A Social network study of a Seattle neighborhood

Michael Scanlon

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Michael Scanlon

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Committee Members:

_____
Alicia Beckford Wassink

_____
Richard Wright

Date:_____

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To my family - my only hope in doing all this was to make you proud.

1. Introduction and overview

1.1 Introduction

Social network studies -- studies of webs of informal and formal interpersonal contacts -- have greatly contributed to sociolinguistic theory, by giving a better understanding of language variation at the individual level. Such linguistic research has shown how an individual's language is influenced not only by the communities to which the individual belongs, but also by the individual's place within a structured community. Most social network approaches in linguistics have described how integrated an individual is into a tightly-knit community, and how the individual conforms to community-specific norms. How social networks contribute to linguistic variation or homogeneity in communities that are not tightly knit and self-contained is less well understood; this study attempts to find out more about this phenomenon.

This study focuses on a sample of African-American speakers that were raised in the neighborhood community of Yesler Terrace, in Seattle, Washington. Yesler Terrace is a community that is particularly well suited to investigate this phenomenon, because of high levels of dialect contact within the community. This study investigates how migration patterns have influenced the language that is spoken by former members of Yesler Terrace.

This study focuses on one well-studied linguistic feature of African-American English, (-t, d) deletion. It provides a phonetic analysis of (-t, d) deletion that accounts for both language-internal and language-external (i.e., social) variation. Most studies of (-t, d) have been conducted within the variationist tradition of sociolinguistics and have concentrated on group-level patterning of this variable. Two exceptions are Guy (1980)

and Roberts (1997), who do look at individual-level variation. This study attempts to examine (-t, d) deletion at the level of the individual.

This study is as much an investigation of social network theory as it is a sociolinguistic study. It will discuss the nature of social network ties, and how macro-level social network structures and features influence the way ties between individuals are conceptualized. It will consider the role of social networks in dialect contact situations where geographic and social mobility is taken as a given, and will ask how social network structure impacts linguistic innovation in speech communities.

1.2 Goals and scope of this paper

This thesis addresses the following research questions: Is Yesler Terrace membership reflected in language use? If so, how? Have features of African-American English (AAE), in particular, constraints on (-t, d) deletion, entered and spread through the Yesler Terrace community? If so, how do innovative linguistic forms enter and spread throughout a social network? How similar is the variety of AAE spoken in Yesler Terrace to other varieties of AAE in respect to (-t, d) deletion? This study develops a social network method that attempts to account for the spread of linguistic forms throughout a social network. It also attempts to positively account for linguistic choices made by individual speakers in a variegated social network; that is, it makes predictions about which linguistic form an individual uses based on her position within a network.

Because of the exceptional place of Yesler Terrace in U.S. racial history, the linguistic forms examined in this study would be best understood within a detailed historical context. Unfortunately, such a project is beyond the modest scope of the

present study, which will focus primarily on the social network of the Yesler Terrace community and its impact on the speech of its community members.

This thesis is divided into five chapters. Chapter 2 is a review of literature relevant to this study. First, a brief history of Yesler Terrace is presented and placed within the larger context of African-American migration patterns in the mid-twentieth century. Secondly, the phenomenon of (-t, d) deletion is described. The general principles of (-t, d) deletion are exposited. Language-internal variation of (-t, d) is described, as are language-external influences on variation, such as social, regional, and age-based variation. Third, an overview of social network theory is provided, and insulated and integrated social networks are compared. The characterization of strong and weak ties in social network literature is discussed and problematized. The impact of social networks on linguistic behavior is discussed. A review of social network approaches to linguistic questions is provided, and the methods and findings of sociolinguistic network studies are considered. The influence of dialect contact on the spread of linguistic change is discussed, and linguistic spread through dialect contact is framed within social network theory. The concept of innovation in speech communities as put forth by earlier studies is problematized.

Chapter 3 is an outline of the methods used in this study. It discusses an approach to addressing the issues introduced in Chapter 2. A description of the subjects used for the study and a description of the data collection process are provided. The characterization in this study of strong and weak social network ties is discussed, and the nature of the relation between individuals and regional dialects is examined. A social

network method that assigns scores to individuals based on their social proximity to regional dialects is introduced. A discussion of network centrality is provided, and a description of the method used in this study to calculate centrality is outlined. The details of the phonetic analysis are outlined, including both auditory and acoustic analysis methods. The statistical methods used to determine the influence of internal constraints on (-t, d) deletion are described. A comparison of univariate and multivariate analyses is provided. Lastly, a group-level analysis of the linguistic data by sex is described.

Chapter 4 presents the results of the social network and phonetic analyses. First, the chapter describes the social network structure of a sample of speakers from Yesler Terrace, and the dialect areas those speakers have ties with. Next, it presents dialect scores for each individual in the sample. Thirdly, it presents (-t, d) deletion statistics for each individual in the sample, and compares (-t, d) deletion rates across the sample. Fourth, it compares results from the social network analysis with those of the linguistic analysis. Finally, it presents (-t, d) deletion statistics based on groups of men and women, and compares the linguistic output of men to that of women

Chapter 5 discusses the social network and phonetic results that were presented in Chapter 4, and draws conclusions about the role of social networks in dialect contact. This chapter also includes suggestions for further study.

2. Background

2.1 Introduction

This chapter presents a survey of literature pertinent to the present study. First, the settlement history of Seattle (and in particular Yesler Terrace) will be presented. The second section gives an overview of a well-studied linguistic variable, (-t, d) deletion, also known as consonant cluster simplification. The third discusses social network theory as it applies to sociolinguistic theory. The fourth section is an overview of dialect contact and change.

2.2 Historical background

The present study concerns itself with African-Americans that migrated post-World War II to Yesler Terrace, in Seattle, Washington, from mostly rural areas of the United States. This migration is part of a larger migration of mostly southern, mostly rural blacks to the Pacific Northwest beginning around World War II and continuing into the 1970s. This migration also is part of the "Great Migration", the migration of African-Americans from the South to urban centers in the North and West beginning around 1916 and continuing through the 1970's (Rickford & Rickford 2000). While the generation under study is fairly geographically dispersed today, the subjects of this study spent the majority of their formative years in Yesler Terrace.

Yesler Terrace is a public housing community established in 1940. Yesler Terrace is located on Yesler Hill in Seattle's Central District, and borders the areas known today as the International District and Pioneer Square. In Taylor's (1994) history of the Central District, he writes, "Black Seattle through much of the twentieth century was

synonymous with the Central District" (p. 5). However, Yesler Terrace was not an insulated community of African-Americans. It enjoys a privileged place in America's racial history, because it was the first racially integrated public housing in the United States. Additionally, Yesler Terrace borders the areas known today as the International District, First Hill, and Pioneer Square, which historically have large Chinese, Japanese, and Filipino populations. African-American children in Yesler Terrace went to school with Asian-Americans and Whites. This integration in housing and schooling seen in Yesler Terrace in the mid-twentieth century runs as a counter-example to the pattern of segregation in Northern cities, as described in Rickford & Rickford (2000), and precedes the Civil Rights Act of 1964 by nearly a quarter-century.

The Pacific Northwest has not been extensively studied as a dialect area, and African-American English in this region has hardly been studied at all. While Wolfram and Schilling-Estes (2000), for instance, discuss regional differences in AAE, they do not mention AAE in the Pacific Northwest or differentiate it from other varieties of AAE spoken in the Western United States. The present study, then, investigates how African-American English is used in one community in the Pacific Northwest, and concentrates on one of the most well-studied variables in varieties of African-American English - variable (-t, d) deletion.

2.3 (-t, d) deletion

(-t, d) deletion (also known as consonant cluster simplification) is characterized by the variable deletion of [t] or [d] in the second position of word-final consonant clusters. It is found in nearly all dialects of English (Wolfram 1991), but it seems to be

more frequent in African American English (Bailey and Thomas 1998). (-t, d) deletion was the focus of this study because high levels of (-t, d) deletion are associated with African-American speech. Also, the focus of the sociolinguistic interviews for this study were events in the past, and the interviews contained many past tense verbs; past tense verbs ending in [t] or [d] commonly show (-t, d) deletion effects.

Table 2.1 provides examples of words in which (-t, d) deletion may apply.

Table 2.1. Consonant cluster combinations (adapted from Wolfram 1969)

First-consonant category	*Cluster*	*Examples*
sibilant	st ʃt zd ʒd	test, post, list, missed, messed, dressed finished, latched, cashed raised, composed, amazed judged, charged, forged
Non-sibilant fricative	ft vd	left, craft, cleft, laughed, stuffed, roughed loved, lived, moved
nasal	nd md ŋd	mind, find, mound, rained, fanned, canned named, foamed, rammed banged
lateral	ld	cold, wild, old, called, smelled, killed
stop	pt kt gd bd	apt, adept, inept, mapped, stopped, clapped act, contact, expect, looked, cooked, cracked dragged, bugged, egged grabbed, sobbed, clubbed

Studies of (-t, d) deletion usually avoid problematic consonant clusters by restricting the kinds of consonant clusters that are studied. In most studies only consonant clusters ending with apical stops are considered. Consonant clusters where one consonant is voiced and the other is voiceless (e.g. [mp] *jump*, [nt] *count*, [lt] *colt*, [ŋk] *crank*, [lp] *gulp*) do not pattern with consonant clusters subject to (-t, d) deletion (Wolfram 1969). (-t, d) deletion applies, therefore, primarily in clusters where elements share the same value for voicing. In consonant clusters followed by words beginning with apical stops (e.g., *test today*, *cold day*), deletion is nearly always categorical, and such examples are usually excluded from (-t, d) studies. Clusters with rhotics in first position are usually excluded from analyses of (-t, d) deletion. Guy (1991) notes that deletion after /r/ is rare, and his study considered postvocalic /r/ as essentially a vowel. Also, Wolfram (1969) cites deletion of postvocalic syllable-final /d/ as a feature of African-American English (AAE) in Detroit. It is not clear whether deletion of /d/ in consonant clusters such as *card* is a result of a consonant cluster simplification rule or a syllable-final /d/ deletion rule[1], and so [rd] clusters are usually excluded from studies of (-t, d). Clusters of nasal plus stop followed by a vowel, such as in *kind of*, are often excluded from (-t, d) analyses, because the cluster is often reduced to a nasal flap.

There are two main internal linguistic constraints on variable (-t, d) deletion in English. The first constraint is commonly called the grammatical constraint, and concerns the morphological status of the word containing the consonant cluster. Clusters within

[1] Syllable-final /d/-deletion is a common feature of AAE. In syllable-final position, when preceded by a vowel, /d/ may be realized as [Ø]. It is unclear whether /rd/ sequences, as in *card*, operate as a vowel-rhotic consonant-stop sequence or as a rhoticized vowel-stop sequence.

monomorphemic words (e.g., as in *past*, *old*) favor deletion most. Clusters in semiweak verbs (e.g., *kept*, *told*), characterized by a vowel change as well as a past tense suffix, usually favor deletion somewhat less than monomorphemic words. Clusters that split a morpheme boundary, such as weak past tense verbs and verb participles (e.g., *passed*, *called*) favor deletion least. The second constraint on (-t, d) deletion is a phonological constraint imposed by the following environment. (-t, d) deletion is most favored when the consonant cluster in question is followed by a consonant (e.g., *past me*), and is least favored when the cluster is followed by a vowel (e.g., *past us*). Table 2.2 gives examples of consonant clusters with each grammatical and phonological constraint.

Table 2.2. Main constraints on (-t, d) deletion.

		morphological status (grammatical constraint)		
		monomorphemic (M)	semiweak (S)	bimorphemic (P)
following environment (phonological constraint)	consonant (C)	*past me*	*kept me*	*passed me*
	vowel (V)	*past us*	*kept us*	*passed us*

Presumably, the motivation for the morphological constraint is the need to preserve grammatical information in words. The apical stop in bimorphemic words is the only indicator of past tense; the deletion of the apical stop makes these forms phonetically indistinguishable from their present tense forms. As such, bimorphemic verbs are more resistant to (-t, d) deletion than are monomorphemic words. The apical stop also marks past tense in semiweak verbs, but past tense in these verbs is also marked by a vowel change, so the need to preserve the apical stop is not as strong as for verbs in the bimorphemic class.

