is given in Figure 49.

Figure 49. Speaker #25 (5 year-old Midlands boy). In semitones; normalized for duration and mean of T3. N=82.



In Figure 49, Speaker #25's non-varying tones (T2, T4, T5) all have the expected contours and pitches of adult speakers. However, his T6 is quite high and appears to resemble South (his matrillect; his mother's tone system is given in Figure 34, Section 3.3.2.2.8). His T6 data is re-plotted with respect to individual T6 words below in Figure 50.

Figure 50. Speaker #25 T6 Words. In semitones; normalized for duration and mean of T3.



In Figure 50, the two gray lines represent Speaker #25's mean tone tracks for the words *fa:n* 'thread' (3 tokens) and *ŋa:n* 'goose' (3 tokens). Note that these tracks are well into the South T6 pitch region. The three black lines represent three slightly lower sets of T6 tokens: his mean tone tracks for *mom* 'fish' (6 tokens), *tsu* 'chopsticks' (2 tokens), and the lowest black line is one lone low token of *ŋa:n* 'goose' which was plotted separately from the high *ŋa:n* tokens. The black tone tracks are closer to the lower T6 pitch regions

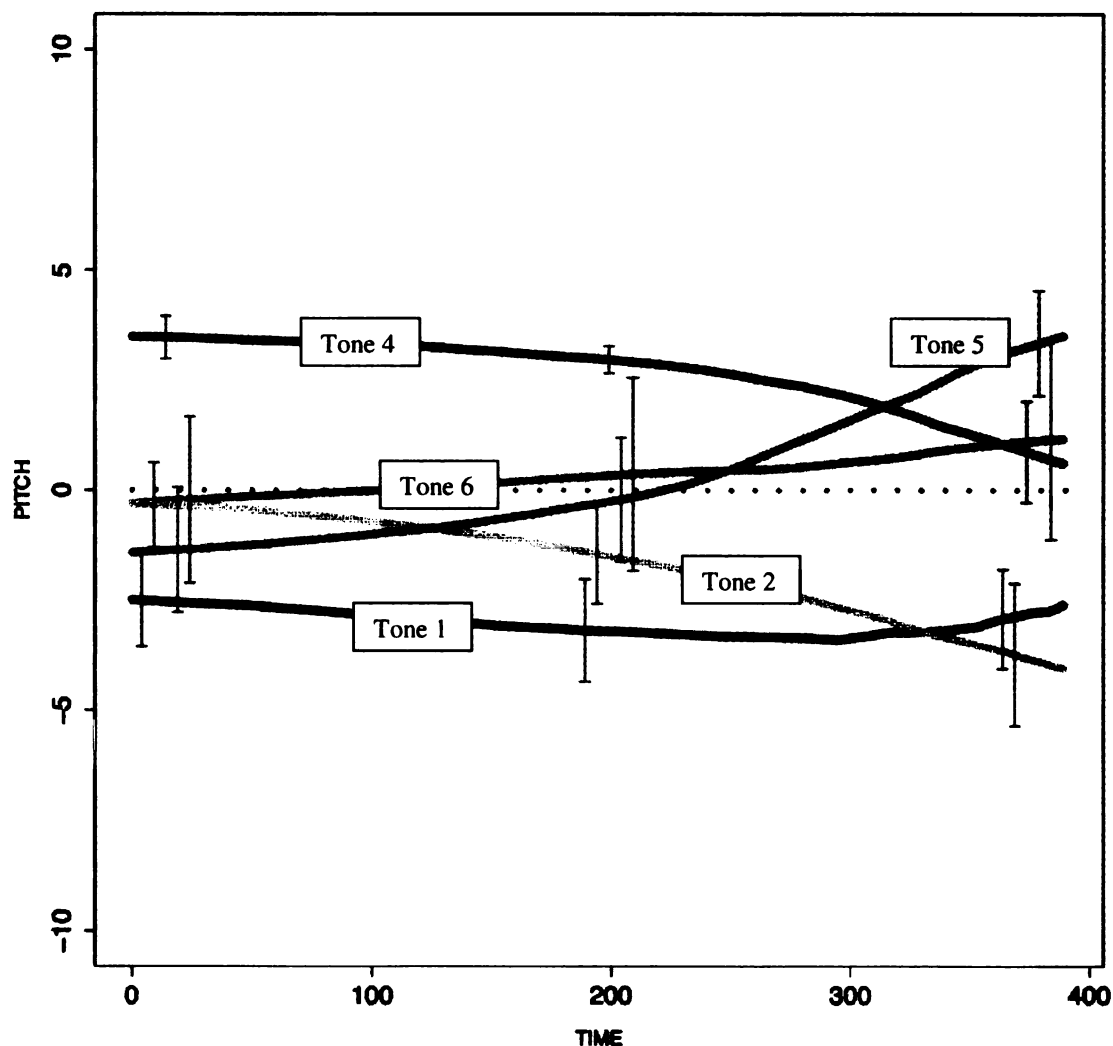
expected for his patrilect, Midlands (note that the baseline Midlands speakers of Figure 13 begin T6 considerably below the midpoint and only slightly cross the midpoint toward the end of the syllable). Thus, like Speaker #9, Speaker #25's T6 appears to show a mix; some words show evidence of the influence of the high T6 of the South mother, while other T6 words show patrilectal tendencies.

It should also be noted in both Figure 50 and Figure 47 that these T6 word-level pitch differences cannot be accounted for simply as a function of the sonority of the onsets (obstruent versus sonorant). In these figures, some sonorant-onset syllables are high and some are low; likewise, some obstruent-onset syllables are high while others are low.

As mentioned above, in this child's clan (Midlands), the patrilect T1 is not significantly different from the clan of his mother (South). Note in Figure 49 that this five year-old boy has a low and slightly rising T1, as expected for Midlands and South. This shows that the rising T1 tone can be acquired by very young children, i.e., both of his parents have a rising T1 in their dialects, and he has it, too. Thus, other children in the study should be capable of producing adult-like T1 tones, such as the North children like Speaker #9 being studied for matrilectal T1 influences. At 5 years old, Speaker #25 already has the fully developed T1 contour of his Midlands patrilect. Therefore, North children's lack of a rising T1 contour (e.g., Figure 46) can then be attributed to the low falling T1 of their patrilect, rather than developmental reasons. See also Speaker #27 below (Figure 51) who also has a T1 that ends with a rising component as expected of her Midlands patrilect.

The other Midlands child is Speaker #27, a 4 year-old girl with a South mother (Speaker #26). Speaker #27's tone system is plotted in Figure 51.

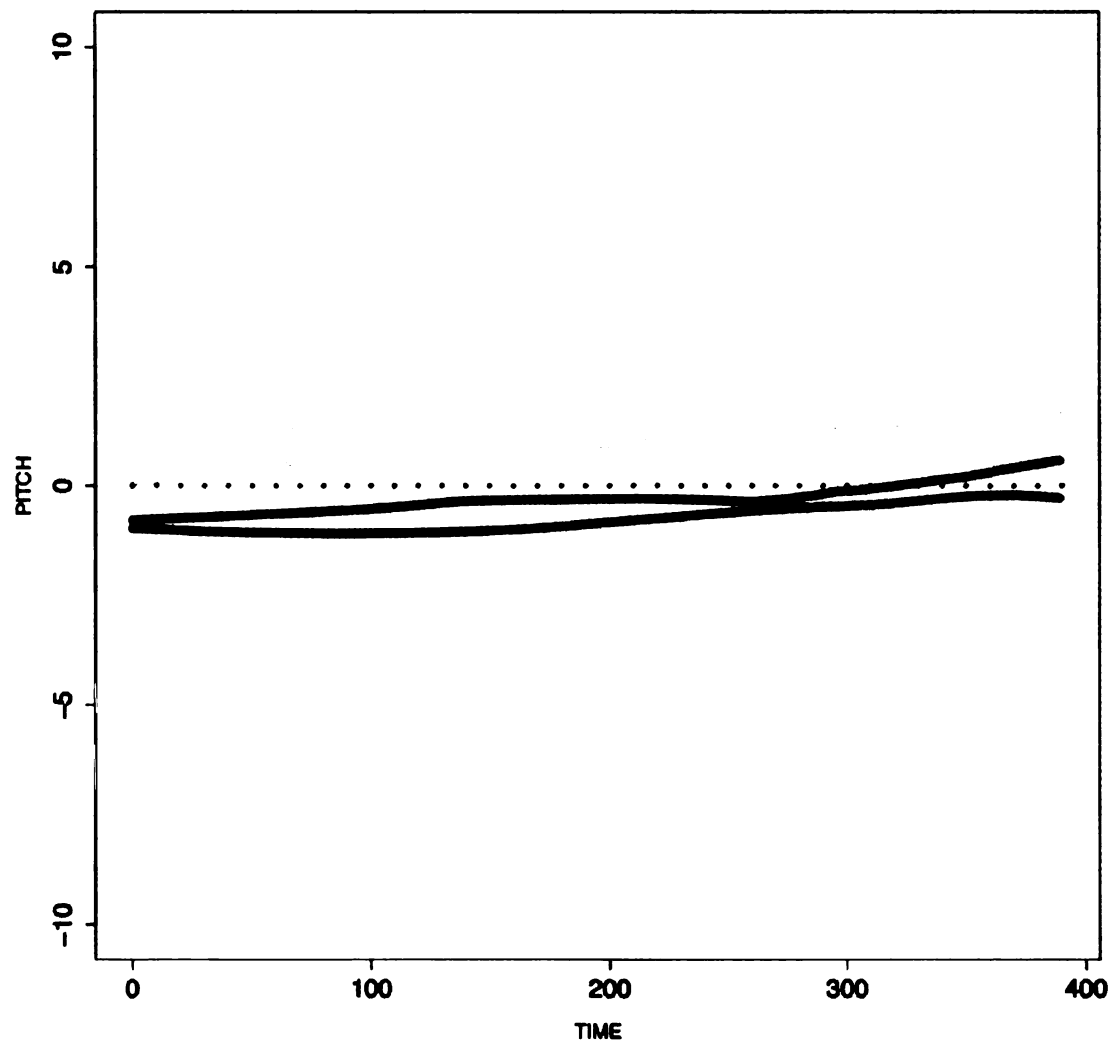
Figure 51. Speaker #27 (4 year-old Midlands girl). In semitones; normalized for duration and mean of T3. N=71.



As with the other children, Speaker #27's non-varying tones are very adult-like in contour and pitch; her T4 is high and falling, her T2 is mid and falling, and her T5 is low and rises across the midpoint. Her T1 is slightly rising in the time range of  $t=200$  to  $t=390$ , as expected of her clan (Midlands; Figure 13). As for her T6 variable, it appears quite simi-

lar to the Midlands baseline speakers, but possibly a bit higher. Therefore, her T6 is divided word-by-word in Figure 52 to determine whether there are any differences on a word-by-word level.

Figure 52. Speaker #27 T6 Words. In semitones; normalized for duration and mean of T3.



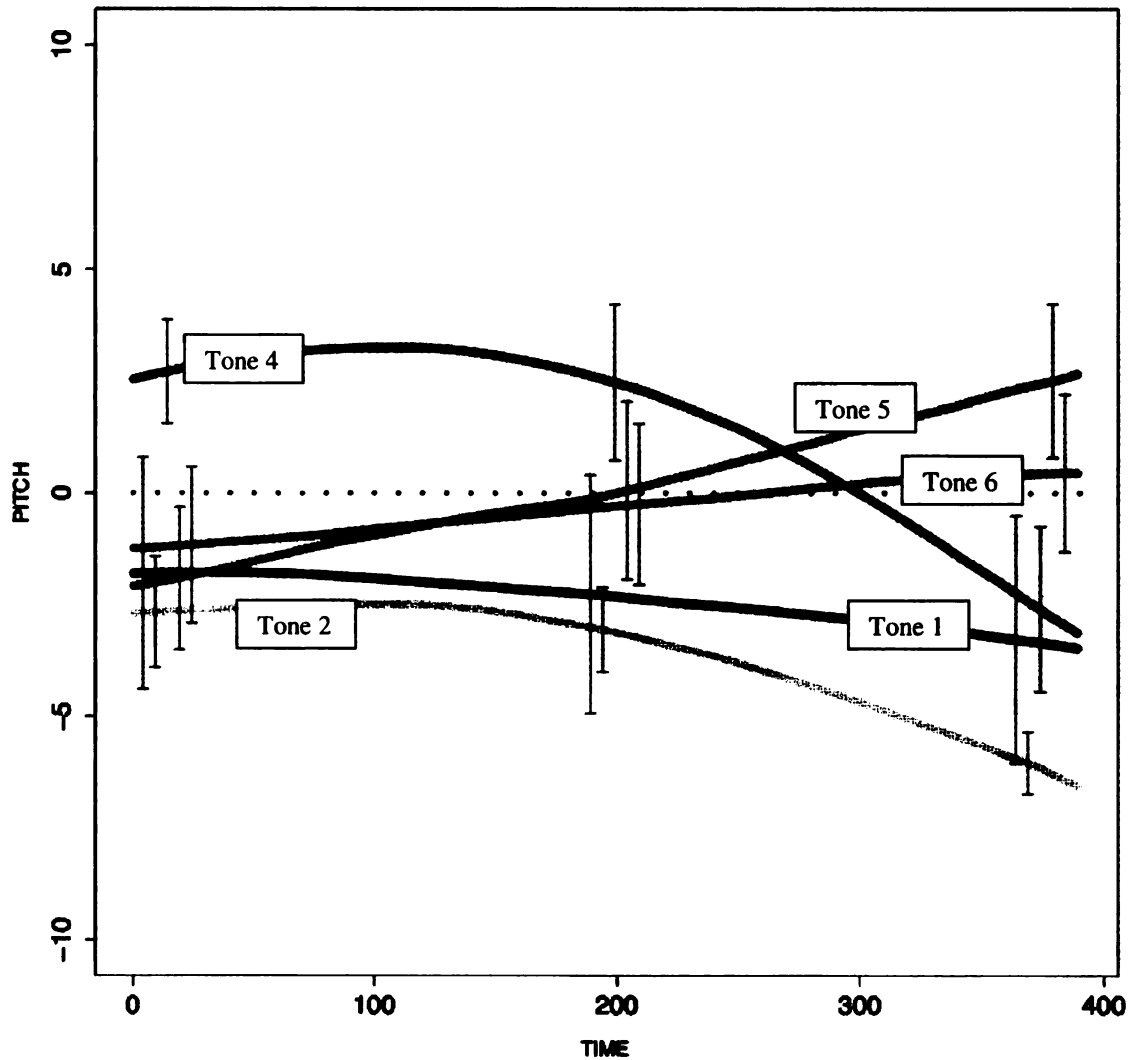
In Figure 52, the two relatively low lines (black) represent Speaker #27's mean tone tracks for *momf* 'fish' (8 tokens) and *tsuf* 'chopsticks' (6 tokens). These words are within the pitch region of the Midlands baseline (Section 3.3.2.2.5). However, the two gray lines



are somewhat higher, representing Speaker #27's mean tone tracks for *teʃ* 'embroidered child-carrier backpack' (6 tokens) and *fɑːn̩* 'thread' (5 tokens). Both of these mean tracks are fully above the midpoint. Therefore, there seems to be a matrilectal influence in Speaker #27's T6.

Now consider Speaker #10 in Figure 53 below.

Figure 53. Speaker #10 (4 year-old North boy). In semitones; normalized for duration and mean of T3. N=122. Note: only 6 tokens of T2.

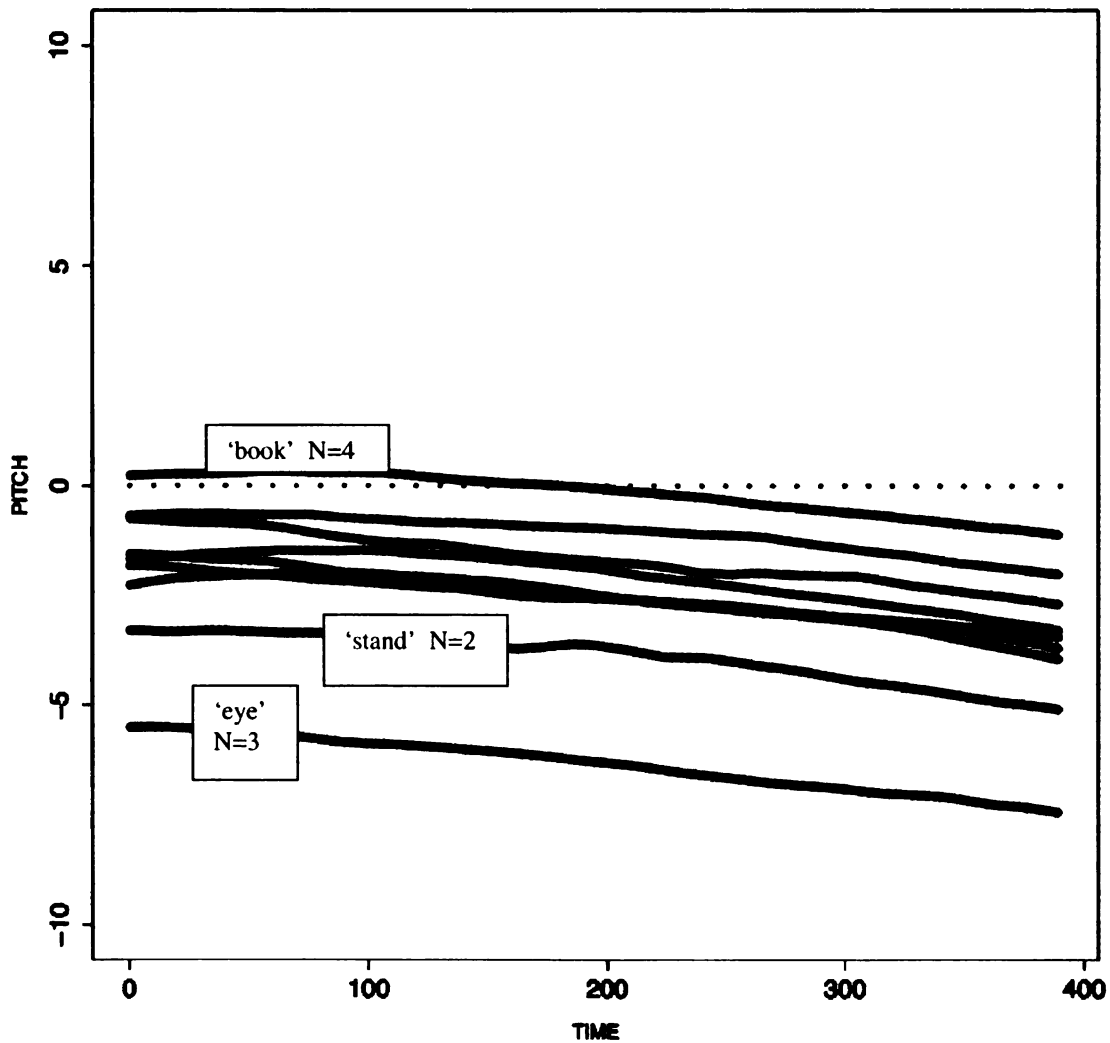


Speaker #10 is a 4 year-old North boy whose mother is Speaker #13. Recall that Speaker #13 moved during her own childhood and shows evidence of both North and South variants in her own speech (See Section 3.3.4 and Section 5.2.2). Therefore, although Speaker #10 is exposed to some of the South variants, his matrillect is a mixture of North and South. In Figure 53, Speaker #10's T1 is low and falling, thus it appears to be the North variant. Similarly, his T6 variant is low as expected for the North region. Among

the non-varying tones, his T4 and T5 are just like their adult counterparts. His T2 has the same contour of an adult T2 but lower. However, this speaker's speech style during the interview was not stable; he sometimes spoke very loudly and directly into the microphone, while other times he spoke quietly. It seems likely that his pitch may have been unstable along with the changes in intensity. In fact, it's somewhat surprising that the rest of this boy's recorded tone system turned out to be so standard in terms of mean tone tracks (note the large standard deviation in his T1 track). It would be necessary to collect a larger sample of tokens from this child to confirm that his T2 is equivalent to an adult T2. But since his T2 contour is exactly what would be expected, the T2 pitch difference is noted but considered an artifact of the speech style in those particular tokens in the recording.

