

# Variation, Change and the Usage-based Approach

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## Abstract

The potential for synthesis between variationist sociolinguistics and theoretical linguistics has been recognised by researchers in both sub-disciplines (e.g. Henry 1995; Adger and Smith 2005) but it has been difficult to move beyond a description of this unified approach towards an account of variation that can explain both ‘social’ and ‘linguistic’ phenomena in the same theoretical framework. Chambers (2005: 217) suggests that such a synthesis is currently “well beyond our reach and hardly even foreseeable”. I argue that this is partly because most of the theories on which attempts to address this issue are modelled are fundamentally asocial in their design and in order to improve the synthesis between sociolinguistics and theoretical linguistics, it is necessary to first begin with a theory in which social and linguistic knowledge are inherently and inextricably linked in cognition. The aim of this thesis is therefore to consider to what extent it is possible to synthesise variationist sociolinguistic methods of data collection and analysis with usage-based models of interpretation.

Using the ethnographic technique of participant observation, the data for this thesis were collected over a 2 year period from a group of 54 speakers who play together in West Fife High Pipe Band (WFHPB). These data form a corpus of 38 hours of conversation (roughly 360,000 words).

Two different phonological variables are discussed in this thesis: th-fronting, which is a consonantal change in progress in this community, and variation in the BIT vowel, which is reported to be a stable variable in this variety. Using quantitative methods that are typically considered appropriate in variationist sociolinguistics (i.e. varbrul and multiple regression), this thesis correlates variation in both of these variables with a number of different ‘social’, ‘linguistic’ and ‘cognitive’ factors and shows that this is one way to explore the potential for synthesis.

However, it is vital not only to incorporate these factors into a quantitative analysis of variation; it is also necessary to be able to explain the outcome of the quantitative analysis by invoking principles of the theoretical framework. By adding the theoretical assumptions of the usage-based approach to an analysis of variation that is already grounded in current sociolinguistic practices of data collection and interpretation, I suggest that it is possible to reach a more unified and insightful explanation of linguistic variation and change in this community *and* a more unified and insightful approach to linguistic theory; one in which “everything fits, and everything fits together” (Langacker 1987: 32).



## **Declaration**

I declare that this thesis has been composed by me and that the work contained within is my own, except where explicitly stated in the text. None of this material has previously been submitted for another degree or professional qualification.

Lynn Clark



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## ***Transcription conventions***

[ ] non-linguistic detail or transcriber comment

[inaudible] the sequence within the bracket is inaudible

/ overlap during turn

... unmeasured pause

\*\*\* omitted section of the transcript

- hesitation or false start

The decision was taken to transcribe the corpus in Scots orthography in an attempt to represent, as closely as possible, the speech of the informants. Of course, as Macaulay explains, “any transcription, no matter how detailed, is an interpretation of the tape and necessarily selective in what it includes or leaves out” (1991:282). In an effort to combine phonetic representation with readability, I followed Macaulay’s (1991) practice of transcribing in a ‘modified orthography’ which illustrates most, but not all, of the phonological variables in the corpus.

Scots does not have an established, standard orthography and so there is a wide range of acceptable spelling variation. However, in order to keep the transcription as consistent as possible, only one spelling variant for each word was selected from the online Dictionary of the Scots Language ([www.dsl.ac.uk](http://www.dsl.ac.uk)) which most closely resembled a written representation of the pronunciation.

The use of the apostrophe to represent phonological processes such as (conservative)<sup>1</sup> l-vocalisation and v-deletion is frowned upon in current discussions of Scots orthography as it invokes the impression that Scots is a deviation from Standard English and further lowers the status of the variety (Macaulay 1991). I have therefore avoided the use of the apostrophe where possible and, following

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<sup>1</sup> Stuart-Smith, Timmins and Tweedie (2007) contrast conservative and innovative l-vocalisation. Conservative l-vocalisation refers to the vocalisation of /l/ after short back vowels, a process that has been common in Scots and Northern English dialects since the 15<sup>th</sup> Century. Innovative l-vocalisation is similar to the l-vocalisation described for Cockney by Wells (1982:258) where the lateral is vocalised to a back vowel.



Macaulay (1991:286), represent conservative l-vocalisation with a <w> e.g. <baw> [bɔ]. I have, however, made exceptions to this practice when transcribing the words *wall*, *full* and *pull* which I have chosen to transcribe (following the practice adopted by transcribers on the Scottish Corpus [<http://www.scottishcorpus.ac.uk/>]) as <wa'>, <fu'> and <pu'>. The alternative transcription <fuu> and <puu> suggests an extra long vowel and <waw> also suggests something other than l-vocalisation.

Neither the Scottish Corpus nor the SLD provide a method to represent intervocalic /ð/-deletion in words such as *brother*, *mother* and *other*. As this is a feature of the dialect of many of the speakers in this corpus, I have chosen to represent it orthographically in the following way:

'brother' → brer [brɛr]

'mother' → mer [mɛr]

'other' → er [ɛr]

Admittedly, this transcription also takes the standard orthography as the norm and implies that intervocalic /ð/-deletion is somehow deviant; however, it also offers a more accurate transcription of the ways in which these words were articulated. Finally, Macaulay (1991) orthographically represents the [əi] diphthong as <aye>. I feel that the spelling <iy> more closely resembles a written representation of this diphthong and so I have chosen to represent it with the spelling <iy> in, e.g. <piy>, <whiy> and <iywiz> (*pay*, *why* and *always*).

## ***0.1 Introduction to the thesis***

The primary aim of this thesis is to consider to what extent it is possible to synthesise sociolinguistic methods of data collection and analysis with usage-based methods of interpretation and, indeed, whether such an approach is necessary and beneficial.

My primary aim also incorporates two secondary aims:

1. to expand the range of methods used in studies of variation and change in Modern Scots and Scottish English. A number of investigations have been carried out on variation and change in Scotland but the vast majority of these studies employ ‘first wave’ methods of investigation (Eckert 2005). These studies typically show regular and replicable patterns of linguistic variation where often the use of vernacular variants strongly correlates with low socio-economic status. However, the application of these methods depends on the adoption of pre-determined social constructs such as social class “which do not necessarily have any kind of objective, or even intersubjective, reality” (Milroy 1987:14). Moreover, this approach is unable to describe or explain the variation that continues to exist *within* larger social categories such as social class. These limitations have increasingly led to a ‘second’ and ‘third wave’ movement in some areas of sociolinguistics, away from a focus on the (imposed) social structure of the larger community to a focus on the social practices in which speakers engage. The main tenet behind the third wave approach is that it is only through observing the use of linguistic variation as a resource for the local community (rather than simply as a marker of community membership) that it is possible to understand how speakers actively combine variables (linguistic and social) to create distinctive styles and to imbue linguistic variation with social meaning. The data for this thesis were therefore collected over a two year period using the technique of long-term ethnographic research or participant observation from a group of 54 speakers who play together in West Fife High school Pipe Band (or

WFHPB)<sup>2</sup>. The corpus consists of 38 hours of recorded speech, roughly 360,000 words.

2. to further explore the structure and organisation of aspects of phonological knowledge within the mind of the speaker. Despite recognising that phonological representations reside in the mind, the majority of research in usage-based Cognitive Linguistics has been concerned with semantic organisation<sup>3</sup>. In Rene Dirven's recent overview of the 'major strands in cognitive linguistics' (2004), cognitive phonology is not discussed (although see Langacker's (1987: 57) definition of the symbolic thesis). Taylor argues that a complete theory of language in the mind must incorporate the cognitive organisation of phonology: "a theory of language which does not do so is only half a theory of language" (Taylor 2002:79). I have therefore focussed primarily on phonological variation in the data.

This thesis combines ethnographic techniques of data collection, sociolinguistic practices of quantitative and qualitative analysis and usage-based methods of interpretation in an effort to question whether it may be possible to reach a more unified approach to linguistic data and theory, one that will ultimately lead to a fuller and more insightful explanation of variation.

## ***0.2. Structure of the thesis***

This thesis is arranged into three main parts. Part I explores the extent to which linguistic theory has incorporated sociolinguistic variation in accounts of language structure (and vice versa), reviewing a selection of research that is characteristic of the dominant approaches. Here I discuss a number of attempts to bridge the gap between sociolinguistics and linguistic theory from several different theoretical perspectives. I explain that while some of these theoretical approaches

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<sup>2</sup> This is a pseudonym, as are all of the names in this study.

<sup>3</sup> This is not true of all usage-based models. The usage-based models of exemplar theory have been applied almost exclusively to phonology (see e.g. Pierrehumbert 1994, 2000, 2001) but, despite sharing a number of commonalities with usage-based Cognitive Linguistics, these models seem to be developing independently and, consequently, usage-based Cognitive Linguistics has tended to focus on syntax and semantics with much less discussion of the organisation and structure of phonological knowledge in cognition.

are more suited to incorporating socially motivated variation than others, most of the attempts are programmatic and lack the empirical support of quantitative data that has become the keystone of the variationist tradition. This section argues that a unified approach to variable data and theory can benefit both the disciplines of sociolinguistics and theoretical linguistics but in order to fully explore this synthesis (within a usage-based model of linguistic theory), it is first necessary to embed any theoretical discussion in a detailed analysis of sociolinguistic variation. This should enable any synthesis to be presented as an extension to current approaches in sociolinguistics, rather than as an alternative, competing approach. This is the aim of part II of the thesis.

Chapter 2 in part II presents the methodology adopted in collecting the data for this thesis as well as a discussion of the social structure and some of the social practices of the speakers in West Fife High Pipe Band. Using methods of analysis that are typically accepted as mainstream in sociolinguistics, Chapters 3 and 4 in part II present analyses of variation for two phonological variables: th-fronting, a consonantal change in progress, and variation in the vowel in BIT which is reported to be a stable variable in this variety. The intention in part II of the thesis is to explore how much of the variation in these variables can be accounted for using only traditional (variationist) sociolinguistic methods.

Part III of the thesis builds on and expands this analysis of variation beyond that which has previously been considered mainstream in variationist sociolinguistics by importing some of the fundamental principles of usage-based linguistic theory to an interpretation of the data presented in part II. Research on lexical frequency has played a large part in discussions of usage-based models of language variation and change because frequency effects in language represent the most straightforward way to show the existence of a relationship between language structure and language use. For this reason, chapter 5 in part III explores the role of lexical frequency as a motivating factor in the variables (th) and (BIT) in WFHPB, in addition to the independent social and linguistic variables already discussed in part II of the thesis. The results of chapter 5 suggest that although the frequency effects that are present in the WFHPB data do not conform exactly to the predictions of usage-based theorists, these results can *only* be explained by adopting certain theoretical assumptions of the

usage-based approach. However, usage-based models make a number of predictions other than the expected relationship between variation, change and lexical frequency (indeed the discussion in chapter 5 suggests that an analysis of variation or change that *only* deals with lexical frequency as a motivating factor often paints an incomplete picture of the variation). Another area of crossover between usage-based linguistic theories and sociolinguistics relates to the way in which social and linguistic information is stored, categorised and accessed in cognition. This is therefore the topic of discussion in chapter 6 of the thesis. This chapter reviews two different approaches to categorization adopted by usage-based theorists: prototype/schema categorization and exemplar categorization. The purpose of this review is not to conclude which method is ‘correct’, only to show that both methods adopt usage-based principles and that both can be successfully applied to linguistic *and* social categorization. The suggestion in this chapter is therefore that a single theory of categorization can equally account for both social and linguistic categorization. This may lead to a better understanding of the relationship that exists between linguistic variation and social meaning.

## **PART I: THEORETICAL OVERVIEW**

## ***PART I: Introduction***

Until relatively recently, the points at which sociolinguistics and linguistic theory had crossed paths over the course of their respective histories were fairly minimal. Section 1.1 begins by establishing why this is the case. Section 1.2 reviews a selection of more recent research that has attempted to incorporate sociolinguistic accounts of variation and change into generative theoretical frameworks. The literature covered in this section has typically resulted from the recognition that linguistic theory should be capable of explaining sociolinguistic variation and so attempts have been made to modify existing theoretical frameworks that are, in all other respects, asocial. These accounts, however, do not attempt to incorporate the social meaning of linguistic variation into the linguistic theory. In order to further improve the synthesis between sociolinguistic variation and theories of language structure, I suggest that it is necessary to adopt a linguistic theory in which there is already, inherent in the model, a clearly assumed relationship between social and linguistic knowledge in the mind of the speaker. Section 1.3 explains that this is the case with usage-based models of grammar and reviews a selection of seminal works from different usage-based theories that have attempted to deal with socially motivated variation in language use. The review presented in section 1.3 will necessarily be brief because I return to more of this literature in detail in part III of the thesis. My intention in this chapter is simply to highlight the areas of potential cross-over between the disciplines of sociolinguistics and linguistic theory and to place my concerns among wider theoretical issues<sup>4</sup>.

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<sup>4</sup> Large parts of the material in this chapter have appeared in Clark (2007).

# Chapter 1: Sociolinguistics and linguistic theory

## ***1.1 The dividing line between sociolinguistics and linguistic theory***

### **1.1.1 Saussure**

The division between sociolinguistics and linguistic theory that has been dominant in twentieth century linguistic research can be traced to the ‘structuralist’ movement and the work of Ferdinand de Saussure, although it was perhaps popularised in mainstream linguistic theory by the generative tradition that followed.

‘Cours de linguistique générale’<sup>5</sup> begins with a brief discussion of the recent history of the discipline of linguistics and explains that, throughout the 19<sup>th</sup> century, a heavy emphasis had been placed on comparative philology. For Saussure, comparative philologists had failed both to adequately define their object of study and to suitably question the significance of their findings (Course 3; Cours 16). Furthermore, although the Neogrammarians had made ‘great advances’ in the field by placing comparative philology in a historical perspective and establishing links between sequences of language change, according to the Course (Course 5; Cours 19), they too had failed to explain the fundamental problem of linguistics; that of defining language as an object of scientific study. Until this was done, Saussure believed that linguistics could not establish itself as a ‘true science’ (Course 3; Cours 16).

Saussure was acutely aware of the complexities involved in such a task. The Course explains that language is at once a dual activity on many levels; it is a combination of articulation and perception; sound and meaning; individual and social; present and past (Course 8-9; Cours 23-25). However, rather than attempt to create an all-encompassing ‘science of language’ that could incorporate each of these facets, Saussure’s solution was to propose that “linguists must take the study of linguistic structure as their primary concern...” (Course 9; Cours 25). To do this, he

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<sup>5</sup> When referencing *Cours de linguistique générale*, I will use the standard system of including two page numbers; the first is from the English translation by Baskin (1960) and the second is from the French original, edited by de Mauro (1973).



had to define 'linguistic structure' as an object of study and show that it was different from all other aspects of language. This led Saussure to make a fundamental distinction between *langue* and *parole*.

Langue is described in the Course as the abstract formal linguistic system which exists in the mind of every speaker or, more accurately (since langue is a 'social product'), community of speakers; it is acquired in the community and every member of that community will share an identical homogeneous langue<sup>6</sup> (Course: 13-14; Cours 30). Parole, on the other hand, is the realisation of actual speech. This is described in the Course as the 'execution of langue'. It is an act of individual will and includes not only the physical act of speech on the part of the individual speaker but also the "combinations by which the speaker uses the code of the linguistic system in order to express his own thoughts" (Course 14; Cours 31). Culler explains that in the act of parole, the speaker selects and combines elements of the linguistic system and gives these forms a concrete manifestation or realisation (1976: 30). Linguistic variation, therefore, originates in parole but can only become a change to the linguistic system when it is accepted by the speech community (Joseph 2004:48). Culler explains that the distinction between langue and parole is essentially a distinction between an underlying social system which exists in the mind of the speaker, licensing linguistic behaviour, and actual occurrences or realisations of linguistic behaviour from individual speakers (1976:33). For Saussure, "in separating langue from parole, we are separating what is social from what is individual, and what is essential from what is ancillary and more or less accidental" (Cours 14; 30). In fact, aside from the initial description of the distinction, there is very little mention of parole in the Course because it insists that the primary strategic function of distinguishing between langue and parole is to isolate the 'true' object of linguistic enquiry and so "disregard everything which does not belong to its structure as a system..." (Cours 21; Cours 40). All linguistic variation was therefore relegated to parole and considered unimportant to the 'true science' of language<sup>7</sup>.

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<sup>6</sup> This is similar to the idea of 'community grammar' as proposed by Labov in his definition of the speech community (see Labov (1989) for an explicit description of his views on community grammar).

<sup>7</sup> Although Saussure recognised that 'external' elements of language 'are concerned with important matters' (in which he includes knowledge of the relationships that exist between languages/dialects,

Once the linguistic system had been adequately defined, it should have been possible to assign every linguistic phenomenon a place in either the system itself or in parole, if it was simply a feature of performance. However, in 20<sup>th</sup> century phonological theory, there is a range of arguments relating to the precise content of phonology (langue) and phonetics (parole). Culler (1976: 82) explains that for Hjelmslev (and exponents of his Glossematics), langue is purely an abstract system and phonetic properties are in no way involved in the description of phonology. The Prague School (to which Trubetzkoy (1939) was a leading contributor), by contrast, tended to treat phonology as both a combination of abstract structure and the sets of rules that combine this structure. Roman Jakobson (1937) included certain features such as the voiced/voiceless distinction in both phonetics and phonology because he considered these to be both abstract features governed by rules and physical realisations. Daniel Jones (1950) described the phoneme as a ‘family of sounds’. He therefore regarded certain aspects of variation in usage as belonging to the phonological system or langue.

The Course’s description of the division between langue and parole in syntax is arguably even more questionable. For Saussure, the act of constructing sentences was the product of the individual speaker because individuals can produce completely new sentences with each utterance (Course: 125; Course: 173). He therefore regarded sentence structure primarily within the domain of parole, with some exceptions. The exceptions included idiomatic phrases and sentences or groups of words that are built on regular patterns. However, it is unclear from the Course how far this notion of ‘regular pattern’ can or should be extended. Saussure was unable to reconcile the fact that an individual speaker can produce completely new sentences with each utterance with the fact that these utterances follow certain patterns. This is because his concept of langue consisted only of a finite list of simple signs; the combinatorial possibilities of these signs were assigned to the domain of parole. In other words, Saussure did not recognise that it may be possible to construct a set of structural rules in langue with which speakers create an infinite number of sentences in parole. Saussure was aware of the problems of his analysis

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various population movements, political and geographic factors and the development of literary languages) he sees no reason to suggest that any of these factors must be taken into account when studying the internal structure of language (Course 21; Cours 40).

and, regarding syntax at least, he adopted a less rigid view of the distinction between *langue* and *parole*, explaining that there can be no “clear boundary separating the language, as confirmed by communal usage, from speech, marked by freedom of the individual” (Course 125; Cours 173). Saussure and the structuralists were therefore responsible for introducing the dichotomy between language structure and language use but it was Chomsky and the generativists who carried this idea forward.

### **1.1.2 Chomsky**

Chomsky recognised the problem with Saussure’s *langue/parole* distinction in syntax but believed that syntax was more than simply a system of inter-related units that follow certain patterns. Chomsky argued that the relations between units are rule-governed and systematic. Rather than abandoning the *langue/parole* distinction, he strengthened it further by advocating a more rigid dichotomy between ‘competence’ and ‘performance’ (Chomsky 1965: 3-4). This is described as the distinction between “the speaker-hearer’s knowledge of his language” and “the actual use of language in concrete situations” (Chomsky 1965: 4). In other words, the former relates to the mental structures that govern linguistic behaviour and the latter to linguistic behaviour itself. In many respects, competence is similar to Saussure’s concept of *langue* but unlike *langue*, competence includes not only knowledge of specific linguistic elements (or signs) but also the combinatorial properties (or rules) of the system. Also, unlike *langue*, competence is not considered to be a social product. For Chomsky, linguistic competence is biologically determined and universal and it is a property of the individual, not the community. This has been articulated as the ‘innateness hypothesis’ i.e. the assumption that language structures are not learned, they are innately present in the human mind and they are triggered by linguistic ‘input’ (see Pinker 1994; Smith and Tsimpli 1995).

Like Saussure, Chomsky argues that the structural characteristics of language must be the linguists’ primary object of concern. The purpose of linguistic theory is to describe the combinatory rules or ‘generative grammar’ of a language. For Chomsky, these rules can be formalized with such mathematical rigour and precision that we can account for the occurrence of ungrammatical sentences in the surface

form (or performance) in the same way that we can account for different results to the same mathematical problem: “we say that they are due to errors of performance – errors made in the application of the rules” (Lyons 1970:44). In Chomsky’s early work at least, variation is dismissed as errors of performance.

Chomsky’s early work (1957; 1965) also implies that sociolinguistic variation is simply uninteresting from a theoretical perspective (unless the study of performance can also incorporate generative grammar (Chomsky 1965: 15)). This was articulated explicitly when he compared the study of sociolinguistic variation<sup>8</sup> with ‘butterfly collecting’: “If you like butterflies, that’s fine; but such work must not be confounded with research...” (1979: 57). In the latter part of the 20<sup>th</sup> Century, Chomsky believed that studies of sociolinguistic variation in language use could be helpful in combating linguistic prejudices but that they were ‘banal’ because they often did not attempt to relate their findings to (generative) linguistic theory and so they lacked the ability to make significant discoveries about the structure of the language system.

The (linguistic) theory deficit is still a common criticism of variationist sociolinguistics, one that is even noted among some sociolinguists. For example, Chambers describes the following as typical of much current sociolinguistic research:

“Most sociolinguists, no less than most theoreticians, go about their business as if they are engaged in self-contained, hermetically sealed research with no implications beyond the immediate results that, say, women in Amman tend to use glottal stops talking to other women but uvulars talking to men, or that, say, ergatives and transitives subcategorize periphrastic modals but unaccusatives do not.” (Chambers 2005: 216).

And yet sociolinguists must question exactly which theoretical advances they should relate their findings to. There is no single theoretical model that is unanimously favoured amongst linguists (this chapter should serve as evidence of that). Also, as Chambers (1995: 29) suggests, certain ‘advances’ in linguistic theory (within the generativist tradition at least) have either now been discarded or so radically revised that any attempt to synthesise sociolinguistic accounts of language change and variation with these theoretical proposals would have seriously weakened the

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<sup>8</sup> This comment was made in response to Labov (1972).

variationist cause. As Trousdale observes, “it would seem that the battle lines are fairly well drawn” (2003: 373). Yet there is evidence from both sides of the division that the strict dichotomy has begun to be relaxed. For example, from the ‘sociolinguists’ side of the fence, Deborah Cameron argues that:

“if sociolinguistics is to progress from description to explanation...it is obviously in need of a theory linking the ‘linguistic’ to the ‘socio’.” (Cameron 1997:59).

Form the ‘theorists’ side, Hudson (1986) explains that such a suggestion is entirely possible because...

...“ it is possible to formalize the content of sociolinguistic knowledge, and to do so using the same formal apparatus as for structural knowledge” (1986: 1075).

Researchers in both camps have therefore begun to question the necessity of the assumed division between competence and performance. Saussure’s explanation for the division between *langue* and *parole* was that *langue* is “the one thing that is independently definable and provides something our minds can satisfactorily grasp” (Course 9; Cours 25). Of course, as highlighted above in the discussion of phonological theory, this is clearly not the case; *langue* has proven be an extremely difficult notion to define. Chomsky’s justification for the distinction seems even weaker. He explains that it was the position assumed by his predecessors (i.e. Saussure and the structuralists) “and no cogent reason for modifying it has been offered” (1965: 4).

This is precisely the problem that Hudson (1986; 1996; 2007b) finds with this division: the debate over the exact nature of the distinction is futile because those who make such distinctions provide no evidence in support of their argument (1986: 1056). Nevertheless, most mainstream linguistic theories continue to distinguish between *langue* and *parole* or competence and performance. This is often articulated as a distinction between ‘linguistic knowledge’ and ‘extra-linguistic knowledge’. ‘Linguistic’ facts are associated with ‘linguistic concepts’ i.e. knowledge of the pronunciation of a word or its word class. ‘Extra-linguistic facts’ relate to register or stylistic variations e.g. “knowing the conditions under which it would be appropriate

to greet the Prime Minister with *wotcher mate...*” (Smith and Wilson 1979: 194; cited in Hudson 1986: 1055).

Hudson (1986; 1996) illustrates the problem with this division using the example ‘sidewalk’ (1996: 245-7). He explains that speakers of English know (at least) four things about this word: they know its pronunciation (an aspect of phonology), its meaning (an aspect of semantics) and its word class (an aspect of syntax). This type of ‘linguistic knowledge’ is typically subsumed under the scope of linguistic competence and deemed worthy of investigation in theoretical linguistics. However, most speakers of English also *know* that this word is an Americanism. This is typically regarded as knowledge of language use and therefore not explored in theories of language structure. Yet if this is also an aspect of ‘linguistic *knowledge*’ then, Hudson asks, why shouldn’t this type of fact also belong with linguistic competence?

The boundary that is assumed to exist between ‘linguistic’ and ‘non-linguistic’ knowledge rests on a belief held in mainstream (generative) linguistic theory that linguistic competence is a unique (innate and universal) aspect of the total knowledge of an individual. In other words, language is claimed to be ‘modular’ (Chomsky 1986) i.e. language knowledge is considered to be a self-contained system in the mind. However, this assumption in itself is extremely controversial (for an overview of the debate, see Pinker 1994 and Tomasello 1995). It therefore seems that those who continue to propose the distinction between ‘linguistic’ and ‘non-linguistic’ knowledge not only fail to question the legitimacy of the distinction but they base their assumptions only on the logic they have inherited from the structuralist tradition<sup>9</sup>.

A further problem with this strict dichotomy lies in the much-quoted paragraph from Chomsky (1965) which states that the task of linguistic theory is not to explain the linguistic system of *actual* speakers of a language but to abstract away from this and explain the linguistic system of “an ideal speaker-listener, in a completely homogeneous speech-community, who knows its language perfectly and

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<sup>9</sup> It is important to note that the division between ‘modules’ of the mind has been advocated both by (generative) theoretical linguists and sociolinguists; in fact increasingly Labov (2006, 2008) has been concerned with describing the ‘sociolinguistic monitor’ which he describes as “a distinct component of the linguistic faculty” that can “store and evaluate the frequencies of sociolinguistic variables” (2006: 512).

is unaffected by such grammatically irrelevant conditions as memory limitations, distraction, shifts of attention and interest, and errors...in applying his knowledge of the language in actual performance” (1965: 3). Chomsky was not the first to take this view; according to Weinreich, Labov and Herzog (1968), it has dominated linguistics from the work of Hermann Paul in the 1800s. The problem with this approach however, as Bender explains, is that it is based on the “misguided assumption that only homogeneous systems can be structured” (Bender 2000: 188). It assumes that linguistic variation is inherently *unstructured* and therefore does not form a part of the structured language system.

An enormous amount of research has now been generated under the heading of ‘sociolinguistics’ in a number of different languages and societies which entirely disproves this assumption and quite clearly shows that linguistic variation is primarily not random noise that can be assumed away as errors of performance or ‘free’ variation. Rather, it is often possible to show variation as having ‘orderly heterogeneity’ (Weinreich et al (1968)); linguistic variation is often indicative of the interface between language and society. It seems quite clear that any linguistic theory that attempts to realistically model the facts of human language can only do so by recognising that language is both variable and structured. It also seems clear that the strict dichotomy assumed between linguistic and social knowledge is artificial. Any theory that aims to be a comprehensive and realistic model of human language must incorporate the social facts of language use<sup>10</sup>.

## ***1.2 Including sociolinguistic variation in formal linguistic theory***

The following section examines a selection of research that has resulted from the recognition that linguistic theory should be able to explain linguistic variation and so

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<sup>10</sup> It is interesting to note that Chomsky has, over the years, relaxed the severity of his assumed distinction between competence and performance by his inclusion of ‘pragmatic competence’ (or communicative competence as it is known in sociolinguistics) as a module of the language faculty (Chomsky 1980: 224-5). However, as Chambers (2005: 216) points out, this change in tack was not stated explicitly by Chomsky and so went largely unnoticed by both theoretical linguists and sociolinguists.

a number of attempts have been made to modify existing approaches that are, in all other respects, fundamentally asocial.

### 1.2.1 Variable Rules

Perhaps the first attempt to develop an existing theory of language structure to incorporate variation in language use was the idea of ‘variable rules’ (hereafter VR), proposed initially by Weinreich *et al.* (1968) and then modified by Labov (1969; 1972 ch8) and Cedergren & Sankoff (1974). VR were proposed as an extension of the optional rules of (the then current model of) generative phonology (Chomsky and Halle 1968). The aim of VR was to explain how competence could be shown to relate to performance more concretely.

In Chomsky and Halle’s (1968) model of generative phonology, variation in t/d deletion could be described using the optional rule shown in figure 1.1.

**Figure 1.1: Optional rules: t/d deletion** (Chomsky and Halle 1968)

$[- \text{cont}] > \emptyset / [+ \text{cons}] \_\_\_ \# \# [- \text{syl}]$

The rule describes that a stop is optionally deleted after a consonant at the end of a word if the next word does not begin with a vowel. This optional rule provides an adequate description of the ‘unmarked’ pattern of t/d deletion in e.g. ‘firs thing’. However, as Labov (1972: 217) explains, it fails to account for more marked patterns of t/d deletion that are typical of some non-standard dialects such as AAVE<sup>11</sup> which occasionally simplify the coda cluster even when the following word does begin with a vowel. Labov (following Weinreich *et al.* (1968)) therefore generalises from Chomsky and Halle’s (1968) optional rules, which can apply some of the time, to the notion of a variable rule, which can apply a specific percentage of the time. VR differ therefore from standard optional rules in that they can occur with some probability, indicated in the formulae with angled brackets.

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<sup>11</sup> In Labov (1972), this is still referred to as BVE (Black Vernacular English).



**Figure 1.2: Variable rule: t/d deletion** (Labov 1972: 220).

$[- \text{cont}] \rightarrow \langle \emptyset \rangle / [+ \text{cons}] \beta \langle \emptyset \rangle \_ \# \# \alpha \langle - \text{syl} \rangle$

This rule states that a stop is variably deleted after a consonant at the end of a word. The angled brackets around  $\langle -\text{syl} \rangle$  show that t/d deletion can also occur variably regardless of whether a vowel or consonant follows next in the sequence. The angled brackets around the second  $\langle \emptyset \rangle$  in the rule relates to the possibility that a stop is variably deleted after a consonant at the end of a word less often if the stop is also an inflectional morpheme (i.e. the consonant at the end of *mist* is more likely to be deleted than the consonant at the end of *missed*, where the consonant marks past tense). The Greek letters in the rule show that the variable constraints affecting t/d deletion are weighted differently.  $\alpha$  is weighted more heavily than  $\beta$ . In other words, this part of the rule shows that the phonological constraint is weighted more heavily than the grammatical constraint for this particular rule. The variable rule is also not fixed but can change throughout a speaker's lifetime, accounting for the fact that as speakers mature, the relevant weightings for these variable constraints can shift and the grammatical environment often then has the stronger effect (Labov 1972:220).

Bender (2000:208) explains that there have been two main challenges to the concept of the variable rule. The first is the argument that speakers are unlikely to actually *know* the probability weightings of the variable constraints. This is expressed most explicitly by Bickerton, who argues that “[S]peaker B must continually be saying to himself things like: ‘Good Lord! A’s percentage of contractions in the environment +V + NP has fallen to 77! I’ll have to step up mine to - let’s see:... what? About 86%!’” (1971:460-461; cited in Bender 2002: 208). Of course, as Bender and others point out, this argument is fundamentally flawed because Bickerton confuses frequencies with probabilities (and, incidentally, he also appears to confuse community frequencies with individual frequencies). The second, more serious problem with the concept of VR is that it appears unable to incorporate the social meaning of variation at the level of individual instances. This is because variable rules deal with random, probabilistic behaviour. As Dittmar (1996) explains:

“variable rules...cannot account for the different productive and interpretive communicative strategies because intention, underlying meaning, and pragmatic aims of communication are not considered in the analysis” (1996: 84-5).