There are also clear articulatory reasons for the phonological constraint. When an apical stop is followed by a consonant, the articulation of the following consonant may obscure the articulation of the apical stop. When the following consonant is apical, this co-articulation may result in the failure to release the apical stop. When the following consonant is not apical, the articulators responsible for the non-apical phones involve physiology independent of the tongue tip, and the non-apical articulation may occur either during or after the apical articulation. When the two gestures overlap, the non-apical gesture may obscure the apical gesture. It is imprecise to say that the apical stop is deleted in these cases. However, it is difficult to distinguish deleted apical stops from unreleased apical stops, and so, from a listener's perspective, the apical stop is not present in either case. Following vowels, on the other hand, do not place such an imposition on the production of apical stops, because articulation of a vowel does not involve any oral closure and requires any oral closure to be released.

The above constraints on (-t, d) deletion in English are often considered universal; M > S > P and C > V, where ">" means "favors deletion more than" (Santa Ana 1991; but see §2.3.3 below for an exception). But other restrictions on (-t, d) deletion vary across regional and social dialects. (-t, d) deletion is known to vary socially by overall level of deletion, the relative ranking of the grammatical and phonological constraints, and the effect of following pause.

While (-t, d) deletion occurs more frequently in African-American English than in most other varieties of English, African-American English is not a monolithic entity. There are several regional varieties of AAE that can be distinguished by their internal

constraints. The relative ranking of the grammatical and phonological constraints varies across regional dialects of AAE. For instance, for rural speakers from the Southern U.S. (African-American and Caucasian), the grammatical constraint is primary; the morphological status of the word has more influence than the following environment on variable deletion (Summerlin 1972). For African-American speakers from the Northern U.S., on the other hand, the phonological constraint is primary; the following environment influences variable deletion more than the morphemic status of the word (Labov *et al*. 1968).

While there is a clear articulatory basis for the phonological constraint ranking C > V, the effect of a following pause (referred to hereafter as "Q") is less clearly rooted in articulation. In some dialects a following pause has an effect similar to that of a consonant (such as in New York City), but in others (such as Philadelphia), pauses affect deletion similarly to vowels (Guy 1980). Unfortunately, the patterning of (-t, d) following a pause has not been studied as much as other aspects of (-t, d) deletion, and the range of regional variation for this constraint outside of metropolitan areas is not clear.

Relative ranking of constraints and the effect of following pause are internal constraints on (-t, d) deletion. (-t, d) deletion is also constrained socially, or according to language-external constraints. For this study it is important to review how sex of speaker and age of speaker appear to influence distributional patterns of (-t, d) deletion.

The sex of the speaker has been shown to influence (-t, d) deletion as well. In Wolfram's (1969) study of Detroit Black English, he observed that women appeared to delete (-t, d) at lower levels than men overall. Wolfram suggests this difference is due to

women's "greater sensitivity to socially evaluative linguistic features" (76). Neu (1980), in a cross-dialectal study of American English speakers, also found that women delete at a lower overall frequency. These findings contribute to a large body of evidence that women use fewer non-standard variants than do men, all else being equal; but the nature of the "sensitivity" Wolfram argues for is unclear. It does not appear that any (-t, d) studies have looked for sex differences in other dimensions along which (-t, d) deletion is known to vary, such as constraint ranking. Given the vagueness of the "sensitivity" argument, it is unclear how men and women would differentiate (-t, d) deletion on this level.

Most studies of (-t, d) deletion have focused on adult speech communities; but a few have investigated how children and adolescents treat this variable. Guy and Boyd (1990) observed three stages of variable (-t, d) rule acquisition. In speakers between 5 and 8 years old (Stage I), (-t, d) in semiweak verbs was deleted categorically (but see Roberts 1997 for evidence to the contrary). In Stage II, speakers deleted in semiweak verbs at levels similar to that of monomorphemes; all speakers attained this stage by adolescence. In Stage III, speakers formulated semi-weak verbs as a separate morphological class, and deleted these at similar levels to that of weak past tense verbs. Guy and Boyd noted that this third stage is not attained by all speakers, even in adulthood. For the purposes of this study, Stage III is the most important to consider. If not all adult speakers are expected to attain Stage III, it is possible that not all adult members of Yesler Terrace show a pattern indicative of Stage III acquisition.

Payne (1980), in her study of adolescents' dialect acquisition in King of Prussia, notes that there appear to be age restrictions on the acquisition of linguistic rules. She found that adolescents had little trouble acquiring simple phonetic variants. However, more complex phonological rules, such as (ae)-raising, which involves a complex set of conditioning factors, were not acquired completely. She asserts, "The incomplete acquisition [of complex rules] indicates that children do not freely restructure and/or reorganize their grammars up to the age of 14 but that they do have the ability to add lower level rules" (p. 175). Most but not the entire sample of Yesler Terrace members in the present study moved into the community well before adolescence. Payne's work predicts that the older migrants to Yesler Terrace would not acquire the community norms.

2.4 Social network theory

Most studies of (-t, d) deletion have been in the variationist paradigm. Variationist sociolinguistic studies explore the relationship between groups of people and their language use. On an individual level, variationist studies describe an individual's language use in terms of social attributes of the individual (e.g., her social class, gender, age, etc.). Social network linguistic studies are a departure from the variationist tradition in this respect.[2] Wasserman and Faust (1994) characterize four main principles of social network approaches:

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[2] Milroy (1987) notes that variationist and social network practices are not necessarily at odds with one another; instead, the networks in which an individual is embedded and the larger social groups to which he belongs are "phenomena at different levels of abstraction" (133).

> 1) actors and their actions are viewed as interdependent rather than autonomous;
> 2) relational ties (linkages) between actors are channels for transfer or "flow" of resources;
> 3) network models focusing on individuals view the network structural environment as providing opportunities for, or constraints on, individual action;
> 4) network models conceptualize structure (social, economic, political, and so forth) as lasting patterns of relations among actors (p. 4).

Social network approaches allow researchers to examine two aspects of some group of people: how individuals are situated in a group and the structure of the whole group. An individual can be characterized as closely tied to other individuals in the group, or far removed; an individual can be described as a hub of the group and closely tied to others (i.e., *central* to the group), or as being a certain distance from other individuals in the group. Network methods allow one to quantify the characteristics of a group as a whole; for instance, a group may be identified as relatively sprawling or relatively tightly-knit.

Central to network theory is the concept that dense and multiplex networks of strong ties have a strong norm-enforcement mechanism on the members of the network (Bott 1957). Dense networks are networks that have many ties between different individuals in the network (e.g., where everyone has ties to everyone else). A tie between individuals is multiplex when those individuals interact in multiple capacities (e.g., as neighbors and co-workers as well as friends). To say that a network enforces norms on an individual means that the individual is subject to rights and obligations particular to the networked community. For example, Milroy (1987) showed that the linguistic behavior of an individual within a strong and multiplex network with a localized vernacular variety

can be predicted based on how central that individual is to the network. A central member of a network is pressured to maintain the norms of that network, while a *peripheral* member of the network does not face such pressure.

There are several approaches to measuring how central an individual is within a social network (see Wasserman and Faust 1994). The present study focuses on *closeness centrality*, which measures how close an actor is to all the other actors in the set of actors. An actor with a high degree of closeness centrality can quickly interact with other members of the social network.

Bortoni-Ricardo's (1985) social network study of linguistic change in Brazil identified two kinds of networks that are helpful to this discussion. An *integrated* network is a network that is "territorially unbounded and more heterogeneous… [it] is associated with a more complex system of role relationships" (117). An *insulated* network, in contrast, "seems to favour the maintenance of the rural culture. ... It is likely to exhibit a high level of…density which functions as a mechanism of resistance to change" (p. 117). The two types of networks should not be thought of as absolutes, but in relative terms (p. 119). Also, while insulated networks tend to be more dense and multiplex than integrated networks, this is not necessarily the case.

Bott (1957), in her examination of social networks of urban families, describes how societal structures outside the family have an impact on role relations within the family. Although urban families have many external relationships, families are not contained within organized groups; rather, they belong to multiple social groups, and play a specific role in each one. In other words, their network ties are *uniplex*, and their

networks are *integrated*. Bott argues that it makes more sense to define an urban community as an aggregate of social networks than as a locality, and that a family's membership in multiple networks means that the roles individuals play will be more varied. In other words, norm-enforcement mechanisms will not be as strong in integrated networks as they are in more insulated communities.

Network methods allow researchers to examine the *content* of ties as well as the *structure* of ties. In the most basic terms, a tie between individuals (or *actors*) represents some linkage between those two individuals. The nature of the linkage can vary greatly, however, as can the meaning of the tie. For instance, a tie can be a relation (e.g., kinship), an evaluation (e.g. friendship), a transfer of material goods (e.g., business transactions), an association or affiliation (e.g., belonging to the same club), a behavioral interaction (e.g., talking together). Ties can be identified as *mutual* (e.g., when two actors consider each other to be friends) or *directional* (e.g., when one actor is a boss of another actor). When a series of ties connects two actors, it is said that there is a *path* between the two actors. The *length* of a path is equal to the number of ties in the path.

Ties can also be identified as strong or weak. Granovetter (1973) states that "the strength of a tie is a (probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (1361). Granovetter (1983) notes that one's acquaintances (*weak ties*) are less likely to be socially involved with one another than are one's close friends (*strong ties*). In other words, the degree of overlap of two individuals' friendship networks varies directly with the strength of their tie to one another. According to Granovetter (1973), the

strength of a tie can also be discussed in purely network-structural terms. Tie strength, as described by Granovetter, is closely related to the structural concept of *transitivity*. Consider three actors A, B, and C, where A and B are strongly tied, and A and C are strongly tied, as shown in Figure 2.1.

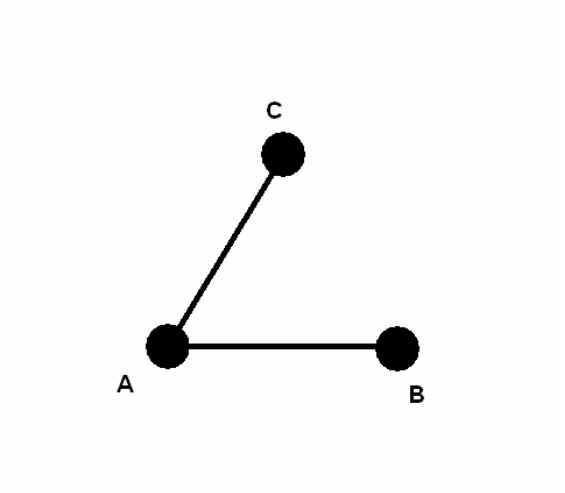


Figure 2.1. Intransitive triad

Granovetter argues that in such a configuration, B and C are also likely to be tied, creating a *transitive triad* where A, B, and C are tied to each other. If there is no tie between B and C, then the tie between A and C is a weaker tie than if B and C were tied. Additionally, the configuration in Figure 2.1, an *intransitive triad*, is marked; i.e., it is not a common triad configuration. So, the strength of a tie is defined according to both to the relation between the tied individuals, and to the larger structure of the social network.