Next, Speaker #10's T6 tones were checked word-by-word to see if there were any effects like those discovered for the speakers above, but Speaker #10's T6 words are all fairly similar and do not show evidence of any high South T6 words as found for Speaker #9 above. Likewise, Speaker #10's T1 words were also checked individually and all were found to have the low, falling North pronunciation. However, since the standard deviation of T1 is quite large (see Figure 53), a word-by-word plot is provided for T1 in Figure 54.

Figure 54. Speaker #10 T1 Words. In semitones; normalized for duration and mean of T3. N=42.



In Figure 54, note the contrast between the mean tone tracks for 'book' *le'* and 'eye' *"da'*.

Despite such instability (due to this speaker's speech style as described above), each track is clearly low and falling, and thus the speaker has a North T1. Furthermore, this speaker provides a useful socio-tonetic fieldwork illustration; despite significant variance in individual tone tokens due to idiosyncrasies in speech style, the overall mean still appears

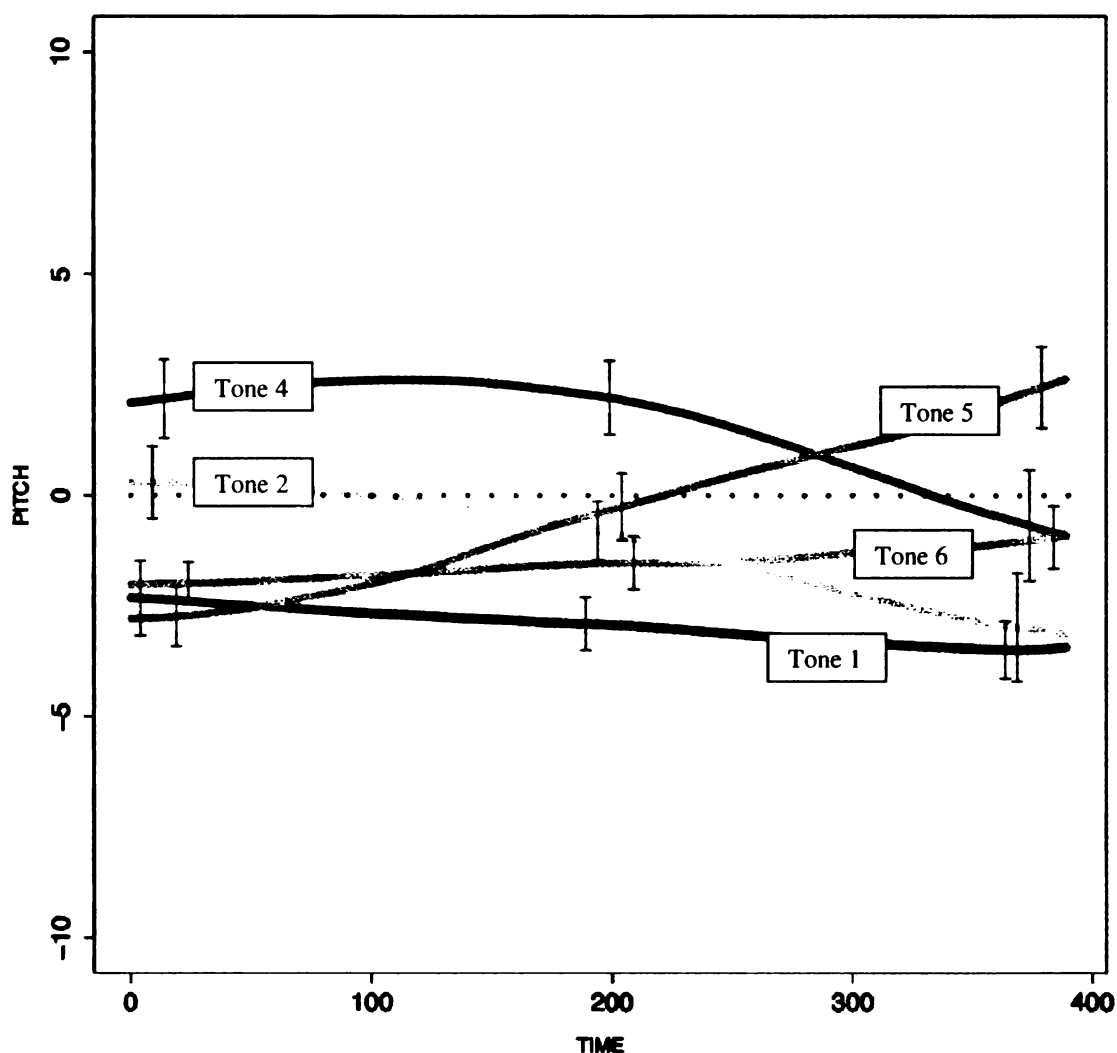
to accurately reflect a stable, standard tone system. That is, his mean T1 track in Figure 53 is a canonical North T1.

#### **3.4.2.2.2 The Older Children (9-12 years old)**

In this section, the remaining children (the 9-12 year-olds) are found to have patrillectal tone systems. Word-by-word tone plots are not produced for these speakers since there is no evidence of matrilectal influence nor word-by-word variability (e.g., large standard deviations in T1 or T6). In fact, due to the monotony found in these clearly patrillectal tone systems, only two children in the 9-12 year-old group have their tone systems plotted below. The tone systems of the remaining two children in the 9-12 year-old group are nearly identical to those plotted here, and so their tone systems are relegated to the Appendix.

Speaker #19 is a 9 year-old North boy with a South mother. His tone system is plotted in Figure 55.

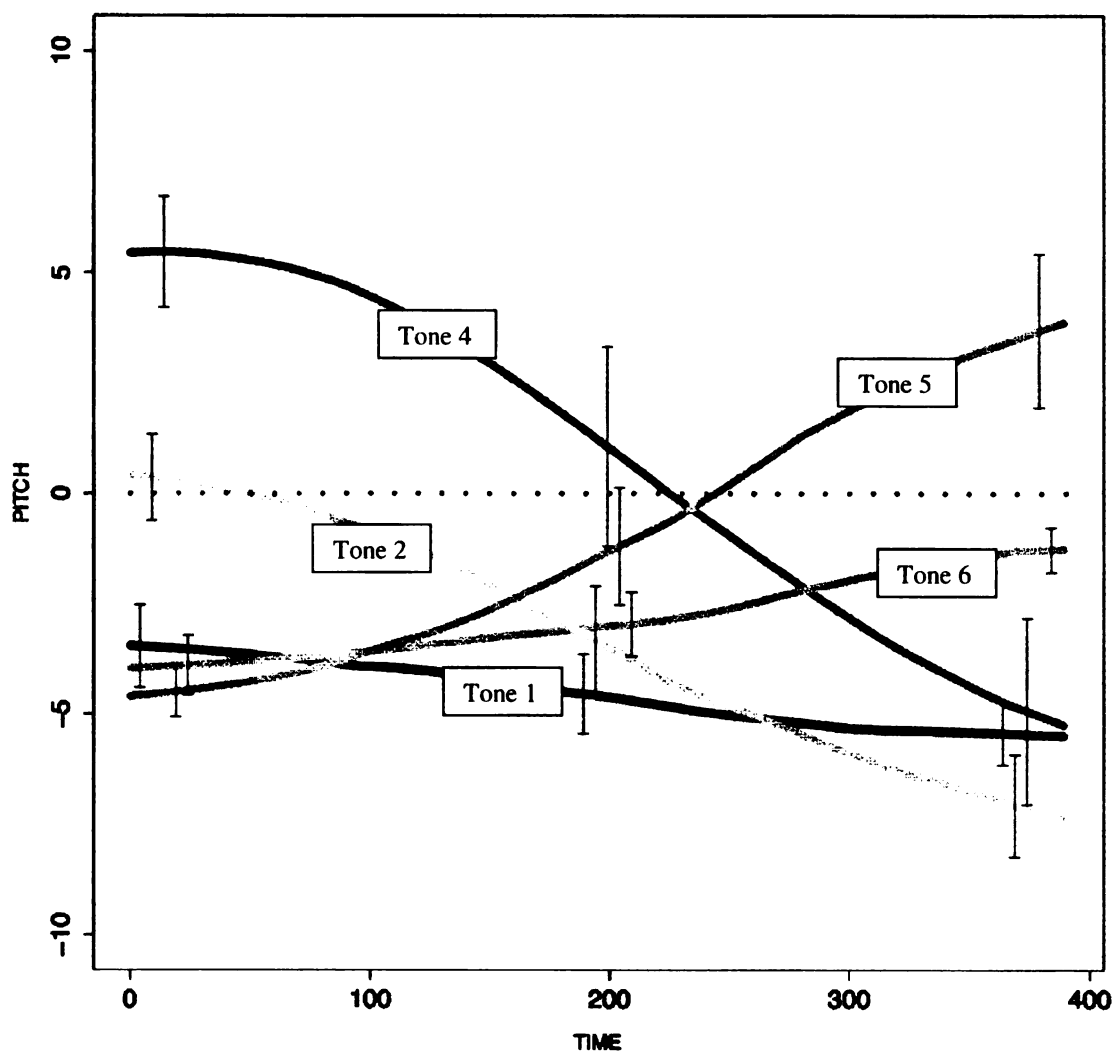
Figure 55. Speaker #19 (9 year-old North boy). In semitones; normalized for duration and mean of T3. N=211.



First, notice that Speaker #19's non-varying tones are standard (T2, T4, T5). Secondly, his T6 is low, definitely indicating a North variant. His T1 is low and falling, also the North variant. Thus, at age 9 he has fully acquired the patrilect.

Speaker #16 is a 10 year-old North girl with a South mother. Her tone system is plotted in Figure 56.

Figure 56. Speaker #16 (10 year-old North girl). In semitones; normalized for duration and mean of T3. N=132.



Speaker #16 has a fully standard North dialect tone system. Not only are the non-varying tones standard, but T1 and T6 are exactly what one would expect for North.

The remaining two children in the 9-12 year-old group, Speakers #12 and #14, have nearly identical results (see Appendix).

### **3.4.2.3 Linear Regression and Classification Trees for the Children's Tones**

#### **Tone T1**

The North children's mean T1 pitches are now checked with linear regression to see how their slopes compare with the two baseline groups. As Table 17 shows, the North children's mean T1 slopes are comparable to the North baseline (patrilect), rather than the South baseline (matrilect). (Midlands children were not included here since T1 does not vary significantly between Midlands and their South clan mothers.)



Table 17. Linear Regression For Mean T1 Pitch (semitones) versus Relative Time for t=200 to t=390 (using R 2.4.1).

Speaker #	Slope (semitones per relative time point)
Children (who all have South mothers and North fathers):	
#9	-0.003043
#10	-0.005926
#12	-0.003322
#14	-0.002837
#16	-0.004414
#19	-0.003207
<i>Children's Mean = -0.0037915</i>	
South Baseline Speakers:	
#1	0.01266
#2	0.001891
#3	0.01014
#4	0.006537
#35	0.0168
#36	0.01273
#37	0.01962
#38	0.01143
<i>South Baseline Mean = 0.011476</i>	
North Baseline Speakers:	
#17	-0.002712
#18	-0.005111
#20	0.001140
#21	-0.002011
#22	0.0007025
#23	-0.001298
#30	0.004044
#31	-0.00239
#32	0.003865
#33	0.00239
#34	0.001027
<i>North Baseline Mean = -0.0000403</i>	

The children's mean T1 slopes were then clustered by the classification tree routine in

Table 18.

**Table 18. Classification Tree Results for Mean T1 Slope in the range t=200 to 390. “S” indicates the speaker clustered with the South baseline, and “N” indicates the speaker clustered with the North baseline.**

Speaker #	Result for Mean T1 Slope (t=200 to 390)
<b>Children (who all have South mothers and North fathers):</b>	
#9	N
#10	N
#12	N
#14	N
#16	N
<b>South Baseline Speakers:</b>	
#1	S
#2	N <sup>5</sup>
#3	S
#4	S
#35	S
#36	S
#37	S
#38	S
<b>North Baseline Speakers:</b>	
#17	N
#18	N
#20	N
#21	N
#22	N
#23	N
#30	N
#31	N
#32	N
#33	N
#34	N

In Table 18, notice that the classification tree computation has clustered the children’s T1 slopes with the baseline speakers of their patriline (North).

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<sup>5</sup> See Section 3.3.2.2.7 (Fig. 17ff.) for discussion of this baseline speaker’s T1.

## Tone T6

Table 19 provides a classification tree computation for the children's mean T6 pitch at t=390 in comparison to the baseline speakers.

Table 19. Classification Tree for mean T6 at t=390 for Children and Baseline Speakers.

Speaker #	Mean T6 Pitch at t=390
Children (who all have South mothers and North fathers):	
#9	N
#10	N
#12	N
#14	N
#16	N
#19	N
South Baseline Speak- ers:	
#1	S
#2	S
#3	S
#4	S
#35	S
#36	S
#37	S
#38	S
North Baseline Speak- ers:	
#17	N
#18	N
#20	N
#21	N
#22	N
#23	N
#30	N
#31	N
#32	N
#33	N
#34	N

From Table 19, it is clear that the children's mean T6 pitches correspond to the North baseline speakers, i.e., the children's patrulect, but recall that some matrilectal influence was found on a word-by-word level above (Figures 47, 50, 52).

#### **3.4.2.4 Conclusions from the Tone Results for Children**

Overall this study finds that older children's tones closely resemble the patrulect, while very young children may have some mix of the patrulect and matrilect. In particular, all of the 9-12 year-old children (Section 3.4.2.2) had standard North tone systems (their patrulect) with no evidence of South matrilectal influence. As for the young children (Section 3.4.2.1), evidence of significant mixing of the matrilect with the patrulect was observed in T6 words. No evidence of matrilectal influence was found for T1 in any of the children. This seems surprising since the T1 dialect variable is far more subtle than the salient T6 dialect contrast. Yet these children in bidialectal homes appear to acquire the patrulectal T1 before the patrulectal T6. Specifically, Speakers #9, #25, and #27 all showed evidence of some higher T6 tone tokens despite the fact that their patrulects have much lower T6 pitches (North dialect for #9; Midlands dialect for Speakers #25 and #27). In addition, although some children's tones had greater variance (e.g., Speakers #9 and #10) than some adults, the children's mean tone tracks are quite comparable to the adults' mean tone tracks. Such results appear to show an underlying stability in the children's tones.

### 3.4.3 Segmental Variables for Children

The diphthong variables (ua) and (ia) that were examined in the speech of the baseline speakers and immigrant married women (Section 3.3.3) are now investigated in the children. Midlands children (Speakers #25 and #27) are not included in the diphthong analysis since there is no variation in these diphthongs between Midlands and South (their mothers' clan).

#### 3.4.3.1 Impressionistic Results for Children

Unlike the baseline speakers and married women (Section 3.3.3.1), impressionistic analysis of the children's diphthong variables shows considerable variability. To describe this variability accurately, it is necessary to outline each child's results. The children are listed in order of increasing age. If the mother gave a prompt (see discussion in the introduction of Section 3.4), this situation is noted.

#### Speaker #9 (3 year-old North girl with a South mother)

Speaker #9 shows a mix of North and South diphthong variants. She produced (ua) in the South variant twice with the mother's South variant prompting, then four more times in the South variant several minutes later. For (ia) in the words *lian'* 'hot pepper', *liak'* 'to lick', and *lian'* 'mosquito', she produced the South variant once without the mother's prompting, then produced three more tokens in the South variant with prompting. Interestingly, for (ia) in the word *mid'* 'hand', she used the North variant once in spite of the mother's prompting with the South variant. She also produced this word twice with the

South variant. Ten minutes later, however, she produced the same word in the North variant five times without any prompting from the mother.

One additional note: The mother's correctional style was seen in an instance of the word 'horse', which has no North-South dialect variation. The child pronounced 'horse' as *meʔ*, and the mother immediately corrected her, saying *maʔ*. The child then produced *maʔ*.

#### **Speaker #10 (4 year-old North boy)**

Speaker #10's diphthongs were all Northern. His mother is Speaker #13, whose own dialect shows a mix of North and South features since she moved during her own childhood (Section 3.3.4 and Section 5.2.2). Without the mother's prompting, Speaker #10 produced 22 tokens of (ua) in the North variant, and he produced 13 tokens of (ia) in the North variant. In addition, with the mother's prompting (North variant), he produced nine tokens of (ia) in the North variant. A few minutes later he produced three more tokens of (ia) in the North variant without the mother's prompting.

#### **Speaker #19 (a 9 year-old North boy)**

Speaker #19's diphthongs were all produced in the North variant: 20 tokens of (ua) and 40 (ia) tokens.

#### **Speaker #16 (a 10 year-old North girl)**

This North girl showed evidence of dialect mixing in the diphthong variables. She produced 28 tokens of (ia) in the North variant but 18 tokens in the South variant. For (ua),

she produced 36 tokens in the North variant and one token in the South variant. After producing that lone South variant token of (ua), she immediately repeated the word in the North variant several times. There were also four interesting tokens of *mia'* 'hand' where the segmental variant did not match the tone variant; *mia'* 'hand' was pronounced with the South variant of (ia) but with the North variant of tone T1 (low, falling).

**Speaker #12 (a 10 year-old North boy)**

Speaker #12 only used the North variants of the diphthongs. He produced nine tokens of (ua) in the North variant and 20 tokens of (ia) in the North variant.

**Speaker #14 (a 12 year-old North girl)**

This pre-teen North girl had mainly North diphthong variants but a few tokens diverged from the main set. She produced 20 tokens of (ua) in the North variant and eight tokens that were perceived to be South (but see the acoustic analysis below). As for (ia), she produced all 40 tokens in the North variant.

**Conclusion from Impressionistic Results**

The impressionistic results for (ia) and (ua) show a significant amount of mixing. The youngest child, Speaker #9, a three year-old girl, had a mix of both patrillect and matrilect, with more of the latter. Speaker #16, 10 year-old girl, also had considerable mixing between the patrillect and matrilect. Interestingly, the three boys (Speakers #10, #19, #12) all used exclusively patrillectal forms.

### **3.4.3.2 Acoustic Results for the Children**

As with the married women and baseline speakers (Section 3.3.3.2), the variable selected for acoustic analysis is (-a) of the (ua) diphthong variable. Since the main purpose in studying the children's variables is to look for possible L1 dialect acquisition interference effects at different ages, the children's data sets are analyzed individually (rather than grouped together for ANOVA as with the married women's analyses above). The children's data are plotted below in increasing order of age, and each child's data points are analyzed graphically in comparison to the baseline data for the two dialect regions. Note, however, that these analyses of the children should be considered tentative due to the limited number of tokens, especially in many of the young children's data. Furthermore, even some individual baseline speakers can be centered somewhat away from the mean of their respective baselines. Nonetheless, the graphical analysis below can give an indication of the children's variants and whether or not strong matrilectal or patrilectal patterns are evident at different ages.

In Figure 57, Speaker #9's (-a) tokens are plotted as black dots. The North and South baseline data sets are represented by ellipses.



Figure 57. Speaker #9, a 3 year-old North girl (black dots).