It is not the case that there is no place for social information but VR does not attribute social meaning to individual instances because, in VR, the hearer does not attribute any significance to the choice between variants (see Bender 2000: 213 for further discussion of this point). This, combined with the now largely abandoned model of phonological theory on which VR was modelled has led to “the quiet demise of variable rules” (Fasold 1996).

### 1.2.2 Optimality Theory

A recent account of variation in linguistic theory that is similar in many respects to VR is Optimality Theory (hereafter OT, McCarthy and Prince 1999; Prince and Smolensky 1993; Kager 1999). The basic premise of OT is that the human language faculty can be described in terms of a series of constraints. All languages consist of the same violable constraints but languages differ essentially in how they rank these constraints. Kager (1999) explains that the two major forces behind all constraints in OT are ‘markedness’ and ‘faithfulness’ (1999: 9-10). The force of markedness assumes that languages naturally exert pressure towards adopting unmarked structures<sup>12</sup> but the force of faithfulness assumes that there is also a pressure, to some extent, to preserve lexical contrast in order to express meaning. Whenever lexical contrast is preserved, there will be some level of markedness and vice versa. Constraints in OT are therefore intrinsically in conflict. These constraints are hierarchically ranked so that when constraints conflict, the highest ranking constraint will always have priority over the lower ranking constraints.

Cross linguistic variation in OT is explained in terms of differences in constraint rankings. Bender (2000) reviews three recent attempts to expand this notion to incorporate individual speaker variation into the model. Anttila (1997)

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<sup>12</sup> ‘Markedness’ in OT is a measure of structural well-formedness and so structurally less well-formed items will be more marked. The concept of markedness in OT is actually a good deal more specific than this but for the purposes of this discussion, the more basic definition will suffice.

modified the OT framework by assuming that individual speaker variation is the result of speakers having partially unranked constraints in their grammar which divide the grammar into different sets that are ranked with respect to each other. However, the constraints within a set are mutually unranked and so the probability of occurrence of each variant is a result of the number of mutually unranked constraints that each violates. Bender (2000:231) attempts to apply this model to stylistic variation in her corpus of AAVE copula deletion and concludes that Anttila's (1997) model, "as a theory of stylistic variation, [...] both predicts implausible styles and fails to predict enough styles" (2000:132). This is because the probability predictions of the model are limited by the number of unranked constraints in the system. For example, if there are only six constraints on a particular variable (as there apparently are on the variation that Anttila investigates – the use of the strong or weak plural morpheme in Finnish trisyllabic words ending in a light syllable) then the smallest probability statistic available is 1/6. There is therefore no way to explain data which has less than 16% variation<sup>13</sup>.

Nagy and Reynolds (1997) have also extended the OT treatment of crosslinguistic variation to incorporate sociolinguistic variation. Nagy and Reynolds (1997) posit 'floating' constraints that can move within some range. Bender (2000) also applies this model to her own data on stylistic variation in copula deletion but finds that "the addition of floating constraints doesn't change the predictions of the grammar significantly" (2000: 232). Bender explains that allowing one constraint to float would give four possible rankings. This means that this model could only predict copula styles that will allow 0%, 25%, 50%, 75% and 100% copula deletion. Even allowing up to three constraints to float would only provide 12 styles, again with equal intervals of copula deletion between each. In other words, this model cannot account for a style which has slightly more or less copula deletion than predicted.

Boersma and Hayes (2001) approach posits that a grammar assigns each constraint to a point on a ranking scale. If two constraints have exactly the same ranking point then the chances of one outranking the other are ½. This model also proposes the partial overlap of constraints. As Bender (2000) explains, if one variant

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<sup>13</sup> Anttila (1997) also notes that this is problematic.

outranks another 99/1, then in Anttila's (1997) extension, this could only be modelled by positing 100 constraints. In Boersma and Hayes (2001) theory, however, this could be modelled with only two constraints that overlap slightly. This approach, therefore, allows a much more fine-grained explanation of speech styles. However, according to Bender (2000), the analysis in this approach is similar in many respects to VR because variation can be analysed by adjusting the position of one constraint along a continuous scale.

Guy (1997) also draws parallels between some versions of OT and VR, explaining that these models are not only remarkably similar, but that there are several avoidable problems with the OT approach. This leads Guy to the conclusion that "the VR model is superior on theoretical and empirical grounds" (1997:333). First, Guy finds the universal nature of the OT constraint inventory problematic because it implies that all speakers have innate knowledge of these constraints, despite many languages displaying no evidence of their existence. For him, "this claim is obviously undisprovable and therefore does not merit scientific consideration" (1997: 337). By contrast, VR makes no claims about the universality of constraints. Secondly, Guy finds that the quantification of probabilities in VR is 'stronger' and more precise than OT because OT can only model relative weightings of constraints (X is higher than Y) but VR can model the *amount* of difference between constraints or rules (1997: 339). Furthermore, VR computes probability by taking all constraints on a particular form into consideration, not simply the highest ranking constraint (as OT does). In this respect, VR is able to explain why there can be linguistic variation even when the linguistic conditions for a particular variant are strongly disfavoured. A good example of this would be the occurrence of foot initial glottaling in certain varieties of English. The highest ranking constraint in OT is like a 'trump card' over-ruling all other constraints but in VR, this can still be overridden when other conditions are favourable. Finally, Guy questions the learnability and computability of the OT model. He explains that a language with a set of 20 constraints (far fewer than is necessary for any natural language) would have around  $2.35 \times 10^{18}$  possible orders for these constraints. He suggests that acquiring knowledge of all of these constraints is surely an impossible task for any

monolingual speaker in a whole life-time, far less speakers of more than one language.

The main problem with both the VR and OT accounts of variation, for the purposes of this discussion, is that they are both based on the same kind of *random* application of rules or constraints. This limits the ability of both models to account for social meaning in linguistic variation:

“Since the choice of ranking and therefore of variation is random...hearers’ can’t attribute any intentionality to speakers’ ‘choice’ of variants. Without such intentionality, it’s hard to see how there could be meaning” (Bender 2000:237).

Therefore, while both OT and VR can (partly) incorporate linguistic variation into their respective frameworks, neither are particularly well suited to handling speaker agency or the association of social meaning with instances of variants.

### 1.2.3 Principles and Parameters

Anthony Kroch’s (1994) paper investigates quantitative variation on the frequency of periphrastic *do* in early Modern English. By re-examining Ellegård’s (1953) statistical data on the rise of *do* in the 15<sup>th</sup> and 16<sup>th</sup> Centuries, Kroch shows that in five sentence types<sup>14</sup>, there is a ‘constant rate effect’: although in these five sentence types the innovation (periphrastic *do*) was found to occur with different frequencies at the same point in time in the history of the language, “the rate at which the newer option replaces the older one is the same in all contexts” (1994: 181). Kroch uses the statistical linkage between the different changes as evidence for a fundamental linkage in the speakers’ competence. Kroch draws on aspects of Chomsky’s Principles and Parameters (1981) to explain the results.

Parameters were introduced into Chomskyan linguistics in an effort to explain variation between languages (Chomsky 1981). In Kroch’s application of Principles and Parameters, the variation that existed in the use of periphrastic *do* is

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<sup>14</sup> The sentence types Kroch examined were negative declarative, negative question, positive transitive questions, positive intransitive question and positive wh-object question.

explained as variation between two competing grammars in the language system, distinguished only by a single parameter: V-I raising. The theoretical assumption is that historically, main verbs were generated in the lower V of the grammar but were raised to the I node during question formation and negation. However, with the loss of the verb-raising parameter, neither inversion nor negation was possible and so *do* (which is generated in the I node) was supplied.

As the variation in each of these sentence types all have the same rate of change, Kroch argues that they must all be different applications of the same grammatical change, the loss of V-I raising. The statistical data do indeed seem to support the approach Kroch adopts but, as Hudson explains, there are some serious problems with the account. For example, if this change did involve a reanalysis of parameter setting for verb raising, there seems to be no reason why it should affect different sentence types at different times (Hudson 1997a: 95; 1997b: 51). Furthermore, the explanation relies entirely on the strength of the verb raising hypothesis yet “the empirical and theoretical underpinnings for this analysis are weak” (Hudson 1997b: 54). For instance, the theoretical assumptions of Principles and Parameters force Kroch to explain the variation that existed in early Modern English as the result of competing grammatical systems. In other words, speakers who used both constructions (V-I raising and *do*-support) were apparently code-switching between two different grammars that were distinguishable only by the single parameter of V-I raising. This is a leap of faith that seems entirely unnecessary, especially as Hudson (1997a; 1997b) shows that the statistical data used by Kroch can equally be invoked in support of usage-based theoretical approaches (such as Word Grammar (Hudson 1990))<sup>15</sup>.

Wilson and Henry (1998) also employ the concept of parameters to explain variable data, this time in synchronic variation between Belfast English and Standard English. As explained above, parameters were introduced to generative linguistic theory in an attempt to explain variable outputs between linguistic systems. The general assumption is that variation between languages is the result of differences in

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<sup>15</sup> Ellegård's (1953) data have also been re-analysed by Warner (2005). This research does not account for the variation in *do* within any particular theoretical framework and so it is not discussed in detail here.

parameter settings<sup>16</sup>. For example, the difference between [+ null subject] (or pro-drop) languages and [- null subject] languages (e.g. the difference between Italian *parlo* and English *I talk*) is defined in this framework as a difference in the parameter setting of overt subjects (Wilson and Henry 1998: 6).

Wilson and Henry (1998) take this argument a step further and ask “what if specific dialects of English can be shown to have their own parameter settings?” (1998: 7)<sup>17</sup>. Re-examining data from Henry (1995) that deals with verb raising, Wilson and Henry (1998) explain that, unlike Standard English, verb-raising in imperatives is possible in Belfast English and sentences like examples (1) and (2) are grammatical.

(1) Read you that

(2) Go you away (1998: 9).

In a Principles and Parameters account of this variation, there are two possible grammars in Belfast English with respect to ‘inverted’ imperatives: one allowing inversion with all verbs and one allowing only inversion with ‘unaccusative verbs’ (which they describe as verbs of motion). There are therefore two different parameter settings in Belfast English and, for speakers who then switch between these two parameters and Standard English, there are three different parameters relating to verb raising.

The problem here is identical to the problem Hudson (1997a) found with Kroch’s (1994) account of V-to-I parameter setting in the 15<sup>th</sup> and 16<sup>th</sup> centuries: in order to accept this account, it is necessary to accept that speakers who vary between these forms are switching between three different grammars. What if there was evidence of another grammatical difference between Belfast English and Standard English that speakers can use variably? This would mean that such speakers are switching between a number of grammatical systems. In fact, Wilson and Henry

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<sup>16</sup> This approach rests on the ‘common sense’ assumption that languages such as ‘English’ exist as definable linguistic entities. The argument is therefore circular - the definition of parameters rests on the supposition of the existence of different languages which are defined as differences in parameter settings.

<sup>17</sup> Again, this approach rests on the assumption that dialects of a language exist as definable linguistic entities. See Hudson (1996:ch2) for problems with such an account.

introduce data showing that there is another grammatical difference between Belfast English and Standard English concerning the use of singular concord. The singular form of the verb is able to appear with plural (non-pronominal) subjects in Belfast English as in example (3).

(3) The doors is closed (1998: 11)

Wilson and Henry argue that their methods are capable of highlighting the interaction that exists between ‘internal’ and ‘external’ linguistic factors. However, in terms of their Principles and Parameters approach, they seem unable to explain why such variation exists at all because their approach to the synthesis between sociolinguistics and linguistic theory does not attempt to incorporate the social aspects of linguistic variation into the theoretical framework. How can the numerous social motivations for linguistic variation and change that have been discovered in sociolinguistic research (such as age, class, gender, ethnicity etc.) be incorporated into the Principles and Parameters approach? Wilson and Henry (1998) recognise their limitations in this respect, explaining that they are “not arguing that the systematic variation found within Belfast English, or any other dialects, may be explained ONLY by invoking parameters” (1998:14).

#### **1.2.4 Minimalism**

Both Kroch’s (1994) and Wilson & Henry’s (1998) approach to variation in Principles and Parameters assumed that speakers can essentially have more than one system of grammatical knowledge and variation is therefore the result of decisions that speakers make about the choice of particular grammatical systems. Adger and Smith’s (2005) account (which is further embellished in Adger 2006 and Adger 2007) differs from both Kroch’s (1994) and Wilson & Henry’s (1998) in that it does not need to invoke a range of competing grammars or multiple mutually exclusive parametric operations in a single grammar; rather there is a single grammar with an inventory of lexical items that bear particular feature specifications.

The Minimalist account proposed initially in Adger and Smith (2005) (and then expanded upon in Adger (2006) and Adger (2007)) assumes the existence of



two different types of syntactic features: those which carry a semantic interpretation (and, hence, are labelled *interpretable*) such as the feature [tense: past] and those which do not (and so are *uninterpretable*) such as the syntactic feature [*u*case: nominative]<sup>18</sup>. In the Minimalist approach, uninterpretable features must be checked by a matching feature during the derivation and once this is done, the feature is deleted. This means that only interpretable features are delivered to the semantic component of the grammar. Morphemes are then associated with the remaining feature bundles and whatever morphological operations that are triggered by these feature specifications are then performed (such as the addition of an affix). Finally, the grammar performs the phonological operations necessary to achieve the surface form.

Adger and Smith (2005) examine variation in two morphosyntactic variables (*do* absence and *was/were* alternation) in data collected from Buckie, a small fishing town in the north east of Scotland<sup>19</sup>. Most other dialects of English which display variation in *was/were* do so across all grammatical persons. In Buckie, however, there is variable use in all contexts except with the pronoun *they* (which can only occur with the plural form of the verb). *Do* absence appears to be restricted to negative declarative sentences in the present tense and in contexts with 3<sup>rd</sup> singular pronouns, and NPs. In other words, both of these variables show a categorical and variable distinction in the patterning of variants. Also, when the *was/were* variation is stratified by age, there is a decrease in the use of the non-standard form from old to young across all variable contexts. The variation in *was/were* is therefore (at least partially) socially motivated, indicating that this variable is perhaps undergoing change in this community with younger speakers favouring the standard form. The data on *do*-absence shows no such pattern, suggesting that this variable is both stable and perhaps also less salient.

The Minimalist framework can account for this variation, Adger and Smith argue, by proposing that “variation arises from lexical items having, by the end of the syntactic derivation, the same interpretable feature specification coupled with different uninterpretable and phonological specifications” (2005: 153). In other

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<sup>18</sup> Adger and Smith (2005) notate uninterpretable features by prefixing them with a *u*.

<sup>19</sup> See Adger and Smith (2002) for an application of these ideas to other morphosyntactic variables in the same speech community.

words, there are essentially two distinct syntactic inputs (or lexical items) to the system which can produce exactly the same semantic output. But if uninterpretable features are checked and deleted before entering the semantic component of the grammar, how can this result in different phonological outputs for these different syntactic inputs? Adger and Smith solve this problem by assuming that checked features are, in fact, not deleted and that they are still accessible to the morphological component of the grammar leading to a difference in the ‘spell out’ of different syntactic inputs. For example, in order to explain the variation that occurs between ‘*was*’ and ‘*were*’, Adger and Smith (2005: 166) assume the existence of two variants of the lexeme ‘be’ (arbitrarily labelled label T and T2) which can both combine with nominals to give the same semantic output but which have different featural content, leading to a different ‘spell out’ of each variant at the surface form. If a speaker selects [*be* T] as the syntactic input, the unspecified features of case, number and person will be checked with the unspecified features of the pronoun and, if the pronoun is [pers 1] (i.e. 1<sup>st</sup> person plural) then the derivation will run and the ‘spell out’ will be *were*. However, the featural content of T2 differs from T and the morphology, explain Adger and Smith, will be sensitive to this, instead spelling out *was*.

Adger and Smith continue to explain how the same principles can be invoked to incorporate *was/were* variation in all other morphosyntactic environments. They also provide a similar account of variation for *do*-absence, although in this case they assume that variation does not derive from choice of lexical item but from the choice of morpheme associated with a lexical item by the ‘spell out’ mechanism. They explain that the framework can straightforwardly capture the variation in *do*-absence by assuming that the morpheme associated with the 1<sup>st</sup> and 2<sup>nd</sup> person singular has two forms: [+ affix] which is realised as ‘*do*’ and [- affix] which is not realised overtly. Adger and Smith are therefore able to incorporate linguistic variation easily into the theoretical framework with little adjustment to the model.

Adger (2006) and Adger (2007) offer further comments on the ability of a Minimalist framework to explain variation in *was/were* variation in Buckie. In these recent re-evaluations of the data, Adger attempts to explain the frequency distribution of *was/were* variation in Buckie as a consequence of the organisation and

combinatorial possibilities of the feature specifications in the grammar of the speech community. The core idea is essentially the same as before i.e. lexical items are made up of feature bundles, some of which are interpretable (in terms of their meaning) and some of which are uninterpretable (or purely formal). These features must be checked in the derivation and so the uninterpretable features must be in agreement with the interpretable features, otherwise the output is ungrammatical. However, despite having different feature bundles, it is possible that lexical items may in fact share not only the same semantic output (as was suggested in Adger & Smith 2005) but also the same phonological output. This means that the grammar can produce the same phonological form in a number of ways. Adger (2006) presents data from Smith (2000) which shows that the percentage of the phonological form *was* in the context of a 2<sup>nd</sup> singular pronoun is 69%, it is roughly the same (67%) in the context of a 1<sup>st</sup> plural pronoun but only around 10% in the context of a 2<sup>nd</sup> plural pronoun. Adger (2006) proposes that this is roughly the frequency of output we would expect from the combinatorial possibilities of a grammar which runs the ‘Seek Maximum Generalisations’ algorithm on the feature bundles associated with these particular lexical items<sup>20</sup>. Running this algorithm therefore produces a number of different routes to the same phonological form. The prediction is that for 2<sup>nd</sup> singular there are two possible routes to *was* and only one to *were* and so the ratio of *was* to *were* should be around 2:1 in this context (notice the similarity to the actual data). In the case of a 2<sup>nd</sup> plural pronoun, there are also two possible routes to *was* and *were* but this time the prediction is in the opposite direction i.e. *were* should occur twice as often as *was*. In reality, the use of *was* was significantly lower than *were* at only 10% but there were too few tokens to accurately test the prediction in this context.

These models together (Adger & Smith 2005; Adger 2006; Adger 2007) essentially assume that variation is the result of two things:

- (a) a choice made by the speaker. Adger and Smith’s (2005) explanation amounts to the same as describing *was/were* variation as a choice between lexical items and *do*-absence as a choice between different allomorphs of a particular morpheme. The difference, however, is that they claim the choice is made at a deeper level of

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<sup>20</sup> See Adger (2006: 517-520) for details of this algorithm.

language structure (i.e. speakers do not choose ‘*was*’ or ‘*were*’; they chose T or T2 and this results in the output ‘*was*’ or ‘*were*’).

- (b) Combinatorial Variability (CV) i.e. variability that is (partially) caused by the mechanisms that create structure in language from the combination of atomic objects during syntactic operations.

The research presented in Adger & Smith (2005) and Adger (2006) shows that it is possible to incorporate variation into a Minimalist framework with very little adjustment to the model. Moreover, the discussion in Adger (2006) attempts not only to describe the variation in *was/were* but also explicitly to *predict* variation in a community grammar. In this respect, it is rather different from the other accounts reviewed in this chapter which simply model variation by building in probabilities, weights or constraint hierarchies.

As noted by Hudson (2007b), there are some statistical problems with the ways in which the data on *was/were* variation in Buckie are presented in Adger (2006)<sup>21</sup>. Nevertheless, it is fair to say that the research presented in Adger & Smith (2005) and (particularly) Adger (2006) represent serious attempts to incorporate inherent variability within the Minimalist Programme.

One criticism that has been levelled against this research (see Hudson 2007 for a fuller critique of Adger (2006)) is that these models cannot explain socially motivated variation, a commonality between all of the research examined in this section. This is because they do not incorporate social information into the grammar. Indeed, all of the approaches examined in this section begin with a purely asocial theory of grammar and try to build in accounts of variation but, in doing so, they only build in the results of such variation, leaving no place for the social motivation of the variation in the theoretical framework. Some of the theories examined in this section may be able to predict variation statistically, but none of them can account

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<sup>21</sup> Adger (2006: 525) claims that “*was/were* variability in Buckie is not affected by extra-linguistic factors in any clear systematic way...each generation of speakers has a very similar statistical pattern for the use of *was/were*...”. Hudson (2007b: 685-688) shows that this is simply not the case; only when the data are averaged across the community is the predicted ratio of *was* to *were* at 2:1 (after *we* and singular *you*) borne out by the data. Adger (2007: 699) claims that this is also inherent in his original prediction and that “this pattern only emerges once enough data is put together”. It is not clear from this rebuttal why the pattern should only emerge from a collection of data from individual grammars if individual grammars pattern in the same way across the community. Neither is it clear, how much data is considered to be ‘enough’ or whether the pattern would remain if more data were to be collected from the same speech community (particularly as the raw data show only 10 tokens in the context following a plural *you*).

for the social motivations of linguistic variation. While Wilson and Henry (1998) report this as a failing of their model, Adger (2006) explicitly states that the intention was only ever to incorporate variability, not social motivations for variability, and so the fact that there is no way to incorporate social meaning into the grammar is not a problem. As Adger states, “this approach does not leave room, within the model itself, for the variants to be associated with social meaning...this is an intriguing position, but one which I wholly reject, mainly for broader reasons of modularity...” (2006: 525). By explicitly stating that it is possible to incorporate variation in a formal linguistic theory while at the same time keeping the grammar ‘socio-free’ and ‘use-free’ (Adger 2007: 67), Adger is able to maintain the rigid competence/performance distinction in line with the Minimalist tradition<sup>22</sup>.

For some, rejecting the existence of social knowledge in the grammar does not push the synthesis between sociolinguistic and linguistic theory far enough. For instance, Hudson (2007b) is heavily critical of this approach for the same reasons as discussed in section 1.1.2 on the problems of modularity: it is difficult to define the boundaries of linguistic competence; “it is easier to imagine such [linguistic] modules than to justify them either linguistically or psychologically” (Hudson 2007: 687). Casillas Martínez is also critical of approaches which only seek to account for variability in grammar and do not also incorporate the social facts of language use:

“The statistical devices in such a theory are just superfluous...we do not need a grammatical theory that gives us the right numbers for a socially meaningful variable, what we need is a grammatical theory that links variables with social meanings...” (Casillas Martínez 2003: 34)

The beginnings of such an approach have already been quietly articulated within usage-based models of grammar. Section 1.3 provides a brief overview of the main claims of usage-based models of grammar and reviews the direction that some of this research has taken, particularly within Cognitive Linguistics. The literature reviewed

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<sup>22</sup> Notice that while Adger (2006) may reject the need to include social knowledge or knowledge relating to language use in the grammar proper, Adger (2007) explains that this does not mean that social knowledge is no-where considered in the derivation, only that it is inappropriate to consider these types of information as belonging in the *grammar*.

at this stage is necessarily minimal because further literature on this topic is discussed in greater depth in part III of the thesis.

### **1.3 'Cognitive sociolinguistics'**

The term 'usage-based' was introduced to linguistic theory by Langacker (1987). Although the term was first introduced in Cognitive Linguistics, as Kemmer and Barlow (2000) explain, it has grown in use since its inception and so too have the number of linguistic theories that adopt the usage-based thesis. In its original conception, the term was employed to describe the three features that characterise the main differences between Cognitive Grammar and generative theories of linguistic structure: CG is '*maximalist*', '*non-reductive*' and '*bottom-up*' (Langacker 2000).

Cognitive Grammar is 'maximalist', as opposed to the minimalist nature of Chomsky (1995). Generative models of grammar have traditionally tried to minimize both the role of learning in language acquisition and the number of (language specific) rules posited to account for language structure in the belief that the best grammar is the most economical one. CG is 'maximalist' in that it assumes a great deal of learning on the part of the speaker during language acquisition. It also attempts, wherever possible, to reduce its reliance on cognitive structures that are unique to language and instead derives language structures from more general cognitive abilities.

Reductionism relates to the association between the abstract and the specific in the grammar. Generative models of language are 'reductive' because they posit that when a speaker has a general rule in their grammar which produces complex structures, there is no need for them also to store in memory an instantiation of such a complex structure e.g. if a speaker has the rule 'Noun + 's' = Noun plural', then there is no need for them also to store the complex structure 'dogs' because this can be generated on-line by applying the rule. Langacker (1987: 29) describes this problem as the 'rule/list fallacy'. Again, the only reasoning behind such a claim is the argument that the most economical grammar is the best one. But CG is not guided by arguments of economy of storage, it is guided by arguments of psychological accuracy and so usage-based models take a non-reductionist approach

to the psychological evidence that speakers can (and do) store both ‘rules’ or abstract generalisations and instantiating expressions<sup>23</sup>.

Generative models of grammar are often described as ‘top down’ because of the heavy emphasis that they place on rules, abstract structures and universal principles as well as the lack of interest that is typically shown in these models towards lower-level structures such as lexical items or idiosyncrasies. CG is ‘bottom up’: it only posits abstract structures in the grammar where there is good evidence for the existence of such structures from language use; it tends to focus on lower-level schemas which are more psychologically plausible and the abstract schematic structures that emerge in language can always be grounded in reality because they “spring from the soil of actual usage” (Langacker 2000:1). There is therefore assumed to be an unquestionable relationship between language structure and language use<sup>24</sup> and language use plays a defining role in shaping the grammar of individual speakers. In Bybee’s terms, “experience affects representation” (2001:67). It is assumed that speakers’ linguistic systems are grounded in ‘usage events’ or instances of producing and understanding language.

This latter feature is still perhaps the key characteristic of a usage-based model of language. This main assumption has several important consequences for our view of language structure. If linguistic structure is not innate, then language acquisition is a ‘bottom-up’ process, in opposition to the ‘top-down’ nature of generative grammar (Tomasello 2000). A ‘bottom-up’ approach to language acquisition argues that language structure is acquired from experience of actual use. Also, if linguistic structure is acquired from experience, there is no need to posit that these structures emerge from any specific language module of the mind. In a usage-based approach to language, linguistic structure is not genetically determined but is instead regarded as an instances of other general cognitive abilities (such as perception, attention, memory, reasoning, inferencing, categorisation etc.). In other words, usage-based theories share a fundamentally non-modular view of language.

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<sup>23</sup> Psychological evidence for usage-based claims such as these can be found in, for example Alba & Hasher (1983) or Johnson (1997). These claims are discussed in greater detail in chapter 6.

<sup>24</sup> Generative grammars would not disagree with this statement but their understanding of the relationship would be radically different. For instance, in a generative model of grammar, the role of experience in relation to language structure might only involve the setting of parameters and once this is done, language use no longer influences language structure.

By claiming that language is essentially non-modular, usage-based theories are recognising that the division between ‘langue’ and ‘parole’ or competence and performance is arbitrary<sup>25</sup>. ‘Linguistic’ knowledge is inextricably entwined with ‘non-linguistic’ knowledge or, as Goldberg (1995: 5) states: “knowledge of language is knowledge”. Because the linguistic structure that is abstracted is largely determined by a speaker’s previous experience (Langacker 1987: 380), and because no two speakers will have had exactly the same linguistic experiences, each speaker will abstract a (minimally) different grammar. Linguistic variation between speakers is therefore inevitable and already presupposed by the theoretical framework (Geeraerts 2003b:1).

One cognitive ability that enables the conception of a usage-based model of human language is the ability to form networks of knowledge in cognition (Israel and Kemmer 1994:165) and so those usage-based theories that have attempted explicitly to model the linguistic system have all employed some form of activation network. In these approaches, the underlying assumption is that each time a particular linguistic structure is successfully recognised or used, a node or cluster of nodes in the cognitive network is activated and this activation spreads throughout the network to other related nodes. Although the network metaphor implies a static structure – nodes as bounded containers of knowledge with links connecting them – it must be borne in mind that language ultimately resides in patterns of neurological activity and so the network model that is proposed is dynamic. The abstract linguistic system is not generated by a series of rules or constraints which are static or fixed; the linguistic system is a dynamic event. It is constantly re-shaping as experiences change, not only during the critical language acquisition period but throughout a speaker’s lifetime (albeit not to the same extent throughout the speaker’s lifetime) and so variation and change are inherent to the usage-based approach.

Kemmer and Barlow (2000: ix) describe the relationship between language structure and language use as a ‘feedback loop’ since experience of language both results from and also continues to shape the speaker’s linguistic system. This is only

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<sup>25</sup> Hudson (pc.) suggests that the division between competence and performance is not at all arbitrary – one refers to knowledge and the other refers to behaviour. The problem is that the term ‘performance’ is often used (incorrectly) to refer to all influences on language that cannot easily be categorised as grammatical knowledge.



possible because humans possess the second of the two cognitive abilities that enable the conception of a usage-based model: the ability to register frequency effects (Israel and Kemmer 1994:165). Frequency research has played a very large part in descriptions of usage-based models of language structure. Particularly important is the relationship between lexical frequency and the ‘entrenchment’ of the lexical item or linguistic unit. Langacker (1987: 59) explains that entrenchment is the result of frequency of successful use. The occurrence of any type of cognitive activity leaves behind a trace in cognition and the more that this type of activity recurs, the more entrenched the trace will become. As a particular node is activated in cognition, it becomes more entrenched which leads to the probability that it will be reselected<sup>26</sup>.

Another major criterion of the usage-based framework is the need to include actual usage data in the construction of any theory in order that theories of language structure can be grounded in real language use. In generative theories of language, the standard methodology has largely been to rely entirely on constructed examples as the primary source of data and to treat speaker intuitions as a window into the linguistic system. Indeed in Chomsky’s early work, the suggestion that actual usage data could be used to interpret linguistic structure was seen as absurd: “observed use of language . . . surely cannot constitute the actual subject matter of linguistics, if this is to be a serious discipline” (1965:4) . However, while speaker intuitions are doubtless an invaluable tool, any theoretical approach which proposes the existence of a relationship between language perception and production must also employ real language data as a source of evidence for understanding the structure of the linguistic system<sup>27</sup>.

It seems that the basic assumptions of the usage-based thesis are fundamentally compatible with a description of sociolinguistic variation. Dirven (2004) argues that usage-based cognitive linguistics “has a very natural basis for sharing common concerns with sociolinguistics” (2004: 20). Despite this, “language variation is still widely absent from cognitive linguistic research, whereas in fact it ought to be at the heart of its research agenda” (Dirven 2004: 21). This view is articulated more forcefully by Geeraerts:

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<sup>26</sup> The concept of entrenchment is discussed in more detail in chapter 5.

<sup>27</sup> See Adger and Trousdale (2007) for further calls to use non-standard dialect data to test linguistic theory.

“As has been explained many times...Cognitive Linguistics is a usage-based model: it takes actual language use as its starting-point, and investigates the cognitive reality behind those facts of use. But if the methodological movement of Cognitive Linguistics so to speak goes from *parole* to *langue*, it should be obvious that sociolinguistic variation in the broadest sense will have to be included in the investigation of actual use; it is impossible to take seriously the claim that Cognitive Linguistics is a usage-based approach and at the same to neglect the social aspects of language use” (Geeraerts 2001: 53).