There is much debate about the impact of strong and weak ties on social networks. Granovetter argues that weak ties can act as *bridges* and allow innovations to flow across group boundaries. However, Granovetter also notes, "The argument of SWT [the Strength of Weak Ties] implies that only *bridging* weak ties are of special value to

individuals; the significance of weak ties is that they are far more likely to be bridges than are strong ties" (208). The decision to only quantify strong ties in the current study follows from two comments regarding this quotation. First, Granovetter acknowledges that weak ties can be either influential (i.e., bridging) or non-influential; the difficulty in distinguishing influential from non-influential weak ties makes it difficult to quantify their influence on a network structure definitively. Strong ties, on the other hand, are known to be influential ties, and focusing on strong ties allows the present study to definitely and manageably connect individuals to dialect varieties. Secondly, Yesler Terrace constitutes an integrated network of geographically and socially mobile individuals, who may belong to multiple non-overlapping groups. In other words, the Yesler Terrace network can be thought of as a set of individuals with strong ties both within and between communities. Correspondingly, in integrated networks, intransitive triads are not necessarily uncommon or marked structures. For instance, if an individual has strong ties to friends in Seattle and family in Louisiana, it is not unusual if one's friends and family never meet. Granovetter's structural definition of a weak tie is based on the evaluation of an intransitive triad as a marked structure. However, in an integrated social network one would expect to find a higher level of intransitivity than in an insulated network. Weak ties, then, are harder to define in integrated networks. This is not to argue against Granovetter's assertion that transitivity is most likely when ties in a triad are strong and least likely when ties in a triad are weak, and this does not outlaw the possibility that weak ties act as bridges. Instead, the argument here is that strong ties may

act as bridges in such networks as well. This characterization of strong ties allows one to examine relations in societal structures not easily defined in terms of primary groups.[3]

Social network studies in linguistics examine how the relationships (or ties) between individuals influence their language. An individual's linguistic behavior can be compared to the web of social ties in which that individual is embedded.

Linguistic behavior can be understood in terms of the role relationships an individual has with others in the community. Bell (1976) notes that a speaker's role in any group ascribes her a status within the group, and that there are norms of behavior that the speaker is expected to follow. When an individual has many role-relationships, her verbal repertoire is very diverse, and she has flexibility in the linguistic forms she can use. For example, Milroy (1987) utilizes the concept of linguistic *diffusion*, as put forth by Le Page (1985), to account for the low frequency of vernacular variants in the speech of 'lames' from Labov's (1972) study of Harlem street gangs:

> …because [the lames] are not constantly subject to the supervision and control of a peer group, they lack any social mechanism whereby a highly focused set of vernacular norms can be consistently maintained against the constant pressure of a competing set of institutionally legitimized norms, and so they drift away from that vernacular. In Le Page's terms, their language becomes more diffuse. (180)

Individuals in a relatively insulated community, on the other hand, are highly influenced by norm-enforcement mechanisms, and Le Page states that their language is likely to be

[3] The question of whether Yesler Terrace can be thought of as a group or community is an intriguing question, but one I leave open here. The notion of 'strong tie' employed in this study does not presuppose the notion of community.

more *focused*, and that vernacular languages or dialects are likely to be maintained in these communities.

Milroy's (1987) study of three working-class communities in Belfast clearly demonstrates a linguistic norm-enforcement mechanism at work. Milroy hypothesized, "even when the variables of age, sex and social class are held constant, the closer an individual's ties are with his local community, the closer his language approximates to localized vernacular norms" (179). Milroy constructed a network strength scale based on the multiplexity and density of individuals' personal networks, and calculated from one's ties with kin, co-workers, and those with whom the individual voluntarily associates. Milroy found that the strength of an individual's network correlated with their use of local norms. Support for this observation, but with different methods, can be found in Labov's (1972) work on adolescent network structure and Black English Vernacular in Harlem, Cheshire's (1978) study of adolescents in Reading, and Gal's (1979) study of language shift in a village in Austria. Milroy interpreted the use of localized vernacular norms as language maintenance in the face of an encroaching supra-local norm.

Insulated communities like those described in the previous paragraph are particularly useful to study the principle of linguistic norm enforcement. The present study investigates the influence of an integrated network on individuals' linguistic output. Integrated networks are an intriguing challenge to the network methods introduced in Milroy (1987). Individuals in integrated networks belong to multiple communities, and this results in more options for an individual and less control of the individual by any one larger group. As such, the notions of multiplexity, density, and centrality do not

adequately account for the kind of language used in more integrated networks. The linguistic social network studies described above associate integrated networks with distance from a community vernacular; but it is more difficult to account for linguistic choices made by speakers within integrated networks. Studies by Bortoni-Ricardo and Milroy & Wei that attempt to account for linguistic variation within integrated communities are described below.

In Bortoni-Ricardo's (1985) study of rural immigrants to Brazlandia, she observed the shifts in moving from the relatively rural community of Caipira to an urban community. Her study assumed all speakers had adjusted, to a greater or lesser degree, from a relatively insulated network to a relatively integrated network. She hypothesized that dialect diffuseness is directly related to the degree of assimilation to urban standards of life. Degree of assimilation was measured in two ways: using an integration index and an urbanization index. For the integration index, speakers were asked to nominate three people with whom they talked most frequently, and individual index scores reflected the average distance between a speaker and all other connected speakers. The urbanization index reflected the level of exposure a speaker's contacts have to urban culture, as measured by seven variables considered to be indicative of urban culture. Bortoni-Ricardo found that men's urbanization and integration indices correlated significantly with the production of urban variants, but that women's language use did not correlate as nicely with the speakers' degree of assimilation to urban culture.

In their study of code-switching among Tyneside Chinese migrants to Britain, Milroy & Wei (1995) also examined language use in a diffuse network. The network

patterns of the Tyneside Chinese in Britain are different from those discussed so far, because they are dispersed over a wide geographical area. Correspondingly, the Tyneside Chinese networks were not described in terms of structural measures, such as network density and multiplexity, but by the content of ties. Milroy & Wei identified three different types of ties for this study: *exchange ties* and *passive ties* were identified as strong ties, and *interactive ties* as weak ties. Exchange ties are ties between people that exchange direct aid, advice, criticism, and support. Passive ties are ties between people who may interact infrequently, but who are considered as a source of influence and moral support. In dispersed communities such as the Tyneside Chinese, passive ties may be very influential. Interactive ties are ties between people who interact frequently and/or over prolonged periods of time, but who do not exchange favors or other material or symbolic resources. Milroy & Wei found that social network ties accounted for variations in language choice that could not be accounted for entirely by the attributive variables of age and generation. Generation of the speaker reflected language use relatively well; but the network variable was found to be a more accurate predictor of language choice than the generation variable, with which it was closely associated but not isomorphic. They found that speakers with more Chinese-oriented networks employed Chinese in more situations than those speakers with more English-oriented networks.

The features Milroy & Wei (1995) associate with passive and interactive ties can be qualified somewhat in order to generalize their application to social network theory. Passive ties as defined by Milroy & Wei (1995) are ties marked by infrequent contact, but here it is recognized that a tie reflecting influence and moral support does not necessarily

need to be a low-frequency contact. High-frequency ties roughly correlate with Milroy & Wei's interactive ties; however, Milroy & Wei define interactive ties as less influential than exchange and affective ties. Bortoni-Ricardo, in contrast, demonstrated that ties marked by high frequency of contact can be influential. If an interactive tie is defined strictly in terms of frequency of contact, it is clear that a tie may reflect both high frequency and affect or exchange. From the Bortoni-Ricardo (1985) and Milroy & Wei (1995) studies, then, three types of influential ties can be recognized: ties reflecting an exchange between individuals (exchange ties), ties reflecting a high level of affect between speakers (affective ties), and ties reflecting a high frequency of contact between speakers (interactive ties)

While both Bortoni-Ricardo (1985) and Milroy & Wei (1995) observed linguistic change in an integrated network, these studies conceptualized linguistic change as a movement away from a vernacular dialect. It is possible to conceptualize linguistic change in integrated communities from another angle; that is, as the spread of linguistic forms throughout a network. Such an approach has the potential to positively account for choices made from a number of available linguistic forms, rather than defining one's language use strictly as maintenance of or movement away from a local norm. The following section examines language change as the spread of innovative linguistic forms into communities, and considers how the structure of a social network influences such an approach.

2.5 Social networks, dialect contact and change

The migration of people from different regions of the United States into Yesler Terrace, Washington resulted in *dialect contact*. Kerswill (2002) identifies three possible linguistic outcomes of linguistic mixing due to dialect contact: *koineization* (or new dialect formation), *regional dialect leveling*, and *linguistic diffusion*. Koineization is the development of a new dialect that is a mixture of established dialects in contact. Regional dialect leveling "refers to the decrease in the number of variants of a particular phonological, morphological, or lexical unit in a given dialect area" (671). Diffusion is the spread of linguistic features across a dialect area. The present study attempts to track the diffusion of regional linguistic forms throughout the Yesler Terrace community.

Kerswill (2002) also argues that linguistic change in dialect contact situations begins with linguistic *accommodation*:

> Accommodation theory assumes that interlocutors converge linguistically (and on other behavioral dimensions) when they want to gain each other's approval, show solidarity, etc., and that they diverge when they do not.…When people speak different varieties, as in a new settlement, the dialect differences are likely to be exploited - consciously or passively - as part of accommodation (680).

Short-term accommodation is a temporary shift in linguistic behavior depending on context. Linguistic change can be thought of as stemming from long-term accommodation, or more permanent changes in a person's speech after contact with speakers of different linguistic varieties.

A theory of social networks and language should be able to describe how dialect contact influences linguistic change. There are two conflicting theories of how linguistic innovation is introduced to communities via contact. Labov (1980) discusses network-

related concepts and their relation to sound change, though not explicitly within a social network framework. Labov observed that "the speakers who are most advanced in the sound changes are those with the highest status in their local community" (261). Labov identifies these speakers as *innovators*; he suggests that innovators have strong ties both inside and outside the local group, and that an innovator is a member of a community who has prestige. Labov's innovator seems to be central to a community, as evidenced by her strong ties within the local group, and can be expected to face some pressure to maintain the norms particular to the community. Yet, Labov argues, she enjoys some autonomy due to her prestige, and can initiate linguistic change within the community. According to Labov's theory of sound change, the linguistic forms used by the innovator "trickle down" to other members of the community.

Milroy and Milroy (1997), in contrast, argue that multiple inter-group ties are crucial to the spread of linguistic form. Milroy and Milroy describe innovators as "mobile individuals … who as a consequence of their mobility occupy a position marginal to some cohesive group" (203). According to Milroy and Milroy, networks that are integrated are more susceptible to innovation. Peripheral people spread innovations to central members of a group; because central members of a group are likely to resist change from the outside, a large number of peripheral members need to adopt a change for it to spread successfully throughout the group. Milroy and Milroy argue that Labov's innovator is better described as an early adopter, and that acceptance of an innovative linguistic form by an early adopter makes that form readily available to the group at large. Milroy and Milroy describe 'innovator' as a relative term; they do not intend to

label some individual in a group as 'the innovator,' but instead want to describe relationships between individuals and the group.

Both Milroy and Milroy (1997) and Labov (1980) consider linguistic innovation in insulated, tightly-knit communities, and rely strongly on the concept of community-specific norm-enforcement mechanisms in their theories. In both analyses, a tie between two individuals is representative of rights and obligations between the two individuals. Because norm-enforcement mechanisms are not as strong in integrated communities, how the two theories of linguistic innovation apply to less insulated communities is less clear. The current study asks if there are alternative ways of conceptualizing a tie between two individuals, in order to analyze integrated networks. One possible alternative is to think that a tie reflects linguistic exposure. If two individuals are tied, then they are exposed to one another's speech. In this case, a tie is also a potential conduit through which innovative linguistic forms can spread.

Also, both the Milroy and Milroy (1997) and Labov (1980) studies, in a sense, characterize individuals' social place in groups as fixed; in contrast, it seems that a social network model of linguistic change should be able to account for the spread of linguistic innovations through groups characterized as socially and geographically mobile.

Even given these differences between insulated and integrated networks, it is possible to test some hypotheses from the Milroy and Milroy (1997) and Labov (1980) theories. In integrated communities one can still, in principle, observe whether change is initiated from the center or from the periphery of the community in integrated communities, as long as the network is not so diffuse that no center or periphery can be

identified. Also, one can still ask whether change can originate with a single individual in the network, or if it is necessary for multiple individuals to actuate change.

2.6 Summary

In this chapter I discussed the historical background, linguistic research, and network theoretical research that contributes to the present study, and raised issues with how social network theory is conceptualized in sociolinguistics. The next chapter outlines a methodology demonstrating how the issues discussed in the background might be addressed.