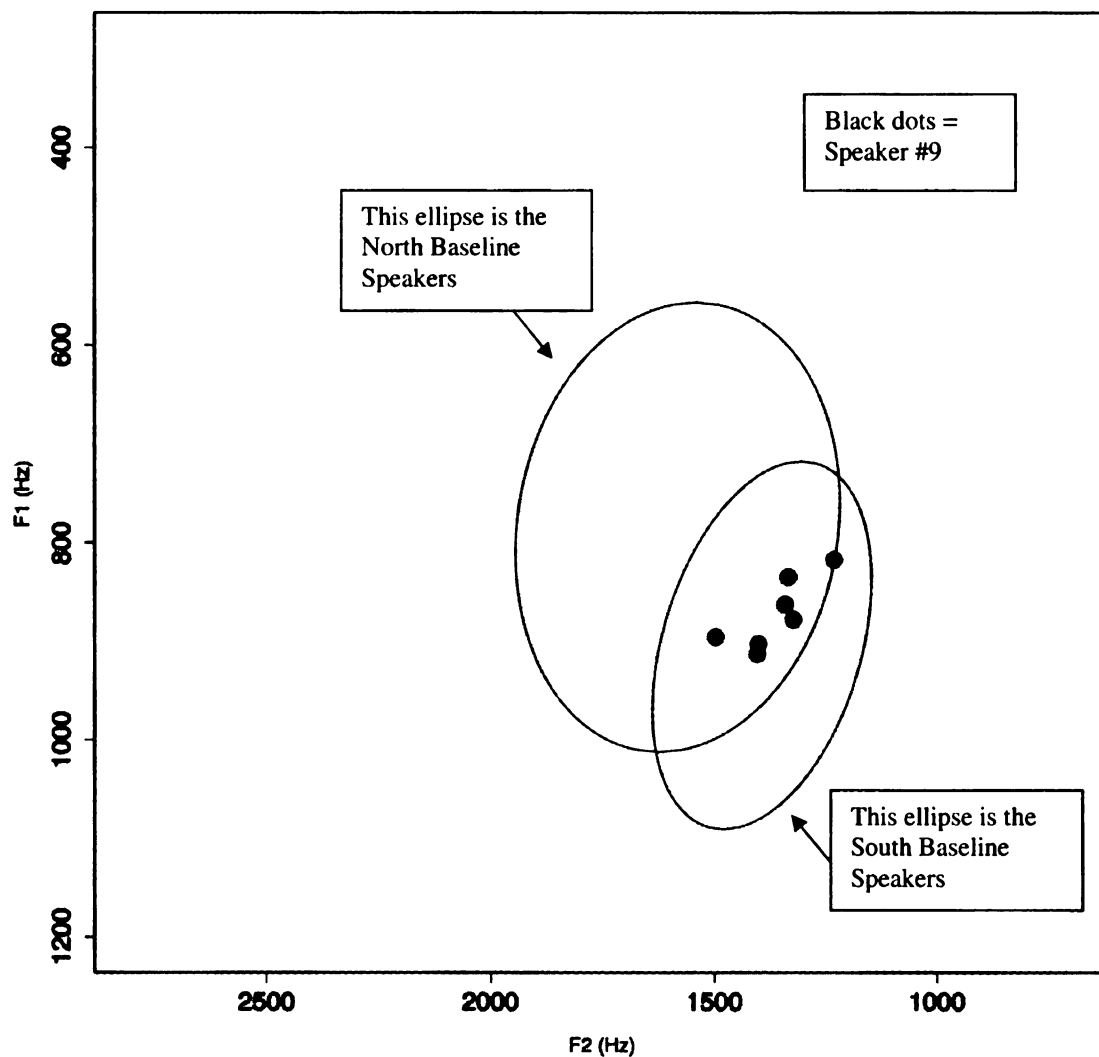
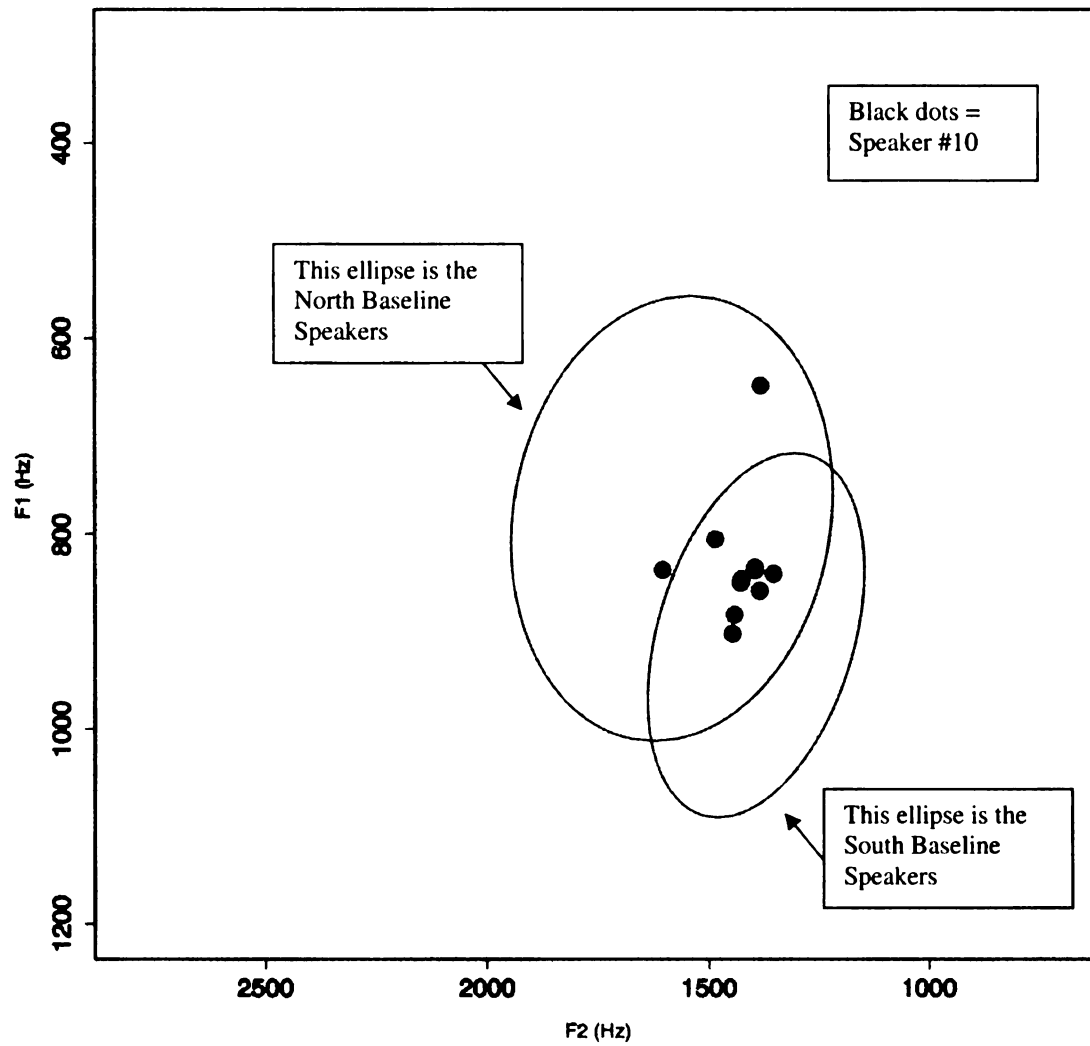


Figure 57 suggests that Speaker #9, a three year-old North girl, is using her matrilect for (-a), rather than her patrilect. Her (-a) tokens are centered very close to the middle of the South baseline speakers' region.

Figure 58 provides a plot of Speaker #10's (-a) tokens.

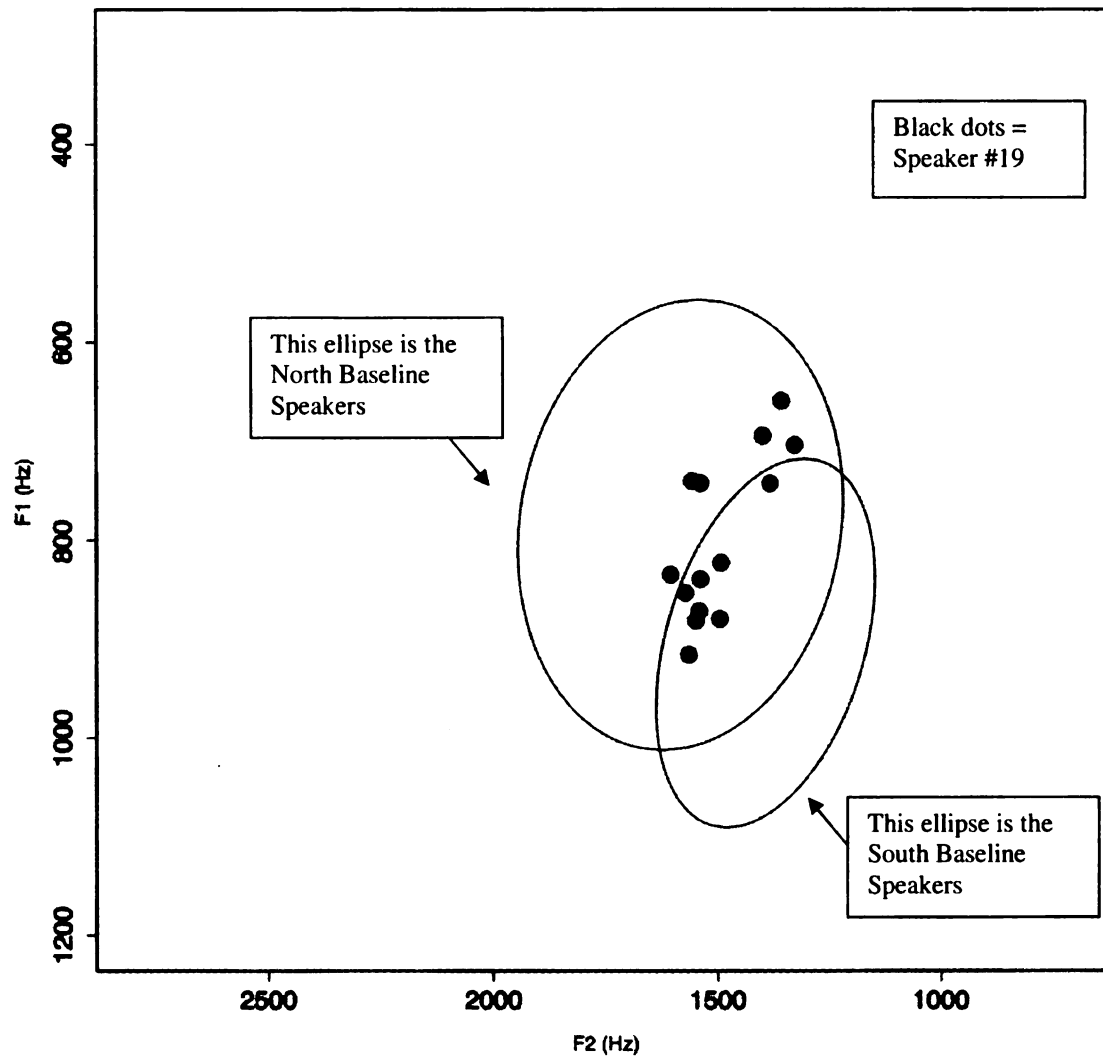
Figure 58. Speaker #10, a 4 year-old North boy (black dots).



In Figure 58, notice that Speaker #10, a four year-old North boy, produced (-a) tokens that are about midway between the two regions, but somewhat weighted toward North.

Speaker #19's (-a) tokens are plotted in Figure 59 below.

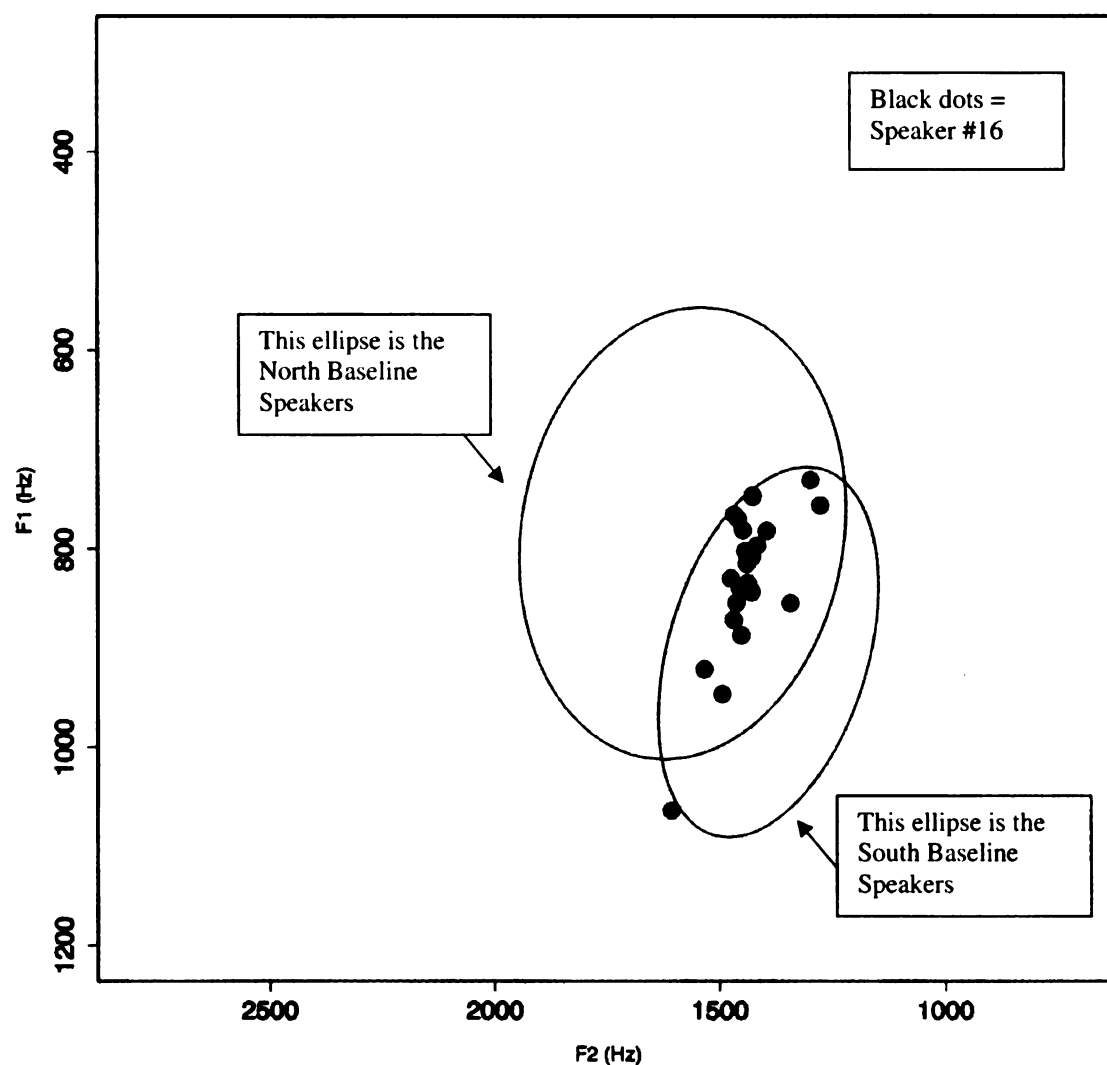
Figure 59. Speaker #19, a 9 year-old North boy (black dots).



In Figure 59, Speaker #19, a nine year-old North boy, produced (-a) closer to his patrillect, North, than his matrilect, South.

Speaker #16's (-a) tokens are plotted in Figure 60.

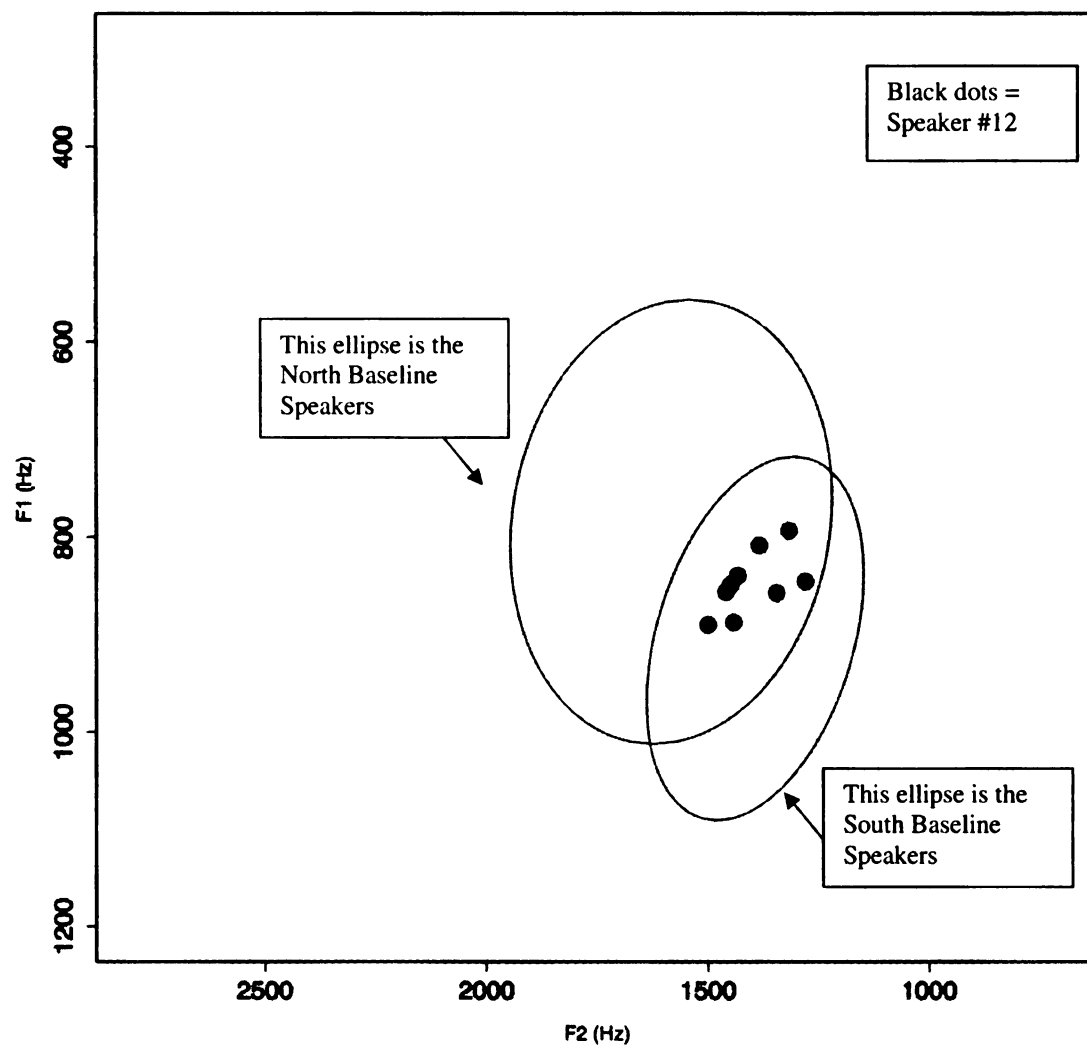
Figure 60. Speaker #16, a 10 year-old North girl (black dots).



In Figure 60, the (-a) tokens for Speaker #16, a 10 year-old North girl, are found to be about midway between the two dialects.

Speaker #12's (-a) tokens are plotted in Figure 61 below.