As Dirven explains, even within the now growing trend of ‘cognitive sociolinguistics’ (see Kristiansen and Dirven: forthcoming), most of the research has been concerned with the merging of linguistic theory and ideology (e.g. Geeraerts 2003a) or with the link between language and culture in the development of cultural cognitive models (CCMs, see Morgan 1997). There is, however, a small body of research that is beginning to address the place of sociolinguistic variation in cognitive and/or usage based models of language. The following section provides only a small taster of this type of research which is explored in much greater detail in part III of the thesis. The phenomenon of t/d deletion has been used in several attempts to include variable data in the generative frameworks reviewed above and so, for the moment, I only focus on two case studies which challenge these efforts by accounting for variation in t/d deletion within a usage-based approach.

### **1.3.1 Israel and Kemmer (1994)**

One of the first attempts to develop an existing usage-based model to explicitly incorporate sociolinguistic variation in language use was proposed by Israel and Kemmer (1994). Working within the theoretical framework of Cognitive Grammar, Israel and Kemmer attempt to show that the theoretical principles of CG can be applied to both the structural facts of grammar and the structured variation of language use.

Israel and Kemmer (1994) examine the phenomena of t/d deletion in English and their attempt to explain this variation primarily rests on invoking the CG concept of ‘*entrenchment*’ (Langacker 1987:59). Entrenchment in CG is described as the cognitive consequence of frequency of successful use: the more frequently a

linguistic unit is successfully encountered and used, the more deeply entrenched it will become in cognition, hence, the more likely it is to be selected in another usage event<sup>28</sup> (1994:166). The claim made by Israel and Kemmer (1994) is that a speaker who displays a high percentage use of the deleted variant (e.g. a speaker who is more likely to articulate [fis] than [fist]) does so because the deleted variant is more entrenched in their grammar. The unit's degree of entrenchment therefore determines the likelihood of its selection in another usage event. However, if the speaker does not display a categorical 100% use of the deleted variant then the speaker will also have stored instances of the undeleted form in cognition. Israel and Kemmer assume that both of these variants will be stored closely together in cognition forming a network of competing phonological nodes (1994: 169).

The entrenchment of individual lexical items or particular instances of the variant is not the only cause of such variation. Speakers will come to recognise patterns in language use. They will generalise across instances and abstract commonality to form schemas where 'schema' is the term given to the more abstract representation of a category which is then specified in greater detail by an instance. Schemas emerge through abstractions over instances and capture commonality between instances (Taylor 2002: 124-5; schemas are discussed in greater detail in chapter 6). For example, t/d deletion is more likely to occur in the environment of a preceding sibilant. This suggests that speakers recognise a pattern that is specific to this phonological environment and hence (either consciously or unconsciously) have abstracted this commonality to form a lower-level schema of the type [Vst##] (which is a more fleshed-out instance of the syllable-structure schema [VCC##]). This schema can vary with the lower level schema [Vs##] (a more fleshed-out instance of the syllable structure schema [VC##]) (Israel and Kemmer 1994: 170-1). If these patterns are particularly prominent then the schemas themselves may become entrenched to different degrees. Competition between schemas will lead to a further source of variability.

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<sup>28</sup> Langacker defines a usage-event as "a symbolic expression assembled by a speaker in a particular set of circumstances for a particular purpose" (1987: 66).

Another example of schema competition in this variable, according to Israel and Kemmer (1994), is between the past tense schema [[PAST]/[d]]<sup>29</sup> and the schema for coronal deletion. The past tense schema is heavily entrenched in the minds of English speakers (because it is frequent and productive). However, there are some instances in which the past-tense schema does not ‘win out’ and a past tense verb is articulated without a past tense suffix. Israel and Kemmer notice that in cases where the past-tense schema is overridden, the verbs in question are often high-frequency verbs (1994: 173). They explain that very high frequency items may become so entrenched in cognition that they can be accessed directly, rather than via the activation of a schema and so it is these forms that are most often able to override the past-tense schema (1994: 173).

The thrust of Israel and Kemmer’s argument is therefore concerned with the CG notion of entrenchment; linguistic variation between speakers is the result either of differences in the entrenchment associated with phonological or symbolic schemas or with individual instances. Israel and Kemmer also propose that their model can account for socially stratified variation, again invoking the notion of entrenchment. They explain that dialectal variation is established on the basis of shared interaction, appealing to the common-sense observation that “the more speakers talk to each other the more they will talk alike” (1994: 167). Dialectal variation is therefore the result of different degrees of entrenchment of linguistic units and schemas across geographically different groups of speakers.

Stylistic variation can also easily be explained with the notion of entrenchment. Israel and Kemmer argue that speakers will come to associate the use of certain linguistic variants with particular speech styles or social types through repeated experience or entrenchment. Speakers can exploit these associations in a socially meaningful way and this may influence the form that is selected. For example, speakers may be more likely to select a deleted form in an informal usage event, having made an association between deleted variants and informality (Israel and Kemmer 1994:174).

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<sup>29</sup> In CG, round brackets indicate that the information contained within is a novel structure and square brackets are used to symbolise ‘unit status’ i.e. that the information contained within has reached a level of sufficient entrenchment that it can be activated largely automatically (Langacker 1987: 60).

Unlike VR or OT, this approach does not rely on random probabilities to explain linguistic variation. Nor does it rely on multiple grammars. Linguistic variation is recognised as systematic and it is directly and intrinsically related to language use. Furthermore, variation in this model is not a ‘side effect’; it is “an inevitable and essential fact about language structure” (Israel and Kemmer 1994:175) and it follows directly from a usage-based approach to linguistic theory.

However, despite the advantages of Israel and Kemmer’s (1994) approach over some of the models discussed in the previous section, there remain certain problems with the account. For instance, while Israel and Kemmer’s (1994) account is capable of incorporating stylistic variation, the social motivation of language use is still marginalised in the discussion and the focus of the paper is on ‘linguistic’ variation that is not necessarily socially motivated. Also, Israel and Kemmer rely almost exclusively on the notion of entrenchment to explain variation. Speakers can ‘select’ linguistic variants but only according to the entrenchment of the instances/schemas and the degree of entrenchment of the associations between linguistic forms and social contexts. In this respect, speakers are not credited with a great deal of agency. They are portrayed as passive respondents who select particular linguistic variants depending on changes in the context of the usage event. Furthermore, although Israel and Kemmer explain that, theoretically, entrenchment is quantifiable as a probability measurement (1994: 170), they do not expand upon this proposal with empirical evidence. The model is therefore programmatic, making only a series of tentative, general arguments about the nature of linguistic variation in a theoretical framework.

### **1.3.2 Hudson (1997a)**

Israel and Kemmer’s account of t/d deletion in CG is weakened by a lack of empirical data in their account. Hudson (1997a) attempts to build on this work by utilizing the empirical data on t/d deletion presented in Guy (1994) to present a usage-based account of the variation.

Guy (1994) invokes a version of Lexical Phonology to account for the regular empirical relationship he finds between t/d deletion and the morphological structure of the word in three different corpora<sup>30</sup>. Guy's 'exponential model' finds that the chance of a word final coronal being realised in an irregular past tense verb (e.g. *left*) is the square of its chance of being realised in a regular past tense form (e.g. *missed*) and its chance of being realised in an uninflected form (or monomorphemic form e.g. *mist*) is the cube of this figure (1994:141-2). In order to interpret these predictions (which, based on the empirical data, appear to be 'real' phenomena), Guy explains that it is necessary to invoke a model in which there are layers of derivations. If the same deletion rule can apply to 'monomorphemic' forms three times, irregular past forms twice and regular past forms once (Guy 1994: 137-8) then the greater rates of t/d deletion in monomorphemes can be attributed to their additional exposure to the rule.

The modified version of Lexical Phonology that Guy (1994) proposes distinguishes (at least) three cycles of processing for every word and so meets these criteria. First the underlying representation (or the input) is inserted into the lexicon, which has two levels dealing with different types of morphological process. Irregular past tense forms are derived at Lexical Level 1 and regular past tense forms are derived at Lexical Level 2. Words are then inserted into a 'phrase marker' to produce an utterance, at which point they are subject to post-lexical (phonological) rules (such as the effect of the following segment, see Guy 1994: 143).

**Figure 1.3: Cycles of Derivation** (adapted from Guy 1994: 138)

	Monomorpheme	Irregular Past	Regular Past
	<b>'mist'</b>	<b>'left'</b>	<b>'missed'</b>
Underlying representation	[mist]	[li:v] + Past	[mis] + Past
Lexical Level 1	[mist]	[[li:v] + ed]	[mis] + Past
Lexical Level 2	[mist]	[left]	[[mis] + ed]
Postlexical Level	[mist]	[left]	[mist]

<sup>30</sup> Guy (1994: 140) claims also to have found the same pattern in a fourth corpus but does not include these data in his analysis.

Guy explains that although each word can only undergo t/d deletion once, more exposures to the deletion rule will mean more deletions in the surface form (1994: 138). In this model, monomorphemes are exposed to the rule three times between the underlying representation and the surface form, irregular past forms are exposed twice between Lexical Level 1 and the surface form and regular forms are exposed only once.

Despite the accuracy of the predictions of the 'exponential model', Hudson (1997a) still has several concerns with the theoretical framework proposed by Guy. This model of Lexical Phonology is not simply an application of variable data to a well-attested phonological theory. For instance, the original version of Lexical Phonology posits that phonological rules are assigned only to specific levels (Hudson 1997a: 78) but in Guy's theory, phonological rules governing t/d deletion are free to apply at different levels of the grammar. Even within Lexical Phonology, this is an extremely controversial theoretical stance. Furthermore, Guy's own earlier work has shown that t/d deletion is not only socially motivated (1980) but that the relevant influences on t/d deletion change as a speaker matures (Guy and Boyd 1990). Both of these present a problem for Guy's model of Variable Lexical Phonology.

Hudson (1997a) accepts the empirical claims of Guy's work but instead attempts to use the same data as evidence for a usage-based model of grammar (Word Grammar 1990). Word Grammar assumes (based on extensive evidence from research in categorisation, pioneered by Rosch 1973, 1975, 1978) that the human mind organises concepts around networks of prototypes. Prototypes are a fundamental principle of categorisation in Cognitive Linguistics. A prototype is described by Taylor as the abstract conceptual core of a category; it is an abstraction of the most common, most frequently encountered, most salient and most representative members of a category (Taylor 1995:59)<sup>31</sup>. Entities are assigned membership in a category by virtue of their similarity to the prototype – the closer an entity is to the prototype, the more central its status within the category. Hudson's model essentially suggests that utterances in which t/d is present are 'typical' i.e.

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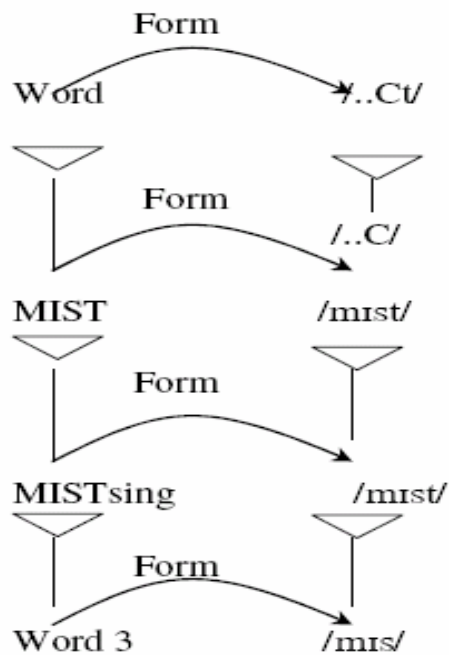
<sup>31</sup> See chapter 6 for further discussion of prototype theory in linguistics.

they are closer to the category prototype and instances in which t/d is absent are exceptions or category extensions.

Hudson, like Israel and Kemmer (1994), emphasises the ‘usage-based’ nature of the model, explaining that speakers abstract patterns of generalisations over variable instances of word final t/d (or, in CG terms, speakers abstract schemas). The main thrust of Hudson’s argument is that in order to explain the statistical regularity of the variation found in Guy’s ‘exponential model’, it is necessary to propose the existence of a schematic hierarchy (or, in WG terms, an inheritance network) with different levels of abstraction. At the lowest level of abstraction, speakers will have stored a particular instance of a word. In figure 1.4, which shows the proposed relationship between form and meaning in Hudson’s model, this is labelled arbitrarily as ‘word 3’. Hudson explains that speakers will also recognise that some instances of words carry additional meaning that relates to plurality and so posits a corresponding level of abstraction in the hierarchy (labelled in this diagram MISTsing). Speakers will also have abstracted further to the level of the lexeme (levelled MIST in the diagram). At the highest schematic level, speakers will have abstracted the concept of a ‘word’ and, in particular, that words ending in t/d can often have alternate variants.



**Figure 1.4: Isa hierarchy showing levels of categorisation for the monomorpheme ‘mist’** (adapted from Hudson 1997a: 86)



This model is based on ‘default inheritance’ or ‘isa’ hierarchies. Default inheritance means that the lower levels in the schema automatically inherit all of the properties of the more schematic categories, as well as some specific ones. The relationships between levels in the hierarchy are represented by a triangle in figure 1.4. The base of the triangle is on the more general category and the apex is connected by lines to any concept that ‘isa’ that category (1997a: 81). In other words, figure 1.4 shows that the particular instance of ‘mist’ that is labelled ‘word 3’ ‘isa’ MISTsing (i.e. an instance of the category Mist ‘singular’), ‘isa’ MIST ( i.e. an instance of the lexeme MIST) and ‘isa’ word.

Hudson suggests that a model such as this can be used to explain the patterns observed in Guy’s exponential model. In figure 1.4, the /t/ of the word 3 item ‘mist’ is “lost” somewhere between MISTsing and the unique instance ‘word 3’. Hudson (1997a: 87) explains that in the model, MISTsing inherits the full form of the lexeme

MIST but that the /t/ is not inherited by ‘word 3’<sup>32</sup>. According to Hudson (1997a: 87):

“the main point ...is to show how the loss of /t/ at the higher level... ‘bleeds’ the rule at the lower level, in exactly the same way as Guy’s t/d deletion rule. If /mist/ has a constant probability  $n$  of being realized as /mis/ at the next level down, the chance of /mist/ surviving at each level is  $1-n$ , so the chances of survival at the bottom level are  $(1-n)^2$ .”

Hudson also uses a similar strategy to explain the differences between monomorphemes and regular and past tense forms (1997a: 88-90) and is therefore able to explain the mathematically regular variation introduced by Guy (1994). Hudson therefore successfully applies actual empirical data to support an existing Cognitive Linguistic theory, succeeding in the (partial) syntheses of variationist and usage-based linguistics.

Nevertheless, despite claiming that this model is ‘usage- based’ and ‘bottom up’ and whilst emphasising the parallels between WG and CG, it seems that Hudson’s model continues to describe the variation in t/d deletion in terminology that implies a derivation. Hudson explains that /t/ or /d/ is ‘lost’ at some point in the application of the rule, which necessarily implies that it is underlyingly ‘present’ in some deeper level of grammatical structure. This view is irreconcilable with some usage-based accounts of language structure that are almost entirely surface orientated. For instance in CG, grammar does not derive linguistic forms, it licences them. There are therefore no transformational or derivational ‘rules’ in CG (Langacker 1987: 26-7).

Although the categories (or schemas) proposed in Hudson’s model may have been acquired by individual speakers from experience of language use (in other words, they are not considered to be innately inherited), the assumption remains that, during production and processing, the speaker begins by selecting the more abstract structure ‘word’ and, after a series of processes of inheritance in which certain linguistic structures feed others, eventually reaches the bottom level of the hierarchy: the realisation. Again, this explanation is incompatible with most usage-based

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<sup>32</sup> Hudson also provides an alternative proposal in which /t/ is ‘lost’ between MIST and MISTsing (1997a: 87).

approaches in which lower level schemas are often more significant than higher level schemas. Furthermore, there is no evidence presented in favour of the suggestion that speakers actually have these three levels of schematic category (why not 4 or 5 levels of schematicity, or, inkeeping with the Cognitive Linguistic claim that abstractions should only be posited when absolutely necessary, why not only 2 – MIST and word?). It is therefore difficult, based on the discussion in Hudson (1997a) to refute the claim that the theory is being driven by the empirical data.

Finally, despite briefly pointing out that the choice between t/d deletion or insertion is also “influenced by the linguistic and social context” (1997a: 85), no real effort is made to incorporate socially motivated variation into the framework. Hudson’s account is empirically stronger than Israel and Kemmer’s (1994) model but like Guy (1994) and Israel and Kemmer (1994), Hudson does not adequately incorporate the social motivations for linguistic variation into the model, despite acknowledging that this *can* be done.

Hudson (2007c) presents a similar discussion which, this time, attempts to re-analyse the data on *was/were* variation in Buckie (discussed in Adger 2006) within a Word Grammar framework. This recent paper makes more of an effort to show that by using a Word Grammar-type network model of cognition, it is possible to link linguistic elements to social categories. However, the discussion of the social aspects of variation is, again, very limited. For instance, Hudson (2007c: 400) claims that in Buckie, “whether a woman chooses *was* or *were* after *we* depends on how much she can identify with the male stereotype which (she thinks) typically uses *was*”. This suggests that women who use *we was* do so because they want to sound like men. This is a very crude interpretation of the relationship between language and gender and one which has been broadly recognised as too simplistic in the sociolinguistics literature for some time (see chapter 3.6 for further discussions on the relationship between linguistic and social categories and indexicality).

It is clear even from this short review in section 1.3 that this doctoral research is not the first to recognise the potential for synthesis between sociolinguistics and usage-based theories of grammar. However, generally the treatment of this synthesis has either been weak on empirical data or weak on the inclusion of the social motivations

of language use. This is problematic because the use of socially motivated empirical research is particularly important in variationist sociolinguistics; as Cameron explains, for most sociolinguists, “quantitative sociolinguistics *is* sociolinguistics” (1997: 58). Regardless of whether we argue that this is an unreasonably narrow view, it remains the case that if ‘usage-based sociolinguistics’ (or ‘cognitive sociolinguistics’) is to be taken seriously as a research method, and is to be beneficial to both theoretical linguists and sociolinguists, it must be capable of incorporating quantitative, socially motivated, variable data. This is the only way that this type of research will ever be considered a serious contribution to *both* sociolinguistics and (usage-based) linguistic theory.

### ***Part I: Conclusion***

It has been my aim in part I of the thesis to highlight the cross-over between the disciplines of (socio)linguistics and linguistic theory and so to place my concerns among wider theoretical issues. This cross-over is difficult to incorporate into generative theories of linguistic structure which were not initially designed to model sociolinguistic variation and efforts to do so have retained the competence/performance divide (see Adger 2006). In usage-based theories of language, no such divide exists and so the cross-over is implied in the theoretical framework. However, it is still largely unexplored and in the emerging cases in which it has been investigated, the emphasis has often been on the capability of the theoretical model to handle variation rather than with an attempt to apply the model to socially motivated linguistic data. In the remainder of the thesis, I hope to begin to address some of these issues.



## **PART II: SOCIOLINGUISTIC ANALYSIS**

## ***Part II: Introduction***

As discussed in Part I of the thesis, previous attempts to explore the relationship between sociolinguistic variation and change in linguistic theory are often programmatic, heavily weighted on the theoretical side and offer simplistic treatments of the social motivations of variation. In order to fully explore the relationship between sociolinguistics and usage-based linguistic theory, and question whether such an approach is beneficial to *both* sociolinguistics and linguistic theory, it is necessary to first embed any theoretical discussion in a detailed analysis of sociolinguistic variation. Part II of the thesis presents such an analysis of variation.

Chapter 2 details the methodology adopted in collecting the data on which the analysis of variation is based. Chapter 2 also discusses the internal social structure of the group of speakers who make up this corpus. Chapters 3 and 4 are concerned primarily with the analysis of variation. Here I present a mainstream analysis of variation using data from two different sociolinguistic variables: th-fronting, a consonantal change in progress, and variation in the vowel in BIT which is reported to be a stable variable in this variety. Using methods of analysis that are typically accepted in sociolinguistics (e.g. varbrul and multiple regression), I attempt to correlate variation in these two variables with a number of different social and linguistic factors which could potentially be influencing the variation. My aim in part II of the thesis is to explore what quantity of the variation in these variables can be accounted for using only traditional (variationist) sociolinguistic methods before exploring, in part III, to what extent an analysis which imports usage-based principles can enhance these existing techniques.

## **Chapter 2: Speaker sample and methods in data collection**

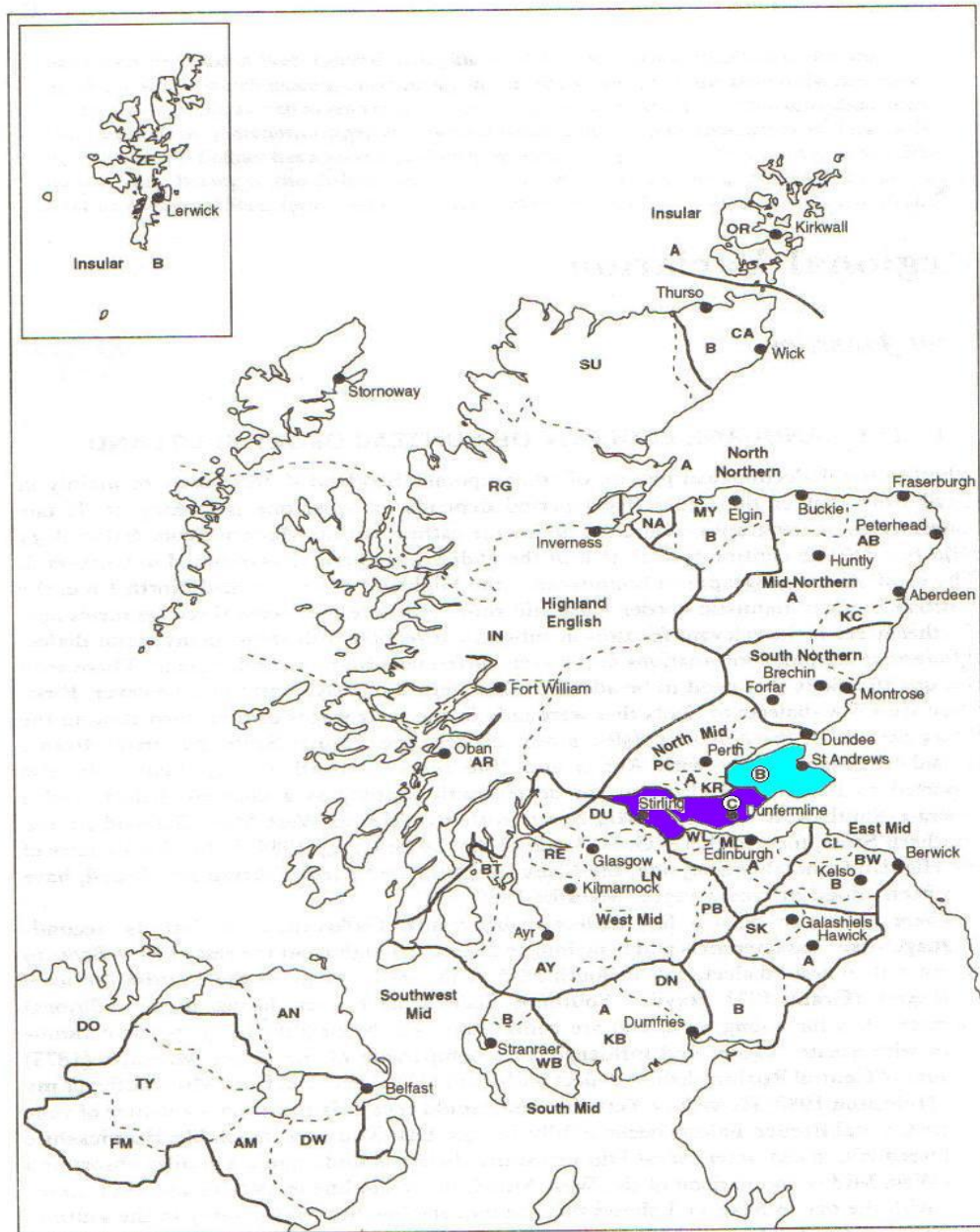
### ***2.1 Introduction***

The data for this thesis were collected from a group of 54 speakers who play together in West Fife High school Pipe Band (or WFHPB). The corpus consists of 38 hours of recorded speech, roughly 360,000 words. The data were collected over a two year period using the technique of long-term ethnographic research or participant observation. This chapter outlines the fieldwork methodologies that were adopted in the collection of the corpus as well as an overview of the changing social organisation of the band.

West Fife High Pipe Band is located in West Fife, Scotland. Figure 2.1 is a dialect map of Scotland (taken from Johnston 1997b: 434) highlighting the major dialect boundaries in Modern Scots. The map shows that the region of Fife is composed of two dialect areas: North Mid B (highlighted in light blue) which is historically centred around Cupar and St Andrews but extends to parts of central Fife and the East Neuk; and North Mid C (highlighted in dark blue) which encompasses the heavily industrialised south and west of Fife as well as parts of Stirlingshire. North Mid C is the dialect area in which WFHPB is situated. I chose this particular area of west Fife as a research site partly because this dialect area has never been extensively studied and partly because I grew up near this area and so was aware of the rich linguistic variation that exists here.



**Figure 2.1: Dialect map of Scotland** (Johnston 1997b: 434)



The settlements in and around where WFHPB is based (and where most of the playing members are from) began as small agricultural markets in the 16<sup>th</sup> and 17<sup>th</sup> centuries but, with the discovery of ironstone and coal, they prospered as successful mining communities before the collapse of the mining industry. As was often the case in mining communities, there was a great sense of rivalry between the various pits in the area. An article in the Central Fife Times (printed on 1/12/1983) explains

that “these conditions nourished sport and music so that consequently Fife became noted throughout Scotland for its coal pits, football, brass bands and pipe bands”. In 1929, the Green Hills Colliery pipe band was formed around the Green Hills pit in West Fife. However, with the steady decline of the mining industry and the closure of Green Hills Colliery in 1965, the band had all but disappeared, save three of its members. Shortly afterwards, the (still functioning) Dream Valley Colliery, also in West Fife, adopted the pipe band, changing its name to Dream Valley pipe band. In 1967, with interest in the band at an all time low, the pipe major decided to introduce a ‘youth policy’. The initiative behind the ‘youth policy’ was that adults from the Dream Valley pipe band would teach local youngsters to play bagpipes and drums, creating a stock of local talent that could then be used as a ‘feeder’ for the adult band in later years. In 1969, two years into this project, the novice juvenile pipe band that would become WFHPB was formed. Although the links between WFHPB and Dream Valley pipe band no longer exist, WFHPB has continued to expand and achieve success in competition. This is largely due to the continuation of the ‘youth policy’ whereby local children are taught to play bagpipes and drums as part of their music education in school<sup>33</sup>.

I had been a piper and had played bagpipes in a pipe band in Fife during my own adolescence and early adulthood. This gave me an insight into the typical social structure of such an organisation and the strong sense of community and loyalty that often accompanies this task. My previous links with pipe bands and with Fife meant that WFHPB was an ideal place in which to conduct long-term ethnographic fieldwork.

## **2.2. Data collection**

### **2.2.1 Ethnography**

Ethnography is the participation in the daily lives of a community over an extended period of time. In sociolinguistics, this is used with the intention of understanding

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<sup>33</sup> I am grateful to a former pipe major and a former leading drummer of the bands for providing me with this information.

“the sociolinguistic dynamics of the community from the perspective of the community itself” (Wolfram and Schilling-Estes 1996: 106). According to Duranti (1997: 85-6), ethnography is characterised by the ability to perform two apparently contradictory functions:

1. ethnographers must have the ability to achieve a reasonable degree of objectivity by ‘stepping back’ from one’s own cultural experiences in order to achieve an ‘etic’ perspective.
2. ethnographers must have the ability to identify with the community sufficiently so as to achieve an ‘emic’ perspective.

The emic perspective is the perspective of community members (otherwise known as the ‘insider’s’ perspective); the etic perspective is the “external, social scientific perspective on reality” (Fetterman 1998: 22) that provides a framework for analysing emic data. When I entered the WFHPB community to begin ethnographic research, I had several advantages that helped towards my understanding of the emic perspective. As previously stated, I had been a piper and had played bagpipes in a pipe band in Fife throughout my own adolescence and early adulthood. I had previous ties with several of the adult members of WFHPB through my experiences as a piper and this helped facilitate my integration into the community. Also, because I had first-hand experience of such an organisation, I could empathise with common complaints – the time demands, early-morning starts on competition days, playing outdoors in the wet, cold weather – but could also understand why, despite these complaints, these people continue to play in the pipe band and why, for many of them, playing in *this particular* pipe band is the most important aspect of their lives. Furthermore, I had the benefit of sounding local, having spent some of my childhood and all of my adolescent years in Fife<sup>34</sup>.

The pipe band world continues to be a male dominated environment and a difficult one for any female to be accepted into, let alone a researcher who is not

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<sup>34</sup> There are (very subtle) differences in the dialects of different towns in the west Fife area which my informants seemed to be acutely aware of. I had grown up in a new town in Fife and so the dialect I had acquired was perhaps more levelled than the surrounding areas (Kerswill and Williams 2000). I had also been at university for six years which undoubtedly affected my ability to use the vernacular as fluently. Despite my best efforts at ‘sounding local’, my informants were still aware of the subtle differences between my speech and theirs, differences that occasionally meant that I sounded more ‘posh’ or ‘polite’ than they did.

fully integrated into the community. The gender differences that exist between the researcher and the researched are a problem for any ethnographer; needless to say that it is impossible to achieve a position of gender neutrality. Some researchers have side-stepped the issue by selecting informants that are the same sex as themselves (see, for instance, Mendoza-Denton 1997; Moore 2003). However, this was not a practical option in this research: there were only seven females in the band at the time that I entered the community and so, had I decided to focus my attention on females, I would have neglected the majority of the community. Despite this, I felt that my own experiences of playing in pipe bands prepared me well for the difficulties of entering a predominantly male community and, consequently, this was less problematic than I had anticipated. Interestingly, I found that my male informants reacted in different ways to the issue of my gender. The adult males often apologised for swearing or telling rude jokes and stories in my presence (but continued none the less). The adolescent males were initially very uncertain of me, particularly (it seemed) of what talking to me could imply. It became apparent when Kate and Lucy joined the band towards the end of 2004 that this reaction was not specific to me; it was related instead to the emergence of their sexual identity. Evidence for this comes from the extract below in which I ask Bobby and Kris why they don't talk to Kate and Lucy and they respond by telling me that they don't want the girls to get the wrong impression.

#### Extract 1

LC: dae yous no talk tae them?

Bobby: sometimes

Kris: they're just quiet, ken I t-I talk tae them but they're just a bit quiet

LC: they must feel a bit awkward

Kris: aye I ken but

LC: coming in tae a pipe band fu' eh guys an naebody talking tae them

Kris: I-I'd go and talk tae them but I'm no wanting tae make an erse eh mase!\*\*\*Bobby you go an talk tae them first and I'll just come oer.

LC: they might hink you're chatting them up

Kris: I ken, that's what I'm saying

With perseverance, my relationship with the adolescent males progressed beyond this and I do not believe that the gender differences that exist between the majority of my informants and me have restricted my ability to collect comparable data from males

and females<sup>35</sup>; on the contrary, it has helped me to understand how both males and females cope with issues of gender differences in this community.