3. Methods

3.1 Introduction

In this chapter I present the methods used in this study, which are divided into three main parts: elicitation of interviews, social network analysis, and phonetic analysis.

3.2 Subjects

The subjects for this study included five men and eleven women. The exact age of the speakers is not known, but it can be estimated that all speakers are about 60 to 70 years old. All speakers lived in Yesler Terrace between 1945 and 1960. With the exception of one speaker, who moved to Seattle at the age of 16, all were either born in the Seattle area or arrived in Yesler Terrace between 2 and 13 years of age, and were raised in Yesler Terrace throughout adolescence. The sixteen subjects were interviewed, and the social network analysis includes social information from all sixteen interviews. For the linguistic analysis, a smaller judgment sample of 7 speakers was selected. These 7 speakers were chosen based on their position within the Yesler Terrace social network (more in §3.5 below).

The subjects' speech today does not necessarily reflect the influence of their years spent in Yesler Terrace exclusively. However, the present study assumes, from Payne's (1980) work, that the subjects' linguistic development before and during adolescence is more of an influence on their speech today than other post-adolescent linguistic influences.

3.3 Data collection

Both the phonetic and social network data used for this study were obtained through casual interviews. There are a few benefits to eliciting casual speech, according to Labov (2001): casual speech most closely represents vernacular speech; an analysis of "casual speech is essential in assessing whether a certain linguistic feature is variable or categorical" (104); and the distribution of word classes in clearest in the vernacular. The interviews were conducted by a member of the Yesler Terrace community; most of the subjects were familiar with the interviewer. Most of the interviews were conducted in dyads, but one was conducted with a group of three subjects, and relatives or friends of the subjects were often present during the interviews. The interviews were centered on the topic of growing up in Yesler Terrace, but were casually conducted, and the subject was allowed to stray off-topic. An interview guide was used, with questions to be asked over the course of the interview (see Appendix 1). The interviews incorporated naming tasks that were the basis for the social network analysis. The naming tasks are described below in §3.4.2. The interviews should be considered very informal, but because the subjects varied in their level of familiarity with the interviewer, and because the interview conditions were not controlled, it cannot be said that the interviews are matched for register. The interviews were transcribed orthographically, and portions of the interview were coded as casual. A portion of the interview was regarded as casual if particular cues marking informality were present: laughter, long turns taken by the subjects between questions from the interviewer, and use of familiar turns with the interviewer. Casualness was coded for use in the phonetic analysis (details in §3.5.1 below).

The interviews were recorded to a Marantz RC300 digital CD recorder using AudioTechnica ES940/C lapel microphones. The interviews lasted between 45 and 105 minutes. The recordings were digitally transferred to a computer for acoustic analysis with the Praat software program (see "Phonetic data analysis" below in §3.5).

3.4 Social data analysis

Demographic information was extracted from the interviews for all subjects. Age when the subject arrived in the Seattle area and age when the subject moved into Yesler Terrace were collected. Information about where the subject's family was from was collected, as were regional areas that may have been influential to the subject. Places the subject had lived were collected. A social network of dialects and individuals was created by tying subjects to dialect areas that were potentially influential to the subjects; a graph of this social network was produced with the network visualization software NetDraw.

In the course of the interview, subjects were asked to name people with whom they "hung out" frequently as children, people they went to for help or advice as children, and people who were the most important to them growing up. The individuals named in these three naming tasks were identified as interactive ties, exchange ties, and affective ties, respectively. Interactive ties, in contrast with Milroy & Wei (1995), were high-frequency ties that were assumed to carry some affect as well. This is because the Yesler Terrace network is a network of children and adolescents, and people with whom the subjects "hung out" most frequently were voluntary associations. Children's networks contrast in this way with adult networks, in which interactive ties are not necessarily voluntary, and thus do not necessarily reflect affect between speakers. An affective tie is

analogous to Milroy & Wei's (1995) concept of a passive tie. However, where Milroy and Wei identify a passive tie as necessarily a tie between two people who see each other infrequently, an affective tie has no such restriction; a tie in this study between two individuals may be both affective and interactive. The subjects were not restricted to the Yesler Terrace community for the naming task, but because the interview topic revolved around living in Yesler Terrace, many of the named ties were people from Yesler Terrace.

For the present study, only strong ties between actors were considered, and interactive ties, exchange ties, and affective ties were all considered strong ties. This study also takes a different approach to the meaning of strong ties than previous social network studies in linguistics. Where previous studies take a strong tie to mean enforcement of local community norms between the two speakers, the present study identifies a strong tie as a path along which innovative linguistic forms may travel. In other words, a strong tie does not necessarily connect an individual to a larger community structure, though a tie can be expected to reflect some affect between tied subjects, and correspondingly some shared norms. For this study, the meaning of a strong tie is also different from that expressed in Granovetter (1983) in that only the meaning of a tie is considered in defining a tie as strong or weak, and not the larger structure of the network.

The social network of individuals was mapped by extracting same-generation interactive, exchange, and affective ties named during the interviews. For ease of analysis, all ties were considered mutual. This network was used for the analyses

described below; a graph of this social network was produced with the network visualization software NetDraw.

The present study seeks to determine if the strength of a tie between an individual and a dialect influences the way the individual speaks. An individual and a regional dialect are considered strongly tied if there are multiple short-distance paths between the two. In other words, the strength of a tie between an individual and a regional dialect is directly related to the number of ties between the two, and inversely related to the length of the ties between the two. Note that the actual *tie* between a dialect variety and an individual in Yesler Terrace is not necessarily strong or weak – under this formulation, the strength of a tie has no impact on whether the *set of paths* between a dialect variety and individuals can be described as strong.

To say that an individual and a regional dialect area are tied is not to say that the individual exhibits behavior (linguistic or otherwise) associated with that regional area. Instead, such a tie means that the individual has had exposure to other people who belong to that regional area. If an individual was born in the Lower South of the U.S. and lived there for a few years before moving to the Pacific Northwest, that individual has a tie to the Lower South; but this regional association should not be taken as an *attribute* of the individual, but rather as a *relation* between the two. Dialect contact raises the possibility of multiple relations to several different regional dialects. Ultimately, the amalgamation of relations an individual has, and the attitudes he has towards them, determines his linguistic output.

To determine the influence a dialect area potentially has on an individual, a dialect score was calculated. For a matrix X that represents the number of ties between individuals, X also represents the number of paths of length 1 between pairs of subjects. X^2, then, is a matrix of the number of paths of length 2 between pairs of subjects, and X^3 is a matrix of the number of paths of length 3 between pairs of subjects. The strength of a tie between subjects is directly related to the number of paths between subjects, and is inversely related to the distance of the paths, so a matrix representing the strength of a tie between pairs of individuals can be calculated using the equation:

$$\text{Strength}_{\text{subjects}} = X + X^2/2 + X^3/3$$

Only paths of length 3 were considered, because a large amount of linguistic spread is not expected; paths with a distance longer than 3 are not expected to carry much influence. A matrix Y represents the set of ties between dialects and individuals. A matrix which represents the strength of a tie between dialects and individuals, then, is the product of matrix Y and the matrix of tie strength between subjects:

$$\text{Strength}_{\text{dialect+individual}} = Y(\text{Strength}_{\text{subjects}})$$

The strength of a tie between a dialect and an individual will be referred to as the subject's *dialect score*. The matrix $\text{Strength}_{\text{dialect+individual}}$ yields a set of dialect scores for each individual.

The closeness centrality of each member of the network was calculated. Closeness between a pair of actors can be defined by the length of the path between the two. If a

short path exists between two actors, they are close; if only a longer path exists between the two, they are less close. Closeness, then, is inversely related to the length of the shortest path, or *geodesic*, between two actors. The closeness centrality of an actor is the sum of geodesics between that actor and all others. Closeness centrality was chosen over other types of centrality (e.g., degree, betweenness centrality) because it most resembles the dialect score introduced in §3.4.4. The closeness centrality statistic is limited in that it can only be measured when the social network is connected; that is, when there is a path between every pair of actors in the network. The actual network tested for centrality was limited, then, to the set of subjects that formed a connected social network. The closeness centrality measure was calculated using the social network analysis software UCINET.

3.5 Phonetic data analysis

The phonetic analysis was conducted on a judgment sample of the sixteen individuals interviewed, based on position in the social network. The goal of the judgment sample was to obtain a group of individuals who varied in their centrality to the community and in their closeness to the dialect areas thought to influence Yesler Terrace. The sample for the phonetic analysis comprises seven subjects.

All consonant clusters found in Table 2.1 were extracted from the interviews. The number of tokens used for the present study was reduced to avoid issues that have been shown to be problematic for (-t, d) analyses and otherwise arrive at a manageable corpus size. Only word-final clusters were considered for the analysis. Tokens of *and* (after Wolfram 1993) and *just* (after Conn, personal communication) were excluded from the

analysis. No more than 3 repetitions of each word were used. When more than 3 repetitions of a word were extracted from the interview, the tokens that were retained were ones that were extracted from a portion of the interview that was judged as casual. Tokens with a following alveolar stop were excluded from the analysis, as were [rd] tokens, proper nouns, and clusters in [nasal]CV sequences. The number of tokens of (-t, d) extracted for the analysis per subject ranged from 134 to 375.

Phonetic tokens were coded for morphemic status of the word containing the cluster, following environment, Table 3.1 provides an overview of the factors and the levels within each factor.

Table 3.1. Overview of factors coded in phonetic analysis of (-t, d) deletion.

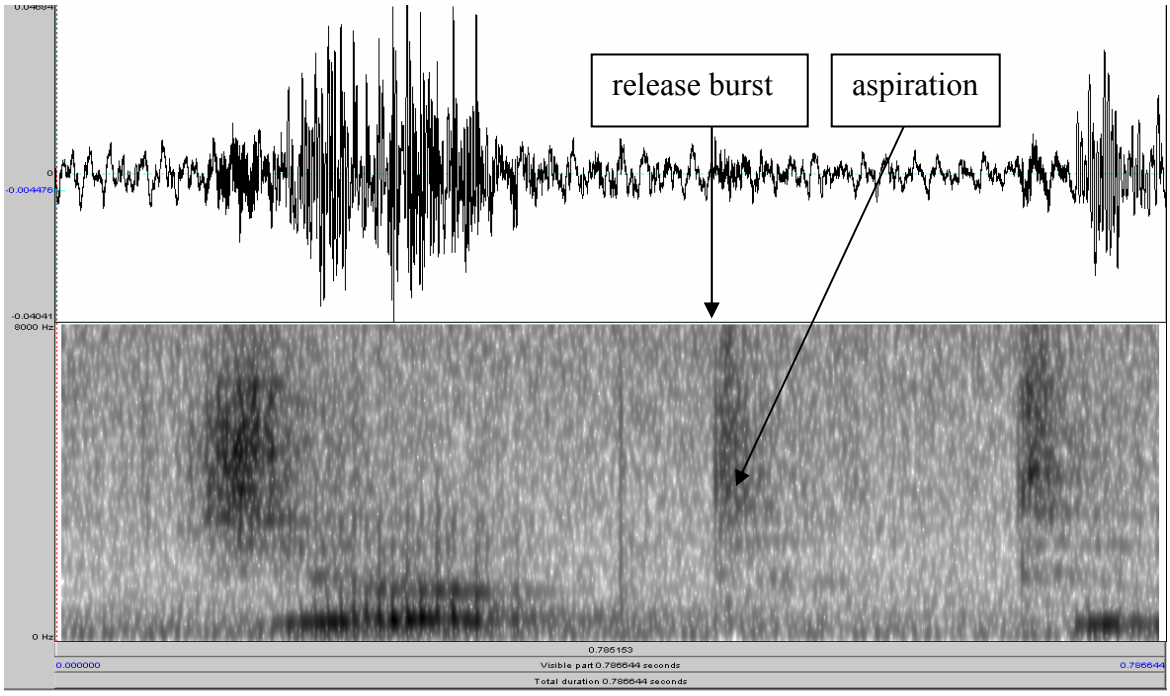
Factor	morphemic status (grammatical category)	following environment (phonological category)
Factor levels	monomorphemic (M) semiweak (S) bimorphemic (P)	obstruent (not apical stop) (C) liquid (C) nasal (C) glide (C) pause (Q) vowel (V)

For the present study, following obstruents, liquids, nasals, and glides were recoded as a single factor level, following consonant, to ensure that there was an adequate number of tokens in each factor level for analysis.