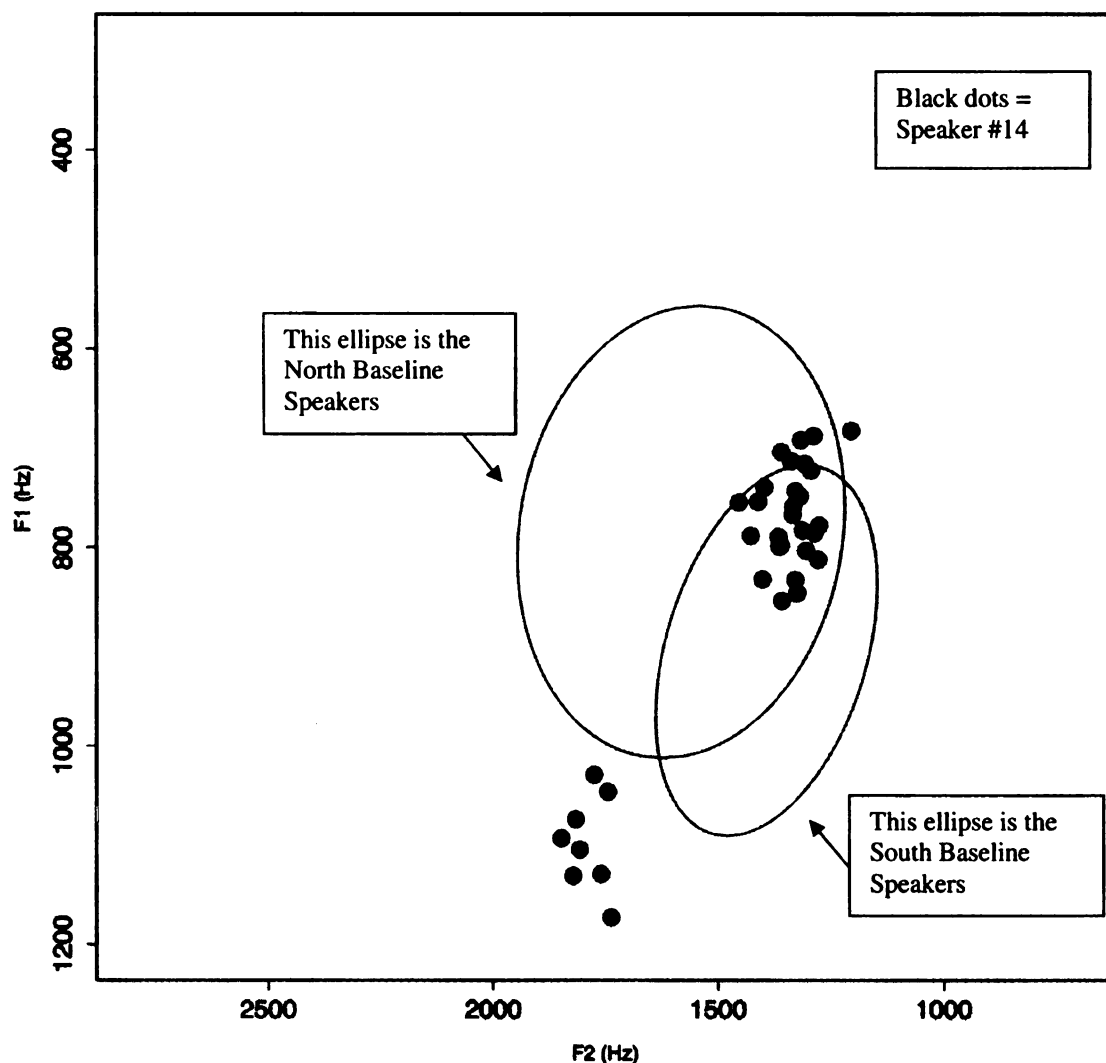
Figure 61. Speaker #12, a 10 year-old North boy (black dots).



As shown in Figure 61, Speaker #12, a 10 year-old North boy, produced (-a) tokens that are closer to South, the matrilect.

Lastly, in Figure 62, Speaker #14's (-a) tokens are plotted.

Figure 62. Speaker #14, a 12 year-old North girl (black dots).



In Figure 62, the majority of Speaker#14's (-a) tokens are closer to North in terms of F1 but closer to South in terms of F2. There are an additional eight tokens which are significantly lower and more fronted than either the North or South baseline speakers. These low, front realizations of Speaker #14's (-a) vowel correspond to the impressionistic observations above where eight tokens were perceived to be South-like (Section 3.4.3.1), but the acoustic analysis shows that the vowels are much lower and much more fronted than either set of baseline speakers. It is not clear why Speaker #14 produced this set of

eight tokens that are so far from other speakers' (-a) tokens in the study. Hypercorrection is not ruled out, but there has been no evidence of hypercorrection in other speakers' (-a), and the eight tokens are far away (on both the F1 and the F2 axes) from both sets of baseline speakers.

### Conclusions from the Acoustic Results

The results of the graphical analysis for (-a) are summarized as follows (in order of increasing age):

Table 20. Graphical Results for the Children's (-a) Vowel.

Speaker Number	Age	Sex	Pronunciation of (-a)
#9	3	F	South
#10	4	M	North
#19	9	M	North
#16	10	F	In-between
#12	10	M	South
#14	12	F	In-between

No clear age or sex-related effects are observed in Table 20.

The children's (-a) results were also categorized using the classification tree process described above. The children's results are listed in Table 21 along with baseline speakers' results (repeated from Table 15). In the table, "N" indicates that the classification tree process clustered the speaker with the North baseline group, while "S" indicates that the speaker was clustered with the South group.

Table 21. Classification Tree for (-a) for Children and Baseline Speakers.

Speaker #	F1 Result	F2 Result
South Baseline Speakers:		
#1	S	S
#2	N	S
#3	S	S
#4	N	N
#35	S	S
#36	S	S
#37	N	N
#38	S	S
North Baseline Speakers:		
#17	N	N
#18	N	N
#20	N	N
#21	N	N
#22	S	S
#23	N	N
#30	N	N
#31	N	N
#32	S	S
#33	N	N
#34	N	N
Children:		
#9	S	S
#10	N	N
#19	N	N
#16	N	N
#12	S	S
#14	S	N

In the children's classification tree results in Table 21, three children are clustered as North in both F1 and F2: Speakers #10, #19, and #16. The youngest speaker, Speaker #9 (3 year-old girl), is clustered as South, her matrilect. Speaker #12 (10 year-old boy) is also clustered as South. Speaker #14 (12 year-old girl) is clustered as South for F1 but



North for F2. But note above that Speaker #14 had eight anomalously low and fronted tokens.

Thus, the classification tree results in Table 21 are similar to the results of the graphical analysis in Table 20. However, for both analyses, recall that the baseline speakers did not all pattern with their expected groups in the classification tree (see discussion in Section 3.3.3.2.2); 14 out of 19 baseline speakers (74%) patterned as expected in F1, and 15 out of 19 (79%) for F2. For the children, only three of six children patterned with the patrilect in F1 (50%), and four of six children patterned with the patrilect in F2 (67%). Since these percentages are somewhat lower than the baseline group, this suggests a possible tendency for the children to mix matrilectal features with the patrilect for the (-a) variable.

#### **3.4.4 Conclusions from the Linguistic Results of the Children**

The children's speech was analyzed in terms of lexical variables (cognate and non-cognate lexical items), tone variation in T1 and T6, and diphthong variation (impressionistic analysis of (ia) and (ua) and acoustic analysis of (-a)).

For the lexical variables, significant mixing between matrilect and patrilect was observed, although patrilectal variants were the most frequent. Speaker #9, a three-year old North girl, showed the most evidence of the matrilect, but Speaker #19, a nine year-old North boy, also had some matrilectal tokens. Two other boys (ages 4 and 10) used patrilectal variants except for a form of 'to transplant' that appeared to be a phonetic compromise

between the matrilect and the patrilect. A twelve year-old girl (Speaker #14) had no evidence of the matrilect in the lexical variables.

For the tone variables, the older set of children (ages 9-12) had accurately patrilectal tone systems, both for the non-varying tones (T2, T4, T5) as well as the dialect variables (T1 and T6). The young children (ages 3-5) showed significant evidence of matrilectal influence in T6, especially when T6 data was analyzed on a word-by-word basis; young children in both the Midlands and North clans showed graphical evidence of high T6 tone tokens (matrilectal). The young children were observed to have exclusively patrilectal T1 contours (observed graphically and statistically with linear regression and classification tree analysis). No sex-related differences were observed in the tone results. Children's accurate production of the tones that do not vary between the two regions (T2, T4, T5) showed that very young children are able to produce complex tones. In addition, Midlands children's speech provided evidence that T1 can be produced accurately at young ages as well.

In the impressionistic results for (ia) and (ua), a good amount of matrilectal influence was found in Speaker #9 (a three year-old girl) and Speaker #16 (a ten year-old girl). The three boys were perceived to be fully patrilectal, although note that one boy (Speaker #12) emerged as more matrilectal in the acoustic analysis of (-a).

For the acoustic results of the (-a) element in the (ua) diphthong variable, the data was analyzed both graphically and statistically (classification tree). Two children were found

to be more matrilectal than patrilectal (Speakers #9 and #12), and two other children were found to be more patrilectal than matrilectal (Speakers #10 and #19). The graphical analysis suggested that Speakers #16 and #14 were in-between the two dialects, while the classification tree analysis clustered them with the North baseline group. No evidence of age or sex-related differences were found in the acoustic analysis of (-a).

From all of these results, a picture emerges of children whose speech is largely patrilectal but which bears significant marks of the influence of the matrilect, especially among the younger children. Tone T6 provided the clearest evidence of this contrast in age since the older children were fully patrilectal in all tones, while evidence of matrilectal T6 was found in young children. The three year-old girl had the most evidence of the matrilect over all. In conclusion, it appears that approaching adolescence, fewer and fewer matrilectal features occur in general, although older children were not entirely immune to the matrilect, particularly in lexical variables and the diphthong variables.

#### **4. The Ethnographic Investigation**

##### **4.1 “Why?”**

The graphical and statistical analyses of linguistic data presented above show that the married women maintain their home dialects quite accurately after years in the husband's village, and that children of such women have some evidence of dialect mixing at young ages and become more and more patrilectal as they get older. However, these conclusions only represent one side of the study. The other side is centered around the question “Why?” As discussed in Section 2.2.1, there is a natural human tendency to accommo-

date to some extent to the linguistic features of those around us. Why then do Sui villagers carefully partition themselves linguistically according to their original clans' dialects, with married women keeping their original dialect features pure like oil floating in water? Both in "sore thumb" features like pronouns and in subtle phonetic variants like T1, the Sui speech community seems to have built a linguistic wall around each clan -- even as the speakers themselves interact freely between clans. To gain a deeper understanding of what is happening in Sui society in general and what is happening in the individual minds of speakers, a series of ethnographic conversations and other observations were conducted. The methodology follows a standard ethnographic approach of interviewing a set of individuals for detailed information and insider's perspectives representative of the community (cf. Niedzielski & Preston 2000).

## **4.2 The Ethnographic Conversations**

### **4.2.1 Questions Used for Ethnographic interviews**

The information presented here is based on (1) the author's observations and extensive interaction with Sui speakers during his language study (1999-2003) and (2) conversations and recorded interviews specifically targeting issues of language and exogamy during the 2005 and 2006 data collection. In the 2005 interviews, speakers were asked to identify differences between North and South clan dialects. In casual settings, speakers were also asked whether married women adapt to the exolect. In the 2006 research, a more extensive series of ethnographic conversations was conducted. A base set of questions was used, but the specific questions sometimes varied according to the responses of the individual. The base set of questions for 2006 is given below.

a. Base questions for teenagers during the recorded interviews:

Do you speak like your father or your mother?  
When you were younger, did you speak like your father or your mother?  
When did you start speaking your father's dialect?  
Why did you start speaking your father's dialect?  
If a person speaks like his or her mother, what do people do?  
Why do they laugh?

b. Base questions for children during the recorded interviews:

Do you speak like your father or your mother?  
When you were younger, who did you speak like?  
If you spoke like your mother, what would people say?  
Do adults tell you which dialect to use?  
What happens if a child speaks like his or her mother?

c. Base questions for married women during recorded interviews:

How long have you lived here in your husband's dialect region?  
Which dialect do you speak?  
Have you adapted to your husband's dialect?  
Why or why not?  
What would other people do if you spoke your husband's dialect?  
What dialect do your children speak?  
Why? Do you teach them to speak a particular dialect?

d. In informal settings with other community members, the following questions were discussed:

Which dialect do children speak here? How do they learn it?  
At what age does a child begin to speak like his or her father?  
Do you ever hear young children speaking the mother's dialect?  
Why don't older children speak like the mother? What factors keep them from speaking like the mother?  
Is there any difference in treatment of boys and girls with respect to learning the dialect?  
Do parents teach their children to speak like the father?  
Do married women adapt to the husband's dialect? If not, why not?  
What will happen if a person speaks the dialect of the mother?  
Why do people laugh when a person speaks the mother's dialect?  
Why is it the custom that people speak the father's dialect?  
Why is it important for married women to speak the father's dialect?

#### 4.2.2 The Responses

Ethnographic responses are presented both in terms of generalizations (to ensure that one doesn't miss seeing the forest for the trees) as well as specific individuals' experiences (to ensure that one doesn't miss seeing the trees for the forest). With the latter in mind, this section begins by presenting a detailed excerpt from an especially informative individual, Speaker #6, a South married woman.

Excerpt (1)

(translated from Sui to English)

- a *Interviewer: You've been in Ljong [a region in the North clan area] for a long time. When you talk, it is like when you were little or is it like here?*
- b *Speaker #6 [South married woman, 52 years old, married 35 years, four children]: No, I was already grown up when I moved here. I can't speak like Ljong... People in Ljong speak like Ljong. People speak like their own place/region. I speak like my own place...*
- c *Interviewer: What if someone with the P. surname [the South clan's surname, same as Speaker #6] came to Ljong and spoke like Ljong, what would people say?*
- d *Speaker #6: Oh, if someone with the P. surname came to Ljong and spoke like Ljong, everyone would laugh. She'd feel embarrassed. She wouldn't speak that way anymore.*  
[Trans. note: 3<sup>rd</sup> Sg. is gender neutral]
- e *Interviewer: Why "embarrassed"?*
- f *Speaker #6: She would know she had done something wrong -- done something inappropriate. So everyone would criticize her -- make her feel embarrassed....In Sui country we always say this: "You are from your own home; your mother raised you. If you go to another home and speak like them, you'll feel embarrassed." People will talk about you like that and make you embarrassed.*
- g *Interviewer: If she married into other region but spoke like that region, would that be doing wrong to her mother?*
- h *Speaker #6: Yes, then the mother would say, "<sigh>Now you're grown up, and you've gone to another place. You speak like they do. Don't you feel embarrassed? Are you giving respect<sup>6</sup> to them [rather than to us]?" People in Sui country say things like this.*

---

<sup>6</sup> *pow*, lit. 'praise'

i *Interviewer*: So if she speaks like the other place, her parents would criticize her sometimes?

j *Speaker #6*: They would criticize! Yes! They would criticize her a lot!

k *Interviewer*: Have you heard this happen?

l *Speaker #6*: Yes, I've heard of it.... They say it like this: "You grew up in our home, but now you've married into another home. [And now] you speak like they do. You're so ignorant; you must like to give respect to them! You're so proud; you're not afraid of what people will say about you!"

m *Interviewer*: You've heard parents say that?

n *Speaker #6*: Yes.

o *Interviewer*: Not to you...

p *Speaker #6*: <laughs>I've been taught about it, so I haven't done it [spoken like Ljong]. When older people said such things, I learned. I haven't been criticized. I learned about it myself when older people said it.

q ...Ljong people say ej<sup>2</sup> [1<sup>st</sup> Sg.], but my home village says ju<sup>2</sup>. People talk this way.

...

r *Interviewer*: What if a child here spoke like Dong [South clan region]...?

s *Speaker #6*: Everyone would laugh. Sui people would say, "Oh, you speak like Dong. You must be a Dong person!" Then that child would feel embarrassed and wouldn't do it again. She'd speak like the father [instead]. Otherwise, people in the village would laugh. She'd get laughed at -- feel embarrassed. She wouldn't speak that way again.

This text (Excerpt (1)) contains a wealth of inside information about Sui culture. The key points include:

- A married woman will continue to speak her patrillect even after she marries into another village (lines b, q).
- This linguistic behavior is enforced by community and family pressure. Ridicule and criticism are applied to those who do not use their patrillectal features (lines d, f, h, j, s).

This reaction is not related to any particular stigmatized clan; recall that Sui dialects do not vary significantly in prestige (Section 2.1.3). Moreover, if a married woman were to use her husband's dialect features, both her home village *and* her husband's village would ridicule her.

- Both adults and children are expected to identify themselves linguistically with their father's clan (lines f, h, l, s), which is linked to surname (lines c-d).
- These attitudes are transmitted verbally from older generations to younger generations (line p).

With Excerpt (1) as background, the ethnographic results of the study as a whole are organized below according to the following topics: Folk understanding of the dialect features in contrast, married women's dialect acquisition/resistance, and children's dialect acquisition.

#### **4.2.2.1 Folk Understanding of the Dialect Contrasts**

Consultants had a very clear and consistent sense of regional variation, and they confidently characterized this variation as directly linked to clan -- and therefore linked to surname as well. People with different surnames were (accurately) presumed to have the dialect features of the clan associated with that surname. For example, consultants said that if someone were to state a stranger's surname, they could immediately predict that stranger's dialect features and home region.



When asked to describe differences between the North and South dialects, consultants usually focused on specific lexical items such as 1<sup>st</sup> Person Singular (*ju*<sup>2</sup> versus *εj*<sup>2</sup>), 2<sup>nd</sup> Person Singular (*nia*<sup>2</sup> versus *ne*<sup>2</sup>) or the discourse marker *ja*<sup>6</sup>, rather than pointing to systematic processes. The Sui consultants were primarily aware of differences between particular words, rather than systematic differences (cf. Niedzielski & Preston 2000:266-69). This is consistent with Trudgill's general observation about dialect contact that when speakers accommodate to another variety, "they modify their pronunciations of particular words," i.e. their motivation is "phonetic rather than phonological" (1986:58), quoted in Chambers (1992:165). For example, in addition to *ja*<sup>6</sup>, speakers also commonly mentioned *naʃ*<sup>6</sup> 'this, here' when describing or imitating the South dialect, thus providing another particular word that exemplifies the T6 distinction. However, speakers occasionally mentioned a difference in "intonation" which may suggest some level of declarative knowledge of systematic tone differences.

Speakers of both regions also often described the South dialect as "faster," "shorter," or "harder," whereas the North dialect was considered to be "slower," "longer," or "softer." This folk linguistic hint may be used to direct future explorations into other possible dialect differences. It is likely that the tonal differences have played a role in forming folk opinion on this point, but there may be other quantifiable linguistic factors that the respondents are perceiving.

A common folk approach used to describe the South dialect was the set phrase *ja<sup>6</sup>-ju<sup>2</sup>*. Literally, this is simply a discourse marker placed adjacent to 1<sup>st</sup> Person Singular, yet it appears to be a folk way of describing the South dialect region. Since 1<sup>st</sup> Person Singular *ju<sup>2</sup>*, the discourse marker *ja<sup>6</sup>*, and Tone 6 (in *ja<sup>6</sup>*) are all salient attributes of the South, this set phrase serves as a convenient shorthand for describing that dialect. Speakers of both the North and South dialects invoke *ja<sup>6</sup>-ju<sup>2</sup>* in their performance speech of the South dialect. This phrase may be compared to the phrase *It's high tide on the sound side* used by the “hoi toiders” of Ocracoke, North Carolina to perform their dialect, as described by Schilling-Estes (1998). Both in the case of *It's high tide on the sound side* and in the case of *ja<sup>6</sup>-ju<sup>2</sup>*, the phrase itself has no meaningful reference when performed in this way; it is performed entirely for the purpose of highlighting stereotypical dialect features.

As for 1<sup>st</sup> Person Singular itself, Sui speakers have an impressive declarative knowledge of the variations from clan to clan. In fact, 1<sup>st</sup> Singular is the most common feature used to describe dialect contrasts throughout the main Sui region in the study (central Sandu Autonomous Sui County). Most speakers seem to have a detailed mental map linking the many subtle variants of 1<sup>st</sup> Singular from clan to clan, and they are quick to explain those pronoun variants to outsiders in detail. This observation supports the notion that linguistic markers play a role in marking the clan of the speaker. Moreover, in an even simpler shorthand than *ja<sup>6</sup>-ju<sup>2</sup>*, speakers often refer to dialect regions simply by their 1<sup>st</sup> Person Singular variants, e.g., “I say *εf<sup>2</sup>*; you say *ju<sup>2</sup>*,” is a common way of characterizing the

fact that one person is a North dialect speaker and the other is a South speaker. Even though only the 1<sup>st</sup> Person Singular pronouns are mentioned, the context usually indicates that the pronoun variant is intended to represent the entire set of dialect features (as a sort of metonym).

Lastly, dialect features are reported in categorical terms. For example, Speaker #5 said, “People who say  $\epsilon f^2$  [1<sup>st</sup> Sg. North] always say  $\epsilon f^2$ . People who say  $ju^2$  [1<sup>st</sup> Sg. South] always say  $ju^2$ .” Speaker #7 reported, “We always speak like our home,” and a South man said, “If you say  $ku^3$  [‘head’, North variant] here in the South, people will say, ‘You aren’t from around here.’ They’ll laugh at you.”