Often the attributes that can benefit the researcher in one area of ethnography can limit them in another. In this case, although my knowledge of the pipe band environment allowed me greater access to the emic perspective, I found it increasingly difficult to achieve the etic perspective in researching a familiar setting (Hammersley & Atkinson 1983: 92). I therefore decided against using ‘complete participation’ as a research method. Some ethnographers (e.g. Jules-Rosette 1978) have suggested that this is the ideal situation. As Hammersley & Atkinson (1983: 94) explain, such immersion in the community offers safety, inside knowledge and often avoids the trouble of access negotiations. The complete participant can access and experience the culture in ways that are as close to the ways in which their participants experience it as possible. In some respects, this would have been the ‘easy option’; in fact, I believe that it was initially expected of me (the pipe major of the band has asked me on several occasions to join as a playing member, although this was never part of the agreement in return for access). This would have helped further my emic understanding of the community because it would have allowed me access to restricted areas (e.g. only playing members can travel to and from competitions on the pipe band bus due to space limitations). This would also have been an ideal way of ‘giving something back’ to the community, which is greatly encouraged in anthropology<sup>36</sup> and it would have undoubtedly alleviated the discomfort I often felt at being in the odd position between ‘stranger’ and ‘friend’ (Powdermaker 1966). The discomfort associated with marginality is something that many fieldworkers report but Hammersley and Atkinson (1983) urge researchers not to allow this uneasiness to cloud the task of analysis:

“There is a sense of schizophrenia that the disengaged/engaged ethnographer may suffer. But this feeling, or equivalent feelings, must be managed for what they are. They are not necessarily something to be avoided, or to be replaced by more congenial sensations of comfort. The comfortable sense of being ‘at

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<sup>35</sup> This is the reason that Moore (2003: 42) provides for not using male informants in her ethnography of a high school in Bolton.

<sup>36</sup> See the Code of Ethics for the American Anthropological Society  
<http://www.aaanet.org/committees/ethics/ethcode.htm>.

home' is a danger signal...there must always remain some part held back, some social and intellectual 'distance'" (Hammersley & Atkinson 1983: 102).

It was clear that the limitations of 'going native' far outweighed the potential benefits. The range and character of the data that I could access would have been greatly restricted. For instance, as a piper in the band, my attendance and participation in practices with other pipers would have been compulsory and I would not have had freedom to move between the various different sub-groups (pipers and drummers, adults and teenagers) with relative impunity. I would not have been able to achieve such a breadth of interaction with all of the community members and I felt that this would have compromised the research. I therefore decided on adopting the role of participant observer (typically employed in sociolinguistic studies with ethnography) in an effort to achieve some level of objectivity.

### **2.2.2 Entering the community**

Seeking permission from 'gatekeepers' (i.e. individuals who have the capacity to grant or deny access) is often the first step towards gaining access to the community. After receiving permission from the head master of West Fife High School and the pipe major of the band, I began ethnographic research with WFHPB for the first time in June 2004. This was a difficult time to enter the community as it was the height of the competition season, which runs from April to September. During these months, pipe band practices are intensive with little time to socialise. Players are practicing on full highland bagpipes and drums, which are much louder than the practice chanters and drum-pads that they use for most of the winter months. This means that even when there is time for conversation, it is often too noisy to be heard. During the initial stages of fieldwork, I occupied my time by observing the behaviour of the group at practices and competitions, attempting to speak with individuals when the chance arose. Although these conditions made interaction initially difficult (and incredibly frustrating) members of the band were at least aware of my presence.

During the winter months, as the band began to practice on quieter instruments, I was able to sit in ‘the circle’ with them as they practiced<sup>37</sup>. This improved my relationship with the group significantly because it meant that I was not only more visible but I could also be more involved; I could share their stories and their jokes and so my status became undoubtedly more ‘participant-observer’ than ‘observer-participant’. Also, as I attended more band ‘functions’ (e.g. bag-packing at a local supermarket to raise money for band funds or the end of season dinner-dance), I showed that I wasn’t simply an ‘exploitative interloper’ (Hammersley and Atkinson 1983:81), but that I was willing to help support the band. Even if this did nothing to improve my status in the band, it allowed me greater access to my informants in a range of environments.

The interviews that comprise the majority of the corpus were collected in the summer of 2006 at the same time as the envelope game data (see below). For the most part, the informants played the game (which took roughly 20 minutes) and then spent around 40-60 minutes discussing aspects of the task and engaging in more general conversation. I was unable to conduct the interviews during the time that the band practiced which meant that interviews had to take place either before the practice started or after it finished<sup>38</sup>. I used an I-River H-120 MP3 recorder to collect the data with a Sony ECM-MS907 microphone.

Mendoza-Denton (1997) interviewed all of her informants relatively early in their relationship in an attempt to ensure that she had roughly equal levels of familiarity with all of her speakers at the time of recording. This was impossible in my case as I already had a personal history with certain members of the band from my previous experience of pipe bands. Furthermore, the familiarity and type of relationship that I had with each of my informants was different. In an attempt to maintain some degree of comparable levels of familiarity between the recordings, I began collecting the 2006 data with the informants that I felt I knew best, gradually strengthening my relationships with those I knew less well before I conducted their interview.

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<sup>37</sup> Both pipers and drummers practice with their seating arranged in a large circle. The purpose behind this is that everyone can see the pipe major/leading drummer and, consequently, the pipe major/leading drummer can see everyone else.

<sup>38</sup> I interviewed Lucy and Dale at their homes because they were both having short periods of time away from the band at the time that I was collecting the recordings.

During the recording sessions, I was keen to avoid the constraints of a sociolinguistic interview, particularly in collecting data from the adolescents in WFHPB. This is because, as Moore (2003:46) highlights, much of the discourse of the classroom is structured in a similar question-answer format, where teachers often ask a question with a very specific answer in mind. She argues that this could lead children to respond to adult questioning in a very strategic way. I therefore did not question any of the informants using a structured questionnaire although I found that guiding them onto certain topics (e.g. stories about band trips to Belgium and Ireland, school teachers, alcohol, friendships) facilitated conversation. They also asked me questions and so the recordings progress as conversations rather than interviews. Consequently, no two recordings are the same in this study which makes comparing topics of conversation tricky. This does not mean, however, that the data from these interviews are not comparable. Indeed, Moore argues that a completely comparable set of interviews is an unachievable goal because it is “unlikely that any two interviews will be the same no matter how structured the approach of the researcher” (Moore 2003:45). The interviews in the WFHPB corpus are comparable simply because the subjects were all exposed to the same stimulus – me.

In the pilot stages of data collection (2004-5), I followed Moore’s (2003) practice of recording in small groups of friends, allowing the informants to choose their own taping partners. This method facilitated conversation but one drawback of this approach was that certain individuals tended to dominate the discourse. By the time I collected the 2006 data, I had been with the band for 18 months and many of the informants that I had worked with previously felt happy to be taped alone. I therefore have several individual interviews in the main corpus. The corpus therefore consists of 34 conversations and 38 hours of speech which, transcribed orthographically, amounts to around 360,000 words.

When I began ethnographic research in June 2004, West Fife High school Pipe Band was an institutional label that encompassed three distinct pipe bands: the Novice Juvenile band (which consisted mainly of children and young adolescents), the Juvenile band (which consisted of the more able teenagers, typically aged 14 upwards) and the Grade 2 band (which was primarily adults). My initial focus had



been on integrating with the Juvenile band. I spent the first year of the research with them and collected a corpus of 11.5 hours of recorded speech which served as the data for my MSc dissertation (Clark 2005). The intention was that this would provide a pilot study for the larger PhD project in which all three groups could be analysed. However, as the research progressed, it became apparent that WFHPB could not continue to sustain three separate bands (they were lacking both players and sufficient funds) and so the decision was taken in January 2006 to reorganise the resources that were available. The Juvenile band was effectively dismantled and the players were dispersed among the other two bands depending on their ability (more able teenagers were moved into the Grade 2 band and less able teenagers were moved into the Novice Juvenile band).

The resulting social landscape is therefore very different to the one that I was presented with in June 2004. Of the 16 original informants from the Juvenile band, 5 have left since the re-organisation of the bands (primarily because of this re-organisation). Table 2.1 shows the place of each individual in the pipe band hierarchy in June 2006. There are 15 females in WFHPB and 39 males who range in age from 12 – 42 (but the mean age is 18.3). The group is socially fairly homogeneous in terms of social class structure, with only 2 individuals (Rose and Lois) who can be unquestionable categorised as ‘middle class’; all other individuals can be roughly categorised as mid-upper working class<sup>39</sup>.

I have divided the table both by band membership (Novice Juvenile and grade two) and also by the instrument that each individual plays. These are the ‘top-down’ category divisions that are imposed on the community; people are either ‘pipers’ or ‘drummers’ in ‘the big band’ or ‘the wee band’. For the most part, pipers and drummers practice separately and only form an ensemble in the weeks leading up to competitions but their relative status in the band is not equal; the pipers feel a sense of superiority over the drummers in the band. This is expressed overtly by Nathan in the extract below:

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<sup>39</sup> This assumption is based entirely on qualitative observations (such as occupation, parents’ occupation, local house prices and the socioeconomic characteristics of the area). No attempt was made to assign these individuals to a social class index.

Extract 2

Nathan: first there's the us an them, pipers an drummer

LC: [laughs] is it really like that?

Nathan: ach, it is a bit, am a bit like that a hink am stuck in ma ways though eh\*\*\*aye it's always been like that for me, a've always said drummers, no interested

LC: [laughs]

Nathan: they'll always be pit tae the side

LC: whiy?

Nathan: I dinnae ken I think it's just for a-the drummers are just there tae make a noise [laughs]

Table 2.1: Top-down category divisions in WFHPB

GRADE 2 PIPERS	NOVICE JUVENILE PIPERS
Ted	Annie
Dale	Mathew
Daniel	Adam
Elton	George
Robert	Luke
Jake	Joe
Rob	Kirsten
Kate	Sean
Lucy	Simon
Steven	Colin
Campbell	Greg
Nathan	Alex
Brandon	Kevin
Kris	Alastair
Jimmy	Nicola
Bobby	Amanda
Karl	Bruce
	Leon
GRADE 2 DRUMMERS	NOVICE JUVENILE DRUMMERS
Lewis	Lois
Pete	Rose
Connor	Judy
Gary	Abbey
Mark	Barney
Keegan	Alan
Gillian	Rebecca
Ben	Suzy
John	Steph
Richard	Chloe

Key  
 Black = no movement  
 Blue = moved from  
 Juvenile to Grade 2  
 Red = moved from  
 Juvenile to Novice  
 Juvenile  
 Green = new to the  
 band in 2006 season.

The grade two band and the novice juvenile band also practice separately and even when they do join together as a single unit (e.g. when they travel together on the same bus to competitions) there is very little communication between members of each band, as highlighted by Elton’s comments in the extract below.

### Extract 3

Elton: honestly don't know any the wee band by the way, I'm no being funny, I'm no trying tae be awkward, I really don't know any them\*\*\*it's hard eh cos ye dinnae see them at competitions cos they're aw away doing whatever they do when we're practicing an in the mornings ken we're away when they're practicing

LC: mm

Elton: an I come tae the practice back eh seven, I dinnae see any them eh, I honestly don't know them like

LC: dae ye never talk tae them on the bus an that?

Elton: nuh

LC: nuh?

Elton: I ken that sounds nasty, it's no like-no trying tae be anti social just dinnae talk tae them

Each member of WFHPB can therefore be clearly categorised as either a member of the grade two band or the novice band (and either as a piper or drummer in each). However, as the field work progressed, I became aware of more subtle divisions within the bands that did not always correspond to the larger category divisions imposed on them. More importantly, these divisions were also apparent to my informants. For instance, in the extract below, Lucy explains that when the pipe major calls a break or leaves the room, she is aware that certain people seem to cluster together into small friendship groups.

### Extract 4

Lucy: I notice who-like simple wee hings like when he says 'right take a fag break', I notice who walks er tae who or when he goes up the stair who walks er tae who tae talk tae, I notice hings like that a lot

In the pilot study for this project (Clark 2005), I attempted to uncover the social categories that my informants were aware of by using a combination of ethnographic observations and interviews, methods that other researchers have found to be relatively unproblematic (e.g. see Mendoza-Denton 1997, Eckert 2000). However, the cultural categories that were discussed as particularly salient in the wider community (e.g. *ned*, *geek*, *goth*, *gimp*, *casual*) did not seem to correlate with my informants' characterisation of each other in WFHPB<sup>40</sup>. The social groups that exist within WFHPB are much less salient than, say, the Jocks and Burnouts of Belten High (Eckert 2000) or the Eden Village Girls and the Populars at Midland High

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<sup>40</sup> The only exception to this was the label 'goth' that was often applied to Amanda and Nicola.

(Moore 2003). Of course, I had already developed my own conceptualisation of the social structure of the group but I was aware that my vantage point afforded me the ability to abstract over the entire community and so it may be different from each of my informants who were inside the community. I was also actively looking for social structure, anxious to find where my analysis would lead. Eckert (2000:76) warns the analyst to avoid ‘funneling’ people into categories of their own devising and so in an effort to resist this temptation and discover the social groups that my informants perceived to exist, I had them play the envelope game.

### **2.2.3 The envelope game**

The envelope game was modelled on a sorting task developed by Tanya Matthews (2005) in her research on the category labels that were given to adolescent girls in an American high school. Matthews supplied each of her informants with a pen, a box of envelopes and 50-100 photographs of their female classmates that were taken from the school yearbook. She then asked them to sort the photos into piles, put the piles into envelopes and label the envelopes.

The aim of the ‘envelope game’ was to understand how the informants grouped themselves and others in the community. I did not have access to photographs of my informants; instead I presented them each with a deck of cards, each card containing the name (and/or nickname) of a band member. I was also aware that they may wish to categorise on different levels of abstractness (e.g. they may recognise ‘grade 2’ as a social group that is distinct from ‘novice juvenile’ but they may also recognise various sub-groups within the larger structure). I therefore supplied my informants with four different sizes of envelopes so that smaller envelopes could be placed inside larger ones, creating a layered group effect. However, this was less effective than I had hoped. Many of the younger members of the band found this made the task more difficult and so chose not to use different sizes of envelopes.

I began the envelope game by asking the informants to sort the cards into groups. Before any further clarification was given, most began to sort the cards into

a crude 4-way distinction: drummer vs. piper, Grade 2 vs. Novice. This is interesting in itself because it implies that these are the most salient levels of organisation for them. However, as I was specifically interested in the social relationships that exist within this imposed social structure, I asked the informants to try to base their judgements on friendship groups that they were aware of<sup>41</sup>.

Most of my informants underwent the same three stage process that Matthews (2005: 69) describes. First, they began by sifting through the cards and characterising particular individuals, commenting on their opinions of the individuals concerned (e.g. see the extract below).

Extract 5

Kris: who's Rose [surname]? Oh that's wan eh the wee wans

LC: aye

Kris: Daniel [surname], aye he's a prick

Robert: Barney [surname], he's a moody-he's awright eh?

Kris: who's that?

Robert: the cunt...pal's wi' Judy

LC: /drummer

Kris: awright aye he's awright. Steven [surname], sound.

Robert: Campbell, wank [laughs]

LC: dae ye no like Campbell?

Kris: he's awright

Robert: Jimmy-Jimmy's awright

Kris: /Jimmy-he's a bit eh a poof

Robert: noh he can go there [laughs]

Robert: Rebecca

Kris: /Rebecca, Jake...oh that's that big new boy oh he's sound

Robert: /he is sound

During the characterisation process, they also began categorising each card, forming piles of cards on the floor. I then asked them to check that they were satisfied with their categorisation before putting the groups into envelopes and labelling the envelopes, thus pointing directly to some cohesive identity for the group.

It became apparent early on in the data collection that no two envelope game results were identical. In other words, no two individuals shared exactly the same

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<sup>41</sup>Colin, Sean and Simon found this too difficult and instead categorised the names on the cards in relation to their own social network structure. For instance, Colin and Sean divided the cards into 5 piles, categorising along a cline of acquaintance from people that they consider to be good friends ('gid pals'), through people that they don't know particularly well to people that they dislike ('bawbags').

idea of the social structure of the pipe band and the friendship groups that existed within it. I therefore applied techniques of social network analysis to the results of the envelope game in an attempt to highlight areas of overlap and agreement within the data. Before considering these results, I will briefly review the development of social network analysis, discussing how my approach both builds on and differs from the methods that are typically applied in sociolinguistics.

## **2.3. Interpreting the Envelope Game results**

### **2.3.1 Social Network Analysis**

A social network is simply a description of a set of actors (or nodes) and the relationships (edges or ties) that exist between them (Wasserman and Faust 1994). Scott (2000) explains that modern Social Network Analysis (hereafter SNA) is the product of various strands of separate developments in social psychology, anthropology and mathematics<sup>42</sup>.

Social anthropologists (such as Barnes (1954), and Bott (1957)) used the term ‘social network’ as a metaphorical tool to describe and explain social phenomena. These early researchers introduced some of the fundamental principles of the network approach. For example, Bott (1957) discussed the structural properties of social networks using the terms ‘close-knit’, ‘loose-knit’ and ‘connectedness’ (Wiklund 2003: 56-7). However, as Scott (2000) explains, it was Clyde Mitchell who laid the basis for a systematic, quantitative social network analysis. Mitchell (1969), in his quest for a more adequate tool to interpret the behaviour of individuals, turned his attention to the mathematics of Graph Theory. In Graph Theory, a graph is simply a set of lines connecting points (much like the ties connecting actors in a sociogram). Graph Theory consists of a collection of mathematical formulae that are capable of describing the properties of the patterns formed by the graph. Mitchell reformulated the ideas of Graph Theory and applied them within a sociological framework to an analysis of social network data. The introduction of Graph Theory

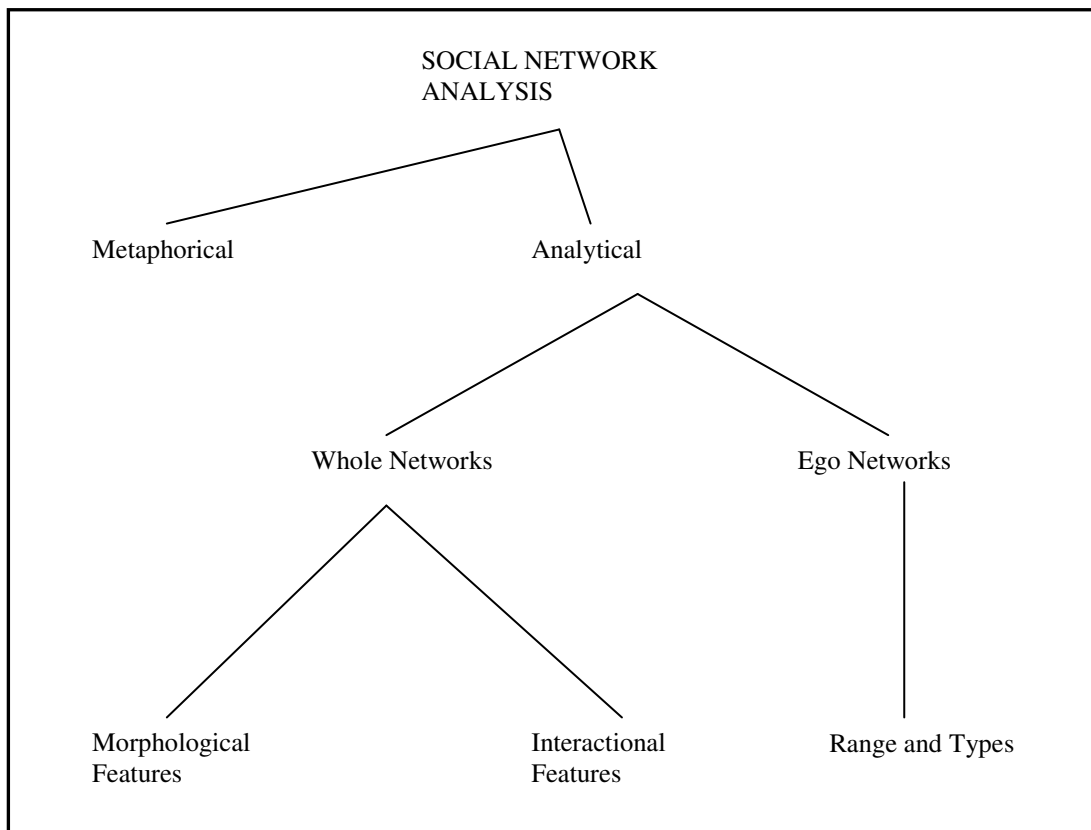
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<sup>42</sup> See Scott (2000, ch2) for a detailed discussion of the history and development of social network analysis.

therefore marked a movement away from a purely metaphorical use of the term ‘social network’ towards an analytical concept.

Since the introduction of SNA, research in a variety of disciplines (including sociology, social psychology, mathematics, political science, anthropology, economics and epidemiology) has led to a proliferation of different methods. The range and type of network approaches are diagrammatised by Raschka *et al.* (2002: 12) in figure 2.2:

**Figure 2.2: varieties of social network analysis**



Raschka *et al.* (2003:11-12) explain that, aside from the distinction between the analytical and metaphorical use of the network concept, there remains a division between the analysis of ‘whole networks’ and ‘ego networks’. The study of whole networks tends to focus on what Mitchell (1969) terms the ‘morphological’ features of the network such as its density (the number of ties between actors), multiplexity (the nature of the ties), reachability (the average number of ties needed to connect any two actors by the shortest route) and range (the number of actors connected by a



link). The ‘interactional features’ of the whole network relate to the interaction that exists between network members as a whole. This can include, for instance, a discussion of the degree of intimacy throughout the network, the frequency of contact between actors in the network, the directedness of relationships in the network and the content of the ties. Alternatively, rather than focusing on the whole network structure, it is often useful to examine the network structure of a particular individual or ‘ego’. As Raschka *et al.* (2002: 13) explain, the range and types of social network an individual can contact and the purposes of the interaction is a central issue in the ego-networks approach.

SNA was popularised in linguistics by James and Lesley Milroy in the 1980s in their application of various measurements of network strength to data collected from three working class communities in Belfast. The technique was introduced as a method for studying linguistic variation between individuals who were not discernible in terms of socio-economic class. Labov’s (1966) model of language variation and change attempted to correlate linguistic variation with ‘global’ social categories such as social class, age and sex. Eckert (2005) describes studies which employ these methods as ‘first wave’<sup>43</sup> (e.g. see Labov 1966; Trudgill 1974; Macaulay 1977). These studies typically show regular (and replicable) patterns of linguistic variation where often the use of vernacular variants strongly correlates with low socio-economic status. However, the application of these methods depends on the adoption of pre-determined social constructs such as social class “which do not necessarily have any kind of objective, or even intersubjective, reality” (Milroy (1987:14). Moreover, this approach is unable to explain the variation that continues to exist *within* larger social categories such as social class. Second wave studies (e.g. Cheshire 1982; Gal 1979; Milroy 1980 [1987]; Rickford 1986) employ ethnographic methods in data collection in an attempt to better understand the patterning of linguistic variation in a local context.

Milroy hypothesized that “closeness to vernacular speech norms correlates positively with the level of integration of the individual into local community networks” (Milroy 1987: 134). The theoretical assumption is that speakers within

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<sup>43</sup> Eckert (2005) has described the methodological approaches adopted in sociolinguistics in terms of a series of waves. These waves do not correspond to their chronological emergence but to the methods which characterise each approach.

dense, multiplex (or close-knit) networks are able to resist pressures of standardization and maintain vernacular varieties because such network structures function as ‘norm enforcing’ devices. Conversely, speakers with loose-knit networks are relatively more exposed to the influence from the standard variety and so “a low level of integration into the network is likely to be marked linguistically by relative distance from the vernacular” (Milroy 1987: 212).

Milroy (1987) measured the level of integration into the network or the ‘network strength’ of each individual by placing them on a six-point scale according to the following five factors:

- membership in a high-density, territorially based cluster
- kinship in the immediate neighbourhood
- working in the same place as at least two others from the same area
- working in the same place as at least two others of the same sex from the same area
- voluntary association with work mates in leisure hours (this applies in practice only when conditions 3 and 4 are satisfied)

(Milroy 1987:141-2).

The first of these measures network density and the remaining four each provide an indication of multiplexity. Scores therefore range from zero, for someone who fulfils none of these conditions and so is not well integrated into the community network, to 5 for someone who is closely integrated into the community.

Although Milroy’s (1987) use of SNA in linguistics was highly innovative, the methods employed have received heavy criticism. For instance, Murray (1993:165) has criticised Milroy’s network strength scale (NSS) for unjustly assuming equal intervals between categories. In other words, the NSS assumes that working in the same place as two others from the same area and of the same sex (point 4 on the NSS) means that the individual is twice as integrated into the network as someone living in the same neighbourhood as their kin (point 2 on the NSS). Marshall (2004:128) also finds that the criteria on which the NSS is constructed are biased in favour of males, particularly in working class communities. For example,

points 3-5 above are inappropriate for women who are housewives because their answers will yield a low NSS although they may still interact regularly with the community.

Murray (1993) also suggests that there is little evidence for the importance Milroy places on the ability of the model to explain language maintenance and change. Milroy (1987: 160) has argued that *strong* i.e. dense and multiplex network ties have a norm-enforcing effect on the individual speaker and they help to maintain non-standard, localised speech forms because close-knit networks have the capacity to exercise control and supervision over its members. Conversely, *weak* i.e. sparse and uniplex network ties help to facilitate language change as weak ties act as ‘bridges’ between dense and multiplex networks. The ‘weak-tie’ model of language change was originally proposed by Granovetter (1973) but was further developed by Milroy and Milroy (1985). The argument is that individuals in the ‘core’ of strong, dense, multiplex networks are likely to find innovation of any level “socially risky” (Milroy 2002:564) but if the innovation is already on the periphery of the group, it will be less so. Mobile individuals with weak ties but no central membership in a close-knit network are in a favourable position to diffuse innovation. However, although such a model of change is highly plausible, there is little evidence (at least in Milroy’s work) that change is actually transmitted through weak ties (Murray 1993:167)<sup>44</sup>. Despite the methodological problems associated with this particular approach to SNA, it continues to serve as a model for much current SNA research in sociolinguistics (e.g. Marshall 2004; Evans 2004). The techniques of SNA have advanced greatly in other disciplines and typically now incorporate more sophisticated mathematics and more detailed methods of data collection (see Hanneman and Riddle (2005) for a discussion of these). Dodsworth and Hume suggest that “linguists could construct more useful measures of network integration and investigate many more quantities (both quantitative and qualitative) of social network data” (2005:290).

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<sup>44</sup> However, see Dodsworth (2005a: 30) who cites evidence from social network studies outside of linguistics which enforces the importance of weak ties in communicative phenomena.

### 2.3.2 Interpreting the envelope game with SNA

The typical method for collecting social network data is with a social network questionnaire (see Stoessel 2002: 104). The purpose of the questionnaire is to elicit information on both the quantity and quality of ties for each individual. The questionnaire developed by Cochrane *et al.* (1990) is emerging as a standard for eliciting social network data because it covers three different network dimensions:

- Relational characteristics (i.e. the nature of the relationship, the form of support and the intensity of the contact)
- Structural properties (i.e. the size of the total network, the size of the primary and non-primary networks and the density and multiplexity of the networks)
- Location in space and time (i.e. geographic and temporal characteristics of the network such as the geographical proximity of ego to another network member and the frequency of contact between them).

However, in order to obtain such richness and variety of data, this necessarily leads to a fairly detailed questionnaire. Hulsten *et al.* (2002) explain that this is often problematic for the informants who find the questionnaire tiresome and difficult to complete<sup>45</sup>. Furthermore, the process of quantifying such complex social information often yields results such as these:

“...A is a 39 year old male...he has a loosely integrated (density of 0.33) social support network of 21 people (14 male and 7 female). He relies on 6 people for emotional support, spends social time with 11 different individuals, can call upon 12 links for practical and 10 links for financial resources, and seeks out 9 individuals when in need of advice or information” (Ripley-Smith 2002:141).

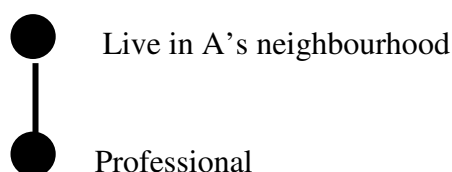
The data contained in the above example may be easily quantifiable but it seems not to consider the massive oversimplification that has taken place in order to reach this level of quantification. For instance, there is no discussion of how the term ‘emotional support’ is defined or how the distinction between ‘emotional support’ and ‘advice’ is made. The researcher may, of course, impose definitions

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<sup>45</sup> Hulsten *et al.* (2002) report only a 60% rate of return on their questionnaires and complaints from participants that the questionnaire took over two hours to complete.

on these terms, in which case, the ‘emotional support’ clique discovered by the SNA may have little or no subjective reality for the speaker (which was exactly the problem with using social class as a social category).

The ‘envelope game’ used in my research is therefore not a typical method of collecting social network data, however it is still possible (and, indeed useful) to interpret different types of data using certain SNA techniques, as Dodsworth (2005b) has shown in her application of Attribute Networking. Attribute networks (AN) are different from social networks in that they do not encode relationships between actors; they encode community members’ conceptions of local social processes and categories (i.e. attributes). In AN, “the nodes represent socially meaningful characteristics of people in the community and a tie between two nodes indicates the perceived co-occurrence of the two characteristics that those nodes represent” (Dodsworth 2005b: 227). For example, the perception by one speaker that people in their neighbourhood tend to hold professional degrees is represented in the AN as follows:



Although the content of the AN and the friendship group data elicited by the envelope game are quite different, both approaches, in their use of SNA techniques, share a common aim: to “systematically model the community members’ conceptions of local social phenomena, including any social boundaries...that are *salient to them*” (Dodsworth 2005b: 227, my emphasis).

Dodsworth recognises that no two individuals in the community will have exactly the same conception of the network (either attribute networks or social networks) and so each individual member’s perception of their social environment is coded separately in a matrix of binary relations. The ‘case-by-case’ data matrix is the typical format in which SNA data is stored. Table 2 below is an example of a ‘five-by-five’ binary matrix.

Table 2.2: Five-by-five data matrix

	A	B	C	D	E
A	--	1	0	1	1
B	1	--	0	1	0
C	0	0	--	0	0
D	1	1	0	--	1
E	1	0	0	1	--

The matrices used in SNA are often square i.e. they contain the same number of rows and columns. Each actor is listed twice, once in the rows and once in the columns. The presence or absence of relations between these actors is represented by a 1 or a 0 in the appropriate cells of the matrix. In the above example in table 2, the data are both binary and undirected which assumes that ties are reciprocal. It displays only the presence or absence of a tie, not the direction of the tie. Not only does this method of representation allow relational data to be stored compactly and systematically, but it is vital that the data be stored in this way in order to utilise social network packages (such as GRADAP, UCINET or STRUCTURE) which can only analyse data that have been converted into a data matrix.

Following Dodsworth (2005b), I encoded the friendship links elicited by each envelope game into a single data matrix of binary (undirected) relations.