All tokens were classified in an auditory analysis as either containing or not containing an apical stop within the cluster. If an apical stop was heard, the stop was said to be present; if an apical stop was not heard, the stop was said to be deleted. Classification was aided by a set of auditory cues that signaled presence of the apical

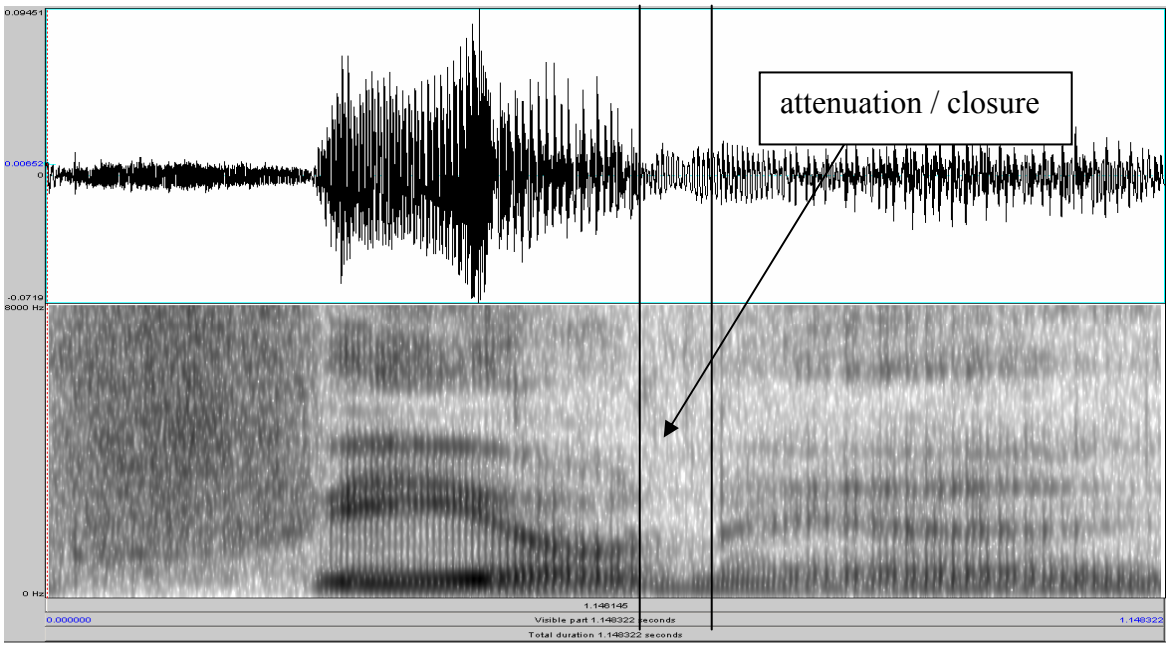
stop. The auditory cues included a release burst; silence after the first element of the cluster, indicating oral closure; a longer vowel or preceding consonant when the apical stop is absent than when the apical stop is present, and an excrescent vowel in consonant-consonant clusters. Not all of these auditory cues were applicable to every token, but the presence of one cue signaled presence of the apical stop.

A sample of the tokens (4-5 for each combination of factors, for each subject) was coded acoustically for verification of the auditory analysis. The acoustic analysis was conducted using PRAAT signal analysis software (version 4.3.37). A wideband spectrogram with a frequency range of 8000 Hz and an analysis window of roughly 1.3-1.5 seconds was visually inspected. Again, stops were classified as present or deleted. A stop was considered present if any of the following were observed: a release burst; silence or attenuation of the acoustic signal, signaling oral closure; or an excrescent vowel in consonant-consonant clusters. Again, not all of these auditory cues were applicable to every token, but the presence of one cue signaled presence of the apical stop. Figures 3.1 and 3.2 provide examples of acoustic cues found in the acoustic signal. Figure 3.3 provides an example of an acoustic signal with no evidence of the presence of an apical stop.



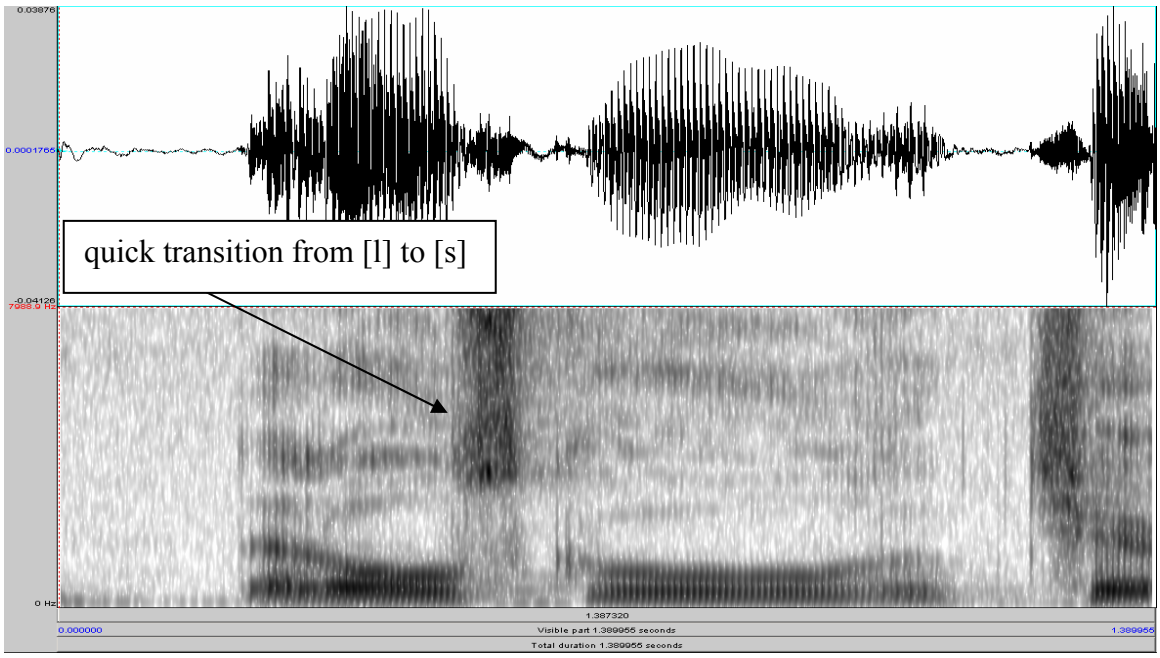
ʤ | ʌ | m | p | t | t | u

Figure 3.1 Waveform, spectrogram, and phonetic transcription of "jumped to", no deletion



f | ɪ | l | d | æ | n

Figure 3.2 Waveform, spectrogram, and phonetic transcription of "filled and", no deletion



| o | l | s | k | u | l |

Figure 3.3 Waveform, spectrogram, and phonetic transcription of "old school", with deletion

When there was a discrepancy between the auditory and acoustic analyses, the auditory percept was considered primary. In this case, there were likely aspects of the auditory signal that had no obvious correlate in the acoustic signal.

Descriptive statistics were obtained for each individual. The percentage of deletion for each morphological category was calculated for each individual, for comparison of the monomorphemic (M), semiweak (S), and bimorphemic (P) factor levels. The percentage of deletion for each following environment was calculated, for comparison of following consonant (C), following pause (Q), and following vowel (V). The relative weighting of the phonological constraint and the morphological constraint were calculated for each individual, by comparing percentage of deletion between four groups, following Wolfram (1991): tokens with a following consonant and not in a bimorphemic word; tokens with a following consonant and in a bimorphemic word;

tokens with a following nonconsonant and not in a bimorphemic word; and tokens with a following nonconsonant and in a bimorphemic word.

Inferential statistics were also obtained. Chi-square tests of independence and logistic regression tests were conducted for each subject. Chi-square tests of independence between factor levels were conducted for each subject, to test whether each factor level was different from the other factor levels within the same factor. For instance, to distinguish three levels of morphemic status, three chi-square tests were run: monomorphemic words with semiweak verbs, monomorphemic words with bimorphemic words, and semiweak verbs with bimorphemic words. Chi-square tests were run using R, a statistical computing environment.

The chi-square test of independence is a univariate test. In analyses accounting for multiple factors, a multivariate analysis is preferable because it allows for the examination of the effects of multiple factors simultaneously, which the chi-square test doesn't; for instance, if there is a disproportionate number of tokens with a following consonant in the set of monomorphemic tokens, the chi-square statistic is blind to the discrepancy, and the chi-square statistic will be skewed. Also, a multivariate analysis allows for the testing of interactions between factors.[4] An interaction is a case "where the variant frequency observed for some combination of factors cannot be adequately predicted by combining the modeled main (or average) effects of the coded factors in that environment" (Sigley 2003, p. 229). For instance, if there is an interaction between monomorphemes and following consonants, then words that are monomorphemic *and*

[4] For a concise description of the importance of testing for interactions in multivariate modeling, see Sigley (2003).

precede a consonant will show an effect different than what a multivariate model predicts for this category.

Goldvarb X is a variable-rule program that produces a logistic regression model, which models how a single dependent variable is influenced by combinations of other independent variables. In the present study, the dependent variable is presence or absence of an apical stop in a consonant cluster, and the independent variables are morphemic status and phonological status. If one considers that there are 3 factor levels for the phonological constraint (following C, following Q, following V), and 3 factor levels for the morphological constraint (M, S, P), then there are 9 possible ways these factors could be grouped, as outlined in Table 3.2 (possible outcomes are actually much greater, but given previous research and descriptive stats from the current study, it's reasonable to assume that, for all subjects, C tokens are deleted more often than V tokens, and M tokens are deleted more often than V tokens; all other models will have a poorer fit). A ">" symbol means that the categories on the left side of the symbol is deleted at a higher level than the category on the right side of the symbol. A "," symbol separating two categories means that the (-t, d) deletion levels of the two categories are not different.

Table 3.2 Possible groupings and rankings within factor levels

Grouping number / run number	*Morphological ranking*	*Phonological ranking*
1	M > S > P	C > Q > V
2	M, S > P	C, Q > V
3	M, S > P	C > Q, V
4	M > S, P	C, Q > V
5	M > S, P	C > Q, V
6	M > S > P	C, Q > V
7	M > S > P	C > Q, V
8	M, S > P	C > Q > V
9	M > S, P	C > Q > V

For each subject, 9 one-level binomial regression analyses were run in GoldVarb X, one for each grouping in the table above. GoldVarb X returns a log-likelihood goodness-of-fit statistic with each regression analysis. The closer this statistic is to 0, the more accurately the regression model fits the observed data. The 9 regression analyses were compared, and the run with the log-likelihood closest to 0 was considered the best fit.

GoldVarb X does not account for interactions between factors in its analyses. GoldVarb's output, though, does give some indication in its output if there is an interaction between two factors. One such indication is the chi-square goodness-of-fit statistic calculated for each combination of factors. If the chi-square statistic for a particular combination of factors (or *cell*) is abnormally high, then the model predicts a very different outcome than the actual outcome for words with that combination of factors. Paolillo (2002) asserts that a when a cell returns a chi-square statistic greater than 3.84, that cell has an extremely poor fit, and an interaction may be present. GoldVarb X also may return skewed statistics if there are too few tokens of any one combination of factors. The chi-square goodness-of-fit statistic is also high when the number of tokens is an issue. In the present study, the number of semiweak verbs elicited may be too low to run an accurate regression analysis. The chi-square goodness-of-fit statistic is useful, then, because it indicates either an interaction, or too few tokens to run an accurate analysis. For the present study, the chi-square goodness-of-fit statistic was checked for each subject's best-fitting regression analysis. If a chi-square statistic of 3.5 or greater

was found for any one cell in the output, then the analysis was recoded on a case-by-case basis to find a better model to fit the data.