#### **4.2.2.2 Married Women’s Dialect Acquisition/Resistance**

Most married women considered themselves to be accurately maintaining their respective patrillects, usually giving an unequivocal response such as Excerpt (2) and (3):

Excerpt (2)

*Interviewer: You came from Dong [South], and now you’ve spent all these years in Ljong [North]. Has your speech changed?*

*Speaker #7 (South married woman, 36 years old, married 12 years, three children):  
No, I haven’t changed.*

*Interviewer: Not even a little?*

*Speaker #7: No. I always say  $ju^2$  [1<sup>st</sup> Sg. South], like my home [Dong, South clan].  
I speak like Dong completely.*

Excerpt (3)

*Interviewer: Now that you've been in Ljong a long time, have you changed [your speaking]?*

*Speaker #5 [South married woman, married 20 years]  
No.*

*Interviewer: Not even a little?*

*Speaker #5: No. ...Not even a single word.*

*...  
The Z. surname people [North] don't speak like the P. surname people [South]. If a mother is a P. person, she won't speak the same [as her husband and children].*

Similarly, a South woman who had been married in the North for 16 years (Speaker #8) said, "I speak like my home [South], not like here [North]... I don't speak like that. [My speech] isn't even a little like theirs." The author then asked one of Speaker #8's acquaintances about her, and that acquaintance also characterized Speaker #8's speech as "not even a little like Ljong [North]."

A South woman (Speaker #24) who had been married in the Midlands region for 10 years said she hadn't adjusted her dialect to the local Midlands people (who have the surname L.). She described the linguistic distinctions between clans as follows:

*Speaker #24: Those are the L. people, so they say  $\epsilon j^2$  [ $1^{st}$  Sg.]. We are the P. people, so we say  $ju^2$ . Each surname speaks its own way... The L. people speak like the L. region. We P. people speak like P. people.*

Another South married woman living in the Midlands region (Speaker #26) said, "I speak like my father and mother, not like my husband," and she said her speech had not changed at all during her nine years in the Midlands clan.

One South married woman admitted to a “tiny bit” of North influence in her speech:

Excerpt (4)

*Interviewer: You've been here for ten years now. Do you speak like Ljong [North] or Dong [South]?*

*Speaker #11 [South married woman]  
Like Dong... Do you hear me sounding like Ljong [instead]?*

*Interviewer: Oh... no.*

*Speaker #11: <laughs> I might sound a bit like Ljong in some words – just a tiny bit. Some people have said this.*

She then gave an example of a disyllabic word, *ni<sup>h</sup> maŋ<sup>h</sup>* ‘what’. She said she has heard herself say it as *nə maŋ<sup>h</sup>*, i.e., with a reduced vowel (and a reduced or neutral tone) on the first syllable, a pronunciation that she described as more typical of the North than the South.

However, none of the married women reported any other changes in their speech except Speaker #13 and Speaker #15. As discussed in Section 3.3.4, Speaker #13 had a mixed clan childhood, so her dialect appears to be unstable. Although her situation is interesting in its own regard (see Section 5.2.1), it is different than the other married women in the study whose childhood clan experiences were more stable.

But Speaker #15, a 59 year-old South woman who had been married in the North for 40 years, is a significant exception to the rule. As discussed above (Section 3.3.2.2.8), Speaker #15 reported that her speech had been influenced by interaction with local children. However, even in her case, the actual dialect acquisition was still quite limited. As

seen in the results of Section 3.3, Speaker #15 still maintained her patrillectal pronouns and most other lexical variables (62 out of 63 tokens) and other features. For example, she used the South discourse marker *ja'* twelve times in three minutes of free speech, a salient South feature that is relatively unmonitored in free speech. She said that her speech is still more like the South and that "I haven't forgotten Dong [South]." But a significant North influence was observed in T6. Furthermore, another community member commented that Speaker #15 had acquired some North features.

As suggested in Section 3.3.2.2.8, Speaker #15 is an exception that highlights the rule. She was a 59 year-old South woman who had been married in the North for 40 years. In her specific case, extensive interaction with local children, perhaps coupled with her age and comparatively long time in the North, had led to some initial changes in her dialect. After all, in other sociolinguistic studies, speakers in her age range have been observed to be less concerned about speech expectations of the community (e.g., Bailey 2002). Yet such acquisition effects were not observed in Speaker #43, a 71 year-old South woman who had been married in the North for 43 years. Therefore, Speaker #15's acquisition, though limited, is considered an atypical individual case and is presumably related to her interaction with children, as she reports, and possibly also influenced by her comparatively long time in the exolect region.

Overall, the results from the married women's conversations about acquisition are quite clear; the married women claim that they maintain their home dialects to a high degree.

## Reasons for Maintaining the Patrilect

When asked why they didn't acquire the husband's dialect, the married women raised issues of ridicule, laughter, societal expectations, and the difficulty of learning a new dialect. An example is given in Excerpt (5) from an interview with Speaker #5, a 41 year-old South woman who had been married in the North for 20 years.

*Speaker #5: If [someone like me] were to speak like they do here [Ljong, North region], people would laugh a lot -- laugh a lot! They would always laugh.*

*If you speak like Ljong, people will laugh. If you say ej<sup>2</sup> [1<sup>st</sup> Sg. North], they'll laugh. They'll laugh.*

Similarly, in Excerpt (6) below, consider Speaker #15, who may have personal experience as the target of such laughter (see above). Notice that these consequences are not limited to the husband's village but include the woman's home village as well.

Excerpt (6)

*Interviewer: What if someone [like you] said ej<sup>2</sup> [1<sup>st</sup> Sg. North]? What would people do?*

*Speaker #15 [59 year-old South woman who had been married in the North for 40 years]:*

*They would always laugh. So [that person] wouldn't talk like that anymore. People would laugh, [saying,] "You don't speak like your own place anymore! You ate the food of our place [as a child], so you should [speak] like our place."*

*They would say, "You are of our place. You ate the food of our place [as a child]. You should be like our place."*

Speaker #15's response (Excerpt (6)) also shows the role of societal expectations. Notice the clan identity that is stressed in phrases like "You are of our place" and "You ate the food of our place." Similar phrasing is found in Excerpt (1) lines f, h, and l, where Speaker #6 also describes family criticism of a person who has stopped using patrilectal features.

In addition, some of the married women reported that they weren't able to learn to speak the husband's dialect. When asked why she didn't speak the North dialect, Speaker #5 (South married woman) said, "I can't, so I don't. When I was little I learned to speak like Dong. After I grew up and moved to Ljong, I kept speaking like Dong." Speaker #7 (36 year-old South married woman) said, "We always speak like our home. It feels better -- saying *ja<sup>6</sup>-ju<sup>2</sup>* feels better than the way they speak here. If you try to speak like the people here, you can't do it."

### **Community Views on Married Women's Acquisition**

This study finds community-wide agreement that a person must speak his or her patrillect regardless of future residence. Through numerous conversations on the subject, the author finds that the community consensus is that the immigrant married women maintain their patrillects for life. In fact, such conversations were the original motivation for the current study -- to determine the accuracy of this folk linguistic viewpoint. Consultants said that very few married women ever change their dialect features. When pressed, some consultants recalled hearing some non-patrillectal features in older women who have been married for a very long time. During discussions with community members about why married women maintain their patrillects, the main reasons given were clan identity and ridicule, and some also mentioned the difficulty of learning another dialect. Samples are given below.



- *Even though they move here [to the husband's village], married women are always members of the father's family.*
- *[If a married woman changed her dialect,] people would tease, "You've been here so long that even your language has changed!"*
- *It's too hard to change; there's no reason to change.*

Consultants stressed that a person is considered a member of the father's clan, not a member of the mother's clan. Further, membership in the father's clan is permanent. In this way, a married woman maintains patrilineal features out of loyalty to the father's household. If a woman moves away and doesn't preserve the dialect features of her father's villages, it can be viewed as disrespectful or inappropriate behavior (see also Excerpt (1)).

Consultants also drew a parallel with surname traditions, suggesting that the (nationwide mainland China) tradition of keeping the father's surname for life is a natural parallel to the local Sui tradition that a person maintain the patriline for life. Just as a person is born with a certain clan surname that will not change throughout his or her lifetime, the person also maintains the dialect of that clan throughout life. In the sense that Sui dialects and surnames are both social institutions -- longstanding indicators of family relationships and loyalty -- this viewpoint may hold valuable insight.

#### **4.2.2.3 Children's Dialect Acquisition**

Community members were interviewed about the speaking habits of children. Adults (both men and women) were consulted, as well as children of immigrant married women.

#### 4.2.2.3.1 From the Adults' Perspective

In Excerpt (7), a South married woman describes the speech of her own children, who are being raised in the North clan.

Excerpt (7)

*Speaker #5: My children say ej<sup>2</sup> -- they speak like their father, not like me.*

*Interviewer: Did you teach them?*

*Speaker #5: Oh! Teach them? If you taught them, they still wouldn't speak [like their mother]! They speak like their place [North]. They speak like their father, like the Z. surname people [North].*

*The Z. people don't speak like the P. people [South]. If a mother is a P. person, she won't speak the same [as the rest of the Z. family].*

*Interviewer: What if the children speak like the P. people [their mother]? Would others laugh?*

*Speaker #5: Yes, they'd say, "You're speaking like your mother. Don't be like that!"*

In Excerpt (7), Speaker #5's responses show that children are strongly conditioned to speak the patrillect, rather than the matrilect. If a child uses the matrilect, he or she is subject to admonishment. Consultants reported that there is no difference in the treatment of young girls as opposed to young boys as they acquire the language. Both girls and boys are expected to use the patrillect, and both are admonished in the same way.

In the following excerpt, another South married woman, Speaker #7, reports a similar situation. Speaker #7 claims that her children never spoke the South dialect (characterized here by its shorthand label, *ju<sup>2</sup>*, 1<sup>st</sup> Person Singular). She also provides another instance of the apparently formulaic criticism, "You eat our food, but you don't speak like

us” (see Excerpt (1) and Excerpt (6)). She brings up the word *muj*<sup>1</sup> ‘scold’ when describing a parent-child interaction about dialect features.

Excerpt (8)

*Speaker #7: My children speak like Ljong [North]. They speak like their father.*

*Interviewer: Did you teach them?*

*Speaker #7: <laughs> No. Since we raised them here, they speak like Ljong. This place says ej<sup>2</sup>, so they speak like this place -- they speak like that when they play. They speak like this place. We [South married women] are the only ones who come from Dong and say ja<sup>6</sup>-ju<sup>2</sup>. The children don't speak like us.*

*Interviewer: When they were young -- being raised by you -- did they speak like you a little?*

*Speaker #7: No! Not like me.*

*Interviewer: From the moment they began to speak...?*

*Speaker #7: They said ej<sup>2</sup>. If they said ju<sup>2</sup>, then others would scold them. People would scold them, “You eat our food, but you aren't [speaking] like us.” ...People would say, “You are a Z. person; Z. people say ej<sup>2</sup>.”*

Adult consultants agreed that parents admonish the children about using the patrilect, although some said that such admonishment only happens infrequently. Some consultants said that children are admonished that “well-behaved” children speak the patrilect and are warned that their friends will gossip or laugh at them if they speak their matrilect. The following phrase was reported to be used by parents in such situations:

me<sup>2</sup> tsop<sup>7</sup> ni<sup>4</sup>,    aw<sup>1</sup>    tsop<sup>7</sup>    pu<sup>4</sup>

*not be.like mother should be.like father*

“[When you speak] don't be like your mother; be like your father.”

When the author asked a South married woman (Speaker #8) about her 14 year-old son, she said, “He only says *ɛʃ*<sup>2</sup> [1<sup>st</sup> Sg. North]. If he said *ju*<sup>2</sup> [1<sup>st</sup> Sg. South], people would laugh at him [and say], ‘You speak like your mother!’ They would laugh, and he would be embarrassed. He’s not willing to speak like his mother. He speaks like his father.” In fact, as with the case of the immigrant married women, avoidance of laughter was one of the most commonly reported motivations for speaking the patrilect.

However, in addition to individually directed responses such as admonishment, laughter, or teasing, consultants also pointed out that the overall village linguistic environment has a significant influence on the child’s dialect acquisition. For example, a South mother living in the Midlands clan (Speaker #24) said, “[My children] speak like their father, not like their mother...They only hear me say *ju*<sup>2</sup> [1<sup>st</sup> Sg. South] when they’re at home. When they’re out playing in the village, they’re with kids who say *ɛʃ*<sup>2</sup> [1<sup>st</sup> Sg. Midlands].”

Children were portrayed by the consultants as interacting with many people in the village who are patrilect speakers, and the village was described as “a single family” both linguistically and socially (but note that there are clear distinctions at the level of the nuclear family, and houses are privately owned). In this way, acquisition of the patrilect is viewed as a natural consequence of interactions in the village. Furthermore, one consultant noted that many children receive care from older siblings who already speak the patrilect. Thus, the children appear to filter the patrilect from the matrilect (and then eventually choose the patrilect exclusively) by means of the community’s direct admon-

ishment, laughter, ridicule and teasing, all in conjunction with the linguistic influences of everyday interactions with older children, siblings, and patrilectal adults in the village. This conclusion is supported through the words of the children themselves in Section 4.2.2.3.2.

### **The Transition from Matrilect to Patrilect**

Before moving on to the children's reports, adult consultants' reports are discussed with respect to the issue of whether children use matrilectal features, and if so, when the transition to the patrilect occurs. For example, regarding grown children's use of the patrilect rather than the matrilect, one adult said, "If you speak like your mother, it sounds like you are a member of your mother's family... It would sound like you are a small child who doesn't know better."

In this study, widespread agreement was found regarding the issue of when children become fully patrilectal; community members agreed that by around 5-7 years old, children have usually fully acquired the patrilect and speak it exclusively. As for younger children, one North mother living in the South clan reported that one year-olds already use the patrilectal 1<sup>st</sup> Singular. Similarly, a South mother living in the North clan (Speaker #7 quoted above in Excerpt (8)) reported that her children had never used the matrilect. But one North man reported observing one year-olds use the matrilectal *ju*<sup>2</sup> [1<sup>st</sup> Sg. South] in the North clan.

Another mother (Speaker #11) explained that older children will never speak the matrilect, even if they may have used matrilectal words when younger. She provided her own example of a lexical variable (which was new to the author): ‘firewood knife’, pronounced *miɗʰ* in one region but *tsomʰ* in the other. She explained, “Even if [my children] said *tsomʰ* [like me] when they were young, later they would say *miɗʰ*. They would say, ‘We don’t say *tsomʰ*; we say *miɗʰ*!’ ...They aren’t willing to speak [the matrilect]. People in the village would always laugh at them....People would laugh at us -- tease us all the time.”

#### **4.2.2.3.2 From the Children’s Perspective**

In this section, observations from conversations with children of immigrant married women are discussed, including teenage children. The main observations are outlined below, and then specific examples are given in the following discussion.

- Like the adults, the children also reported fear of laughter as a central motivation for speaking the patrilect.
- Four older girls (ages 10, 12, 15, 16) reported that they remembered speaking the matrilect when they were very young but that they changed to the patrilect at around 5-7 years old. All four recalled making that change; two said it was due to ridicule or fear of ridicule (Speakers #14 and #17); two said the change happened because they had spent some time in their early childhood in another dialect region before coming to the father’s village (Speakers #16 and #18).

- The two teenage boys (14 and 15 years old) both claimed that they had never spoken with matrilectal features.
- A nine year-old boy said he used both matrilectal and patrilectal features but that he used more patrilect than matrilect.

In the following, examples from specific children's experiences are given to illustrate the points above. First, an excerpt is provided from a 12 year-old North girl (Speaker #14), who has a South clan mother (Excerpt (9)).

Excerpt (9)

*Interviewer: Do you think you speak like your father or your mother?*

*Speaker #14: When I was little, I spoke like our mother. Now that I'm older, I speak like our father.*

*Interviewer: Do you remember—how old were you when you spoke like your father?*

*Speaker #14: When I was four years old, I spoke like our mother. When I was seven years old, I spoke like our father.*

*Interviewer: You remember...?*

*Speaker #14: Yes.*

*Interviewer: Why did you change?*

*Speaker #14: People would always tease me – they always laughed at me.*

*Interviewer: They laughed at you because you talked like your mother?*

*Speaker #14: Yes.*

*Interviewer: What did they laugh about? What did they say?*

*Speaker #14: "You're old now, but you [still] speak like your mother! You're in Ljong, but you speak like Dong...?"*

Similarly, a 16 year-old North girl (Speaker #17) with a South mother said that she remembered making the decision to speak the patrilect at around five years old. She remembered that she had once spoken the matrilect when she was very young, but she made the decision to change because, “If I spoke like my mother, then other children would laugh at me, so I felt afraid.” She reported that she now speaks the patrilect completely (*liwʹ ɔʹ liɔkʹ liɛwʹ* ‘finished, completely wiped away’). (Her linguistic results largely confirm that view, although she used the matrilectal variant of ‘wardrobe’ four times (see Section 3.3.1) and also produced five matrilectal tokens of ‘female’ (see Section 3.3.3.1).)

A 10 year-old North girl (Speaker #16) recalled being teased for using South features, and a 15 year-old North girl (Speaker #18) with a South mother reported that if she used the matrilectal 1<sup>st</sup> Singular, people would laugh at her.

The two teenage boys (ages 14 and 15) both reported that they had never used matrilectal features. When asked why he didn’t use matrilectal features, the 14 year-old North boy (Speaker #21) said, “You [i.e., Sui children like himself] speak like others in the village; you hear them laugh [when someone uses the matrilect].” The 15 year-old North boy (Speaker #20) also reported that he had always used the patrilect. Like the other members of the community, he mentioned laughter as the consequence for using the matrilect. When he was asked why people laugh, he said, “If they see you behaving that way, they’ll tell stories about you [and say,] ‘You speak like your mother, but you’re here in your father’s place/region!’” He reported that adults often teach children to speak “like



your father, not like your mother.” (Note in Section 3.3.1 that this boy (Speaker #20) produced four tokens of ‘head’ in the matrilect. He was also observed to produce the T6 word ‘fish’ in the matrilect.)

Since both of the teenage boys claimed that they had always been exclusively patrilectal, one wonders if perhaps it is not “manly” for a boy to admit that he ever spoke the matrilect. After all, a younger boy, nine year-old Speaker #19 (see below), indicated that he currently had both matrilectal and patrilectal features.

As discussed in Section 3.4.1, interviews with very young children provided additional insight into mother-child interaction in Sui society. For example, Speaker #9, a three year-old North girl with a South mother, had evidence of both the matrilect and the patrilect. In one interesting case among the lexical variables, even though the mother whispered a word in the matrilect, the child still produced the patrilectal variant (Section 3.4.1). For one of the (ia) diphthong words, she produced the patrilectal variant even though her mother had just prompted her with the matrilectal variant (Section 3.4.3.1). Similarly, Speaker #10, a 4 year-old North boy, was coached by his mother to say *<sup>m</sup>biɑ'*, the matrilectal variant of ‘to transplant [a seedling]’, but he said *<sup>m</sup>biɛ'*, a mix of the two dialects (the patrilect form would be *miɛ'*<sup>2</sup>; see Section 3.4.1). Thus, these examples suggest that even young children are involved in actively filtering the matrilect from the patrilect. Additional ethnographic information was not directly available from the chil-

dren in this lowest age range due to shyness and other cross-cultural barriers in their first encounter with a foreigner and recording equipment.

A nine year-old boy (Speaker #19) indicated clear awareness of the dialect differences in his parents. When asked why they spoke differently, he said, “One is from another place; one is from here.” He said that he spoke only like his mother when he was younger. He reported that he now has both matrilectal and patrilectal features, with more of the latter than the former (he said he uses patrilectal 1<sup>st</sup> Singular).

#### **4.2.3 Conclusions from Ethnographic Research**

The ethnographic results provide insight into the role of the community in the members’ dialect decisions, thus providing valuable perspective on the linguistic results of Section 3. On the basis of conversations with adults and children in both recorded interviews and informal group settings, there is community-wide agreement on the following:

- (1) The clans have a set of contrastive dialect features that are commonly discussed by community members; (2) a person is expected to speak the patrilect rather than the matrilect; (3) anyone who speaks his or her matrilect or speaks a spouse’s dialect (e.g., the exolect) is subject to ridicule, teasing, and criticism; (4) married women maintain their patrilects very accurately regardless of immigration and long-term residence in the husband’s village; (5) grown children speak the patrilect exclusively; (6) any matrilectal features a child may have due to the influence of the mother’s speech are gone by the time a child reaches about 5-7 years old; (7) children learn to use the patrilect as a result

of ridicule, adults' admonition, and interaction with older children and patrilectal adults in the village environment in general.