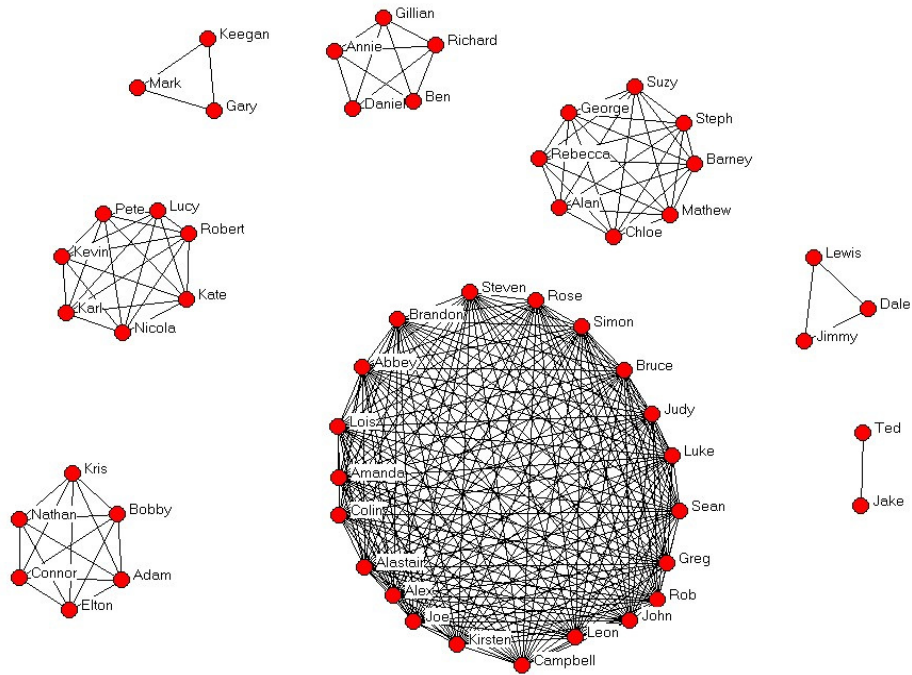
Table 2.3: Example of part of a binary matrix

	Ted	Dale	Daniel	Elton	Robert
Ted	--	0	0	0	0
Dale	0	--	0	1	0
Daniel	0	0	--	0	0
Elton	0	1	0	--	0
Robert	0	0	0	0	--

The value 1 represents a stated relation of friendship between individuals and 0 represents the lack of a stated association. In other words, the example above shows

that Elton and Dale were grouped together by one of the informants in the same envelope as ‘friends’. The information contained within a single matrix can then be converted into a sociogram.

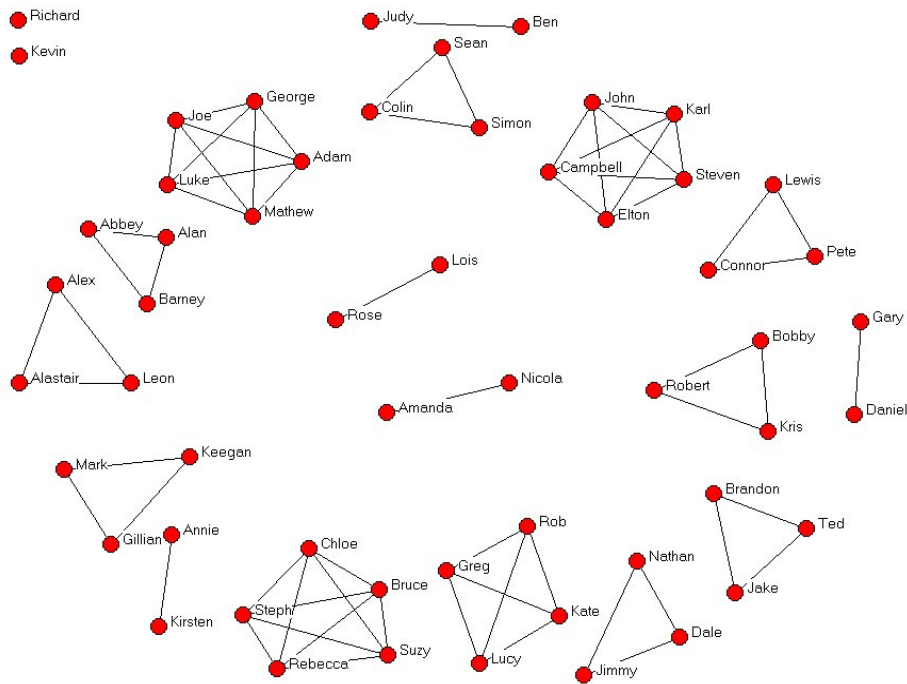
**Figure 2.3: Gary’s envelope game sociogram**



Comparing the individual sociograms can usefully highlight disagreement among community members. For instance, the obvious difference between figure 2.3 (Gary’s social space) and figure 2.4 (Daniel and Brandon’s collective social space) is that while Gary has chosen to make a few generic categories, lumping all of the novice juvenile players together, Daniel and Brandon have divided the individuals into lots of smaller social groups<sup>46</sup>.

<sup>46</sup> Daniel and Brandon have more contact with members of the novice band as they are involved with them in a teaching capacity. They presumably therefore have a more detailed understanding of the friendship groups within it.

**Figure 2.4: Daniel and Brandon’s envelope game sociogram**



The results of each separate envelope game can also be collated into an aggregate matrix to show similarities across individual networks. This is useful in highlighting areas of agreement among the community.

**Table 2.4: Extract from the aggregate network**

	Ted	Dale	Daniel	Elton	Robert
Ted	--	5	7	3	0
Dale	5	--	11	15	1
Daniel	7	11	--	10	2
Elton	3	15	10	--	2
Robert	0	1	2	2	--



The aggregate matrix is achieved simply by adding together the information from each individual matrix. The result is that “the aggregate network is considered a rough model of the community’s perceived social structure according to the informants whose interviews contribute to it” (Dodsworth 2005b: 228).

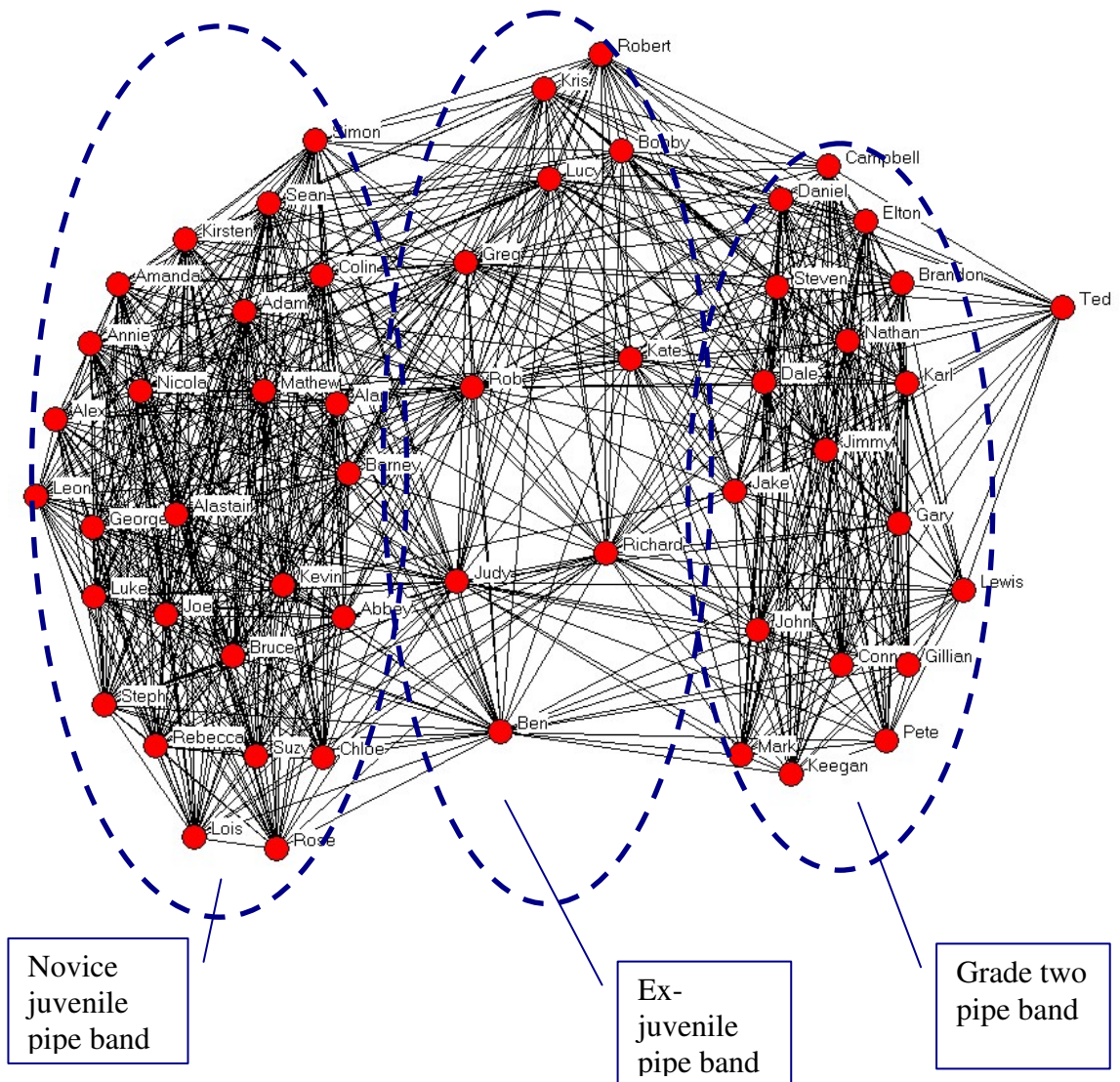
In the aggregate network, the numerical value of a tie reflects the number of informants who recognised the friendship relationship. The maximum value for any tie in this aggregate network is 32<sup>47</sup>. Ties with a very low value represent connections that are not broadly recognised in the community and so salient friendship groups are therefore likely to be those with a high tie value because they are recognised by multiple speakers. Individuals with weaker ties in the aggregate network may exist on the periphery of these salient groups and may play particular roles in the community (e.g. they may act as bridges or brokers).

Had there been no identifiable sub-groups in the community, I would have expected the aggregate matrix to consist mainly of low valued ties and to be randomly distributed. This is not the case; indeed several ties have the maximum value of 32 and so were recognised by all informants. However, not all of the ties have a value of 32 which suggests that there is disagreement among the community members. This disagreement is apparent when the aggregate matrix is transformed into a sociogram as in figure 2.5:

---

<sup>47</sup> Although I conducted 34 individual and group recordings (i.e. have 34 ‘envelope game’ results), I have not included the data from either the game played with Sean and Colin or with Simon as they chose not sort the data according to friendship patterns. This is interesting in itself and so perhaps relevant in other ways but these data are therefore not appropriate for inclusion in the aggregate network.

**Figure 2.5: aggregate network sociogram**



The sociogram above is organised with spring embedding which locates the points in the graph with the shortest path lengths closer together in the graph and so provides a rough indication of ‘distance’ between the actors or nodes in the network. The graph seems to display three main components. The dense left-hand group corresponds roughly to the current novice juvenile pipe band and the dense right-hand group corresponds roughly to the current grade two pipe band. On the far right of the network is the pipe major, Ted, who is the leading authority figure in the band.

Many of my informants found it difficult to assign Ted to a friendship group because of his status as a leader (see comments below from Jake and Jimmy).

Jake: \*\*\*Ted's on his own isn't he? How dae ye pit Ted intae-ye cannae pit him intae a pile can ye?

Jimmy: \*\*\*Ted really cos eh his role, he's sortae, he's in every group

The less tightly-knit cluster in the centre of the sociogram is composed primarily of individuals who were members of the now obsolete juvenile pipe band. Although these individuals have been officially re-categorised, their status as a friendship group is therefore still apparent to some extent.

Despite the benefits that the sociogram brings to the interpretation of data, when dealing with large data sets, its usefulness is limited because significant patterns can become obscured among a web of ties. To overcome this problem, several quantitative measures of sub-group analysis were employed.

### **2.3.3 Finding Subgroups**

One of the most fundamental applications of SNA since its inception has been its use in discovering sub-groups or 'cliques' within the larger group structure. The anthropologists in the 1940s and 1950s used the 'clique' concept as a theoretical construct in their approach to social organization. Warner and Lundt describe a clique as an "informal association of people among whom there is a degree of group feeling and intimacy and in which certain group norms of behaviour have been established" (1941: 32). However, as the social network metaphor began to be applied to Graph Theory and more advanced mathematical techniques were devised to quantify network relations and structures, the 'clique' became a formal construct. Scott (2000:114) explains that the current mainstream approach is to define a clique as the maximum number of actors who have all possible ties present among themselves. In other words, a clique is a maximally complete subgraph. Table 2.5 presents the results of various measures of network analysis that were employed to find cliques in the aggregate network; these measures of network analysis are

explained below. All calculations were performed by the network software UCINET (Borgatti, Everett and Freeman 2002).

Table 2.5: Clique Analysis (binary data)

NO.OF SUB-GROUPS	CLIQUE	N-CLIQUE (N=2)	N-CLAN (N=2)
1	George Luke Joe Alex Kevin Alastair Bruce Leon	Mathew Adam George Luke Joe Alex Kevin Alastair Bruce Leon	Mathew Adam George Luke Joe Alex Kevin Alastair Bruce Leon
2	Adam George Luke Joe Alastair Bruce Leon		
3	Mathew Adam George Luke Joe Alastair Leon		
4	Dale Nathan Jimmy	Dale Elton Steven Nathan Jimmy Karl	Dale Elton Steven Nathan Jimmy Karl
5	Dale Nathan Karl	Dale Elton Steven Campbell Nathan Karl	Dale Elton Steven Campbell Nathan Karl
6	Daniel Campbell Brandon	Daniel Elton Steven Campbell Brandon Karl	Daniel Elton Steven Campbell Brandon Karl
7	Elton Steven Nathan Karl		
8	Elton Steven Campbell Karl		
9	Robert Kris Bobby	Robert Kris Bobby	Robert Kris Bobby
10	Ted Jake	Ted Jake	Ted Jake
11	Rob Kate Greg	Rob Kate Lucy Greg	Rob Kate Lucy Greg
12	Kate Lucy Greg		
13	Lewis Pete Connor Mark Keegan Gillian	Lewis Pete Connor Gary Mark Keegan Gillian	Lewis Pete Connor Gary Mark Keegan Gillian
14	Gary Mark Keegan Gillian		
15	Annie Kirsten Nicola Amanda	Annie Kirsten Nicola Amanda	Annie Kirsten Nicola Amanda
16	Sean Simon Colin Alan	Sean Simon Colin Alan	Sean Simon Colin Alan
17	Lois Rose	Lois Rose	Lois Rose
18	Judy Barney	Judy Barney	Judy Barney
19	Abbey Rebecca Suzy Steph Chloe	Abbey Rebecca Suzy Steph Chloe	Abbey Rebecca Suzy Steph Chloe

The data contained within the aggregate matrix is valued (i.e. it contains information on the strength of the tie between each node). However, most algorithms for locating

substructures operate only on binary data and so it is necessary to convert valued measures of relations into a simple binary matrix. This understandably results in the loss of a great deal of information but the additional power and simplicity of analysis of binary data is often worth the 'cost' of the loss of information in a valued graph. In order to carry out an analysis of substructure, it was therefore necessary to convert the aggregate matrix into binary form.

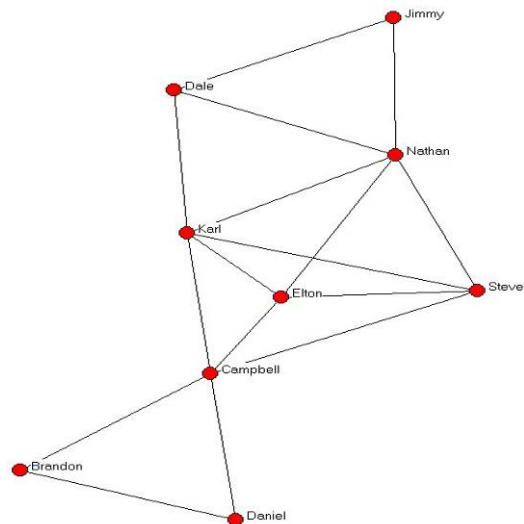
When dichotomizing a valued graph, the analyst selects the cut-point in the data, the value at which the data is re-organised. In this aggregate matrix, the highest value of tie strength is 32 and the lowest is 0. The median of these two points, 16, was therefore chosen as the cut-point. All ties with a value of less than 16 were coded as 0 and all ties with a value greater than or equal to 16 were coded as 1. The binary matrix provided the data for the analyses presented in table 2.5. The results of the basic clique analysis are presented in column two of table 2.5. The algorithm finds 19 sub-groups in the data, several of which have overlapping members.

The definition of a clique as a maximally connected sub-graph is often considered too restrictive for 'real world' data as it insists that every member must be directly tied with every other member of the group. For this reason, a number of alternative methods of analysis have been proposed. The earliest of these is the *n*-clique, developed by Bron and Kerbosch (1973). In this analysis, *n* represents the path distance<sup>48</sup> at which members of the clique are regarded as connected. A 2-clique is therefore one in which members are connected either directly (at distance 1) or indirectly (at distance 2) through a common neighbour. This is similar to the notion of 1<sup>st</sup> and 2<sup>nd</sup> order zones in the use of SNA in sociolinguistics (see Milroy 1987: 53 for details). To illustrate this concept, see figure 2.6 which displays a section of the network sub-structure.

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<sup>48</sup> The length of the path is measured by the number of lines that connect two points on a sociogram (Scott 2000:68).

**Figure 2.6: network substructure and n-clique**



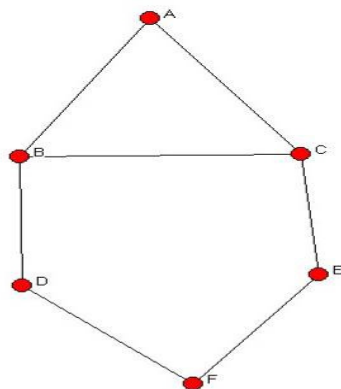
A straightforward clique analysis considers Brandon, Daniel and Campbell as a distinct subgroup (no. 6 in column 1, table 2.5) because the distance between each is 1. However, if we increase the path distance to 2 as in a 2-clique analysis, Daniel, Brandon, Campbell, Steven, Elton and Karl can be regarded as a clique since the distance between them is either 1 or two. The distance between Daniel and Dale is 3 and so they do not constitute a clique in a 2-clique analysis. Instead the analysis suggests that there are 3 subgroups or cliques in this structure and they share the members Elton, Steven and Karl in common.

By applying the 2-clique method and relaxing the definition of clique membership, the cliques of the first analysis are made more inclusive. As a result, there are fewer maximal cliques in the 2-clique analysis than in the strict 1-clique analysis and larger sub-groups as some of the areas of overlap between 1-clique structures can be analysed as a single clique.

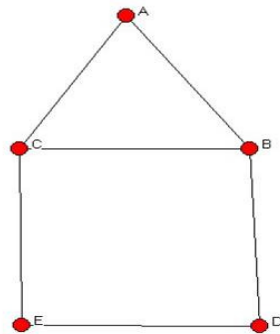
However, as Scott (2000:116) explains, there are two important limitations to the n-clique analysis. Firstly, values of n which are greater than 2 may be difficult to justify sociologically. Hanneman and Riddle (2005: chapter 5) explain that the n-clique approach tends to find long and stringy groupings rather than discrete sub-groups and while this type of analysis may be important in discovering the overall structure of the network, it is not necessarily helpful in the identification of small

sub-groups. Secondly, it is entirely possible for members of n-cliques to be connected by points on a path although they are not themselves members of the clique. Several analysts have taken up this problem and proposed revisions to the n-clique notion. Mokken (1979) has argued that a more useful indication of the division between subgroups becomes apparent when the diameter of the clique (i.e. the greatest distance between any pair of points) is also reduced to n. This approach is called n-clan. Scott (2000: 117) provides an example of the difference between n-clique and n-clan. In figure 2.6 below, the set [A,B,C,D,E] comprises a 2-clique but the 2-distance path that connects points D and E runs through a non-member, F. This sub-group therefore has an n-clique of 2 but a diameter of 3 because the path distance between the most distant members of the clique is 3. In figure 2.7, however, both the path distance and the diameter of the clique is 2 and so this is an example of 2-clan.

**Figure 2.7: 2-clique, 3 diameter**



**Figure 2.8: 2-clique, 2-diameter (2-clan)**



When both the  $n$ -clan ( $n=2$ ) the  $n$ -clique ( $n=2$ ) are applied to these data, the results are identical.

The approaches to clique analysis in table 2.5 all employ binary data. The  $f$ -group algorithm allows data to be re-coded at different levels and so can make more use of valued data. Rather than coding the aggregate matrix as binary, it codes the data as 0, 1 and 2. In the analysis, a value of 0 is assigned to all ties that are below the cut-off value selected by the analyst (in other words, the programme ignores all ties that are re-assigned as 0 in the new matrix). A score of 2 is assigned to a ‘strong tie’ (the value of which is calculated by the algorithm when the analysis runs) and ‘weak ties’, those which lie between these two values, are coded as 1. In the first analysis in table 2.6, the  $f$ -group cliques are based on a calculation in which all ties in the original aggregate matrix below a value of 1 are re-coded as 0 and so are ignored.

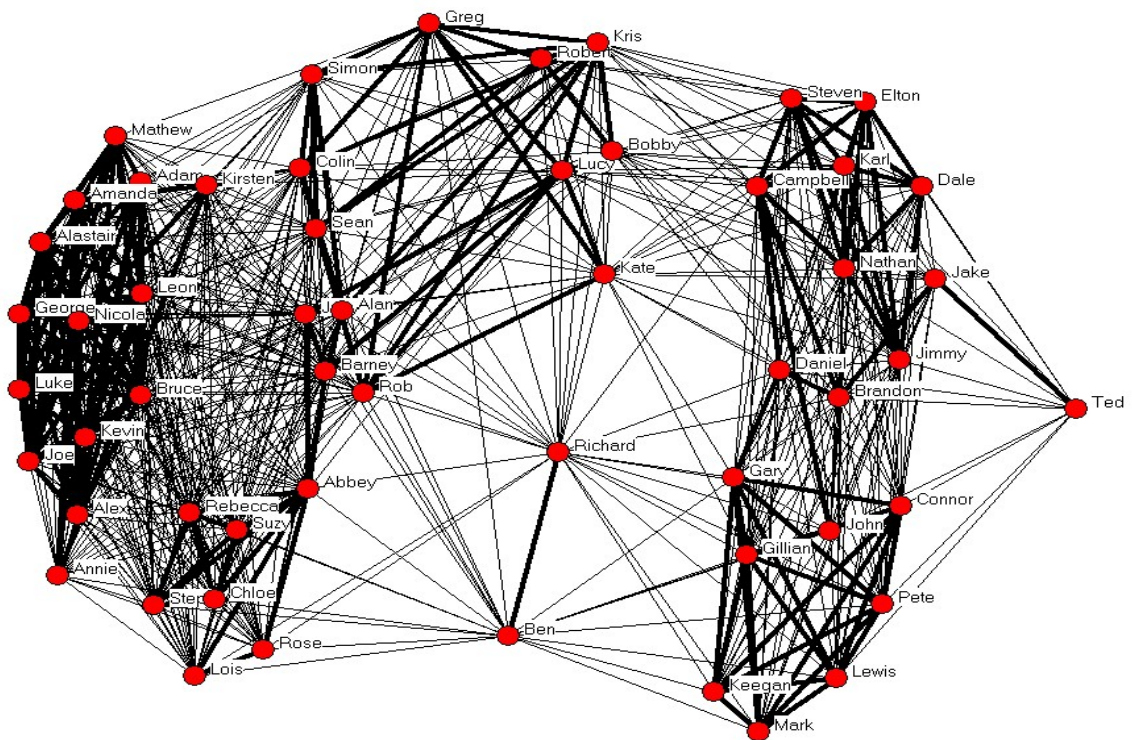


Table 2.6: F-group clique analysis (valued data)

NO.OF SUB-GROUPS	F-GROUPS (F=1)	F-GROUPS (F=8)	F-GROUPS (F=16)	F-GROUPS (=24)
1		Mathew Adam George Luke Joe Alex Kevin Alastair Bruce Leon	Alex Leon	Alex Leon
2			Kevin Alastair Bruce	George Joe
3			Mathew Adam George Luke Joe	Mathew Adam Luke
4	Ted Dale Daniel Elton Jake Steven Campbell Nathan Brandon Jimmy Karl Lewis Pete Connor Gary Mark Keegan Gillian John	Dale Nathan Jimmy	Dale Nathan Jimmy	
5				
6		Daniel Elton Steven Campbell Brandon Karl	Campbell Brandon	
7			Elton Steven Karl	
8				
9	Robert Rob Kate Lucy Kris Bobby Sean Simon Colin Greg Lois Rose Judy Abbey Barney Alan Rebecca Suzy Steph Chloe	Robert Kris Bobby	Robert Kris Bobby	
10		Lewis Pete Connor Gary Mark Keegan Gillian	Lewis Pete Connor	
11		Rob Kate Lucy Greg	Rob Kate Greg	
12				
13			Mark Keegan Gillian	
14	Ben Richard	Nicola Amanda	Nicola Amanda	Nicola Amanda
15	Annie Mathew Adam George Luke Joe Kirsten Alex Kevin Alastair Nicola Amanda Bruce Leon	Annie Kirsten	Annie Kirsten	
16		Sean Simon Colin Alan	Sean Simon Colin	
17		Lois Rose	Lois Rose	Lois Rose
18		Judy Barney	Judy Barney	Judy Barney
19		Abbey Rebecca Suzy Steph Chloe	Rebecca Suzy Steph Chloe	Rebecca Suzy Steph Chloe

The f-group ( $f=1$ ) analysis produces cliques similar to those identified in figure 2.4.

**Figure 2.9: f-group ( $f=1$ ) sociogram**

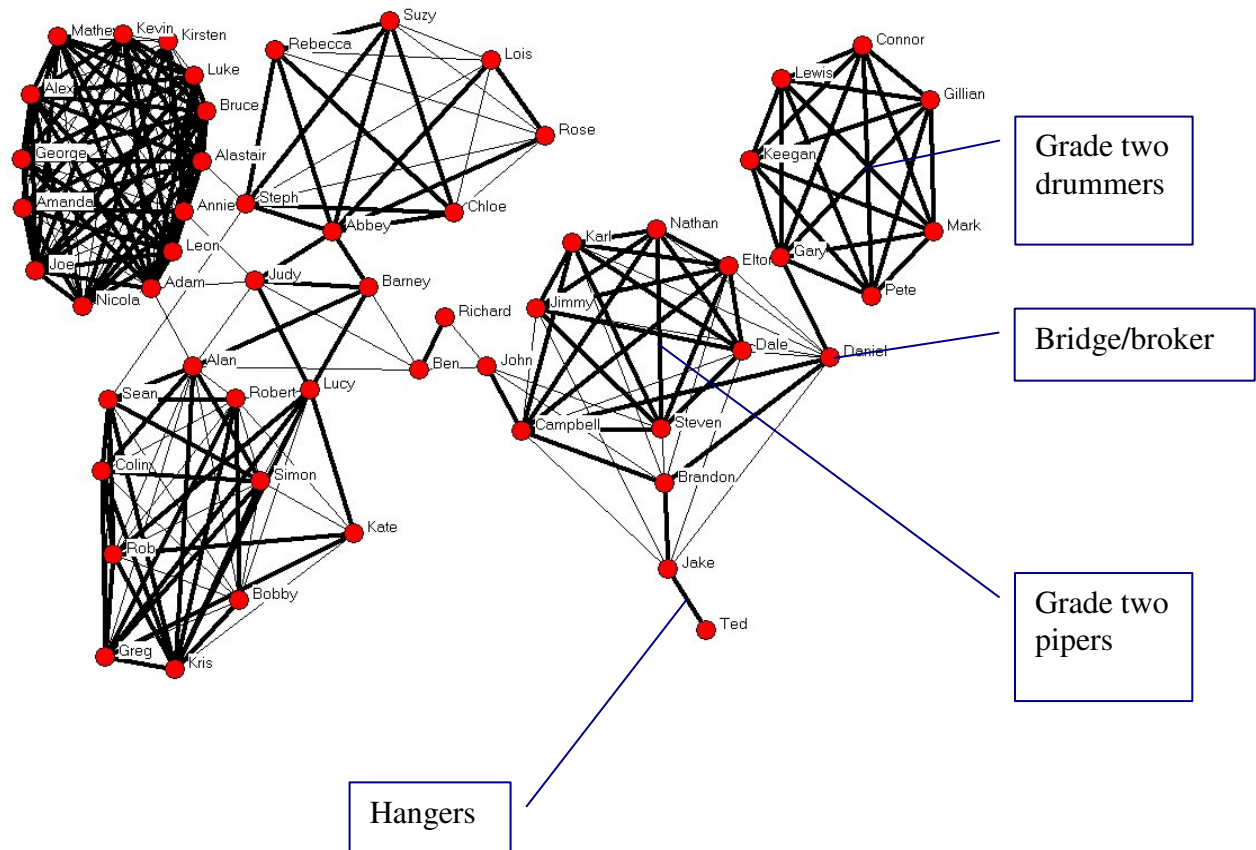


Although the clique analysis is based only on combinations of strong ties (highlighted in bold), which, in this case, are calculated by the f-group analysis as ties with a value of 12 or more in the aggregate matrix, the benefit of the f-group analysis is that it does not discard all other ties. It is therefore possible to see a web of weaker ties in the sociogram.

When the analysis runs on  $f=1$  (i.e. when the algorithm is programmed to ignore all ties with a value of 1 or less in the aggregate matrix), the resulting analysis suggests that there are only four sub-groups within the community. One of these sub-groups corresponds roughly to the novice juvenile pipe band, one corresponds roughly to the grade two pipe band, one to various members of the now dismantled juvenile pipe band and one to Ben and Richard. This is the only analysis in which Ben and Richard are considered a clique. Recall that “the higher a tie’s value, the more it reflects a perceived social fact that is recognised throughout the community,

rather than by just a few speakers” (Dodsworth 2005b: 236). As we increase the cut-point in the data between strong and weak ties, we also begin to see connections that are better recognised and so are more salient to the community.