To find out whether the phonological constraint or the grammatical constraint is primary, a step-up step-down regression analysis was conducted for each subject. In a step-up step-down one-level binomial regression in GoldVarb, the step-up phase rank-orders the factor groups by their contribution to significantly increasing the log-likelihood (Santa Ana 1991). A log-likelihood close to 0 indicates that the constraint in question is strong; the primary constraint is the constraint used in a model with a log-likelihood closest to 0.

While the main problems the present study posits have to do with network structure and variation across individuals, it may be helpful to compare the results of the network analyses with a variationist analysis of a larger social group. Sex of the subjects is the obvious choice for a group-level analysis, as previous studies have shown differential levels of (-t, d) deletion by sex.

A judgment sample of six subjects - three men and three women - was used for the group-level analysis (more on the judgment sample in §4). Chi-square tests and logistic regressions were conducted on the groups of men and women, as in the individual-level analyses above. From the tests it was determined if morphological category has a differential effect on (-t, d) deletion for men and women; if following environment has a differential effect on (-t, d) deletion for men and women; if the grammatical constraint is different from the phonological constraint for men and women,

and if grammatical and phonological constraints interact differently for men than for women.

4. Results

4.1 Introduction

This chapter presents the results of both the social network and phonetic data analyses. §4.2 describes the dialect areas relevant to the study. §4.3 describes the structure of the social network of individuals, and the relation of individuals to dialect areas. Direct ties between individuals and dialect areas will be discussed, as will the strength of ties between individuals and dialect areas. §4.4 describes the phonetic realization of (-t, d) for each subject, and describes intra-speaker variation based on the morphemic and phonological constraints. §4.5 compares constraints on (-t, d) deletion across subjects, and attempts to justify the linguistic differences between subjects based on the structure of the social network. The results in this section will respond to the question of whether and how linguistic forms have spread throughout the Yesler Terrace network. §4.6 employs a variationist analysis of the linguistic data based on sex differences.

4.2 Demographic information

Figure 4.1 shows the regional areas that were influential to the sample of subjects.

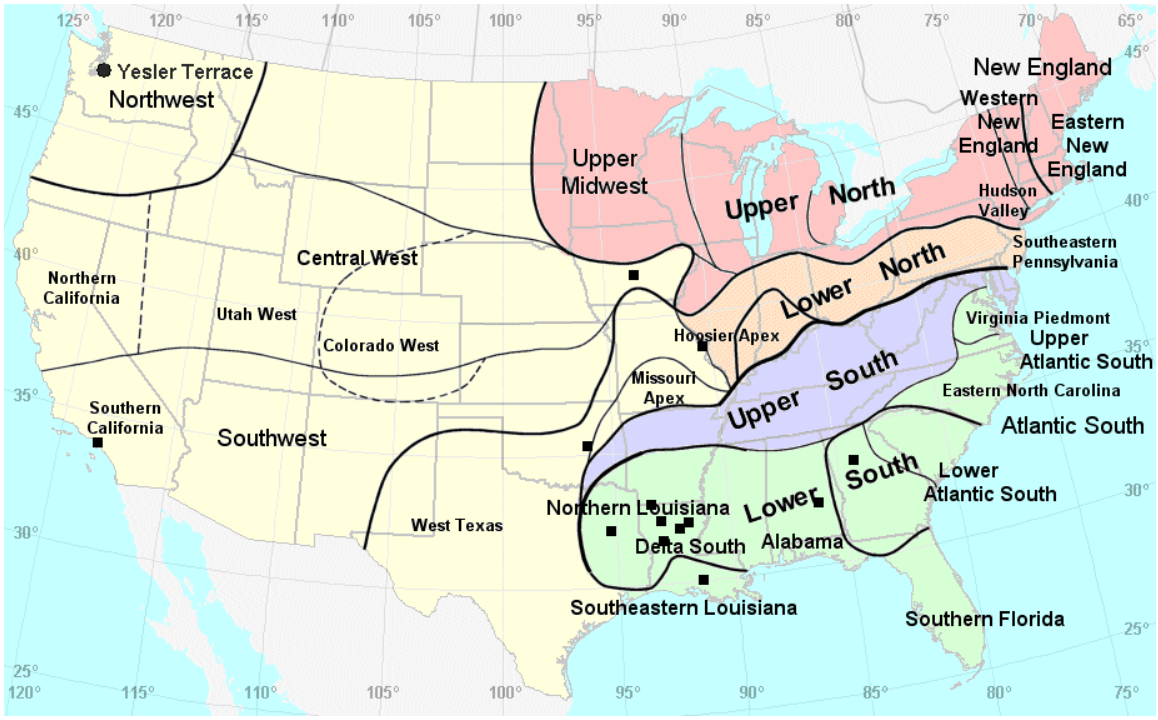


Figure 4.1 Dialect areas associated with Yesler Terrace members (map adapted from Carver 1987)

The majority of named regional areas were in the territory classified by Carver (1987) as the Lower South. Because previous studies have documented the constraints on (-t, d) deletion in this area, and found that African-American and Caucasian use of (-t, d) in the Lower South are similar, it is possible to analyze the Lower South as a unified region in regard to (-t, d) deletion. Figure 4.2 shows a network representation of the ties between dialects and individuals. Dark squares represent subjects who were interviewed, and light circles represent dialects. Note that Figure 4.2 differentiates between different ethnic dialect varieties, such as Native American and AAE varieties.

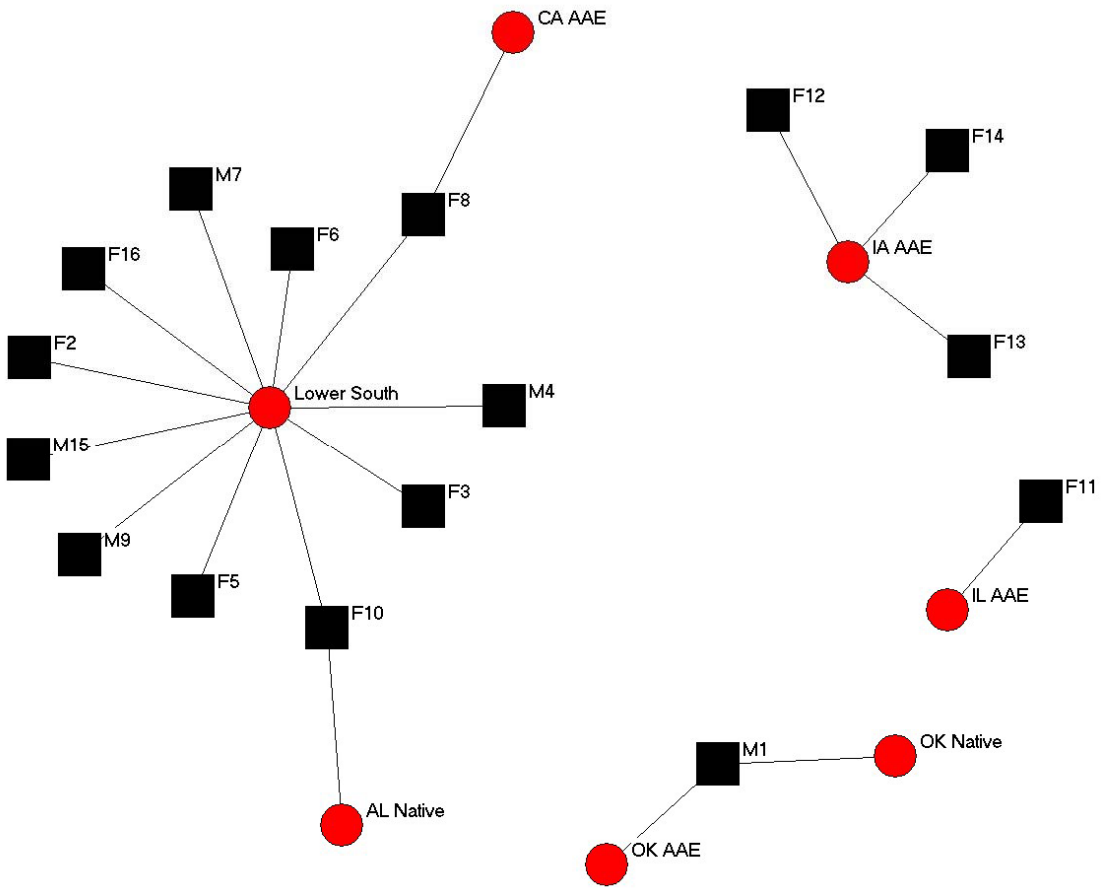


Figure 4.2 Two-mode network of Yesler Terrace members and dialect areas

Again, it is clear from this figure that a majority of the sample has direct ties to Lower South region. This figure also shows that three female subjects are tied to an Iowa African-American English dialect.

4.3 Social network results

Figure 4.3 shows the results of the naming task. Interviewed subjects are represented by dark squares, and individuals that were named as strong ties are represented by light circles.

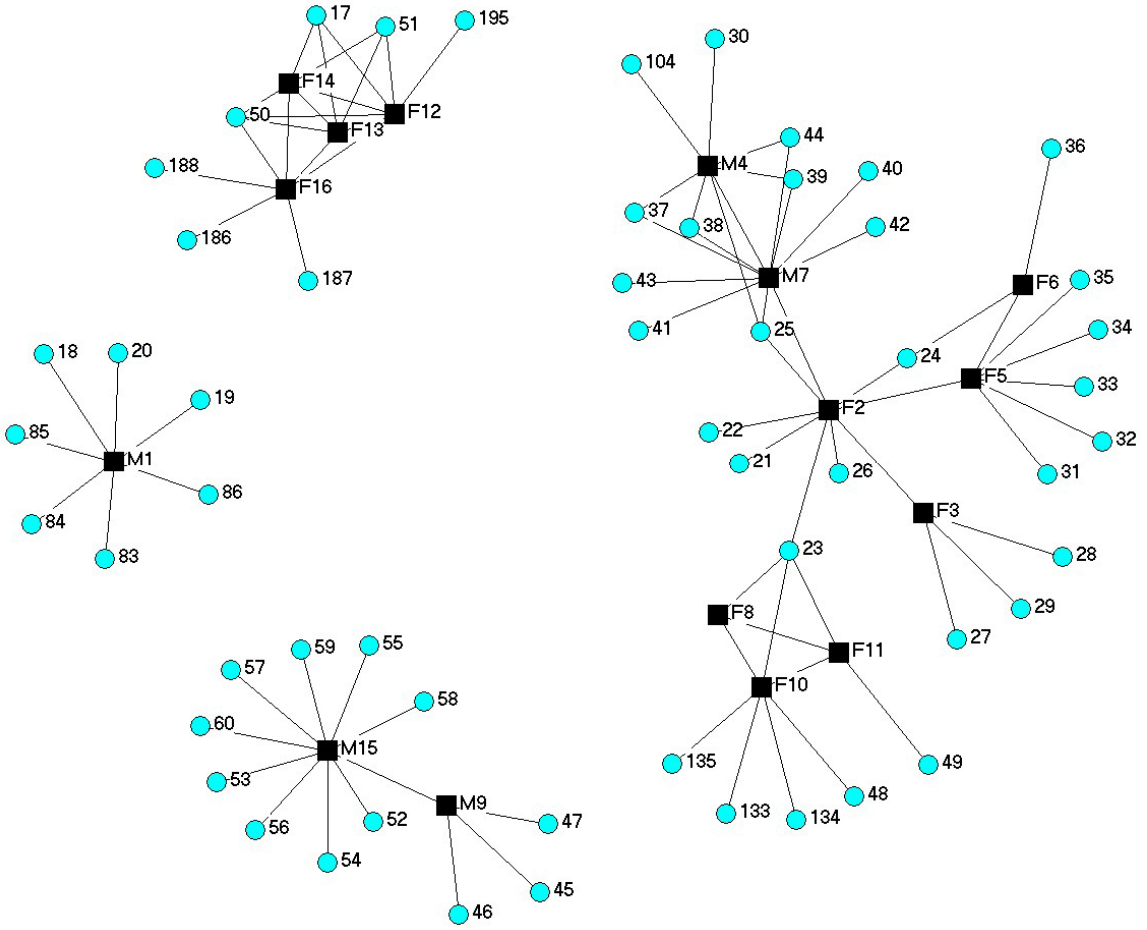


Figure 4.3. Social network of subjects and strong ties

There appears to be one large cluster, two smaller clusters, and one isolate. Furthermore, the main cluster is mostly comprised of subjects with ties to the Lower South. This network is conservative, and may not reflect cohesiveness of Yesler Terrace community; from interviews it was clear that most of the subjects knew each other, so a social network that quantifies weak as well as strong ties within the community would likely yield a more connected network.