■ Additional insights from the ethnographic investigation: (1) Teenagers sometimes can recall a point in their childhood when they made the transition from matrilect to patrilect; (2) traditional family roles may underlie dialect choices; people are expected speak their patrilects throughout their lifetimes since they are viewed as permanent members of the father's family. Thus, if someone speaks the matrilect or a spouse's dialect, it may indicate to the community that that person is not identifying with the father's clan.

## **5. Analysis**

### **5.1 Summary of Overall Results**

#### **Linguistic Results**

Almost all of the immigrant married women maintained their respective patrilects very precisely despite spending a decade or more in the husband's dialect region. The variables tested included salient North-South dialect features (e.g., the salient pitch contrast in T6, the "sore thumb" 1<sup>st</sup> Person Singular Pronoun, the South discourse marker *ja'*, and other non-cognate lexical variables) as well as subtle features (e.g., the subtle contrast in T1 contour, the cognate lexical variables, and the (ua) and (ia) diphthong variables). Both the salient and the subtle features were maintained with equal accuracy by the great majority of the women. Moreover, the variables tested included some dialect features for which consultants showed ready declarative knowledge (e.g., lexical variation in *head*) as well as some features of which consultants were not so consciously aware (e.g., lexical

variation in *frog*, T1 contour, (ua) and (ia)). In addition, the women maintained the patrilectal variants regardless of speech style (citation style, “flexible phrase list” style, and free speech style). Finally, the women maintained their patrilectal features regardless of whether the variable was segmental, suprasegmental, or lexical. Even the South discourse marker *jaʔ*, which occurs in relatively unmonitored free speech, was maintained by the South married women and not acquired by the North women.

Only one of the married women showed significant deviation from the dialect of her home clan, and that deviation was mainly limited to one variable. Speaker #15, a 59 year-old North woman who had been married for 40 years, showed evidence of lowering in her T6 tone in the direction of the South variant. If any speaker were to have some acquisition, someone of her age or above would be most likely since older speakers are known to have less concern about community expectations (cf. Bailey 2002). Yet even Speaker #15 still maintained her patrilect with respect to *jaʔ* and pronouns in free speech as well as many other features.

In addition to the married women who had stable patrilects, there was one married woman living in the North region (Speaker #13) who had moved during between North and South during childhood and showed signs of instability in her dialect. She had a significant mix of North and South dialect traits throughout her speech. Her case shows that the maintenance of the patrilect only occurs when the patrilect itself is well-established (see also discussion below in Section 5.2.1).

As for the children, even the younger children had primarily patrilectal features, but clear evidence of matrilectal features was observed as well. Overall, younger children appeared to have more matrilectal influence than the older children (the tone variable T6 in particular), although even the older children still had some remaining patrilectal influences in some variables. No consistent gender-related patterns were observed.

Specifically, some mixing of the matrilectal lexical variants with the patrilectal lexical variants was observed. Moreover, in a few instances, children were observed to combine the two variants into a form that appeared to be a phonological compromise between the two dialects. In case were very young children received a verbal prompt from their mother, they sometimes still used the patrilect rather than the matrilectal variant that had just heard.

The tones that do not have dialect variation in these regions (T2, T4, T5) were produced very accurately by the children regardless of age. Additional evidence of very young children's ability to acquire tones was shown in the T1 of Midlands children (since their patrilect and matrilect both have a low rising T1).

Both older and younger children produced the T1 contour in the patrilectal form. However, significant matrilectal influences were found in T6 pitch; for the younger children (3-5 years old), there was clear evidence of a tendency to raise T6 (in the direction of the high T6 of their South mothers).

For the (ia) and (ua) diphthongs, the majority of the variants were patrilectal in the impressionistic analysis, but some matrilectal variants were observed in the girls' speech. The variation appeared to be independent of age, but the lack of matrilectal variants in the boys' speech was noted. However, in the acoustic analysis of (-a) of the (ua) diphthong, one of the boys had matrilectal influences.

### **Summary of Ethnographic Results**

Consultants showed clear awareness of dialect contrasts and linked them directly to clan membership and surname. All members of the community claim to speak their patrilects for their entire lifetimes regardless of whether or not they move to other clans. Signs of patrilectal influence in married women are said to be very rare. If observed at all, such slight changes in dialect are considered to be usually limited to women who have been living in the husband's region for an especially long time. Ridicule is the most common consequence of speaking the matrilect or a spouse's dialect; direct admonition and criticism occur as well. Children are viewed as speaking the patrilect exclusively from a very young age (around 5-7 years old), and this choice of dialect is encouraged both through direct admonition, ridicule, and daily interaction with patrilect-speaking peers and adults in the village. Consultants suggested that local traditional views of the family may underlie these attitudes; a person is considered a member of the father's clan for life.

### **5.2 Identity in the Sui Speech Community**

The data collected in this study led to unexpected results with respect to the immigrant married women's dialect features. Most other investigations of immigration and dialect

contact (Section 2.2.1) have shown that immigrants tend to acquire some of the dialect features of a new region to a significant extent. In particular, previous work showed that lexical items and phonetic variation are features commonly absorbed by long-term immigrant residents. By contrast, this Sui study finds that the immigrant married women maintained their patrillects with a very high degree of precision despite living in the husband's clan for a decade or more. As mentioned above (Section 2.2.1), dialect acquisition is modulated by many social factors, so one would hope to find a reasonable explanation for why the Sui women's linguistic behavior differs from the patterns of dialect acquisition observed in so many other studies elsewhere. In the following, the author proposes a model of Sui clan identity and language variation that explains the sociolinguistic actions and attitudes observed in Sui immigrant women, non-immigrant men, and children being raised in such bidialectal homes.

### **5.2.1 Adults' Acts of Clan Identity**

In short, this study proposes that a Sui woman's lifelong sense of identity with her father's clan would explain why she maintains her patrillect even in the face of long-term, daily interaction with speakers of another dialect -- and in the face the natural human tendency for accommodation (cf. Section 2.2.1). On an ongoing daily basis, she chooses the linguistic features (both salient and subtle) that clearly mark her as a member of her father's clan. (Note that, following Deser (1991:131), the use of the term "choose" or "choice" does not imply a conscious choice, although there may be specific instances where it is more conscious than others.)

This study finds that the Sui married women are not following the more typical accommodative behavior found in other studies where it is commonly the case that speakers will naturally accommodate to some extent:

...if a speaker of American English and a speaker of English English come into contact, each of them knowing very well that, say, American English *sidewalk* corresponds to English English *pavement*, it is perfectly possible that the American will eventually start saying *pavement*, and/or that the English person will begin to say *sidewalk* – even though there is no strictly communicative point in their doing so. (Trudgill 1986:2)

Two signifiers for one signified (cf. de Saussure 1993[1910-11]) is a likely situation where one might expect to find lexical accommodation. But what can be said about a situation of dialect contact where such accommodation doesn't happen? What particular attributes of such a case of dialect contact would cause a contrast with the English example above? The members of the Sui speech community are well aware of many lexical items with clan-level semantic overlap very much like *sidewalk* and *pavement* (see Section 3.2.4.2 and 4.2.2.1). Yet in these Sui clan-level variants, neither side accommodates; a visitor to a Sui community will soon hear very obvious, stable differences in 1<sup>st</sup> Singular and other lexical items in face-to-face communication between two speakers, for example.

Of course, the Sui speech community in the current study is by no means the only situation where contrastive features exist side-by-side with long-term stability. The well-documented case of Japanese “women’s language” is such an example (e.g., Ide 1982, Inoue 2002, Adachi 2002 *inter alia*). The Japanese speakers’ identification as “woman” or “man” and their associated social roles are apparently the factors that override the natural



tendency to accommodate that Trudgill observes. Similarly, Thai has two formal 1<sup>st</sup> Person Singular pronouns which are chosen according to the gender identity of the speaker: *dichan* for women; *phom* for men (cf. Silverstein 1995b[1985]:528, Higbie & Thinsan 2003). The case of Sui is surely related to identity as well -- but clan identity rather than gender identity.

Despite years of immersion in their husbands' regions, the women in this study were found to remain remarkably consistent with their fathers' dialects, even with respect to discourse markers and pronouns used in free speech. That free speech result alone, particularly with respect to the salient South discourse marker *ja'* discussed above, is strong evidence that the women maintain their home dialect even after years away from home. Recall that Chambers (1992:149) observes that lexical items are acquired faster than other features. Similarly, Smith & Johnson (1986:40) and Peter Trudgill (p.c.) suggest that in situations of dialect contact, lexical items are the easiest features to willfully control. So the lack of such lexical replacement by the Sui migrant women, as well as lack of acquisition of other features, suggests that the desire and expectation to identify with their home clans causes them to resist an otherwise powerful linguistic tendency for accommodation and acquisition of dialect features. The women maintain their identity as members of their original clans, and therefore as "outsiders" in their husbands' regions, through acts of linguistic agency that directly oppose the dialect acquisition norm.

Such behavior is a commonplace fact of life for locals and not deemed worthy of any comment -- much less any change -- on the part of either speaker. Instead, the members

of a married woman's original clan and her husband's clan all expect her to speak the patrilect, so there is no perceived clash or need for accommodation between her speech and the non-immigrant members of the village. Moreover, this clan-driven sociolinguistic behavior is perceived as natural and "common sense." The consultants view the practices of their speech community to be an inevitable consequence of clan lineage, and any other way of speaking is almost unthinkable: "Those are the L. people, so they say *ɛʃ*<sup>2</sup> [1<sup>st</sup> Sg.]. We are the P. people, so we say *ju*<sup>2</sup>. Each surname speaks its own way... The L. people speak like the L. region. We P. people speak like P. people."

The quote above brings to mind Berger & Luckmann's *legitimation* of social institutions:

As the individual reflects about the successive moments of his experience, he tries to fit their meanings into a consistent biographical framework... It follows that great care is required in any statements one makes about the 'logic' of institutions...reflective consciousness superimposes the quality of logic on the institutional order (1967[1966]:64).

While the Sui people themselves view married women's dialect resistance as a natural, common sense outcome of clan relationship, the actual linguistic result (accurate, long-term, exclusive adherence to the patrilect) may not be so natural as it might seem to the insiders. (See also Fairclough's observations about the assumptions that are often inherent in "common sense" (2001[1989]:2, 70, 78). But, of course, all cultures attach dubious "common sense" social meanings to arbitrary linguistic signs (e.g., *aint*, *-in/-iŋ*, r-lessness, etc.).)

In the case of Sui, dialect features are tightly associated with a social meaning of clan identity. Since ridicule and shame greet any member of the community who linguistically strays from identification with the father's clan, this shows the strength of community expectations and the primary methods for correcting wayward members. The following is a South married woman's description of what a woman's family would say if she spoke like the husband's region: "They say it like this: 'You grew up in our home, but now you've married into another home. [And now] you speak like they do. You're so ignorant; you must like to give respect to them! You're so proud; you're not afraid of what people will say about you!'"

From the quote above, it is clear that the speaker was being accused of failing to identify herself with her home clan. Similarly, another South woman described the consequences as follows: "People would laugh, [saying,] 'You don't speak like your own place anymore. You ate the food of our place [as a child], so you should be like our place.'" The phrase "You ate the food of our place" occurred several times in the ethnographic conversations (Section 4), and it appears to be an idiomatic expression for clan identity and loyalty. After growing up, a person is always expected to behave as a loyal a member of the clan where he or she was raised.

In addition, the very existence of such metalinguistic admonition and ridicule (see additional examples in Section 4) implies that (1) it must be possible for married women to choose to use dialect features of the husband's clan, thereby going against the community's expectations, and (2) this sometimes happens (but only very rarely, as this study

has found). Thus, it is not a foregone conclusion that a married woman necessarily will speak her patrillect; she makes a choice. The formation of that choice is described below with respect to language and identity.

### **Language and Identity**

Mendoza-Denton (2002) outlines three approaches to language and identity. The first approach, which she calls “sociodemographic category-based identity,” has been very effective in describing “large-scale patterns of variation” (cf., Labov 1994, cited in Mendoza-Denton, p. 481). Mendoza-Denton notes many successful studies in this framework and recognizes its achievements, but she also cautions that this approach generally assumes that identities are “relatively stable” (p. 482), and one must also be careful to avoid the potential pitfall of taking Euro-American analyses of identity categories (age, class, gender, etc.) and assuming they can be directly transferred and applied to diverse communities (2002:478). (Fortunately, in the current study the consultants made it clear from the beginning that clan is the most relevant category when discussing the dialect variables studied here, so clan was chosen as the primary independent variable.) Moreover, studies in Mendoza-Denton’s first category have broad-based viewpoints that aim for large-scale patterns, so it is harder to see variation on the level of small communities and the role of small-scale interactions of individuals.

Mendoza-Denton labels a second approach to identity as “practice-based identity” (2002:486), citing such work as Bourdieu (1978, 1991), Wenger (1998), Eckert & McConnell-Ginet (1992), and Le Page & Tabouret-Keller (1985). (Labov 1963 is another

study that seems appropriate for this category.) This approach has the advantage of allowing for “evolving conditions” and puts the focus at “the level of the construction of social relationships.” Such a perspective has been especially effective in communities where traditional class and other hierarchical notions cannot be applied in a straightforward manner. In particular, in Le Page & Tabouret-Keller’s (1985) study of pidgins and creoles, they show how this approach provides a meaningful description of the complex sociolinguistic patterns of such communities.

Lastly, Mendoza-Denton describes a third approach, “practice-based variation,” which moves even more into the realm of fine-grained study of behavior at the level of individual variation. For example, she cites the work of Johnstone & Bean (1997) who argue for more emphasis on “self-expression and individuality” in variationist research (Mendoza-Denton 2002: 490). A further example of this viewpoint is given by Johnstone, Andrus, & Danielson, who describe research on the speech and attitudes of five Pittsburghers conducted at a “very fine-grained level of particularity” (2006:78), following perspectives of Silverstein (1995a[1976], 2003). Mendoza-Denton (2002:491) also notes that her own research of Latina gang members in California (e.g., 1999) follows such a “practice-based variation” approach as well.

The current study reflects at least some aspects of each of the three approaches to identity that Mendoza-Denton describes, i.e., using relatively broad-based demographic categories to draw general conclusions, while also examining practice-based social relationships, and then moving down to the individual level. However, among the three approaches, the

current study is probably closest to second approach. Exemplified by Le Page & Tabouret-Keller's (1985) model of *acts of identity*, this approach involves group-oriented patterns yet with an eye to individual agency and the social construction of identity, and it therefore seems most fitting to the Sui situation described here (see also Eckert 2005:15 "acts of affiliation").

Le Page & Tabouret-Keller (1985:14) view linguistic behavior as "a series of *acts of identity* in which people reveal both their personal identity and their search for social roles." They observe that such acts of identity occur when (1985:182):

- (i) we can identify the groups
- (ii) we have both adequate access to the groups and ability to analyse their behavioural patterns
- (iii) the motivation to join the groups is sufficiently powerful, and is either reinforced or reversed by feedback from the groups
- (iv) we have the ability to modify our behaviour

With respect to (i), the Sui people clearly can identify the clans. They also have adequate access (ii) to these clans as part of the speech community. They are exposed to members of other clans through marriage, festivals, and occasional interaction on market days. Folk linguistic discussions of other clans' dialect features are common, and such folk discussions show a detailed awareness of nearby clans' variables. As for (iii), recall from the ethnographic investigation (Section 4) that Sui people have very strong motivation to maintain their group membership since ridicule and admonition are the consequences of linguistically straying from one's original clan loyalty.

Lastly, (iv) the Sui people have the ability to modify their linguistic behavior sufficiently to identify themselves; in particular, they could easily modify the salient lexical variables.

Note that the variable 1<sup>st</sup> Singular crosses no phonological boundaries (for example, in the clans studied here, 1<sup>st</sup> Singular always has tone T2, a non-varying tone, and the segments in both variants of 1st Singular are native to both dialects). Speakers show an easy ability to perform the 1<sup>st</sup> Singular variants of all the surrounding clans, and they often produce phrases like, “I say *ɛf*<sup>2</sup>; you say *ju*<sup>2</sup>.” While some subtle phonological cues may be more difficult, Sui speakers show strong evidence in discussion of other clans’ features that they can adopt enough of the features of another clan to be identified with them. In addition, as mentioned above, the very existence of metalinguistic consequences in the community (ridicule, admonition, criticism) suggests that some people can and do use another clan’s features occasionally – or at least that the community recognizes the potential for this to occur. It may also be worth noting that the author (an L2 speaker of Sui) found himself unconsciously changing pronouns after only a few hours in a different clan. This urge to change came in response to the natural inclination for accommodation, especially after Sui speakers commented on his 1<sup>st</sup> Singular and identified him accordingly. Finally, recall that Smith & Johnson (1986:40) also find “lexical markings of social groups” on a similar level of inter-clan dialect differences in patrilineal Nganhcara clans in northern Australia (Section 2.2.3).

Therefore, this study concludes that the Sui married women (as well as the children; see below) are performing acts of clan identity as they maintain the patrilect regardless of long-term daily interaction with members of the exolect. They are not mechanically absorbing the dialect around them according to a predetermined formula (such as dialect acquisition as a simple function of density of social interactions). Instead, they perform

linguistic acts of clan identity in direct opposition to the otherwise normal urge to accommodate. After all, they could presumably choose to weather the metalinguistic criticism and ridicule if, say, they had some reason to show disrespect to their family or some other urge to associate themselves with the new clan.

Of course, there is an even deeper “Why?” question to be addressed: Given that Sui people perform linguistic acts for the purpose of clan identity, why is clan identity so important in this community? Most consultants were unable to articulate a response to this question. But two men provided a possible answer: strong traditional family roles. As mentioned in Section 4.2.2.2, these consultants noted a parallel between the tradition of keeping one’s surname for life regardless of marriage, and the expectation that one will keep the same dialect for life regardless of emigration upon marriage. They saw the surname custom as outward evidence of deep traditional values, namely, a person is always viewed as a member of the father’s family. It would not be surprising to find a linguistic realization of these family roles. Therefore, linguistic clan identity may well reflect such an expectation of traditional family relationships: “They would always laugh. So [that person] wouldn’t talk like that anymore. People would laugh, [saying,] ‘You don’t speak like your own place anymore! You ate the food of our place [as a child], so you should [speak] like our place.’”

### **Lucky #13 Revisited**

The case of Speaker #13, described in Section 3.3.3.2.3, provides an additional perspective on Sui clan identity: What happens when someone’s clan identity is not well-



established during childhood? Speaker #13 was a married woman living in the North who had a mixed clan childhood; she was born to a South family but raised in the North for most of her childhood (until 12 years old), then lived in the South until marriage, and then immigrated back to the North upon marriage. Unlike most people who had stable childhoods with clearly defined home clans and patrilects, Speaker #13 did not have one clearly defined home during childhood. In a striking contrast with all of the other married women, she had an obvious mix of both dialects in her speech (even including a mix of 1<sup>st</sup> Singular variants; see Section 3.3.3.2.3). She was not grounded in either clan in terms of loyalty, so she clashed with the community's clan-based linguistic expectations. Note below her reactions to the community's criticism about her lack of fully patrilectal speech. She is the only respondent who shows that she is willing to argue with the people who are giving her metalinguistic criticism.

Excerpt (10)

*Interviewer: So you've changed to [speak] like Ljong?*

*Speaker #13: Yes.*

*Interviewer: Do you get laughed at?*

*Speaker #13: Yes! They laugh a lot! <laughs>. I've changed to [speak] like Ljong, so they laugh. <laughs> People laugh at me.*

*...[People say,] "Now you're like Ljong. You don't speak like before. Now you've eaten their food and become like them. You're not like before." <laughs>*

*[But I say], "Now I'm eating their food, so I [speak] like them."*

*...You go ahead [i.e., you move along in life]. You just become like [the people around you]. You don't act like before.*

*...[People] say I've changed to [speak] like Ljong. They always scold me! [They say], "You don't speak like before."*

*I say, “I’ve come here; I’m always with them [Ljong people], so I speak like the ‘here and now’<sup>7</sup>, not the past<sup>8</sup>.” I say it like that to them.*

*Interviewer: You don’t care that they talk about you?*

*Speaker #13: When they talk, I don’t care. I say, “My memory is bad... I can’t remember [how to talk like South]...I can’t remember!” <loud>*

Since Speaker #13 did not have a well-defined home clan during childhood, she sees no need to specifically identify with the South clan (her father’s clan). She has “moved on,” and doesn’t think she should be expected to “act like before.” In a remarkable contrast to all the others, she denies that her clan identity must be permanent: “Now I’m eating their food, so I speak like them.”