**Figure 2.10: f-group (f=8)**

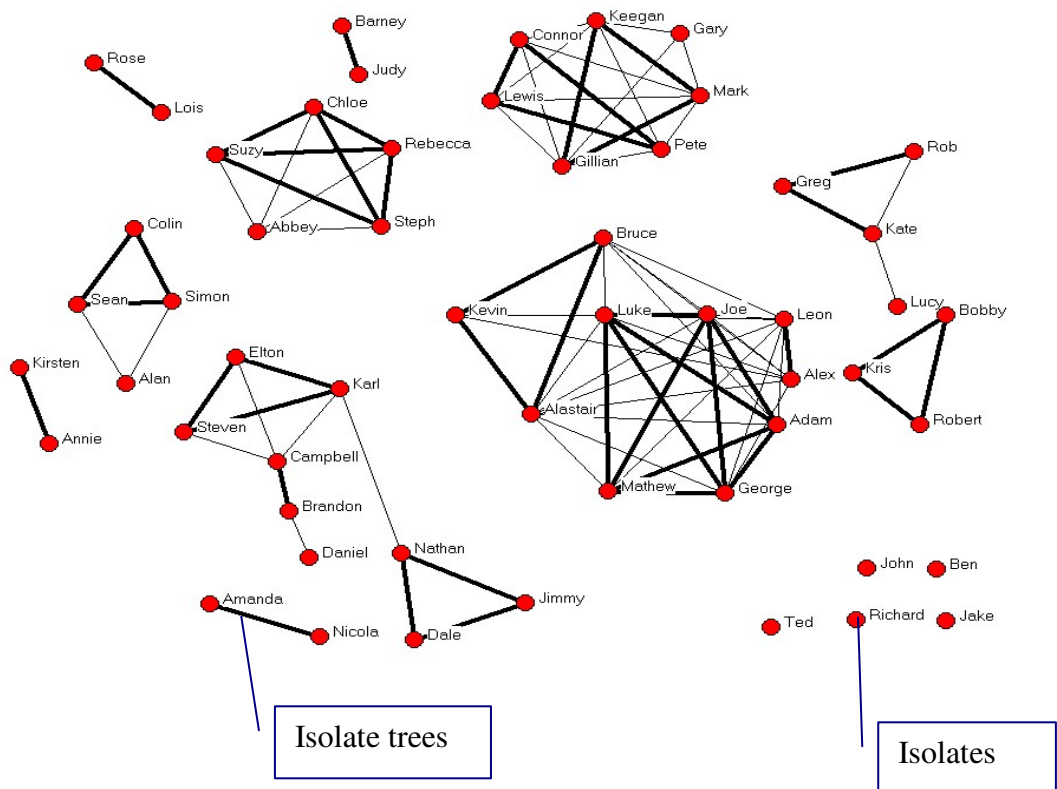


The f-group (f=8) analysis ignores all ties with a value of less than 8 and therefore only includes ties which were mentioned by at least 25% of the informants. This time, a strong tie is considered to be one with a value of 18 or more. As we would expect, there are more sub-groups in the analysis. Group 4 in the f-groups (f=1) analysis (i.e. the group which corresponded roughly to the grade two pipe band) is, at this level, split into three smaller cliques, one of which corresponds to the grade two drum corps. Similarly, group 9 in the f-groups (f=1) analysis (i.e. the group which corresponds roughly to the ex-juvenile pipe band) has also been split up at this level and is analysed as a series of smaller cliques. Group 15 in the first analysis is still, in the main, connected by strong ties, however Annie and Kirsten are now analysed as a

separate group, connected more to each other than to the rest of the group, as are Nicola and Amanda (this is not apparent in the sociogram). We also begin to see which individuals are peripheral members of some cliques. For instance, Daniel is the only link between the clique that consists primarily of grade two drummers and that which consists primarily of grade two pipers. He therefore acts as an intermediary between the two cliques but is not himself a central member of either. Also notice that Ted, Jake and John are, in this analysis, ‘hangers’ (Scott 2001:106) i.e. they are connected directly to members of cliques but are not themselves central members of cliques.

The f-group (f=16) analysis again produces very different results to the previous f-group analyses.

**Figure 2.11: f-group (f=16)**



F-group (f=16) only includes ties that are mentioned by 50% of the informants and so ignores all ties with a value of less than 16. In this case, strong ties are those which have a value that is greater than or equal to 22 and weak ties are somewhere between 16 and 22. This analysis produces a smaller number of cliques (again as we

would expect since we are reducing the available data in the analysis). At this cut point, we begin to see the emergence of isolates (i.e. points in the graph that are no longer connected to any other). These individuals have the weakest ties and correspond to the individuals that the majority of the groups had difficult categorising. Notice also the emergence of isolated trees (i.e. chains of points or dyads that are no longer connected to a larger clique structure).

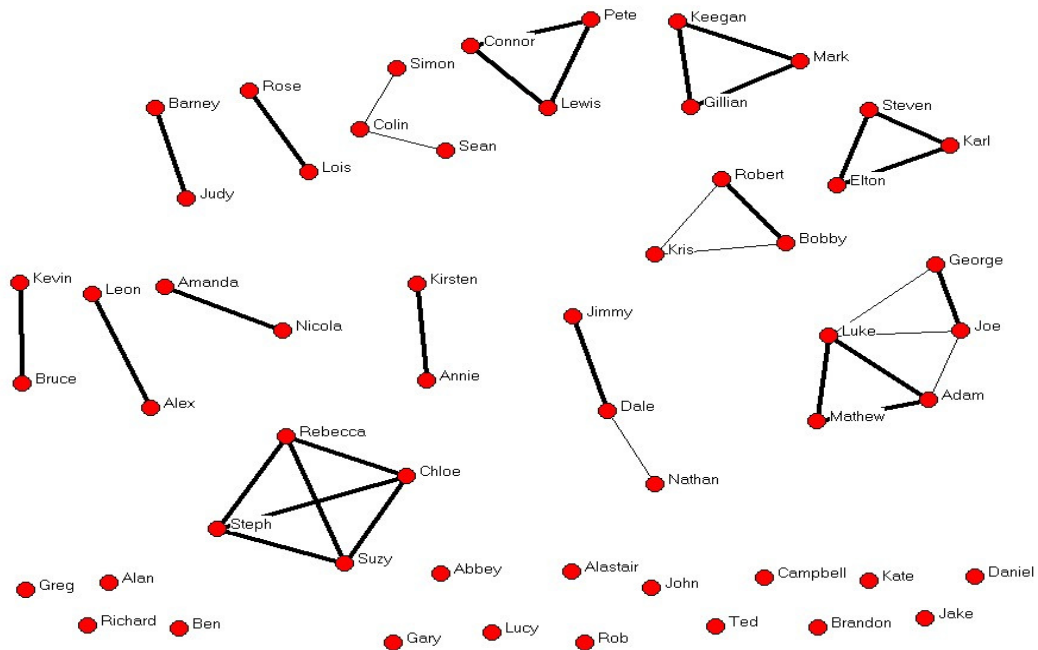
In f-group (f=16), some of the cliques that were identified at the previous level of analysis are now analysed as composed of smaller dyads and cliques. For instance it is apparent that the cluster that was in f-group (f=1) composed mainly of ex-juvenile players is, at this level, composed of four sub-groups:

1. Robert, Kris and Bobby
2. Rob, Kate and Greg (with Lucy weakly tied)
3. Sean, Colin and Simon (with Alan weakly tied)
4. Judy and Barney

Similarly, the two clusters that were groups 4 and 6 in the f-group (f=8) analysis (i.e. mainly grade two pipers) is, at this level, further analysable as three distinct cliques that are only tenuously linked with weak ties. Group 1 in the f-group (f=8) analysis (i.e. mainly novice pipers) is now sub-divided into three cliques that are, however, still connected by several weak ties.

By the time we reach the value of (f=24) in the f-group, 75% of the data is discounted and only the strongest ties are available to use in the algorithm. Strong ties are valued at 27 and weak ties fall somewhere between 22 and 27.

**Figure 2.12: f-group (f=24)**



The only value in running the f-group analysis at such a high level is that the strongest ties in the data become apparent. Notice that the cluster of female tenor drummers in the novice juvenile band (Rebecca, Chloe, Steph and Suzy) is retained but most of the larger social structure is now reduced to dyads and triads.

In order to reach a more definitive sub-structure, I looked for similarities in the results across each of these different clique analyses (tables 2.5 and 2.6). These similarities are displayed in table 2.7.

Table 2.7: Group membership, similarities across clique analyses

	<b>GROUPS</b>
<b>1</b>	(a)[Mathew, Adam, George, Luke, Joe] (b)[Kevin, Alastair, Bruce] (c)[Alex, Leon]
<b>2</b>	(a)[Dale, Nathan, Jimmy] (b)[Elton, Steven, Karl] (c)[Daniel, Campbell, Brandon]
<b>3</b>	Robert, Kris, Bobby
<b>4</b>	(Ted, Jake)
<b>5</b>	(a)[Lewis, Pete, Connor] (b)[Mark, Keegan, Gillian] (c)[Gary]
<b>6</b>	Rob, Kate, Greg [Lucy]
<b>7</b>	(a)[Annie, Kirsten] (b)[Nicole, Amanda]
<b>8</b>	Sean, Simon, Colin, [Alan]
<b>9</b>	Lois, Rose
<b>10</b>	Judy, Barney
<b>11</b>	Rebecca, Suzy, Steph, Chloe [Abbey]

In some cases, there is a great deal of similarity between the cliques that are selected as structurally significant by different types of clique analyses. For instance, in all but the f-group (f=1) analysis, the following cliques were consistently identified:

- Robert, Kris, Bobby
- Rob, Kate, Greg
- Sean, Simon, Colin
- Lois, Rose
- Judy, Barney
- Rebecca, Suzy, Steph, Chloe

These groups therefore seem to constitute the most salient or most clearly identifiable friendship groups in the community. In some cases, larger groups appear to split into smaller sub-groups as the cut-point in the data is increased. This is the case for group 1, 2, 5 and 7 in table 2.7. This level of sub-structure only becomes apparent at f-group (f=16) when the programme takes account of ties that are mentioned at least 16 times (i.e. 50% of the time). In other words, these sub-groups

are less salient in the community at large. I have highlighted this sub-division in the later stages of the analysis by including the individuals that constitute the sub-groups in square brackets. Ted and Jake are consistently analysed as a clique in the basic clique, n-clique and n-clan analyses but are not considered a clique in either of the f-group analyses so I have enclosed them in rounded brackets in table 5 to highlight this discrepancy. Finally, several individuals are 'loosely tied' to particular cliques and they become isolates as the cut-point in the analysis is increased. For instance, Lucy is loosely tied to Rob, Kate and Greg; Alan is loosely tied to Sean, Simon and Colin; and Abbey is loosely tied to Rebecca, Suzy, Steph and Chloe. I have indicated this in the table by enclosing these individuals in square brackets within their respective sub-groups.

### **2.3.4 Problems with the envelope game as SNA data**

Interpreting the results of the envelope game as social network data and dividing the community based on the result of clique analyses of this data is one way in which it is possible to benefit from the techniques of SNA whilst at the same time reaching a better understanding of the local social structure as perceived by the informants. However, there are problems with this method.

Clearly, this method of encoding relational data as binary is problematic: it is a gross simplification to describe social relationships as categorically 'strong' or 'weak'. This problem partly stems from the problems of analysing relational data with the techniques available in SNA and partly from the nature of the envelope game which forces discrete categorisation when, in reality, the boundaries around groups are not rigid. Most of my informants had difficulty with this aspect of the game<sup>49</sup> but, interestingly, they often had problems categorising the same individuals (see the discussion of isolates in section 3.2).

Also, this method of data collection did not allow for an examination of multiplex social relationships between individuals. By categorising only on the basis of friendship, other types of potentially relevant information are excluded from the analysis e.g. the sibling relationship between Gillian and Gary or the marriage

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<sup>49</sup> This also troubled Matthews' informants (2005:68) although they were asked to provide a 'free sort' or 'unconstrained sort' i.e. they were not told which criteria to use when sorting.



relationship between Gillian and Keegan. Although a more traditional approach to social network data collection (such as a questionnaire) would have allowed for an investigation of multiplex ties in the community, the focus would still have been on social structure. In other words, it would still not be able to account for the sense of belonging that many of these speakers feel; an awareness that they are part of something more meaningful than merely a network of connections between people:

Extract 6

Daniel: hing wi this band tae is everybody kens each er an their family an hings like that ken

Brandon: aye

Daniel: it's a close band eh, it's no just fucking cunts turning up tae practices

The limitations of second wave methods more generally have increasingly led to a 'third wave' movement away from a focus on structure to a focus on practice.

## ***2.4. Communities of practice***

Both second and third wave studies employ ethnographic methods but the primary difference between them is that while second wave studies conduct ethnographies of geographically defined communities, third wavers use ethnography to study 'communities of practice'. The community of practice construct (hereafter CofP) was introduced to linguistics by Eckert and McConnell-Ginet (1992), following its use by Lave and Wenger (1991), as a tool to describe social learning. A CofP is defined as "an aggregate of people who come together around mutual engagement in an endeavour. Ways of doing things, ways of talking, beliefs, values, power relations – in short, practices – emerge in the course of this mutual endeavour" (Eckert and McConnell-Ginet 1992: 464). The CofP was introduced in research on language and gender and it is in this domain that it has continued to receive most support, leading a movement away from an emphasis on the binary distinction between 'male' and 'female' social categories to a more local analysis of the construction of stylistic resources in different gendered communities.

Wenger (1998: 76) offers three criteria that any 'aggregate of people' must satisfy in order to be characterised as a CofP:

1. **MUTUAL ENGAGEMENT:** that is, there must be regular interaction between the participants of the CofP, although, as Meyerhoff (2002: 527) notes, this interaction or engagement need not necessarily be harmonious.
2. **A JOINTLY NEGOTIATED ENTERPRISE:** members of the CofP must regularly come together for some purpose. The nature of the enterprise is not important (although Meyerhoff (2002: 528) argues that it is important that the enterprise be reasonably specific). What is important is that there is some circularity: "members get together for some purpose and this purpose is defined through their pursuit of it" (Meyerhoff 2002: 528).
3. **A SHARED REPERTIORE:** this is a shared collection of resources that is developed over time through the practices of the first and second criteria.

Is the CofP a relevant tool for understanding the social relations and practices of this community?

It is difficult to justify treating the entire WFHPB community as a single CofP. Wenger (1998: 126-7) explains that some social configurations are too broad or diverse to be treated as a single CofP. They may often share historical roots or belong to the same institution or even have members in common but the possibility of mutual engagement of the participants and, hence, cohesion of the CofP, is limited by the breadth and diversity of the structure. Wenger (1998: 126) refers to groups of related CofPs as constellations of CofPs. As previously discussed, WFHPB has an imposed social structure already in place which divides individuals according to the particular pipe band that they play in and also the instrument that they play. All of these groups continue to share the name of WFHPB, they share the same geographical proximity (they practiced in the same building and travel together to and from pipe band competitions on the same bus) and they have related enterprises.

In this respect, they share certain characteristics of Wenger's constellations of CofPs. However, both Wenger (1998:112) and Meyerhoff (2002:528) urge the analyst to exercise caution in their use of the term CofP since not every community is necessarily a community of practice. If we apply Wenger's three defining criteria to these social groups, we are faced with some problems.

There is clearly the existence of a jointly negotiated enterprise: members come together to practice their various instruments with the ultimate goal of winning competitions and raising the profile of the band. There is also the existence of a shared repertoire. Wenger (1998: 125-6) explains that CofPs will typically display a range of more specific features which may include, for instance, the absence of introductory preambles as well as the use of jargon and shortcuts to communication, local lore, shared stories, inside jokes and knowing laughter. Included in this list may be the "stupit wee songs that WFHPB sings on the bus" (Dale). In the extract below, Alan and Ben are discussing their frustration at their inability to access some of the repertoire of the grade two drummers in the band who repeatedly tell stories of past achievements that they have shared:

Extract 7

Alan: but they aw mind back tae the days when it was 'we won the Europeans' an that

LC: aye

Ben: aye an-noh ken what a dinnae get, like big John an Pete an that are iywiz talking aboot when they went away tae some place an they stiyed an they aw got mortal an aw this eh

However, it is unclear whether each of these imposed sub-group divisions meet the criterion of mutual engagement. It is not necessary that all of the participants in the CofP all interact intensely with each other but it is clear that certain participants in these groups never speak with other members of the group. For instance, Kris and Robert explain in the extract below that they almost never talk to Kate:

### Extract 8

Kris: I'd say 'awright' tae Kate an that eh but

Robert: I dinnae, I've never talked tae her in ma life

Kris: aye she's no somedy that ye dinnae really-ye dinnae really talk tae her eh  
cos

LC: how?

Kris: I dinnae ken, just

Robert: I just dinnae

This is not an isolated case. Although 'mutual engagement' is much more than the simple act of talking, it is difficult to ascertain to what extent mutual engagement is possible when the individuals concerned do not engage in some form of direct verbal communication. It is also unclear exactly how much mutual engagement is required between participants in a CofP. Wenger is reluctant to define this in any great detail, explaining only that "what it takes for a community of practice to cohere enough to function can be very subtle and delicate" (1998: 74).

There is perhaps better support for the importance of social practice, and hence the CofP construct, at the friendship group level (i.e. the level investigated by the envelope game) rather than the imposed 'top down' community divisions. One source of evidence for this comes from some of the labels that were applied to friendship groups during the envelope game.

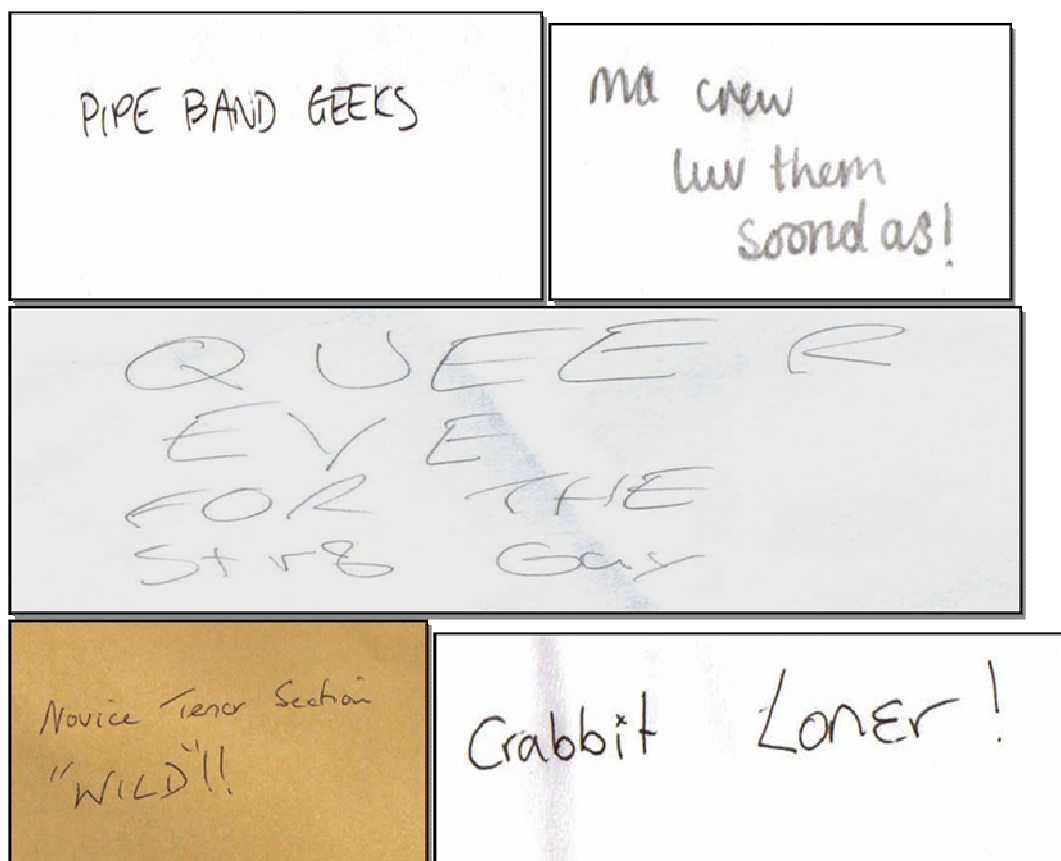
Most of the informants found the labelling processes particularly difficult and spent a great deal of time agonizing over the label that they should write. In some cases, they were so concerned with making sure that what they wrote on the envelope couldn't be construed as offensive that their initial description of the group barely resembled the 'politically correct' version that eventually appeared on the envelope. For instance, from Annie and Kirsten's initial characterisation of the groups to the point at which they formalised these characterisations in writing, 'the cool crew' became "other part of the novice juvenile band"; the 'try tae be cool crew' became "newish people"; 'the wee people that dinnae talk tae anybody' became "Valley lassies" and their own friendship group is eventually labelled "oor crew" rather than 'the best group ever'<sup>50</sup>.

---

<sup>50</sup> The adolescents in Mathew's study expressed similar concerns about formalising their opinions of people in ink. Compare Annie and Kirsten's response to the group of girls in Matthews (2005: 72) who characterised and categorised people as 'sluts' but then labelled the envelope as "people whose moral values are different than society's standards but are not necessarily wrong".

The labels were of a variety of different sorts and typically contained a fairly detailed description of the informants. Figure 2.13 provides some examples of the range of different labels that were given to the groups:

**Figure 2.13: Examples from the envelope game**



Despite the variation in the naming strategies, the labels that were given were often a description of the social practices of the group and in some cases, there are striking similarities between these descriptions. For instance, the descriptions of group 2(a) in table 2.7 above (Dale, Nathan and Jimmy) often related to the commitment, maturity and ability of its members as well as to the fact that they have all played together in another band previously (Dream Valley).

- “More serious, want to do well, ADULTS OF BAND, mature, do well for themselves and practice hard, BIG BAND” (Lucy)
- “Motivated to do well in GR 2. Ex-Dream Valley” (P)
- “Oldskool Dream Valley” (Gary)
- “Been in band longest” (Greg)
- “Old school buddies. Ex-Dream Valley. Similar piping abilities/friends” (Lewis)
- ‘ex world champs’ (Dale)

These individuals are all in their mid to late twenties and have all played together either in this pipe band or in Dream Valley for a number of years (Nathan jokes that this must surely be his centenary year). They are friends both in and out of band, spending time with each other occasionally at weekends.

At a typical pipe band practice at WFHPB, these three individuals are immediately discernible. They all have ‘professional’ jobs (Dale is a banker in Edinburgh, Jimmy works in government in Edinburgh and Nathan is a police officer) and the clothing that they *choose* to wear at the pipe band practice reflects this aspect of their identity. In the following extract, Elton and Steven are discussing the inappropriateness of Dale’s clothing at pipe band:

Extract 9

LC: how come ye dinnae wear yer work claes tae band?

Elton: cos ye wear them tae yer work aw day, I-I dinnae ken how Dale done that

LC: that’s what am wanting tae ask about

Steven: aye he loves it though

\*\*\*

Steven: and he liked folk tae ken, he liked

Elton: /and he liked wearing his shirt an tie an cufflinks an that

LC: aye

Steven: fucking sun glesses indoors

Elton: /an walked in wi his sun glasses in December

With comments like Dale ‘liked folk tae ken’ and ‘he loves it’, they touch on a sense of arrogance that this friendship group, and Dale in particular, seem to convey regarding their jobs. This is expressed more explicitly by Lucy in the following extract:

#### Extract 10

Lucy: he comes in fae work a lot an he's got his shirt an tie on, I hink people sort eh look doon at him because, nae disrespect tae them but some eh them are likes eh painters or-or ken or joiners or something whereas like a dunno what he

LC: /mm aye  
works as, dae you ken?

LC: I hink he works in a bank

Lucy: aye see he's got like a sortae upper class job sortae hing wi the suit sortae hing

LC: aye

Lucy: an I hink people look doon at him hinking 'who's he hink he is walking in like that'.

I have known Nathan for a few years which helped facilitate my entrance into this group; otherwise I imagine that this would have been a difficult group to break into because they do not make an effort to mix with many of the others in the band. For instance, when the majority of the group go outside for a 'fag break' (including those that don't smoke), they tend to stay indoors, usually with group 2b, segregating themselves from the rest of the band. The members of this group all share a real sense of commitment to the band and, in particular, to the pipe major of the band (Ted) who taught them all to play the bagpipes and who has been a mentor to them ever since. Dale's comments in the following extract were reverberated by Nathan and Jimmy.

#### Extract 11

D: \*\*\* what I think keeps or had kept me at the pipe band for the last three or four years is just loyalty

LC: loyalty tae WFHPB?

D: aye, because a-

LC: /so ye wouldnae have left for anither pipe band?

D: /no-no even WFHPB, tae Ted. He's the guy that taught me, he's the guy that taught me everything I know, a've never been under anybody else really\*\*\*the reason that I've no left tae go tae another band is because eh sortae loyalty

In the above discussion of group 2a, I have attempted to move beyond the categorisation of this group as 'friends' and provide an account of my understanding of the group in terms of their shared social practices. If it is the case that each of the sub-groups identified in table 2.7 can be discussed in a similar fashion then there

may be some degree of overlap between the groups that the SNA identified as structurally significant and the groups that seem to form communities of practice. In her research on adolescent social practices in Belten High, Eckert (2000) also makes connections between social networks and communities of practice. Eckert's analysis of variation in Belten High begins with a description of the social landscape in terms of three communities of practice: the Jocks, the Burnouts and the In-betweens. Jocks are typically middle class, aim towards further education, are school orientated and often involved in sports and/or school government. Burnouts, by contrast, typically come from working class families, smoke tobacco and marijuana, are bound for the local workforce, skip classes, have frequent encounters with the police and reject high school culture. The majority of high school students at Belten, however, fall somewhere between these two extremes of orientation (and hence are referred to and refer to themselves as in-betweens). In-betweens describe their own social identity in terms of traits shared with both the 'jocks' and 'burnouts'. Eckert (2000) also investigates variation between the friendship clusters that exist within these social categories, claiming that "the friendship clusters that make up the social network of the Belten High student body constitute the communities of practice in which the most active negotiation of social meaning takes place" (Eckert 2000:171). In other words, Eckert is suggesting that the clusters (or cliques) of a social network are analogous to communities of practice<sup>51</sup>.

Although this generalisation seems to hold in Belten High, this is not necessarily always the case in WFHPB. For instance, several of my informants categorised Daniel and Gary as a separate group but their status as a friendship group is not widely recognised within the community. Nevertheless, the group is characterised by the existence of certain social practices; indeed it is the existence of these social practices that requires the group to be less salient – this group is characterised by the fact that its members take drugs together. Because these friends tend to keep their social practices concealed, the clique analysis does not recognise them as constituting a distinct sub-group in the community, although some of the others in the band are aware of their group status and their social practices. This is reflected in some of the labels that the group were given.

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<sup>51</sup> This argument was also made in Eckert (2006).



- “Enjoyed a ‘smoke’ together. Get along well” (Connor)
- “Sheer Junkies” (Kris and Robert)
- “friends, smokers, hopeless drinkers” (Pete)
- “trainspotters” (Elton and Steven)

Also, although the CofP construct can usefully be applied to many of the sub-groups identified among the adults in the community, it is difficult to find similar social practices among the younger informants. This is highlighted by the fact that labels for the sub-groups within the novice juvenile band often focus more on shared attributes than shared practices:

- “in same school, come at same time to practice, come from same place”
- “they talk to each other at practice and they are friends”
- “both came from Mendhill pipe band”

It is also clear that many of the younger members of WFHPB do not experience the same sense of commitment or attachment to the band that many of the adults do. Connor has played with WFHPB for 10 years and in the extract below, expresses a sentiment that seems to be a tacit understanding between many of the adults in the band - playing in a band “gets a grip eh ye”. Wenger explains that the CofP can not only give rise to an experience of meaningfulness but that it can also “hold us hostages to that experience” (1998:85).

Extract 12

LC: \*\*\*how I mean it's-it's something that-it's hard tae describe what pipe band life is like tae people that arenae in the pipe band

Connor: I hink p- I hink folk that arenae in a pipe band dinnae get it eh

LC: aye

Connor: they dinnae understand the effort that goes in, they dinnae understand what it does cos it gets a grip eh ye, an how committed an how passionate folk can be about it

LC: mm hm

Bruce, on the other hand, is one of the youngest and newest members of WFHPB. He is 13 years old and hasn't yet played with the band in a competition which means that when the band is practicing for competitions, he is often told to sit to the side.

When I asked if he felt close to members of the band or if he felt that it was in any way like a community or an extended family, I was met with a puzzled silence. He explains in the following extract that he only began to play the bagpipes because some of his friends had already started and because it was an opportunity to skip French class at school.

Extract 13

Bruce: I just want tae be in it cos I like-when I started chanter I never-I never wanted tae dae it at aw but like I passed the music hing an I wiz like nah am no wanting tae dae it an that but like loads eh ma pals wiz there like Kevin, Paddy, Jamie [surname] an aw that eh so I just went for the first couple eh weeks, partly cos I wiz missing French but, so I went and I learnt the wee stuff an that like the scale an that an I thought it wiz no bad so I just kept daein it an then everybody else quitted an it wiz just me an Kevin an we just kept daein it

In comparing the social practices and commitment to the enterprise of the older and younger members of the band, I am not suggesting that the CofP framework is only applicable to adults. This is clearly not the case; in fact the large amount of research that has been produced on adolescent CofPs has led Bergvall (1999:279-280) to suggest entirely the opposite. Wenger (1998) explains that “the repertoire of a CofP includes routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions, or concepts that the community has produced or adopted in the course of its existence” (1998:83). In other words, the practices that emerge as a result of mutual engagement take time and sustained interaction to develop. It is therefore likely that some of the younger members of WFHPB simply haven’t had time to develop these.

It seems from the above discussion that not all of the network cliques identified by the SNA (see table 2.7) can accurately be described as CofPs and, also, not all of the CofPs that exist in the community have been identified by SNA. The question then is which sociolinguistic tool should be used to provide the most accurate representation of the social landscape in WFHPB?

The current trend in sociolinguistics is to focus on the practices that are generated in relationships as a way of explaining how social meaning becomes associated with linguistic variables. Rejecting the notion that linguistic choices index social categories directly (Ochs 1992), the third wave approach argues that

linguistic variables may be associated with fairly abstract social meanings that then take on more specific social meanings associated with the practices of a particular CofP. Eckert (2005) argues that it is only through observing the use of linguistic variation as a resource for the CofP that it is possible to understand how speakers combine variables (linguistic and social) to create distinctive styles. However, despite recognising that a CofP is not a discrete entity but a “node of mutual engagement that becomes progressively looser at the periphery, with layers going from core membership to extreme peripherality” (Wenger 1998: 118), the temptation remains in a CofP analysis to homogenise the individuals within the CofP and reduce the heterogeneity to a prototypical form, giving CofPs “a concreteness they do not actually possess” (Wenger 1998:61). The result is that peripheral members of the CofP are often marginalised in the analysis. This is not the case in SNA where peripheral members of the network (with weak ties) are thought to play a vital role in the transfer of information throughout a community. However, a focus on the structure of the community (at the expense of an analysis of practice) can also be problematic. As Moore (2003:14) explains, SNA lacks the capacity to *explain* sociolinguistic variation because it presents speakers as members of social networks who select linguistic variables to display social meaning. It does not question how speakers come to give social meaning to language; neither does it allow for speaker agency - the model implies that the network is the agent, exercising control over the individual.

I am aware of the drawbacks of each of these approaches and am therefore not suggesting that either of these techniques be employed as a research method independently. These methods are not mutually incompatible; instead, they can be combined to provide a more thorough understanding of the social structure of the community, invoking a discussion of social practice when it is necessary and helpful to do so. Indeed, an understanding of the weaknesses of these approaches only serves to underscore the need to tackle a discussion of social structure armed with a variety of tools. As Meyerhoff (2002) explains, the introduction of the CofP should be viewed as “an addition to the tool chest, not an attempt to throw out the old tools” (2002: 533).

This chapter has provided information on the methods used to collect and interpret the data for this thesis. I have combined ethnography with SNA and a CofP based approach in an effort to help me avoid superimposing my own preconceived ideas about the social structure of the group and to understand the local categories and groups that are important to my informants. In the following two chapters in part II of the thesis, I turn to a quantitative analysis of linguistic variation within this community.

## **Chapter 3: Th-fronting in WFHPB**

### ***3.1 Introduction***

This chapter deals with the patterning of the incoming innovation ‘th-fronting’ in West Fife High Pipe Band. The (th) variable has received considerable attention in English linguistics in recent years as the phenomenon of th-fronting – ‘the replacement of the dental fricatives [θ,ð] with the labiodentals [f] and [v] respectively’ (Wells 1982:328) – is alleged to have rapidly spread across some of the major towns and cities of Britain. Recent studies of this linguistic change in British English have provided interesting accounts of the sociolinguistic pattern of the variants of (th) and the spread of the labiodental variant. In order to situate findings on the patterning of this variable in WFHPB against the wider research literature, this chapter begins by briefly highlighting the patterns of variation and change that have been found with respect to this variable first in England and then in Scotland. Sections 3.4-3.5 then analyse the variation in the WFHPB corpus using techniques typical of modern quantitative sociolinguistics and section 3.6 attempts to uncover the social meaning of th-fronting in this community.