Table 4.1 presents the dialect scores for each subject, for each of seven regional and ethnic dialects. The dialect score reflects the closeness of an individual to a dialect; the higher the dialect score, the stronger the tie between the two.

Table 4.1. Dialect scores for interviewed subjects

		Regional dialects						
		Lower South	OK AAE	OK Native	CA AAE	AL Native	IL AAE	IA AAE
Subjects	M1	0.00	3.50	3.50	0.00	0.00	0.00	0.00
	F2	31.00	0.00	0.00	1.17	1.17	1.17	0.00
	F3	10.33	0.00	0.00	0.33	0.33	0.33	0.00
	M4	21.50	0.00	0.00	0.00	0.00	0.00	0.00
	F5	16.83	0.00	0.00	0.33	0.33	0.33	0.00
	F6	8.17	0.00	0.00	0.00	0.00	0.00	0.00
	M7	30.50	0.00	0.00	0.33	0.33	0.33	0.00
	F8	11.33	0.00	0.00	3.50	5.67	4.67	0.00
	M9	7.33	0.00	0.00	0.00	0.00	0.00	0.00
	F10	13.33	0.00	0.00	5.67	5.50	6.00	0.00
	F11	12.83	0.00	0.00	4.67	6.00	4.00	0.00
	F12	10.17	0.00	0.00	0.00	0.00	0.00	31.83
	F13	9.83	0.00	0.00	0.00	0.00	0.00	31.00
	F14	9.83	0.00	0.00	0.00	0.00	0.00	31.00
	M15	10.33	0.00	0.00	0.00	0.00	0.00	0.00
	F16	7.50	0.00	0.00	0.00	0.00	0.00	29.83

Many of the subjects have the strongest ties to the Lower South, but there are a few exceptions. Subject M1 is closest to Oklahoma varieties. Subjects F12, F13, F14, and F16 are most strongly tied to Iowa AAE.

For the most part, there is a correspondence between the dialect each subject is directly tied to and the dialect for which the subject has the highest dialect score. There are two exceptions: subject F11 is directly tied to Illinois AAE, but scores highest for the Lower South dialect; and subject F16 is directly tied to the Lower South, but scores highest for the Iowa AAE dialect.

Table 4.2 summarizes the pattern of (-t, d) deletion expected to appear in each regional dialect relevant to the present study, with respect to the primary constraint on deletion.

Table 4.2. Constraint rankings on (-t, d) deletion expected by regional dialect

Regional dialect	Expected primary constraint
Lower South	grammatical (Summerlin 1972)
OK AAE	no prediction
OK Native	no prediction
CA AAE	no prediction
AL Native	no prediction
IL AAE	phonological (Labov *et al*. 1968)
IA AAE	phonological (Labov *et al*. 1968)

The regional dialects can be identified roughly as Southern (Lower South), Northern AAE (IL AAE, IA AAE), or neither (OK AAE, OK Native, CA AAE, AL Native). While previous research allows predictions to be made in the present study for Southern and Northern regional varieties, lack of research on (-t, d) in the other regions makes any prediction about (-t, d) difficult.

Table 4.3 shows the results of the closeness centrality measure for the main cluster of the social network, with individual subjects ranked from most central to least central. These results are compared to the phonetic results in §4.5 below.

Table 4.3. Social network centrality for subjects within main cluster (ranked)

Subject	F2	M7	F5	F3	M4	F10	F11	F8	F6
Centrality	50.67	42.70	38.78	35.85	32.48	31.15	30.40	30.16	29.01

4.4 Phonetic results

Table 4.4 reports the percentage of tokens that were deleted per subject, following conventions from Wolfram (1991). A comparison of four environments gives an indication of whether the morphological or phonological constraint is primary. If an individual deletes cluster-final (-t, d) in bimorphemic words with following consonants (the second column in Table 4.3) at a higher rate than in words that are not bimorphemic and have a following nonconsonant (the third column in Table 4.3), then the phonological constraint is primary. If the deletion rate for the third column is higher than that of the second column, then the grammatical constraint is primary.

Table 4.4. Percentage deleted tokens per subject

	Following consonant		*Following nonconsonant*	
Subject	*not bimorphemic*	*bimorphemic*	*not bimorphemic*	*bimorphemic*
M1	60% (87) *(tot. n)*	50% (119)	54% (54)	17% (115)
F2	80% (45)	37% (30)	43% (28)	6% (48)
F3	71% (38)	22% (41)	52% (25)	15% (60)
M9	65% (49)	40% (57)	45% (33)	17% (60)
F11	66% (50)	62% (37)	72% (36)	27% (52)
F12	78% (37)	58% (57)	25% (36)	21% (63)
F16	53% (43)	26% (43)	43% (30)	7% (30)

For subjects M1, F2, F3, M9, and F16 it appears that the grammatical constraint is primary. For subject F12 it appears that the phonological constraint is primary. Subject F11 shows an unexpected pattern; while one would expect monomorphemic and

semiweak tokens with a following consonant to show the highest levels of deletion, subject F12 shows a higher deletion level for her monomorphemic and semiweak tokens with a following nonconsonant. The inferential statistics below, especially the statistic from the logistic regression, show a more regular (-t, d) deletion pattern for subject F12 than the descriptive statistic presented here.

Table 4.5 shows the results of the chi-square test of independence. A ">" symbol means that a significant difference ($p < .05$) was found between (-t, d) deletion levels of the categories on either side of the sign; the category on the left side of the symbol shows a higher level of (-t, d) deletion than the category on the right side of the symbol. A "," symbol separating two categories means that the (-t, d) deletion levels of the two categories were not found to be statistically different. (See appendix B for chi-square statistics and *p*-values.)

Table 4.5. Constraint ranking for judgment sample (based on chi-square statistics)

Subject	*Morphemic status ranking*	*Following environment ranking*
M1	M > S, P	C, Q > V
F2	M, S > P	C > Q, V
F3	M > S > P	C > V
M9	M > S, P	C > Q, V
F11	M > S, P	C > V
F12	M, S, P	C > Q, V
F16	M > P	C > V

Based on the chi-square test, no two subjects appear to have the same set of constraint rankings. Additionally, for subject F12, the monomorphemic, semiweak, and bimorphemic categories were not found to be statistically different from one another. Subject F12 shows a more expected pattern in the multivariate analysis which follows,

and the sample shows more consensus overall for the multivariate analysis than for the univariate analysis.

For all seven subjects, the best run of the logistic regression was the first run. (See Appendix C for log-likelihood statistics for each run.) However, for 4 subjects a chi-square statistic of 3 or greater was found for one cell in the output (cell sv for 3 subjects, cell sq for one subject). The issue with each subject involved the category of semiweak verbs. This category has the fewest tokens, far fewer than the monomorphemic and bimorphemic categories. So, it is possible that the high chi-square statistics associated with this factor level are due to low token counts, or that an interaction is present. Unfortunately, it is very difficult to tell which problem caused the models to fit poorly. A good-fitting model was obtained for each of these subjects by omitting the semiweak category from the analysis. Table 4.6 summarizes the findings of the logistic regression analysis.

Table 4.6. Constraint ranking for judgment sample (based on regression statistics)

Subject	*Morphemic status ranking*	*Following environment ranking*
M1	M > S > P	C > Q > V
F2	M > P	C > Q > V
F3	M > P	C > Q > V
M9	M > S > P	C > Q > V
F11	M > P	C > Q > V
F12	M > S > P	C > Q > V
F16	M > P	C > Q > V

The regression results are more consistent than the chi-square test results; all subjects have similar deletion rates (-t, d) before a pause, somewhere intermediate between deletion levels before a consonant a before a vowel. Note that a morphemic status

ranking was found for subject F12 with a multivariate analysis, when a univariate analysis could not rank her morphemic categories.

There does appear to be a pattern based on sex of subject in the regression statistics; only women show the M > P morphological constraint ranking. It also appears that only subjects M1, M9, and F12 have clearly attained Guy & Boyd's Stage III of (-t, d) acquisition, where semi-weak verbs are considered as a separate morphological class. However, this differential ranking may be a result of low token counts for some subjects. It is worth noting that the three subjects with the constraint ranking M > S > P had the highest token counts for this sample. More tokens would be needed to determine how semi-weak verbs are considered for subjects F2, F3, F11, and F16.

The relative ranking of grammatical constraint and phonological constraints is less consistent across the sample, though, as shown in Table 4.7.

Table 4.7. Relative ranking of grammatical and phonological constraints

Subject	*Ranking*
M1	phonological > grammatical
F2	grammatical > phonological
F3	grammatical > phonological
M9	grammatical > phonological
F11	grammatical > phonological
F12	phonological > grammatical
F16	grammatical > phonological

The results in Table 4.7 are best described in light of the subjects' dialect scores.

4.5 Results for social network scores vis-à-vis phonetic results

There appears to be a clear influence of dialect region on the subjects' constraint rankings. For all subjects with direct ties to the Lower South dialect area (F2, F3, M9,

F16), the grammatical constraint is primary. This result is consistent with the expectation for the Lower South region with regard to (-t, d) deletion. Of the three subjects not directly tied to the Lower South, two are not part of the main network cluster (M1, F12); for these subjects, the phonological constraint is primary. Subject F11, the other subject not directly associated with the Lower South, is part of the main network cluster; for her, the grammatical constraint is primary. Table 4.8 provides a comparison of the primary constraint on (-t, d) deletion with the dialect areas most strongly tied to each individual.

Table 4.8. Primary constraint and primary dialect area

Subject	*Primary constraint*	*Highest-scoring dialect area*
M1	phonological	OK AAE, OK Native
F2	grammatical	Lower South
F3	grammatical	Lower South
M9	grammatical	Lower South
F11	grammatical	Lower South
F12	phonological	IA AAE
F16	grammatical	IA AAE

The most interesting case is subject F11, for whom the grammatical constraint is primary. She has a direct tie to Illinois AAE, and from this direct tie alone it might be expected that the phonological constraint is primary for her, contrary to her actual usage. She does not have any direct ties to the Lower South, but she is closely tied to individuals who do have direct ties to the Lower South, and she has a higher dialect score for the Lower South than the other three dialects she is tied to. It appears that the dialect score can account for F11's patterns of (-t, d) deletion; it is less clear that there is not some other explanation for her constraint ranking. It may be the case, for instance, that her pattern of

(-t, d) deletion is idiosyncratic. Or, the primacy of the grammatical constraint on (-t, d) deletion may be a feature of Pacific Northwest AAE or Pacific Northwest English in general. Alternatively, her pattern of (-t, d) deletion may be the result of influence from other dialects to which she is tied and from which the present study can make no predictions, such as California AAE and Alabama Native English. However, the structure of her local social network appears to at least reinforce the primacy of the grammatical constraint.