The example of Speaker #13 shows that there is a significant social cost when an individual doesn’t identify with the patriline: a clash with the community-wide system of linguistically marked clan identities. Her case also shows that, in the absence of a well-established clan identity, a Sui immigrant married woman can be influenced by the natural tendency to accommodate to the exoclan: “You just become like [the people around you]. You don’t act like before.”

### **5.2.2 Children’s Acts of Clan Identity**

Clan identity affects all members of the community, and the analysis of the children’s linguistic behavior fits naturally with the analysis of the married women above. Clan identity influences the children’s speech, although the children’s case involves other factors as well, as described below.

---

<sup>7</sup> lit., ‘front’

<sup>8</sup> lit., ‘back’

The children's linguistic results of this study (Section 3.4) as well as the children's ethnographic results (Section 4.2.2.3.2) show that by the time of adolescence or slightly before, children dispose of most matrilectal features in favor of the patrilect, thereby establishing a single focused variety in an age range that recalls the critical period hypothesis (Lenneberg 1967, Schachter 1996, cited in Bhatia & Ritchie 1999:579). Children are expected to begin speaking their patrilects almost from the moment they begin to speak at all: "You're speaking like your mother. Don't be like that!" Although very young children may receive a little more leeway, older children are unequivocally expected to speak the patrilect. One adult said that if a person speaks the matrilect, "It would sound like you are a small child who doesn't know better."

A Sui child has (at least) the following three sources of sociolinguistic input from the community: (1) exposure to the mother's speech (and/or other women in the village who happen to be from the same clan as the mother), (2) direct metalinguistic comments/admonition/ridicule from various members of the speech community, and (3) exposure to the patrilectal speech of older children, older siblings, and adults in the village as a whole.

Of the three inputs, (1) provides impetus for the use of matrilectal features, while (2) and (3) encourage use of the patrilect. Without the presence of (1), a child would not need to make a linguistic choice. Evidence for the presence of (1) is given in the following.

### **Evidence of the Mother's Influence**

First of all, in the above, (2) suggests the presence of (1). The ethnographic reports of metalinguistic admonition from the community suggest that matrilectal features do exist at times in the speech of children or at least that the community recognizes the potential for that to occur.

Secondly, Payne (1980:174), Trudgill (1986:34-6), and Deser (1991:128, 132, 134) emphasize the importance of parents' influence in L1 acquisition, thus moving away from the peer-influence model (cf. Labov 1964, 1966, Weinreich, Labov, & Herzog 1968, Allen 1973, cited in Payne 1976:7ff., 128 and Deser 1991:15ff., 127ff.). For example, in Trudgill's (1986:34) study of Norwich English, he shows that "even people who were born and brought up in Norwich and who otherwise have perfect local accents do not correctly master the /u:/ - /ʌu/ distinction between *moan*, *mown*, etc., *if their parents come from somewhere else*, i.e., if their parents do not have a Norwich accent" (1986:34, emphasis in original). He concludes that speakers cannot acquire this complex underlying phonological distinction in Norwich unless they have heard it from the start of their language acquisition process: "Exposure to it in the speech of their peers from the age of four or five is, surprising as this may seem, not sufficient" (1986:36).

Similarly, in Payne's (1980:174) study of immigrant families in Philadelphia, the children did not fully acquire the Philadelphia short-*a* rule unless their parents were native to Philadelphia. As Deser (1991:16) puts it, Payne's data show that "No matter *where* the children were born – in the state of Pennsylvania or out-of-state – it was the *parents'*

native dialect which was the best predictor of the child's success in learning the irregular phonological pattern" (emphasis in original).

While the parental influences noted in Trudgill (1986:34-6) and Payne (1980:174) are primarily found in relatively complex phonological processes, Deser's (1991) study of African American children in Detroit finds a parental influence in the following relatively straightforward phonetic variables of Southern and Northern U.S. English: /æ/, /ai/, and vowel duration (p. 49). Strikingly, Deser reports that if even just one of the parents originated in the South, then the child showed evidence of some Southern dialect features before adolescence (1991:112, 118).

Of course, the Sui children are being raised in a rather different culture than the studies outlined above, and such differences can be significant in children's socialization. For example, Ochs & Schieffelin (1982) describe how the Kaluli people of Western Samoa and Papua New Guinea have child-rearing practices that differ significantly from Anglo-American middle class homes. Ochs & Schieffelin point out that, in the case of Anglo-American middle-class homes, child-rearing is (stereo-)typically more dyadic in nature. But among the Kaluli people, children have more multi-dimensional interactions. For example, extended families of a dozen or more people live together, thus giving the child a much larger scope of interaction. (For other examples of diversity in children's socialization, see Schieffelin & Ochs 1986.)

While the Sui people are observed to have village social interactions that reflect such a communal attitude to some extent (see Section 4.2.2.3), the number of people living in a single house is usually much smaller than the situation described by Ochs & Schieffelin, so the mother's influence on a child is stronger. Therefore, the cultural contrast in child-rearing practices between Sui and the studies discussed above (i.e., Deser 1991, Payne 1980, Trudgill 1986:34-6) is acknowledged, but it is clear that Sui mothers influence the children's speech to a significant extent: (1) matrilectal features were found in children (Section 3.4), (2) older children reported (Section 4.2.2.3.2) that they recalled a time when they had matrilectal features, and (3) children and teenagers described ridicule of children who used matrilectal features, including themselves in some cases.

### **The Role of Ridicule**

Like the adults, laughter was commonly mentioned by the children as a consequence for speaking the patrilect. In addition, some older children (including teenagers) were able to recall and describe their own transition from the matrilect to the patrilect at around 5-7 years old. When asked if they could remember the motivating factors behind this transition to the patrilect, three of them specifically cited laughter or fear of laughter. For example, a 16 year-old North girl recalled that time of transition when she was younger, saying, "If I spoke like my mother, then other children would laugh at me, so I felt afraid" (Section 4). Another similar example from Section 4 is repeated below:

*Interviewer: Why did you change?*

*Speaker #14 (12 year-old North girl): People would always tease me – they always laughed at me.*

In conclusion, although the children's case has more dimensions than that of the immigrant married women, the children appear to be responding to the same issue of clan identity. Like the adults, Sui children perform acts of clan identity in the form of clan-level dialect features. At around 5-7 years old, children make a transition toward speaking the patrilect exclusively. This transition occurs in response to metalinguistic influence of the community around them as well as exposure to the patrilect through patrilectal adults, older children, and siblings.

### **The Molly Experience**

Chambers (2002) introduces "The Ethan Experience," i.e., a child of immigrant parents with L2 English is found to have an "innate accent filter" as he or she is raised in an English-speaking country. Chambers reports that such children never acquire their parents' non-native English features. The current study uncovers another linguistic life experience that may be labeled "The Molly Experience." In "The Molly Experience," both parents are native speakers of mutually intelligible dialects. Among the children investigated, a three year-old North clan child, "Molly" (Speaker #9), had a North father and a South mother. "Molly" had already acquired most of the patrilect by three years old, but she showed evidence of the matrilect as well. Exposed to a mix of phonetic and lexical variants from the matrilect and patrilect, Molly was learning to filter out the set of features that form the matrilect and instead use the set of features that form the patrilect. For example, recall Section 3.4.1 where she used the patrilect for *socks* even though her mother has just prompted her in the matrilect variant. Molly was unruffled by the two

competing signifiers for one signified. At three years old, she was making her way through the transition toward a time when she will exclusively speaking the patrillect.

When the transition is complete, Molly will then retain the patrillect for the rest of her life, regardless of future residence. Young Sui girls like Molly will eventually find themselves immersed in another clan since Sui married women are expected to immigrate to the husband's village. Yet Molly will retain the identity and dialect of her father's clan for life. Among the options available in the existing linguistic structures around her, she will use patrillectal features to perform linguistic acts of identity. Molly's ongoing linguistic task, therefore, will be to perform those daily acts of clan identity throughout her lifetime so that she is always clearly perceived as a member of her father's clan.

### **5.3 Conclusion**

On the basis of the foregoing investigation and analysis, it is now possible to present a unified account of the Sui dialect contact experience: All members of the community, women, men, and children, perform linguistic acts of clan identity that continually reinforce their clan membership. In the case of immigrant married women, such acts of clan identity operate in direct opposition to the otherwise typical human tendency for dialect acquisition. The immigrant women maintain their patrillects to a very high degree rather than acquiring exolectal features. For the children of such women, a transition to the exclusive use of the patrillect begins at a young age as they learn about their linguistic identities through the metalinguistic influence of the community, and as they are directly exposed to patrillectal features in daily village interactions. Older children and teenagers



adhere more closely to the patrilect, becoming fully patrilectal as they reach adulthood. For all members of the community, ridicule is the consequence for dialect features that would identify the speaker as a member of any clan other than that person's father's clan. In addition to ridicule, children who use matrilectal features and women who use exolec-tal features may be admonished or criticized.

Although the sociolinguistic issues in the current Sui study are played out on the clan level, they exist elsewhere on many other levels as well. Whether using a pronoun that identifies oneself with the father's clan in a Sui community in rural China, or using a particular linguistic feature to identify oneself as a member of the "nerd girl" social group in an American high school (Bucholtz 1999), we constantly perform such linguistic acts of identity (Le Page & Tabouret-Keller 1985) to mark our places in a social world of "organized diversity" (Gumperz 1982b).

### **Additional Contributions of This Study**

Besides the specific results and conclusions presented above with respect to dialect contact, identity, and Sui exogamy, the current study provides progress in socio-tonetics, dialect acquisition, variationist sociolinguistic research of indigenous minority languages, sociolinguistics of exogamous clan-based societies, Sui acoustic phonetics and dialectology, and folk linguistics.

First, as noted in Section 1.2, very few sociophonetic studies have focused on lexical tone as a variable, and those prior studies relied primarily on auditory judgments rather than in-depth acoustic analysis. The present study pioneers an acoustic, quantitative sociolin-

guistic approach to lexical tone as a sociophonetic variable, thus encouraging the development of a subfield that could be called “socio-tonetics.” Since some 70% of the languages of the world are tonal (Yip 2002), tone is an important variable to be explored in sociophonetics. To this end, the present study has introduced detailed socio-tonetic techniques (including R functions for handling large amounts of socio-tonetic data in a way that allows for convenient graphical and statistical analysis and normalization) and practical approaches to the issues that arise in fieldwork-based quantitative sociophonetic analyses of tone.

Secondly, dialect acquisition has received comparatively little research attention in linguistics research (Section 2.2.1). Yet globalization and increasing immigration and interdependence lead to a rising role of linguistic contact in contemporary society. The present study contributes to the understanding of dialect contact and immigration by showing how identity may be performed linguistically in a way that opposes the otherwise common tendency for accommodation. The systematic immigration patterns found in exogamous Sui culture serve as a “laboratory” with respect to this aspect of human behavior.

The present study also illustrates the importance of indigenous minority languages to variationist sociolinguistics. Such lesser-known languages have long been emphasized in grammatical theory, descriptive linguistics, and anthropological linguistics. Yet in quantitative variationist sociolinguistics, while great achievements have come through research of majority languages and well-known non-indigenous minority languages, considerably less research has focused on indigenous minority languages. Without more balanced

research attention to such underrepresented languages and the diverse perspectives they provide, our understanding of language variation and change will be incomplete. For example, as outlined in Section 2.2.4, such lesser known languages have new insights to provide to variationist sociolinguistics with respect to social class, clan, lack of a standard, network analysis, exogamy, gender roles, acute contact with majority languages, and other factors.

In particular, unlike many studies of majority languages where social class is a central sociolinguistic factor, clan-level variation is a key factor for rural egalitarian language communities like Sui. Since many rural indigenous societies around the world are organized along clan lines, this study emphasizes the importance of clan as a sociolinguistic variable in research of language variation and change (Section 2.2.4, Section 2.1).

In addition, the acoustic component of the current study has contributed to Sui dialectology by providing an acoustic dialect comparison of three Sui regions. The study finds acoustic evidence of diphthongal and tonal variation, including evidence of a progressive shift in T6 pitch from South to Midlands to North (see Section 3).

Finally, the study also contributes to the understanding of folk awareness of language variation (see below, as well as Section 1.2 and Section 4), since Sui folk viewpoints were contrasted with empirical linguistic analysis of dialect features found in the speech of immigrant women, non-immigrant men, and the children of such bidialectal homes.

### **Closing Thoughts**

In closing, the hypothesis of Section 1.1, namely, that married Sui women who have been immersed in the husband's clan dialect region for a decade or more will acquire the husband's clan dialect features to a significant degree, has been shown to be false. Instead, the results confirmed the view of the folk consultants. They insisted that married women usually do not acquire the new dialect; when pressed, they recalled rare cases when some acquisition was observed in an older woman who had been married for a very long time. And that is exactly the result of this study with respect to immigrant women's dialect acquisition.

This outcome shows that folk understanding of a speech community can provide invaluable and often very linguistically sophisticated information for a sociolinguistic researcher who is not native to that community -- or any sociolinguistic researcher for that matter (cf. Preston 2005, Niedzielski & Preston 2000). Such information serves as an important foundation and guide for empirical linguistic investigation. As for the current study, the author has made his way through a long tunnel of empirical data and detailed analysis, only to find, upon emerging at last, that the folk consultants are waiting patiently on the other side with bemused smiles and a cup of *hau* (homemade fermented rice drink).

## APPENDIX A

### Additional Baseline Speakers' Tone Systems

For reference, additional baseline speakers' tone systems are provided here.

Figure 63. A South Baseline Speaker (Speaker #1). In semitones; normalized for duration and mean of T3. N=123. Dotted line represents the mean of T3.

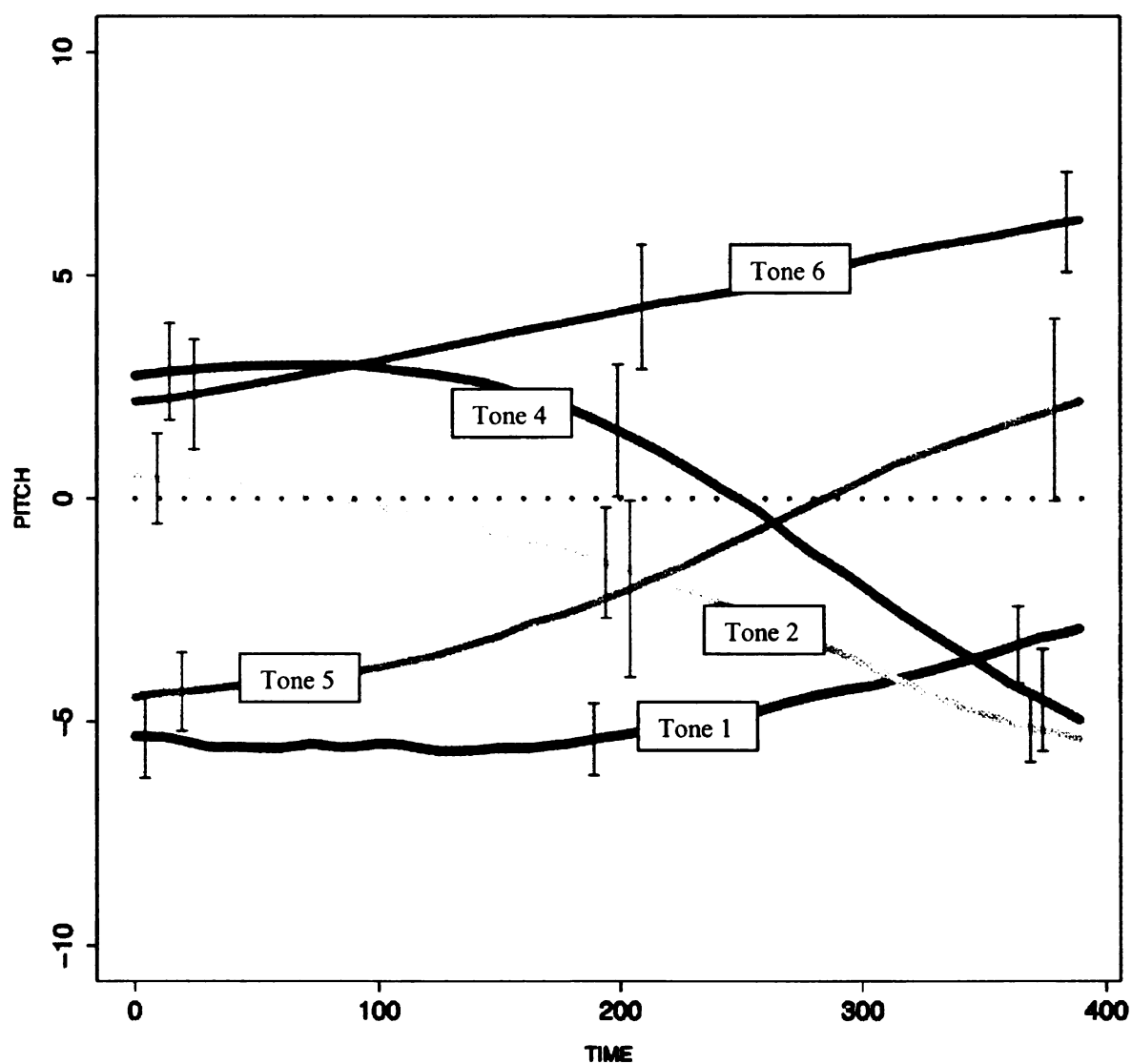
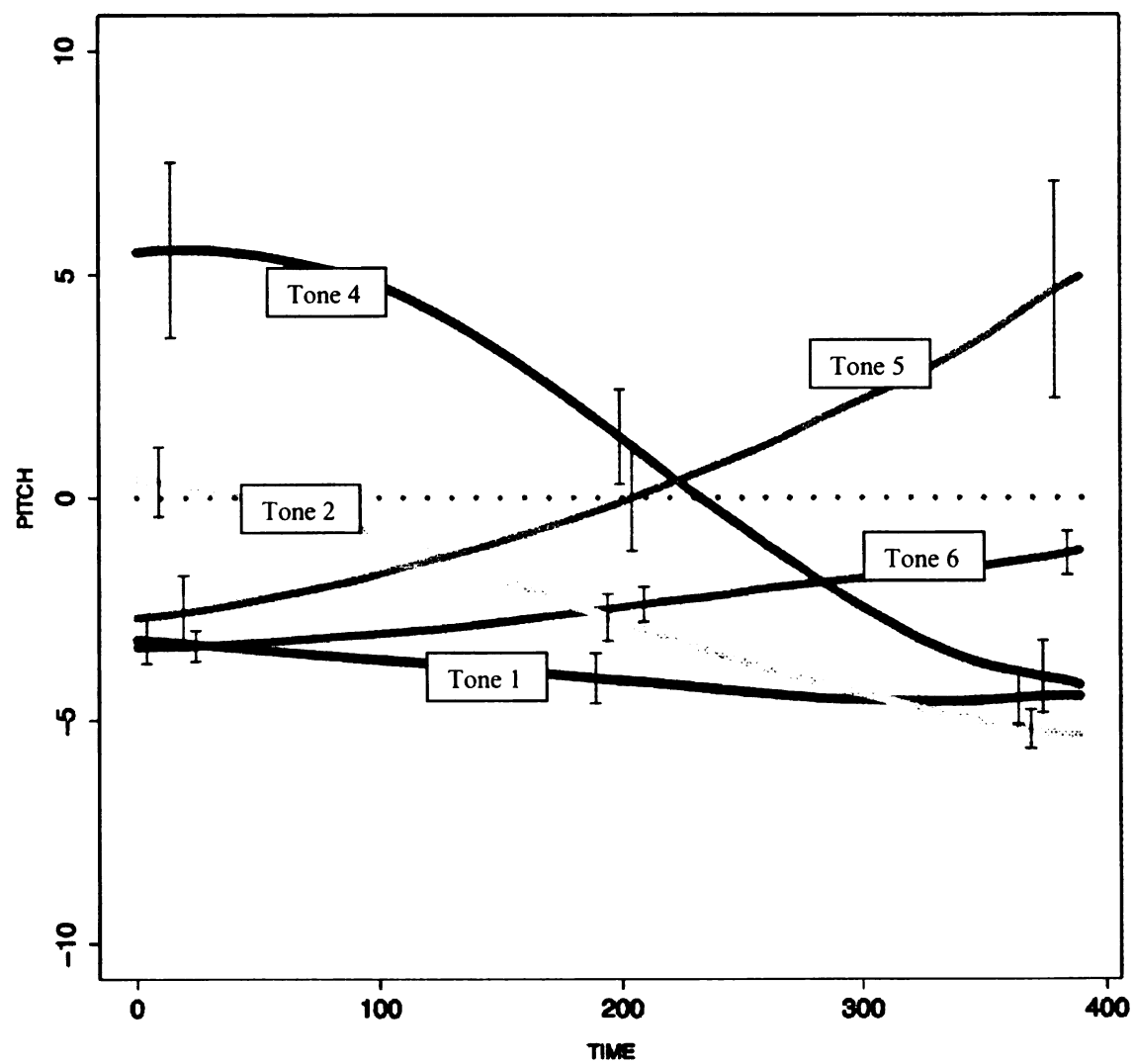


Figure 64. A North Baseline Speaker (Speaker #21). In semitones; normalized for duration and mean of T3. N=121. Dotted line represents the mean of T3.