This chapter tries to answer the question: what quantity of the variation in th-fronting can be accounted for using only traditional (variationist) sociolinguistic methods? The aim here is to discover how far a mainstream analysis of this variation can take us towards explaining the variation. Part III of the thesis explores how much further we can go with an analysis which also attempts to account for the theoretical assumptions of the usage-based thesis.

### ***3.2 (th) in England.***

The earliest recorded indication of the realisation of /θ/ as [f] is in Elphinston (1787) who speaks of a tendency for “a rather low type of Cockney English” to say “Redriphe for Rotherhithe and loph for loth” (cited in Wyld 1927: 209, Kerswill

2003: 234). Kerswill (2003) presents evidence from the SED which suggests that the use of [f] for /θ/ may have originated in two separate focal areas simultaneously: the area in and around Bristol in the south west of England and in the south east of England around London. It is generally thought to be the case that this change spread out from the economically and culturally important centres of Bristol and London to surrounding geographical areas and Kerswill (2003:234) speculates that perhaps the establishment of good rail links between Bristol and London in the mid 1800s encouraged the spread of the change between these two cities<sup>52</sup>.

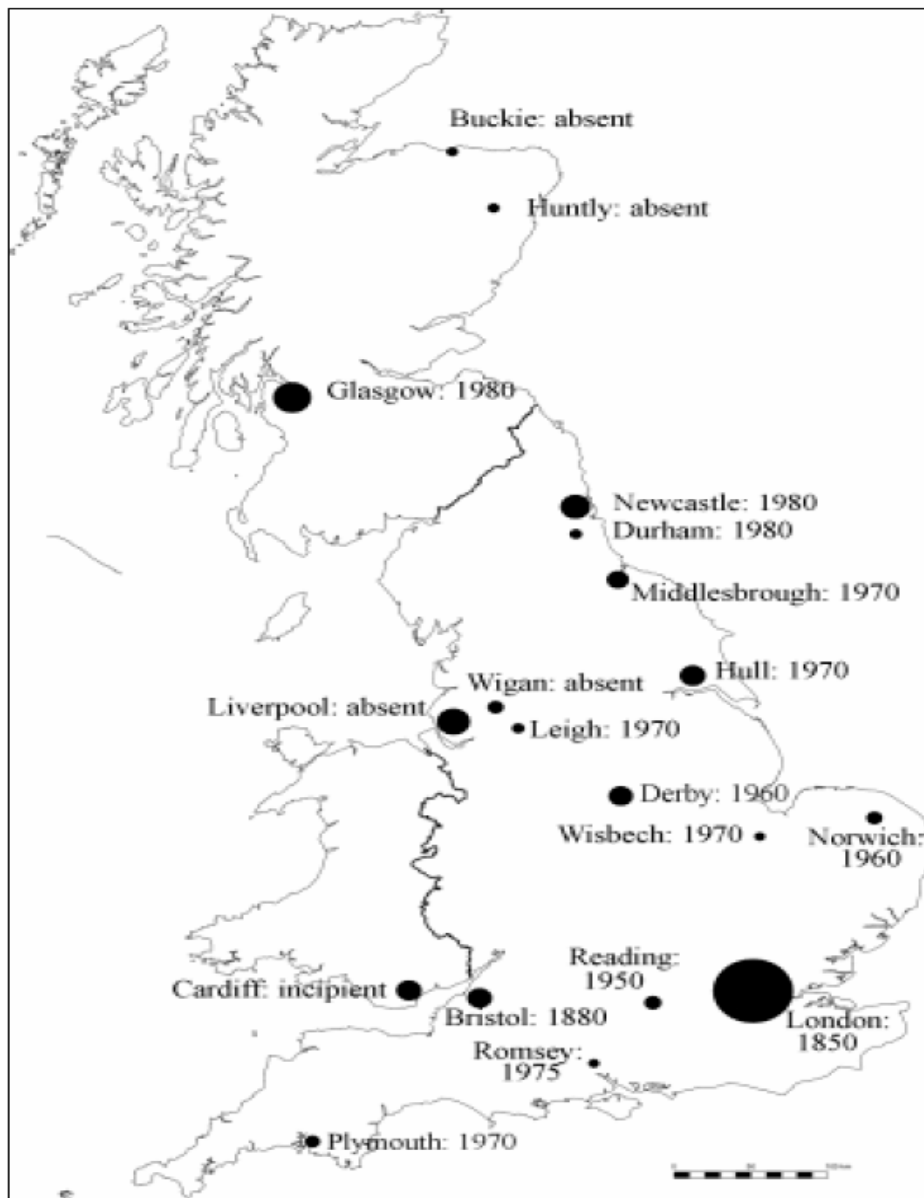
In an effort to investigate the spread of th-fronting across time and space, Kerswill (2003:236) maps the approximate birth dates of the age cohorts who were the first to use th-fronting ‘to a significant degree’<sup>53</sup> in various parts of the British Isles. Figure 3.1 details these results.

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<sup>52</sup> It is not clear from this discussion why the change did not also spread to other cities with good rail links to London and Bristol at the same time.

<sup>53</sup> Kerswill (2003) is charting the use of th-fronting in a community, not the idiosyncratic use of the variant as a result of immature speech.

**Figure 3.1: Spread of th-fronting in Britain based on the earliest dates of birth of cohorts to use the innovation non-idiosyncratically (Kerswill (2003:236)).**



The size of the circles in figure 3.1 represents the relative populations of each settlement. The change then is clearly spreading across Britain from the south (i.e. London and Bristol) but, as Kerswill (2003: 239-240) explains, these data do not support a straightforward geographical diffusion model because the change appears to have ‘hit’ large regions in the north of England and Scotland at roughly the same time.

The remainder of section 3.2 considers synchronic data which shows the spread of this change in progress in the south of England (Reading and Milton Keynes) and the North East (Newcastle, Durham and Hull). This will provide an overview of the social distribution of the variants of (th) in England.

### **3.2.1 (th) in Milton Keynes, Reading and Hull (Williams and Kerswill 1999)**

The investigation into th-fronting in Milton Keynes, Reading and Hull was conducted as part of two large research projects on dialect levelling<sup>54</sup>. A corpus of approximately 100 hours of data was collected for the Milton Keynes project from 48 working class children (aged 4, 8 and 12) and one adult caregiver was recorded with each child. Approximately 90 hours of data was collected for the Dialect Levelling project from 96 adolescents in the three towns Milton Keynes, Reading and Hull. Overall, the data were drawn from 190 hours of recorded speech and 191 informants.

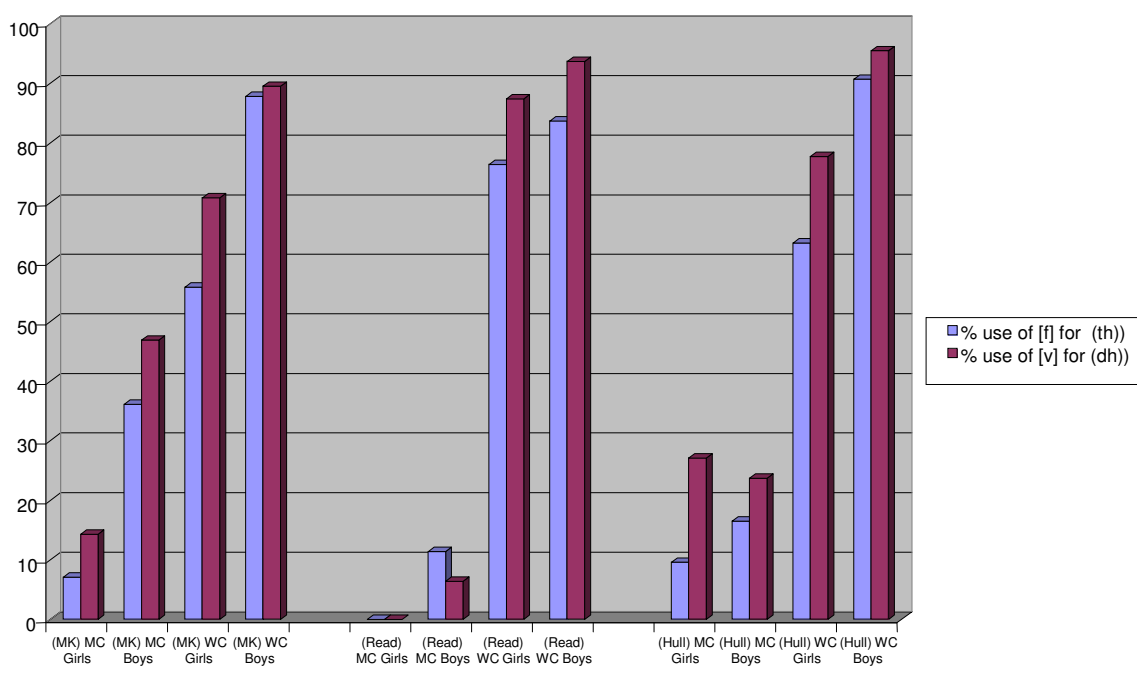
Despite being a more recent development in Hull than in Reading or Milton Keynes (see figure 3.1), figure 3.2 shows that the distribution of the variants of (th) is broadly the same in all three communities studied. In all cases (particularly in Reading), social class is the strongest influencing factor in the spread of the change with working class adolescents using substantially higher proportions of the fronted variants than middle class adolescents. Furthermore, it is working class *boys* who are showing the most preference for the innovation. The only case in which the girls have a higher frequency of use of the ‘fronted’ variant than boys is the middle class girls in Hull (and this is only the case with voiced th-fronting).

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<sup>54</sup> *A new dialect in a new city: children’s and adults’ speech in Milton Keynes* (1990-1994) ESRC ref. R000232376 and *The role of adolescents in dialect levelling* (1995-1998) ESRC ref. R000236180.



**Figure 3.2: Comparison of th-fronting across Milton Keynes, Reading and Hull**  
 (data extracted from Williams and Kerswill (1999: table 8.8)).



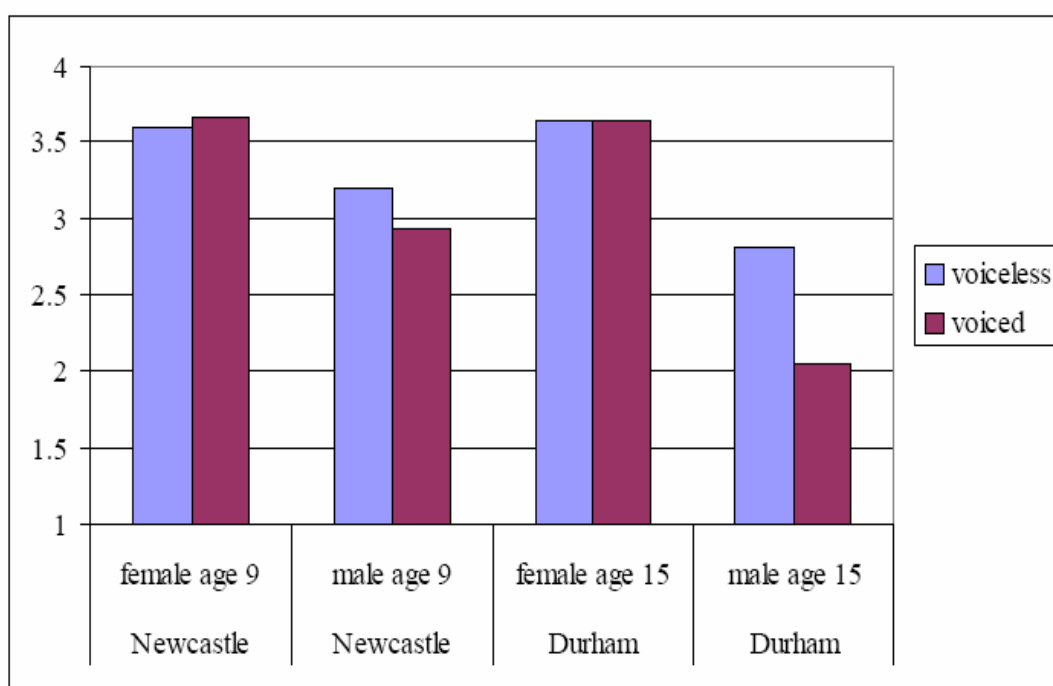
### 3.2.2 (th) in Newcastle and Durham (Kerswill 2003)

Th-fronting is a relatively recent phenomenon in Newcastle and Durham. In 1994, there was no evidence of th-fronting among the adolescent population of Newcastle (Watt and Milroy 1999) but it has since been found among 9-10 year olds (Allen 2003, cited in Kerswill 2003: 235). In Durham, there was no evidence of th-fronting in the 1983 cohort of 14-16 year olds analysed by Kerswill (1984) but it has been found in speakers of this age bracket from the same area in 2003 (Kerswill 2003:235).

Figure 3.3 compares the results of th-fronting in surveys conducted by Allen in Newcastle (2003, cited in Kerswill 2003: 237) and Kerswill in Durham (Kerswill 2003). Compared with the results presented in section 3.2.1, the Newcastle and Durham studies represent much smaller projects and this must be borne in mind

when comparing the results from sections 3.2.1 and 3.2.2. The Newcastle sample is of only 4 working class girls and 4 working class boys, aged 9-10 years old. The Durham sample is of 8 working class girls and 8 working class boys aged 14-15. The scale on the Y axes represents the scoring system used by both researchers: 1 = unequivocal [f] or [v]; 4 = unequivocal [θ] or [ð] and 2 and 3 represent intermediate variants.

**Figure 3.3: Retention of [θ] and [ð] among working class adolescents in Newcastle and Durham (from Kerswill 2003:237 )**



Again, the data for both cities show strikingly similar patterns: although these studies only collected data from working class speakers, in both cases male adolescents use more fronted variants of both the voiced and voiceless variable than their female peers.

Evidence from investigations of th-fronting in 5 cities across England seem to suggest that the change is being led by working class adolescent males and that social class is perhaps the most influential factor in the spread of this change.

### **3.3. (th) in Scotland**

#### **3.3.1. (th) in Glasgow (Stuart-Smith and Timmins 2006)**

Although Wells invokes ‘th-fronting’ as a general cover term for the spread of a ‘fronted’ variant in both the voiced and voiceless variables, Stuart-Smith and Timmins (2006) adopt the term only with reference to the voiceless variants because, in Scottish English at least, the variational patterns of [θ] and [ð] are very different. The first reported evidence of ‘modern’ th-fronting<sup>55</sup> in Scotland is given by Macafee (1983: 54) as occasional and sporadic but the main body of research on th-fronting in Glasgow comes from the analysis of two corpora collected in 1997 and 2003, both of which form part of a much larger research project into language variation and change in Glasgow (Stuart-Smith and Tweedie 2000). The 1997 corpus comprises read and spontaneous speech from 32 speakers stratified by age (older and younger), sex and social class (working class and middle class). The 2003 corpus comprises read and spontaneous speech from 36 working class adolescents, divided into three age groups: 10-11 year olds, 12-13 year olds and 14-15 year olds. The analysis of th-fronting in Stuart-Smith and Timmins (2006) only details the results of this variable in the spontaneous speech sample of both corpora as certain variants did not generally occur in read speech.

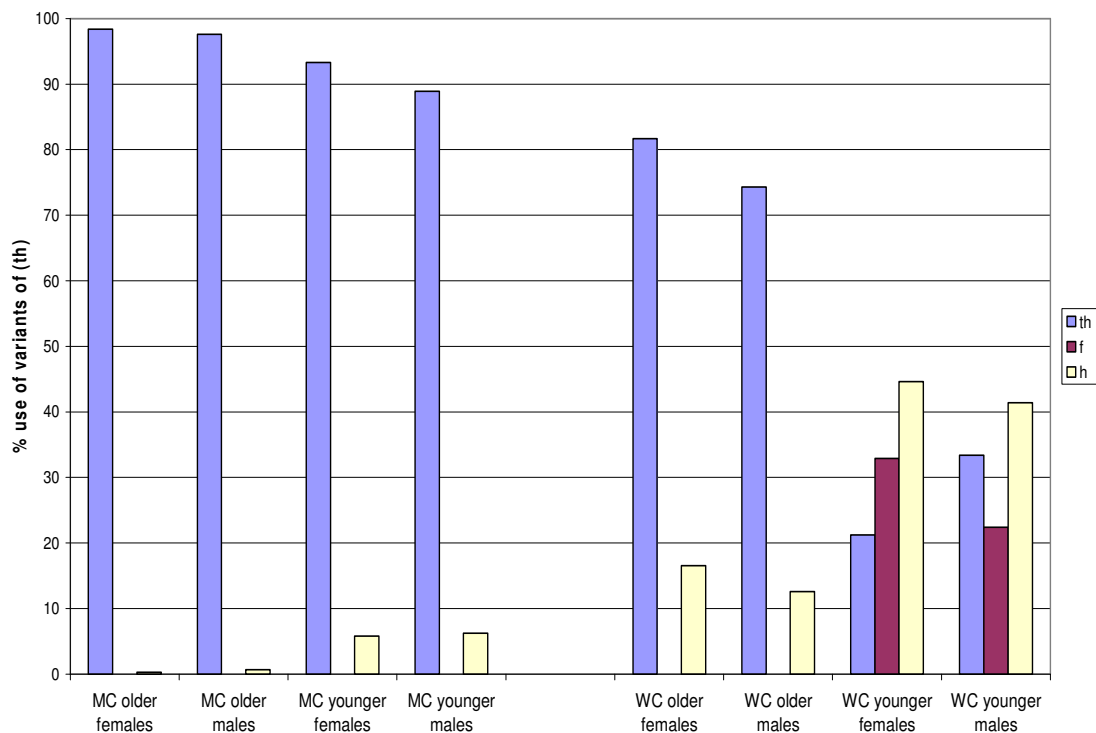
In the 2003 corpus, the variants of (th) are given as [θ], [h] and [f] (although in the 1997 data, more fine-grained categorisations are employed and include intermediate variants and a miscellaneous category). From an examination of the distribution of these variants in the 1997 corpus (figure 3.4), it is clear that the incoming fronted variant is associated primarily with working class adolescents in Glasgow, a pattern which we have seen elsewhere in Britain. However, notice that in these data, the highest users of the incoming ‘fronted’ variant are working class

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<sup>55</sup> Johnston (1997a: 105) claims that th-fronting ‘nearly made it’ as a sound change in a much earlier period in the history of Scots and is attested as far back as the 16<sup>th</sup> Century.

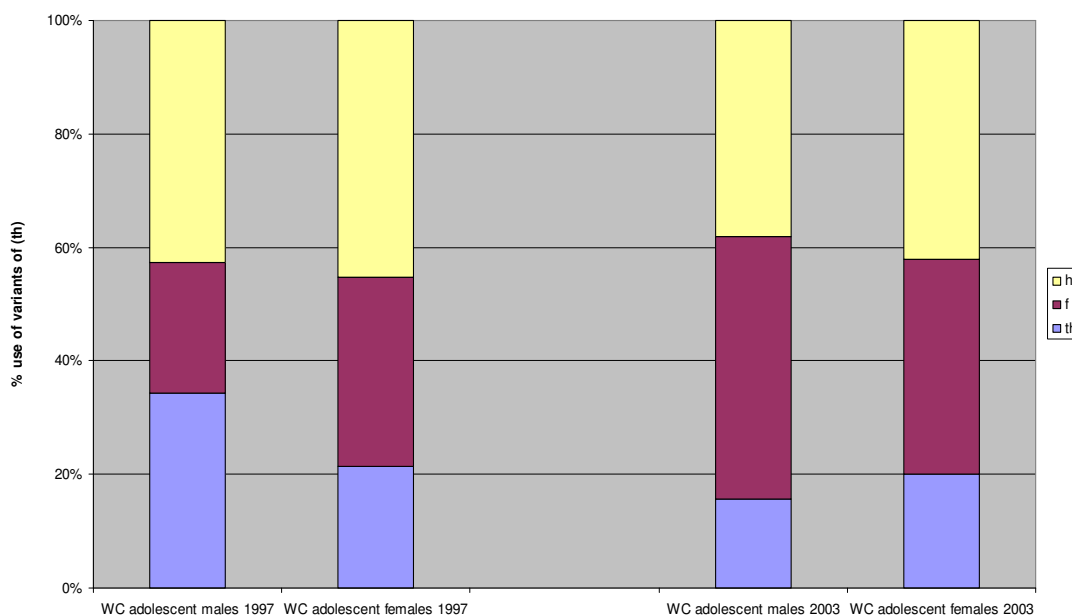
adolescent *females*. This is not typical of any of the other communities in Britain in which th-fronting has been investigated.

**Figure 3.4: th-fronting in Glasgow in 1997** (based on data presented in Stuart-Smith and Timmins 2006, table 1)



Furthermore, by comparing the pattern of distribution of (th) in working class adolescents from both the 1997 and 2003 corpora (figure 3.5), we can see an increase in the use of [f] in both the male and female speakers. Notice also that the males in 2003 now seem to be using higher proportions of the [f] variant than females.

**Figure 3.5: th-variable in working class adolescents in 1997 and 2003** (data extracted from Stuart-Smith and Timmins 2006, tables 1 and 2).



Stuart Smith and Timmins (2006: 175) point out that the increase in the use of the [f] variant seems to be at the expense of the standard variant [θ]; the local [h] variant remains fairly stable across time. The authors attribute this to the fact that the [f] variant provides these working class adolescents with another variant to add to their repertoire that can express non-standard identities and therefore reject any features associated with perceived middle class, established norms.

### 3.3.2 (th) in Livingston (Robinson 2005)

Livingston is a New Town situated in the Almond Valley in West Lothian, approximately 15 miles from Edinburgh and 30 miles from Glasgow. It was created in 1962 as an overspill community from Glasgow. The Livingston project aimed to

complement research on the direction and motivation of variation and change elsewhere in British New Towns (Kerswill 1996, Williams and Kerswill 1999).

The informants in the Livingston project were stratified by age and sex but not social class<sup>56</sup>. Three age groups were identified: 11 year olds, 15 year olds and ‘older’ speakers, a category which consists of a range of adults who were original inhabitants of the Livingston Station area before the New Town was created.

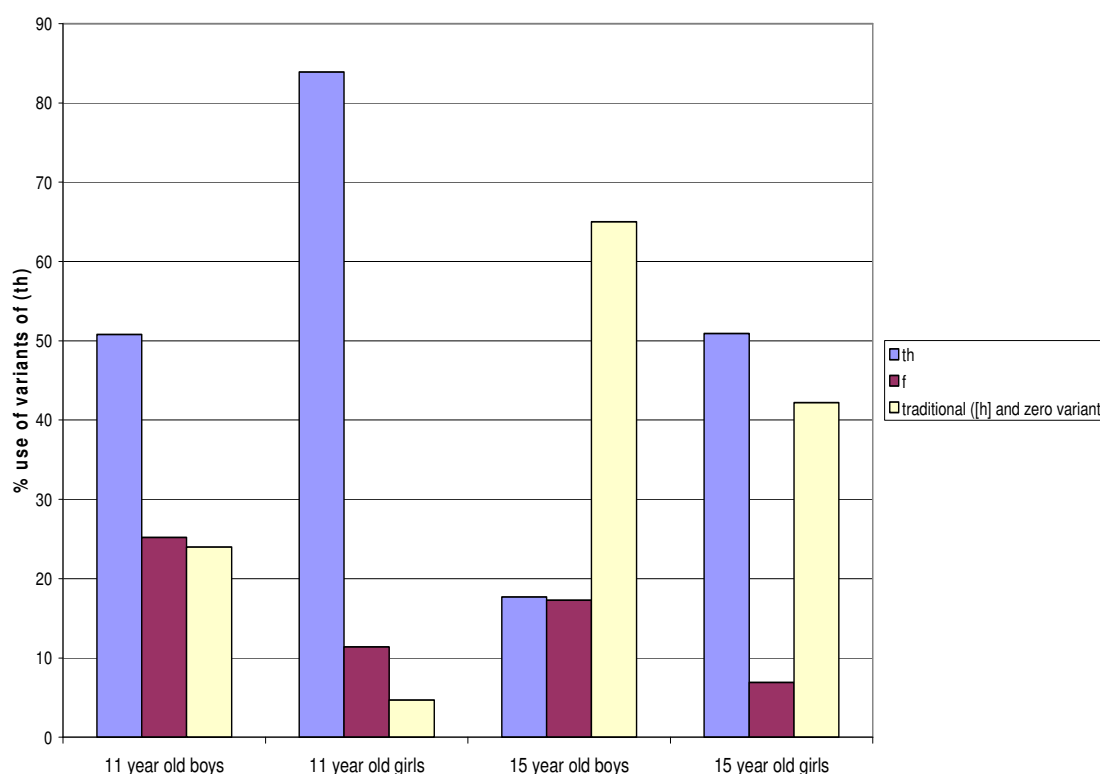
Robinson (2005) identified four main variants of (th): [θ], [f], [h] and a local ‘zero’ variant<sup>57</sup>. Furthermore, in order to make the comparison between local and non-local variants, the [h] and ‘zero’ variants were collapsed into a category labelled ‘traditional’. As in Glasgow, the traditional variants are rare in reading style and so the data in figure 3.6 represent only the conversation style for this sample. There is no evidence of th-fronting in the ‘older’ age category in Livingston so their data is not included in figure 3.6.

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<sup>56</sup> Robinson (2005: 182) explains that problems associated with the definition of social class are worsened in a new town as “the very concept of a New Town undermines many of the social conventions which perpetuate rigid class divisions”.

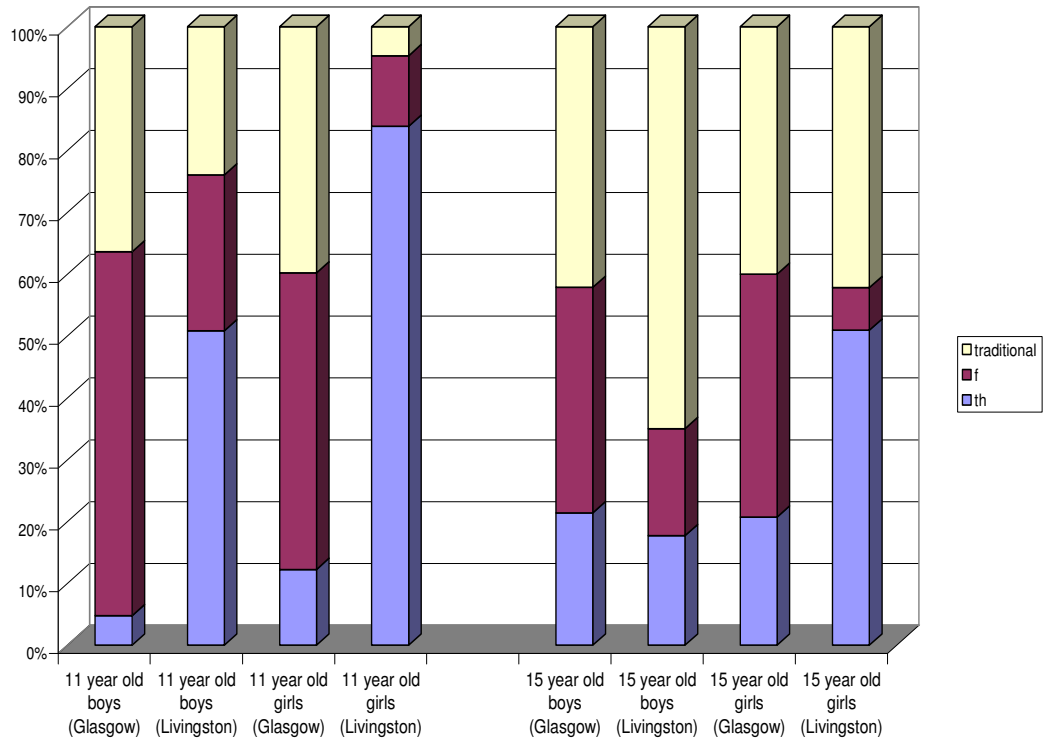
<sup>57</sup> Robinson (2005) recognises that intermediate variants may exist but, as with Stuart-Smith and Timmins (2006), has coded the data into broad categories.

**Figure 3.6: Variants of (th) in adolescents in Livingston** (data extracted from Robinson 2005: 189, table 4)



This community seems to make the least use of the [f] variant among those discussed so far which may perhaps indicate that the sound change is more recent here. In some ways the pattern of th-fronting in Livingston is similar to that found across the UK – the [f] variant occurs more among adolescent males than females. However, there are also some striking differences between the patterns of th-fronting in Livingston and Glasgow (see figure 3.7).

**Figure 3.7: th-fronting among adolescents in Glasgow (2003) and Livingston (2005)**



In Glasgow, an increase in the use of the [f] variant by younger adolescents is paralleled by a decrease in the use of the *standard* variant while the local traditional [h] variant remains stable; in Livingston, an increase in the use of the [f] variant by younger adolescents is paralleled by a decrease in the use of the *traditional* variants. In other words, these data would suggest that the incoming [f] variant is replacing the traditional local forms in Livingston. However, any conclusions drawn from this comparison must be treated with caution as the methods used in collecting the data for these two samples were quite different.

To summarise, a brief overview of the published literature on th-fronting in non-standard varieties of British English reveals a number of consistencies between the



use of ‘fronted’ variants and the social factors age, gender and social class. The main finding seems to be that th-fronting is favoured by working class adolescent males in most communities. In section 3.4, I present the results of the analysis of th-fronting in WFHPB. However, it is first necessary to explain the processes involved in identifying and defining the variable in this corpus.

### **3.4 (th) in WFHPB**

#### **3.4.1 Circumscribing the variable context**

In circumscribing the variable context of (th) in the WFHPB corpus, I began by extracting each instance of the voiceless variable from the transcripts. Variationists would then typically exclude the following categories of variation, for the reasons detailed below (Tagliamonte 2006: 86-96).

**The lexical items ‘*although*’ and ‘*though*’.** It is often claimed that these lexical items have distinctly Scottish pronunciations and are realised with a voiceless variant in both Scots and Scottish Standard English (Trudgill and Hannah 1994). However, in the WFHPB corpus, these items are realised variably with voiced and voiceless variants and so it is unclear exactly what the underlying phoneme is in these cases. As I am presently concerned only with the voiceless variable, these lexical items have been excluded from the analysis.

**Instances of performance speech or imitation.** In the following extract, Alan is imitating the speech of his teacher:

#### Extract 14

Alan: Mr Red’s like “that’s the-that’s the *th*ird late slip he’s had, he’s no turned up for class”, he’s like, an I’m standing there gaun “noh a’ve no seen him”.

While examples such as these can provide us with valuable insights into the social meaning of variation (see Schilling-Estes 1998), the motivation for variation is clear in these cases and therefore need not be considered in an analysis of variation.

**Discussions of linguistic variation.** In the following extract, the speaker is describing variation in the lexical item ‘something’:

Extract 15

Lewis: an she’ll write on the internet how she talks

LC: aye

Lewis: ken for example, eh...instead eh saying ‘something’, she’ll actually say ‘suhing’

LC: right

Lewis: ‘suhing’ an she’ll actually write on MSN

In these instances, speakers arguably have a heightened awareness of variation and, as the aim of variation analysis is to understand unselfconscious ‘natural’ speech or ‘the vernacular’ (the Vernacular Principle, Labov 1972:112), examples such as these are often omitted.