Subject F16 is another interesting case. She has a direct tie to the Lower South, and for her the grammatical constraint is primary; but her highest dialect score is for Iowa AAE, a non-Southern regional dialect. She scored highest for Iowa AAE because she is in a tightly-knit cluster (or clique) with 3 subjects with direct ties to Iowa AAE. Since she is most closely tied to Iowa AAE, it might be expected that the phonological constraint is primary for her. However, she moved into Yesler Terrace at the age of 13. Relative ranking of constraints on (-t, d) deletion appears to be a complex rule (though of a different sort than those rules examined by Payne 1980). Because F16 moved to Yesler Terrace at such a late age, it is unlikely she was able to acquire the Iowa (-t, d) pattern completely. Subject F16's pattern of (-t, d) deletion, like subject F11's, may be idiosyncratic or particular to the Pacific Northwest. But her pattern of (-t, d) deletion shows a clear resistance to her local network influences.

Subject M1 is one for whom it is difficult to make any prediction based on dialect scores; he is tied only to Oklahoma dialects, for which the present study has no

information. The primacy of the phonological constraint for M1 is discussed below in relation to his centrality within the network.

The subjects within the main cluster had centrality scores ranging from 50.67 (for subject F2) to 29.01 (for subject F6). For the present study, linguistic data is only available for three of these subjects: F2, F3, and F11. F2 has the highest centrality score of the subjects in the main cluster; F11's centrality score is on the low end of the range (30.40). Despite this range, each of the three subjects showed the grammatical constraint as primary, and had the highest dialect score for the Lower South. Any conclusions about the main cluster would ideally be based on linguistic data for all the subjects in the cluster; but from the three subjects for whom linguistic data is available, there seems to be consensus on the distributional pattern of (-t, d) particular to the cluster.

The subjects who are not part of this central cluster do not show as much consensus on the patterning of (-t, d) deletion. Subjects M9 and F16 show the grammatical constraint as primary, while subjects M1 and F12 show the phonological constraint as primary. While M1, M9, and F12 are all peripheral to the network, their centrality measures and dialect closeness scores have different things to say about them. Subject M1 is an isolate, so even without a centrality score it is clear that he is not very central to the social network at all. While it is not possible to describe his constraint ranking in terms of network influences, it is clear that the local network structure does not exert much influence on his (-t, d) pattern. The fact that M1's (-t, d) deletion patterns differently from that of the individuals in the main cluster reflects this lack of influence. While subject F12 also favors the phonological constraint, her pattern of (-t, d) deletion

reflects not only a lack of influence from the main network cluster, but also an influence from the clique she is a part of. Subject M9 is not a part of the main cluster, but his (-t, d) deletion resembles that of the main cluster. His dialect score, tying him closely to the Lower South, correctly predicts that the grammatical constraint is primary for him.

4.6 Phonetic results by sex

Subjects M4, M7, M9, F2, F3, and F11 were chosen for group analysis by sex. Each of these six subjects belongs to the main cluster of the social network, and so can be expected to show a high degree of agreement for the social evaluation of linguistic features.

Logistic regression was conducted for the two groups. For women, a chi-square statistic of 3 or greater was found for two cells in the output, cell sv and cell sq. Again, the issue involved the category of semiweak verbs. When semiweak verbs were excluded from the analysis, the expected constraint ranking pattern emerged, as shown in Table 4.9.

Table 4.9. Rankings by sex

Sex	*Morphemic status ranking*	*following environment ranking*	*primary ranking*
female	M > P	C > Q > V	grammatical
male	M > S > P	C > Q > V	grammatical

In general, the chi-square goodness-of-fit test returned higher levels of error for the group analyses than for the individual analyses. This suggests that within a group, men and women may delete at different levels, even if the constraint rankings are the same for all subjects within the group. Also, it appears men have attained Guy and

Boyd's Stage III of (-t, d) acquisition. It is less clear whether women have attained this stage; but again, low token counts may have obscured the women's actual morphemic status ranking, and any evidence of difference between men and women's performance of (-t, d) is inconclusive.

5. Conclusions

This study used social network methods to explore the mechanisms of linguistic change involved in a dialect contact situation. Most of this study focused on linguistic variation at the individual level. By using a social network method, it examined the influence of region on an individual, even when the region in question did not belong to the individual but instead was associated with the individual. It found that linguistic features associated with the Lower South are also used by central members of Yesler Terrace. Additionally, there is some evidence that the structure of a social network has an effect on the diffusion of Lower South linguistic forms throughout the community. While it is not possible to claim that the structure of the Yesler Terrace social network caused the patterns of (-t, d) deletion found in the current study, the predictions made by the social network model employed here do agree with the findings of the linguistic analysis.

This study differs from other linguistic social network studies, in that ties were not analyzed strictly as indicative of norm-enforcement mechanisms but also as potential conduits across which linguistic forms can spread. The method developed in this study is applicable to integrated communities, although the difficulty in obtaining conclusive proof from social network studies of such communities is palpable. If the case of subject F16 in the present study is considered to be a case of linguistic diffusion, then this study provides evidence that linguistic forms spread from the center of the social network, in agreement with Labov (1980). However, the present study also provides support for Milroy's assertion that multiple members of a community with ties to other communities are needed for linguistic diffusion to take place. The dialect closeness score was

employed here under the assumption that multiple strong ties contribute more to dialect diffusion than single ties, and the model used here fits the data well. In a sense, Milroy's network method and the method developed here appear to support the same conclusion, using different methodologies and a different characterization of ties.

The network method used here, though, does offer an explanation for the linguistic output of the subjects that is outside the scope of Milroy's methodology. Subject M9, who was not central to the Yesler Terrace social network but showed a Lower South pattern of (-t, d) deletion, exemplifies the usefulness of the dialect closeness social network approach. Milroy's notion of network centrality as a norm-enforcement mechanism asserts that M9 has no strong obligation to delete (-t, d) comparably to the central members of the network, but makes no prediction as to what his actual pattern of (-t, d) deletion might look like. M9's dialect scores, though, correctly predict that he exhibits the same (-t, d) deletion pattern as the main cluster. Additionally, and on a more abstract level, the present study problematizes the distinction made by Milroy between central and peripheral members of a community. In cases of dialect contact among geographically mobile people, members of a community can be both central to the local community and have strong ties to outside communities.

An individual-level analysis of dialect contact also allows a comparison of factors in variation that are commonly considered "internal" or purely linguistic, as opposed to external, or socially motivated, factors. It is not groundbreaking to comment that the realization of these internal constraints may be externally motivated, but this study

investigates how internal factors vary according to social differences within one speech community.

There are some aspects of the language situation described here that, for reasons of time and scope, could not be focused on. This study looks at the community of Yesler Terrace at a point in time far removed from the present, and does not say much about the theoretical implications of such "long-distance" analysis, such as the linguistic influence of the subjects' life experiences since leaving Yesler Terrace. A more complete study would provide a more complete theoretical consideration of this issue.

One question this study hints at, but does not ask, is the extent to which Yesler Terrace is a unified community, and whether the Lower Southern pattern of (-t, d) deletion is a feature that belongs to the Yesler Terrace community. From the centrality measure, there is some evidence that there is consensus on usage of (-t, d) in the community, but a more thorough examination of the social meaning of community and the social meaning of linguistic forms would help clarify this issue. It is also unclear whether the speech of the subjects interviewed is reflective of their "own" speech, or of accommodation to an interlocutor who is associated with Yesler Terrace (and by extension, with Yesler Terrace norms of behavior). Future studies could seek to answer these questions by investigating the attitudes of speakers associated with Yesler Terrace towards the community. Ideally, such a study would examine how connected an individual is to outside influences, how connected he is to community influences, and the relationship between the two.

A future study might also explore the relationship of a Yesler Terrace dialect with macro-social groupings, such as African-Americans across the United States, in more depth. Milroy & Wei (1995) note, "A coherent theory of language choice…needs to make explicit the relationship between community networks - 'frames' within which language choice takes place - and large-scale social and economic structure" (153). A study that attempts to connect individual-level variation to community-level patterns, while taking into account how the larger social structure and historical context influences the community, would advance sociolinguistic theory and provide a more complete picture of the mechanisms that contribute to dialect contact. A combination of social network and ethnographic methods seems to be a sound approach to this end.

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Appendix A: Interview guide

Network information:

Ties between individuals	Affective ties: Who was most important to you? Where were these people from? Interactive ties: With whom did you spend time most frequently? Where were these people from? Exchange ties: Who did you go to for help? Who did you exchange advice or help with? Where were these people from? Who do you keep in touch with now?
Time span of ties	How far back did you guys go (for *all* affective, interactional, exchange ties)? Do you still talk with them today?
Ties between individuals and dialect varieties	Individual / family geographical history: Where do you come from? Where has your family lived? After moving to YT, did you still talk with people from…
Race/ethnicity	What kinds of people were there where your family came from? Was there a good mix of people? Was it diverse? Follow-up: So you would consider your family…
Attribute network ties	What did you do as kids? Where did you hang out? Who hung out with whom (in YT, outside of YT)? Did you do things with your family? (e.g. church events, other events that weren't "kid events") Were you involved with other (non-Terrace) communities/groups/places?

Qualitative questions:

Qualitative idea of how connected individuals are to their heritage / how different heritage location and PNW are	Family stories Were your family members a lot like people from that region/state/city? Was YT a lot like the other places your family is from? Was there anything that struck you (or other family members) about YT/Seattle/PNW when you/they got out here?
Voluntary association	Who hung out with whom in YT and outside of YT? Who keeps in touch with whom now?
Activities	Did different groups of kids do different activities? What did they do? For example, were boys involved with different groups than girls? What other (non-Terrace) communities were people involved with? Did anyone have ties to the International District? City-wide political or social groups? What groups? What Terrace-based activities are people involved with now? Who is involved?
Qualitative sense of meaning of YT	How have things changed in YT since you were kids?
Qualitative sense of community	Why have people left YT? Have people maintained ties to Terrace? If so, why? (e.g. family, close friends) Was YT a tight community? Do you think of YT as being a group? What made it tight / unique / a group? What does it mean to be a community member of YT?

Appendix B: Chi-square statistics by speaker

		paired categories					
		M-S	M-P	S-P	C-Q	C-V	Q-V
subject	M1	4.767 (χ^2) .029 (*p*) *	2.37E+01 1.142e-06 *	0.088 0.767	3.835 0.05	3.50E+01 3.239e-09 *	1.36E+01 2.286e-04 *
	F2	1.788 0.181	3.44E+04 4.448e-09 *	1.10E+01 9.050e-04 *	7.676 .006 *	2.76E+01 1.478e-07 *	3.455 0.063
	F3	4.058 .044 *	3.78E+01 7.710e-10 *	7.04 .008 *	0.401 0.527	9.068 .003 *	2.998 0.083
	M9	4.362 .037 *	2.09E+01 4.917e-06 *	0.438 0.508	6.319 .012 *	8.149 .004 *	0.004 0.95
	F11	7.67 .006 *	1.77E+01 2.552e-05 *	0.003 0.959	0.658 0.418	7.964 .005 *	2.035 0.154
	F12	0.564 0.453	3.493 0.062	0.038 0.845	1.49E+01 1.143e-04 *	3.22E+01 1.378e-08 *	1.222 0.269
	F16	0.921 0.337	1.63E+01 5.419e-05 *	2.79 0.095	0.015 0.903	5.769 .016 *	3.81 0.051

* indicates $p < .05$

Appendix C: Regression log-likelihoods by speaker

subject \ run	1	2	3	4	5	6	7	8	9
M1	-225.614*	-231.804	-235.662	-228.608	-231.229	-228.607	-231.207	-229.601	-225.660
F2	-69.366*	-74.295	-72.731	-78.135	-74.367	-73.236	-70.759	-70.972	-73.043
F3	-82.505*	-85.644	-87.223	-85.465	-87.113	-82.574	-84.244	-85.616	-85.616
M9	-116.888*	-123.438	-120.045	-121.608	-117.125	-121.181	-116.938	-120.039	-117.063
F11	-106.610*	-112.124	-111.896	-108.152	-106.874	-108.061	-106.651	-111.525	-106.836
F12	-110.235*	-119.417	-111.327	-119.287	-110.781	-119.274	-110.778	-110.636	-110.236
F16	-79.368*	-80.597	-82.870	-80.833	-82.578	-79.377	-81.340	-80.567	-80.764