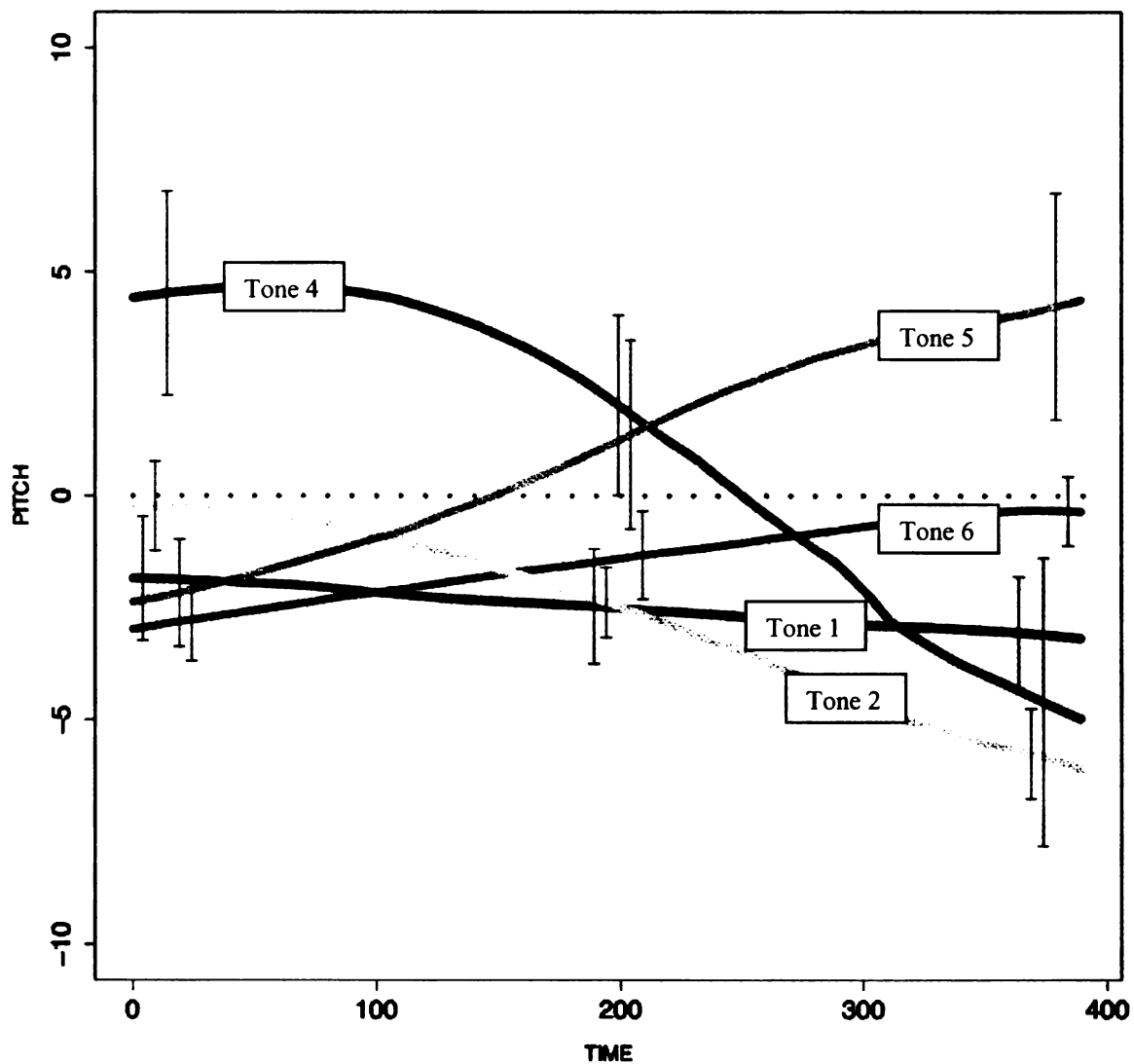


## APPENDIX B

### Additional Older Children's Tone Systems

Two additional older children's tone systems are plotted here. Speaker #12, is a 10 year-old North boy with a South mother (Speaker #5). His tone system is plotted in Figure 65.

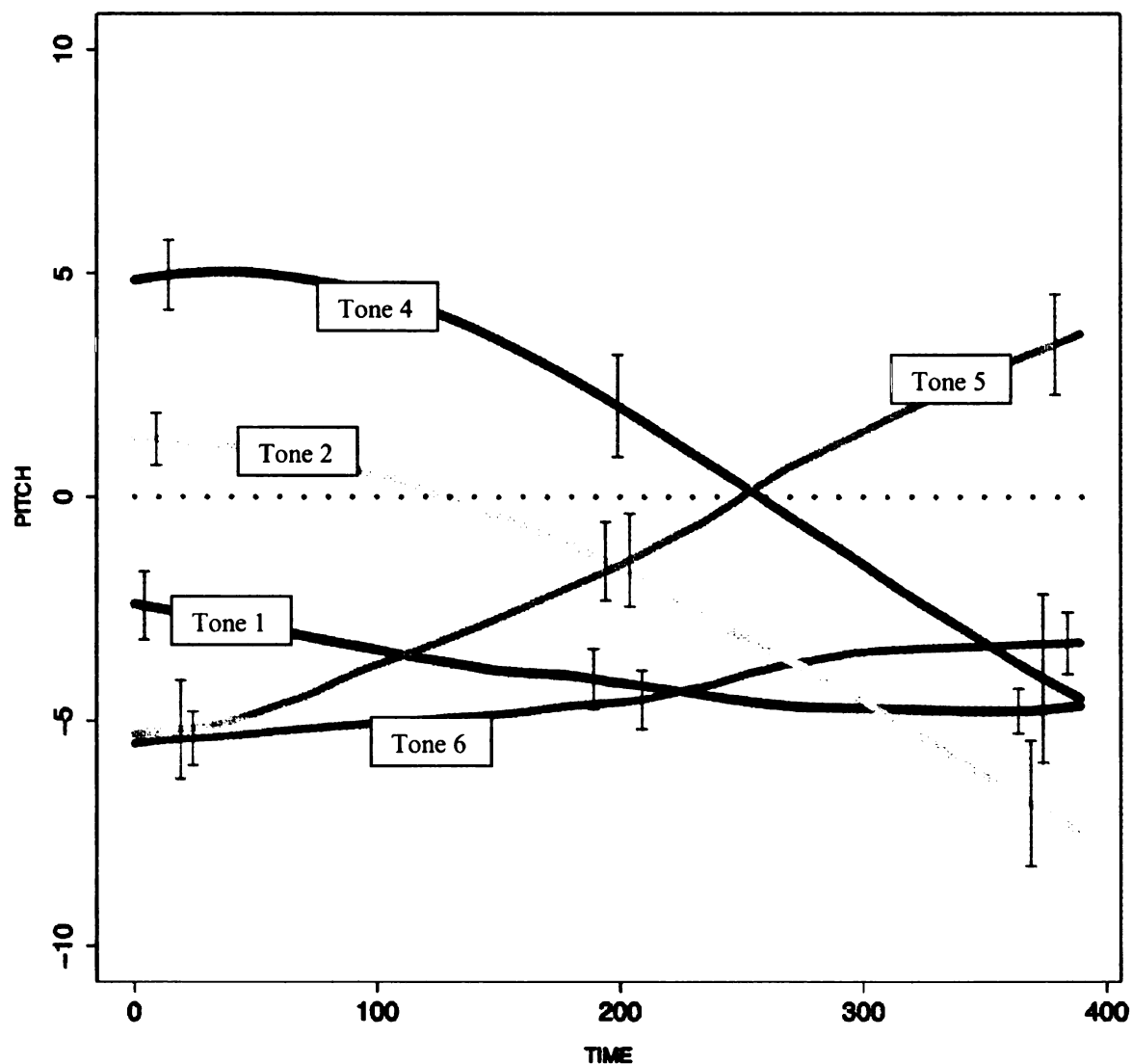
Figure 65. Speaker #12 (10 year-old North boy). In semitones; normalized for duration and mean of T3. N=101.



As with the other older children, this speaker shows strong evidence that the patrillect has been fully acquired. The tone system in Figure 65 represents completely standard North tones, as exhibited by T6 and T1.

The tones of the oldest child, a pre-teen girl, are now shown. Speaker #14 is a 12 year-old North girl with a South mother (Speaker #5). Her tones are plotted in Figure 66.

Figure 66. Speaker #14 (12 year-old North girl). In semitones; normalized for duration and mean of T3. N=127.





The North pre-teen girl's tone system shows no sign of matrilectal influence in T1 or T6, showing instead full acquisition of her patrilect, North.

## APPENDIX C

### Initial Phonological Evidence for /tua/

If the segment /u/ in words like /tua/ is actually part of a consonantal onset cluster or labialized consonant onset, i.e. /twa/ or /tʷa/, then the following sequences would also be expected in the lexicon:

* twe	* lwe
* two	* lwo
* twe	* lwe
* twu	* lwu

and so on.

Instead, /-ua/ appears to be a diphthong, occurring in words such as:

<u>South</u>		<u>North</u>	
ʔdua <sup>1</sup>	~	ʔduə <sup>1</sup>	'salt'
tua <sup>3</sup>	~	tuə <sup>3</sup>	<i>Sui New Year Festival</i>
lua <sup>1</sup>	~	luə <sup>1</sup>	'boat'
lua <sup>5</sup>	~	luə <sup>5</sup>	'to rest'
luan <sup>2</sup>	~	luən <sup>2</sup>	'to crawl'
ʔjuan <sup>1</sup>	~	ʔjuən <sup>1</sup>	'to stand'
kuan <sup>5</sup>	~	kuən <sup>5</sup>	'first, before'

Moreover, a similar diphthong exists, /-ui/ (or /-uj/), which doesn't have North-South variability:

<u>South</u>		<u>North</u>	
sui <sup>3</sup>		sui <sup>3</sup>	'Sui'
hui <sup>6</sup>		hui <sup>6</sup>	'to sit'
ʔmui <sup>1</sup>		ʔmui <sup>1</sup>	'to scold'

## APPENDIX D

### R Functions for Normalizing Tones

#### Normalizing the Tones for Duration and Linear Pitch

The following is a set of functions which (1) normalize the tone for duration by computing pitch points along the slope between each raw data point for 600 relative time points (the function *smooth*), (2) remove the first 25% and the last 10% in order to avoid boundary distortion of F0, and (3) normalize the pitch height according to the mean value of the mid-level tone for that person. The function which performs these operations at once is *tone.normal* (for Hz) and *tone.normal.smt* (for semitones).

Specifically, the function *smooth* conducts the following procedures. The full duration of each tone track is spread across a time axis of 600 relative time points. Next, an appropriate pitch value is assigned to each of the 600 relative time points. Specifically, for every two adjacent pitch values originally reported from Praat for that tone track, the local slope between the two pitch values is computed. Then, using this local slope information, appropriate pitch values are inserted for each relative time point between the two raw time points corresponding to that pair of adjacent measured pitch values. This process is repeated throughout the tone track until all “gaps” are filled along the whole 600-point relative time axis. The final result is a tone track with 600 pitch values corresponding to 600 relative time points. This tone track may now be easily compared to other tone tracks regardless of differences in raw duration.

The *smooth* function is written to conduct these iterations from the end of the syllable back to the beginning, thus reducing the possibility of rounding error in the critical portion of the syllable needed for this study (i.e., the last one-third). The function makes an accurate fit to the data. However, some rounding error is sometimes observed near the end of the iteration for syllables with long duration or with especially abrupt pitch changes, so a back-to-front iteration is best. Of course, the iteration could be reversed for other tone variables if greater sensitivity were needed at the beginning of the syllable instead.

```
##Function I. First, convert.time is used to convert the times to a 0-600 scale.
##input: x = raw values of a tone track
##output: z = the times as divided evenly along a 0-600 scale.
convert.time <- function(x) {
  i <- 2
  z <- c()
  relative.time <- c(1:length(x$pitch))
  interval <- floor(600/length(x$pitch))
  if (((600-(interval*length(x$pitch)))>0)
  {interval<-interval+1}
  else {while (((interval*length(x$pitch))-600)>interval)
    interval<-interval-1
  }
}
```

```

z[1] <- 0
while (i <= length(x$pitch)) {
  z[i] <- relative.time[i-1]*interval
  i <- i+1
}
return (z)
}

```

## ##Function II. Tone Smoother

```

##Match pitches to each of about 600 time points
##local slope is computed to fill in blank spots
##input: x=the tone data table (x$pitch, x$time)
##output: the smoothed version (pitch, time)
smooth <- function(x) {
  i <- length(x$pitch)
  #The index i counts from the number of raw data points, i.e., length(x$pitch),
  #down to zero.
  n <- 600
  #Initialize the new tone track table
  newx <- c()
  newx$time <- c()
  newx$pitch <- c()
  newx$pitch[600] <- x$pitch[length(x$pitch)]
  #Calculate the time interval between each of the raw points
  # (This will be 0.01 sec in the current type of data being used)
  raw.interval <- (max(x$time)-min(x$time))/(length(x$time)-1)
  #Calculate the time interval between each of the 600 new points
  time.interval <- (max(x$time)-min(x$time))/600
  #Initialize the time marker
  current.time <- 0
  #Now build the new tone track, piece by piece
  while (n > 0) {
    #First calculate local slope (slope between closest two raw data points)
    if (i==0) {i <- 1}
    local.slope <- diff(x$pitch)[i-1] / raw.interval
    if (i==1) {local.slope <- diff(x$pitch)[1] / raw.interval}
    newx$time[n] <- n-1
    #Then assign the appropriate pitch to the given time point
    newx$pitch[n] <- x$pitch[i] - local.slope*(current.time)
    #Check to see if it's time to move on to the next i yet
    if (current.time > (raw.interval-time.interval)) {
      i = i - 1
      current.time = 0
    }
    current.time <- current.time + time.interval
    n = n-1
  }
  return(newx)
}

```

```
##Function III. Remove the first 25% (150 out of 600) and last 10%
##in order to avoid potential phonetic influence of obstruent onsets and also
##to avoid unstable changes at the very end of the pitch track.
```

```
smooth.and.chop <- function(x) {
  leng <- length(smooth(x)$pitch)
  y <- smooth(x)
  z <- y[151:(leng-60)]
  z$pitch <- y$pitch[151:(leng-60)]
  z$time <- y$time[151:(leng-60)]
  return (z)
}
```

```
#This version of tone normal is for Hz (see below for semitones)
```

```
tone.normal <- function (x,y) {
  sac <- smooth.and.chop(x)
  z$pitch <- sac$pitch - y
  z$time <- sac$time
  return(z)
}
```

```
#Here is a version of tone normal which converts the output to semitones:
```

```
tone.normal.smt <- function (x, y) {
  sac <- smooth.and.chop(x)
  z <- c()
  zz <- c()
  #Calculate the person's mean T3 in semitones
  smtn.mean <- 12*(log(y/100)) / log(2)
  temp.mean <- rep(smtn.mean, 390)
  zz <- sac$pitch
  #Convert tone track to semitones
  smtn <- 12*(log((zz)/100)) / log(2)
  #subtract the person's mean T3 in semitones from the semitone version of the tone track
  z$pitch <- smtn - temp.mean
  z$time <- sac$time
  return(z)
}
```

### **Create a Pitch Track Composed of the Mean Pitch for Each Relative Time Point of All Tokens of a Given Tone for a Given Speaker**

The example below is for Tone 1 of Speaker #34. The entries “nm5\_qhal1”, etc., are the individual pitch data tables. The number 162 is the mean of T3 for that speaker.

```
meaned.nm5 <- c()
n <- 1
tr1 <- tone.normal(nm5_qhal1,162)
tr2 <- tone.normal(nm5_qhal2,162)
.
.
[insert the other pitch tables for this tone]
```

```

.
.
tr23 <- tone.normal(nm5_il2,162)
while (n<=390) {
  meaned.nm5$time[n] <- n-1
  temp <- c(tr1$pitch[n],
tr2$pitch[n],
.
.
tr23$pitch[n],
)
  meaned.nm5$mean.pitch[n] <- mean(temp)
  meaned.nm5$sd[n] <- sd(temp)
  n <- n+1
}

```

### **Creating a Vector with All the Pitch Values for a Given Time for a Given Speaker:**

Example with Tone 1 of Speaker #35. The entries “sm1\_gol1”, etc. are the individual pitch data tables. The number 293 is the mean of T3 for that speaker. The number 350 represents the particular time point of interest, i.e.  $t=350$ ). (Use tone.normal.smt if semitones are needed instead of raw Hz.)

```

n <- 350
sm1.350 <- c(
  tone.normal(sm1_gol1,293)$pitch[n],
  tone.normal(sm1_gol2,293)$pitch[n],
  .
  .
  [insert the other pitch tables for this tone]
  .
  .
  tone.normal(sm1_twal2,293)$pitch[n]
)

```

### **Putting All of the Individual T1 Tokens (Converted to Semitones) for Every Speaker into One Large Table (tone1.smt):**

```

#First, get the tokens of the first speaker:
which.person <- 1
which.group <- 2
n <- 1
tr1 <- tone.normal.smt(pm1dual1,111)
tr2 <- tone.normal.smt(pm1jol1,111)
tr3 <- tone.normal.smt(pm1jol2,111)
.
.
.

```

```

tr22 <- tone.normal.smt(pmltcengl2,111)
while (n<=390) {
temp <- c(tr1$pitch[n],
tr2$pitch[n],
tr3$pitch[n],
.
.
.
tr22$pitch[n]
)
j <- 1
while (j <= length(temp)) {
tone1.smt$time.ind[i+j-1] <- n
tone1.smt$person[i+j-1] <- which.person
tone1.smt$group[i+j-1] <- which.group
tone1.smt$pitch[i+j-1] <- temp[j]
j <- j+1
}
i = i+j-1
n = n+1
}
#Now add the next speaker:
which.person <- 2
which.group <- 2
n <- 1
tr1 <- tone.normal.smt(pglggol1,173)
tr2 <- tone.normal.smt(pglggol2,173)
tr3 <- tone.normal.smt(pglggol3,173)
.
.
.
tr24 <- tone.normal.smt(pglnjanl4,173)
while (n<=390) {

temp <- c(tr1$pitch[n],
tr2$pitch[n],
tr3$pitch[n],
.
.
.
tr24$pitch[n]
)
j <- 1
while (j <= length(temp)) {
tone1.smt$time.ind[i+j-1] <- n
tone1.smt$person[i+j-1] <- which.person
tone1.smt$group[i+j-1] <- which.group
tone1.smt$pitch[i+j-1] <- temp[j]
j <- j+1
}
i = i+j-1

```

```
n = n+1
```

```
}
```

```
#Then add the next speaker and so on.
```



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