**Instances of reading.** In collecting the data for this corpus, the informants were asked to write a description of the groups that they felt existed in the community (see chapter 2) and many of the informants proceeded to read aloud what they had written. As Stuart-Smith *et al.* (2007:233) have shown, the results for the variable (th) are often very different in reading style and conversation style in Scotland because literary education tends to be carried out in Scottish Standard English and so there is often a suppression of local or non-standard forms when informants are asked to read. I therefore excluded these tokens from the analysis.

**Child directed speech.** In two of the recordings, there was a small child present, the son of a piper in the adult band. Below is an examples of child directed speech in the corpus:

### Extract 16

Greg: oh take that out yer mouth *th* pal, take that out yer mouth\*\*\*Right can a speak *with* Lynn please?

Previous research (e.g. Foulkes *et al.* 2005) has found that when adults speak to children, they dramatically decrease the frequency of vernacular variants in their speech. I therefore also exclude these cases from the analysis.

After circumscribing the variable context, I began extracting all instances of the variable from the corpus (6616 sites of (th)). This was done auditorially and then random selections of these tokens were cross-checked for accuracy of transcription. During this process, it became apparent that in WHFPB, as in Glasgow and Livingston, there are a number of different possible realisations of (th) but many of these are lexically restricted and so must be treated as exceptions to the variable (th) and excluded from the analysis. In this corpus, there are five different contexts of variation in (th):

**1. (th) before /r/ in a syllable onset.** This context includes the lexical items *three*, *through*, *threw*, *throw*, *threat*, *throat* and *arthritis* in this corpus. Possible variants of (th) in this context are: [θ]~[f]~[ʃ]. With regards to this latter variant, evidence from the Linguistic Atlas of Scotland (vol 3, Mather and Speitel 1986, hereafter LAS,) suggests that similar variants are quite widespread in Scotland, but that variants with palatal or palato-alveolar initial consonants are highly localised, with the only recorded instance being Dunino in Fife<sup>58</sup>. The [ʃ] form only ever occurs in environments of a following /r/ and so it cannot be included as a true variant of (th). I therefore excluded these cases (416 tokens, 6% of all (th) sites) from the analysis.

**2. (th) in a coda cluster.** When (th) occurs in a coda cluster i.e. where (th) either follows or precedes another voiceless segment in the coda, assimilation often takes

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<sup>58</sup> Although the LAS reports that this feature is only found in Fife, Stuart-Smith (pc) has pointed out that this feature is also found in Glasgow and it was also evident among speakers in Ayr (Pukli 2007).

place e.g. in this corpus, the word ‘maths’ is sometimes realised as [mas:]. There were only 15 instances of this non-realised, assimilated variant in the WFHPB corpus and all were in the context of complex coda clusters and so I decided to remove these from the analysis of variation because their existence was predictable.

**3. (th) in the lexical item ‘with’.** In these data, [θ] and a zero variant are the only forms that appear in this context and there is near categorical use of the zero variant (98.4%). It is unwise to include invariant or near categorical data in an analysis of variation and so I have excluded all instances of the lexical item ‘with’ from the analysis (2181 tokens, 33% of all (th) sites). However, I have included the lexical items ‘outwith’, ‘within’ or ‘without’ in the analysis as these words follow the pattern of variation apparent in (5) below.

**4. (th) in the lexical items *think, thing* and their derivatives.** This context includes the lexical items *think, thing, thinking, everything, nothing, something, anything, awthing, thingy, thingwie* and *thingymajigy*. Variants of (th) in these words are: [θ]~[h]~[ʔ]~[f] and a zero variant but the [f] variant is extremely rare (it only occurs once out of a total of 2775 instances). As this is the only context in which the glottal variants [h] and [ʔ] appear, these lexical items seem to represent a different context of variation and so all instances (42% of all (th) sites) were omitted from the analysis of (th).

**5. All other contexts.** All other lexical items in the corpus that are not constrained by the lexical or phonological conditioning discussed above show variation between only two variants: [θ]~[f]. My analysis of variation in this chapter will focus only on this variation. Unless otherwise stated, my use of the term (th) will only consider lexical items in context 5 (1229 tokens of (th) or 19% of the total number of (th) sites in the corpus).

### 3.4.2 Distribution of (th) by age and sex in WFHPB

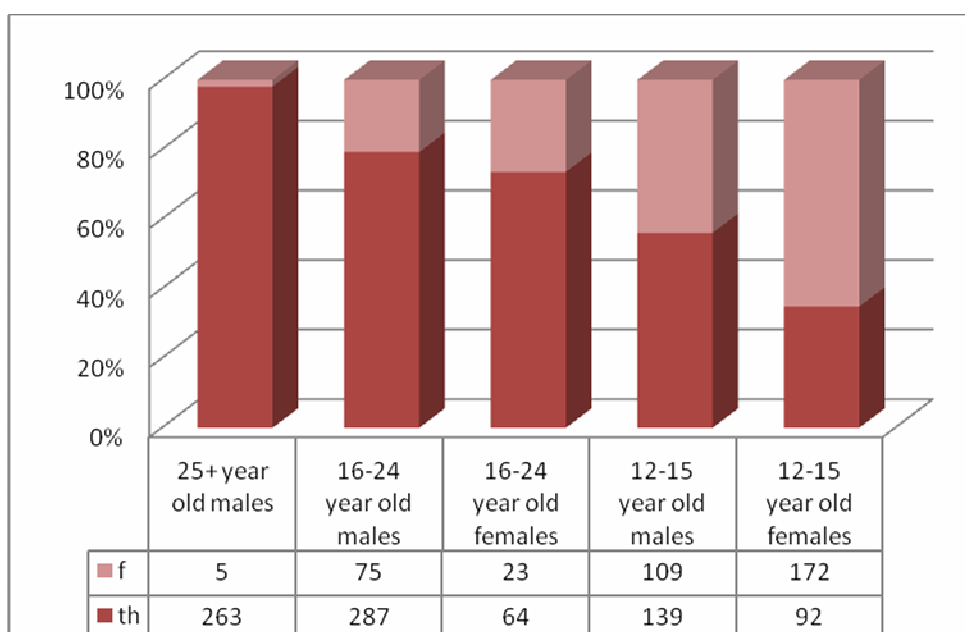
The data for (th) in WFHPB, when stratified by age and sex, are given in table 3.1 below. These data are then charted graphically in figure 3.8 and raw token numbers are provided in the data table below figure 3.8.

Table 3.1: Variants of (th) in WFHP, represented as a percentage and stratified by age and sex.

		th	F
12-15 year olds	Male	56	44
	Female	35	65
16-24 year olds	Male	80	20
	Female	74	26
25+ year olds	Male	98	2
	No females in this group	N/A	N/A

Total N = 1229.

Figure 3.8: variants of (th) in WFHPB stratified by age and sex.



The labio-dental variant is not a traditional feature of this dialect which means that although most of the speakers in this group are younger than 40, speakers older than this are unlikely to use this variant. The general trend in these data follows the pattern of other studies of (th) in Britain – this is a change in progress that is being led by younger adolescents. Older adolescents and adults favour the standard variant [θ] and younger adolescents favour the incoming innovation [f]. Notice, however, that unlike most other research on this variable (with the exception of the 1997 Glasgow Speech Project corpus), it seems that it is *females* who are the highest users of the [f] variant in WFHPB. There are no females in the 25+ year old age bracket in the band but in the 12-15 year olds and the 16-24 year olds, females are using higher proportions of the [f] variant than males in this community.

The accounts of th-fronting in British English to date have correlated linguistic variation with social factors such as age, sex and social class and they have presented these results as I have in table 3.1 and figure 3.8. However, while this type of analysis can reveal general patterns of variation in a data set, these methods are limited in their ability to explain variation within social categories at a local level. For instance, the current analysis can reveal the general pattern that, overall, female adolescents show higher frequencies of the labiodental variant than their male peers in this community but it cannot explain the variation that exists within the social category ‘female adolescents’; nor can it account for the fact that some female adolescents in the group are resisting the change entirely. Furthermore, (to my knowledge) none of the accounts of th-fronting in British English have yet considered whether any ‘linguistic’ constraints may be operating on this variation<sup>59</sup>. In order to reach a better understanding of the patterning of (th) in the WFHPB corpus, it is necessary to expand the analysis of variation beyond the basic ‘wave’ factors of age, sex and social class and to consider the potential effects of other (social and linguistic) constraints on variation.

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<sup>59</sup> Stuart-Smith and Timmins (2006) go a little way to addressing this problem by considering the place of the variable in the word.

### **3.5 Variable Rule Analysis**

Varbrul<sup>60</sup> was developed (by Cedergren (1973), and Rousseau & Sankoff (1978)) to handle naturally occurring data. Varbrul can be used to ascertain the effects of various independent factors influencing the distribution of a dependent variable by means of stepwise multiple regression. It does this by computing the effect of one independent variable (or factor group) while explicitly controlling for the effects of all other known independent variables (Guy 1993:237).

#### **3.5.1 Coding**

Varbrul requires discrete variants for both the dependent and independent variables (or factor groups) and so the researcher must code each factor group (which contains a number of factors) in this way. The ‘linguistic’ factor groups coded in this analysis of variation are provided in table 3.2 and the social factor groups are in table 3.3.

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<sup>60</sup> For a more detailed discussion of the statistical model of varbrul see Sankoff (1988) and Guy (1988; 1993) and for a practical ‘how to’ guide to varbrul, see Tagliamonte (2006).

Table 3.2: Linguistic factor groups for varbrul analysis of (th)

<i>Factor Group</i>	<i>Factors</i>	<i>Example Token</i>
<b>Preceding phon. segment</b>	Front vowel	<i>it's me an Billy an Keith an that</i>
	Back vowel	<i>bad parts eh Glenrothes</i>
	Coronal consonant	<i>it wiz brilliant for about a month</i>
	Dorsal consonant	<i>we're aw on the same wavelength</i>
	Pause	<i>LC: so age-you're what fourteen? A: thirteen</i>
<b>Following phon. segment</b>	Front vowel	<i>cos I'm thick</i>
	Back vowel	<i>I've thought eh everything else</i>
	Coronal consonant	<i>about three month never drinking</i>
	Dorsal consonant	<i>they've both got wives an children</i>
	Pause	<i>B: she just opens her mooth J: well I'll shut up then</i>
<b>Preceding word boundary</b>	Present	<i>mm hm, thirty year aulds</i>
	Absent	<i>we went tae see this marathon eh</i>
<b>Following word boundary</b>	Present	<i>they've both got the same colour eh hair</i>
	Absent	<i>no Glenrothes</i>
<b>Preceding [f]</b>	Present	<i>is it the fourth wan ye need?</i>
	Absent	<i>eh Cowdenbeath pipe band</i>
<b>Place of (th) (syllable)</b>	Onset	<i>third</i>
	Coda	<i>same age both annoying</i>
<b>Place of (th) (word)</b>	Initial	<i>a thought it wiz no bad</i>
	Medial	<i>what's it called-Methil</i>
	Final	<i>Cos they're both in the same band</i>
<b>Lexical category</b>	Place names & proper names	<i>aye it's Keith</i>
	Ordinals & numerals	<i>when he wiz in third an fourth year</i>
	Other	<i>a thought the jobs were starting</i>

### Preceding and following phonological context

The first two factor groups coded for the possible effects of phonological context as an influencing factor in motivating (th) variation as no other studies of (th) have considered the effect of phonological context on this variation. I began by coding phonological context in detail with each individual segment as a separate factor but a number of cells were left empty or had very low cell counts (see Guy 1988:129-132 on the problems of low cell counts) and so it was necessary to collapse some of these factors together. I have chosen to represent the factors in this factor group on the



front/back dimension. The main difference in articulation between [f] and [θ] is the position of the tongue in the vocal tract – the tongue occupies a fronted position in the mouth when articulating the dental fricative. I therefore hypothesised that if th-fronting is influenced by phonological context, the dental variant may be more likely to occur either immediately preceding or following other fronted articulations<sup>61</sup>.

### **Word boundary**

Again, as this has not been considered in previous studies of th-fronting, I was interested to discover if the variation in (th) was perhaps sensitive to morphological information such as the occurrence of a word boundary either immediately preceding or following the variable.

### **Preceding [f] in the word**

The motivation for including this factor group was to test for a priming effect. Is the labiodental variant more likely to occur if the word in question has a labiodentals voiceless fricative somewhere else (preceding the variable)?

### **Place of (th) in the word**

Stuart-Smith and Timmins (2006) investigated the role of the lexicon in th-fronting in Glasgow and found that the labiodental variant occurs more frequently in word final position than word initially or word medially. They attribute this to the high frequency of the *think/thing* set of words and the fact that [h] occurs word initially (*thing*) and word medially (*everything*) in these lexical items. I was interested to know if this effect remains once the *think/thing* set of words are removed from the analysis of (th).

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<sup>61</sup> I tried numerous ways of coding the factors for phonological context including front/back, tense/lax, high/low, place of articulation and manner of articulation. There appeared to be no obvious pattern to the correlations between th-fronting and phonological context and regardless of how I coded the data, there was no significant difference to the fit of the model (see Tagliamonte 2006: 149-150 for details of how to compare the log likelihood of different runs of the analysis to find the best 'fit'). It therefore makes little difference how the factors are represented for phonological context in table 3.2.

**Place of (th) in the syllable**

There is a great deal of typological evidence (see Kiparsky 2008) that place and manner features are frequently neutralized in syllable codas. Following Steriade (2008), Kiparsky suggests that a plausible reason for coda neutralization might be the low perceptual saliency of the relevant featural distinctions in the syllable coda. We therefore might expect to find that th-fronting occurs more frequently in coda position.

**Lexical category**

Stuart Smith and Timmins (2006) note in their discussion of th-fronting in Glasgow that several of the lexical items that seem to be resisting th-fronting in their corpora are ordinals and proper names and so I was interested to test this factor on these data.

Table 3.3: Social factor groups for varbrul

<i>Factor Group</i>	<i>Factors</i>
<b>Individual speaker</b>	54 individual factors, one for each speaker
<b>Speaker sex</b>	Male Female
<b>Community of practice membership/ Friendship group membership</b>	A “They act hard all the time”/ “fancy tune folk” B “Tiny wee pipers” C “The new folk” D “Pipe band geeks”/ “Ex-Dream Valley” E “comedians” /“Same dress sense, same music taste, same easy going attitude” F “Fun/up for a laugh, not very serious” G “that’s a fake ID son” H “senior drummers”/”pipe band geeks” I “one big happy family” J “On the fringe” K “13 goin on 30” L “goths”/ “new lassie pipers” M “Lazy PPI!” N “Valley lassies” O “Under agers” P “Novice tenor section ‘WILD’!!” Q No CofP affiliation
<b>Age</b>	12-15 years old 16-24 years old 25+ years old
<b>Length of time in the band</b>	< 10% of age 10-19% of age 20-29% of age 30-39% of age 40-49% of age 50+% of age
<b>Area of residence</b>	Lochgelly Balingary Lochore Cardenden Cowdenbeath Falkland Glenrothes Scotlandwell Rosyth Dunfermline Burntisland Dollar Leven Dundee Crossgates

### **Individual speaker**

I initially coded each individual speaker separately because of the discomfort I felt at grouping sets of speakers into categories (see chapter 2). In the end this was unmanageable as a factor group because there were too many speakers who either showed no variation (and so produced a **\*knock out\*** in varbrul – it is impossible to include these speakers in an analysis of variation as the data is not variable) or had a small number of tokens of (th). This factor group was therefore not included in the final analysis.

### **Speaker sex**

Based on the results in figure 3.8, it would appear that speaker sex should be a significant factor influencing variation. However, I wanted to test this variable against the others and find out whether the results for speaker sex in figure 3.8 are ‘real’ or whether they are a by-product of another factor.

### **Community of practice/Friendship group membership<sup>62</sup>**

The friendship groups presented here are based on the cliques found by the UCI NET analysis of the envelope game results (see chapter 2) and the labels in table 3.3 were given by the informants. These groups are therefore not categories that I have imposed on the community; they represent how the speakers themselves view the social organisation of the band<sup>63</sup>.

### **Age**

Age is a continuous variable and so wherever the boundaries between factors are placed is a somewhat arbitrary decision. The factors represented here are the result of several attempts to find the best fit of the model to the data and it seems that the

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<sup>62</sup> Not all of the friendship groups listed here are CofPs (as discussed in chapter 2) and so I have labelled this factor group ‘Community of practice/friendship group’ to show this.

<sup>63</sup> I tried grouping some of these friendship groups into larger categories, again based on divisions that were apparent in the data from the UCI NET analysis applied to the envelope game results in chapter 2. This produced a significantly worse log-likelihood (using a likelihood-ratio test) which suggests that the data are best represented with a more fine-grained friendship group structure.

category boundaries in table 3.3 correspond best with the data for (th) in this community.

### **Length of time in the band**

I was aware that some individuals felt a great deal of affiliation to the band and had been a part of this organisation since they were young children while others had joined more recently or had played with other bands at different times in their lives. I attempted to measure the strength of affiliation to the band by quantifying the amount of time each individual had spent there as a percentage of their life.

### **Area of residence**

When I asked the speakers in the corpus if they were aware of linguistic variation in the group, they mostly responded that they were. When I asked them why they thought these differences existed, they were often quite insistent that this was simply the result of dialectal variation:

#### Extract 17

LC: see aw the folk in the band, dae they aw talk the same?

Bobby: nuh

LC: how no?

Campbell: aye you've got different eh dialects like it's amazing how many dialects are in Fife alone eh

I decided to test their intuitions with this factor group. I chose not to group the places of residence together into a smaller number of factors since often my informants were insistent that there exist significant linguistic difference even between adjacent towns and villages.

In order to achieve a valid varbrul analysis, the factor groups must be 'orthogonal' (Guy 1988:136) i.e. there must be minimal overlap between the factor groups. This can often be difficult to achieve, for example in the 'linguistic' factors coded here, there is a certain amount of overlap between the factor groups 'place of (th) in the syllable', 'place of (th) in the word' and 'word boundary'. Independence of social factor groups is perhaps even more difficult to achieve as there is more potential for

overlap (see Bayley 2002: 131). In this case, almost all of the social factors interacted substantially. This is because individuals in this community tended to form friendship cliques with others of the same sex, of roughly the same age and from the same local area. Rather than simply collapsing all of these factor groups into a single factor group, I attempted to tease apart the different factors influencing variation by running the analysis multiple times and including different factor groups in the analysis each time. For instance, on the first run, I included the factor group CofP/Friendship group membership (but did not include the factor groups Age and Speaker Sex); on the next run I removed the CofP/Friendship group membership and included Age (but not Speaker Sex); on the next run I removed Age and included Speaker Sex, and so on. I then compared the results of each analysis using a likelihood ratio test to find which provided the best ‘fit’ and therefore the best indication of the likely factors influencing this variation.

Of the overlapping linguistic factor groups ‘word boundary’ and ‘place of (th) in the syllable’, I found that neither of these factor groups was significantly better than the other at accounting for variation in the data. This suggests that th-fronting is not sensitive to morphological information. Similarly, there was no significant difference to the model when I compared the log likelihood outcomes of the analysis containing the factor group ‘place of (th) in the word’ with the factor group ‘place of (th) in the syllable’. I made the decision to present the results for the factor group ‘place of (th) in the syllable’ based on the typological evidence that languages tend to neutralize contrasts in coda position.

The social factor groups, ‘age’, ‘speaker sex’ and ‘area of residence’ were included to test for the types of correlations found in previous research on (th). Eckert (2005) refers to social factors of this kind as ‘first wave’ criteria. First wave studies are characterised by an attempt to correlate linguistic variation with global social categories. In this analysis of (th), there is, however, overwhelming evidence for the importance of the factor group ‘community of practice membership/friendship group membership’ above these first wave social categories. The inclusion of any other social factor group in place of community of practice/friendship group membership did not significantly improve the fit of the model. This lends support to the appropriateness of the methodology adopted in the

data collection process and the interpretation of these data within an analysis that takes friendship group membership/community of practice membership into account.

### **3.5.2 Results of varbrul**

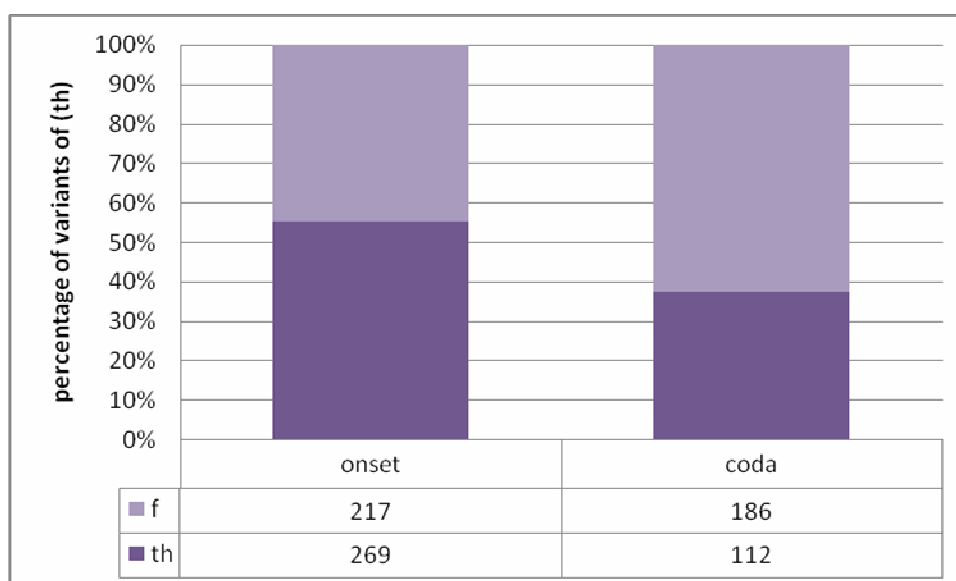
The results of the multivariate and distributional analysis of (th) across the WFHPB corpus are given in table 3.4.

Table 3.4: Multivariate analysis of the contribution of factors selected as significant to the probability of (th): [f]. Factor groups not selected as significant are not shown in this table.

Corrected mean			0.48
Log Likelihood			-
			406.112
Total N			784
	Factor weight	% of (th): [f]	N
<b>Community of practice/friendship group</b>			
A “They act hard all the time”/ “fancy tune folk”	0.71	67	49
B “Tiny wee pipers”	0.94	93	56
C “The new folk”	0.88	85	59
D “Pipe band geeks”/ “Ex-Dream Valley”	0.08	7	27
E “comedians”/ “Same dress sense, same music taste, same easy going attitude”	0.33	31	28
F “Fun/up for a laugh, not very serious”	0.77	75	24
G “that’s a fake ID son”	0.53	59	34
H “senior drummers”/ “pipe band geeks”	0.09	9	76
I “one big happy family”	0.46	45	20
J “On the fringe”	0.24	23	57
K “13 goin on 30”	0.61	59	39
L “goths”/ “new lassie pipers”	0.52	55	87
M “Lazy PPI!”	0.32	30	78
O “Under agers”	0.48	44	32
P “Novice tenor section ‘WILD’!!”	0.77	78	45
Q No CofP affiliation	0.36	34	73
<i>Range</i>	86		
<b>Preceding [f] in the word</b>			
Preceding [f]	0.82	68	22
No preceding [f]	0.48	48	762
<i>Range</i>	34		
<b>Lexical category</b>			
Place names and proper names	0.44	48	351
Ordinals and numerals	0.36	39	324
All other lexical items	0.61	52	109
<i>Range</i>	25		
<b>Syllable structure/place of (th) in the word</b>			
(th) in onset position	0.38	38	298
(th) in coda position	0.58	55	486
<i>Range</i>	20		



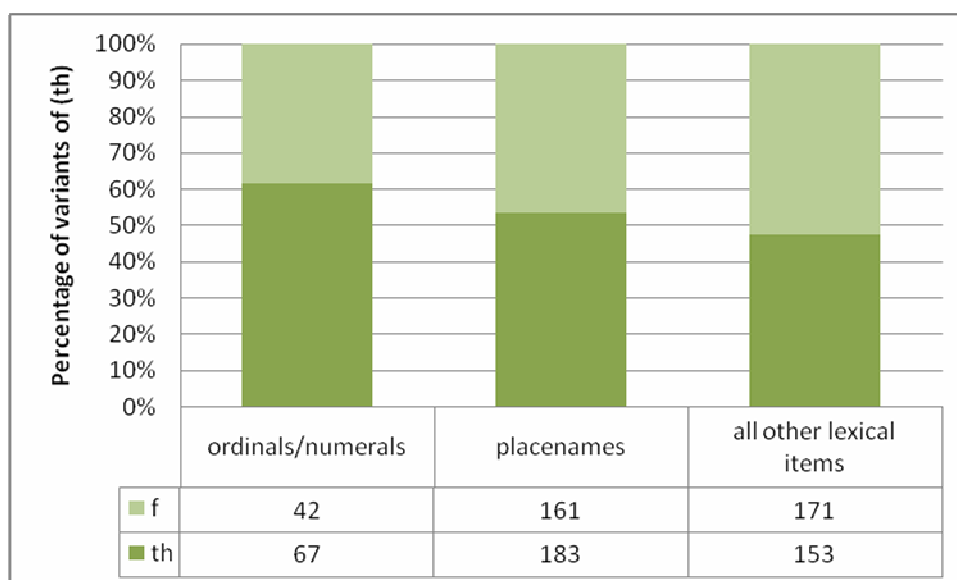
Table 3.4 is organised to show the factor groups in the order of their significance on the variation<sup>64</sup>. The factor group which displays the least effect on the variation while still remaining significant is syllable structure.



The results for this factor group suggest that when (th) occurs in syllable initial position, it favours the dental fricative and when it occurs in the syllable coda, the labiodental is more likely to occur. As previously mentioned, there is typological evidence that neutralisation of contrasts tend to take place in syllable codas (Kiparsky 2008).

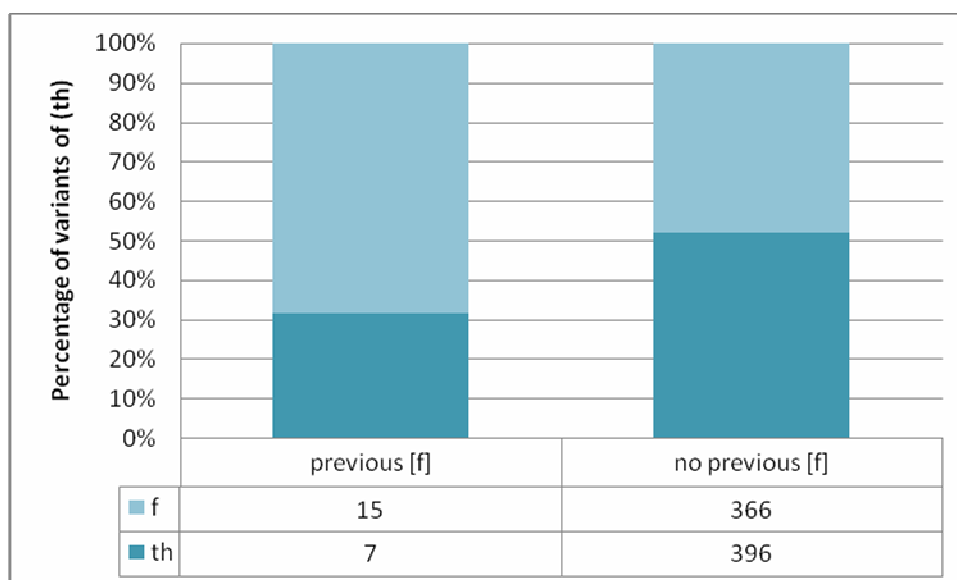
The next most important constraint on the variation in (th) is lexical category.

<sup>64</sup> The corrected mean (also known as the input value) is a measure of the rate of ‘rule application’ or “an average frequency of occurrence of the application value of the dependent variable” (Paolillo 2002: 76). A corrected mean of 0.48 means that, all other things being equal, the likelihood of (th) being realised as [f] in this corpus is around 48%. The log likelihood value measures the likelihood that a particular set of data has been generated by the model. This is the value used when considering which combination of factors provides the best ‘fit’ of the model to the data. The total N is simply the total number of tokens included in the final run of the analysis. Finally, the factor weight is a value that is assigned to each factor during the analysis. It is essentially a measure of relative influence on variation. The number ranges from 0 to 1 and it is often stated in the literature that a factor weight of greater than 0.5 favours the application value (in this case, the labiodental variant) and a weight of less than 0.5 disfavors the application value.



These results support the proposition made by Stuart-Smith and Timmins (2006) that ordinals and place names may be more resistant to the spread of th-fronting than other lexical items as ordinals, place names and proper names favour retention of the dental fricative<sup>65</sup>.

The next most significant constraint on variation in (th) is the factor group which codes for a priming effect.



If the lexical item in question contains an [f] somewhere before the variable (such as in *fourth* and *fifth*) then the variable strongly favours the labiodental variant.

<sup>65</sup> Kunter's (2007) research into variation in stress placement in compounds has also found that proper nouns and place names behave differently than other lexical items as they show significantly less variation.

Finally, the most important outcome from table 3.4 is that the factor group ‘community of practice/friendship group membership’ substantially outranks all other constraints on the variation. This suggests that variation in th-fronting is primarily socially motivated. This information, combined with the information collected from the ethnography, may enable us to reach an understanding of what the social meaning of th-fronting is in WFHPB.

### ***3.6 Th-fronting indexing social meaning***

The discussion of th-fronting thus far has centred on considering variation as a mechanism for language change in the context of locally defined communities. The investigation so far has been a typically ‘second wave’ approach. Some recent approaches to the study of language variation have moved away from this type of analysis and have begun instead to consider linguistic variation as a resource for constructing social meaning. Although this was first employed in Labov’s (1963) Martha’s Vineyard study, which examined the relationship between variation in the diphthongs /ay/ and /aw/ and the island identities of the speakers, this approach to linguistic variation has been expanded upon in recent years, particularly in work on language and gender.

Eckert’s (2000) work on variation in Belten High, Detroit, is one example of this more recent re-examination of social meaning. Eckert (2000) examined the distribution of seven linguistic variables (one morphosyntactic, six phonological), and was able to show that many of the innovations in these variables were being led by ‘Burnouts’ in this community. Crucially, however, Eckert does not simply attribute these patterns of variation to membership in the Burnout category; the use of these innovative variants is not simply considered a ‘badge’ of membership in the predetermined social category ‘Burnout’. Rather, Eckert argues that the social meaning of these linguistic features is created by the social practices that Burnouts typically engage in.

This argument has since been put forth in several other works. For instance, Zhang (2005) employs this approach in a discussion of the construction of a new professional ‘yuppie’ identity in China; Moore (2003, 2006) takes a ‘third wave’

approach to the analysis of variation in adolescent girls in a high school in Bolton; and Podesva (2006) also approaches stylistic variation in the speech of three gay men within a framework of identity construction. Podesva presents a theoretical framework to explain how this meaning making process takes place. I now briefly summarise this framework before considering its application to understanding the social meaning of th-fronting in WFHPB.

Podesva (2006) suggests that the linguistic unit to which social meaning attaches is the individual variant and that the linguistic variant can have social meaning even devoid of conversational context. Podesva suggests that since evidence from perception studies (e.g. Campbell-Kibler (2005)) has shown that listeners can access the social meaning of variation from hearing only a single token of the variant, social meaning must be able to attach to the individual linguistic variant. However, not all linguistic variables can be used to signal social meaning. According to Podesva, this only happens with those variants that are sufficiently salient.

Saliency is a problematic concept as it has been used in linguistics with a variety of different intentions. Based on previous approaches to saliency in sociolinguistics (e.g. Labov 1972c, Trudgill 1986, Williams and Kerswill 2002), Podesva argues that tokens can become salient in the following two ways:

“(1) Categorical Saliency

- a. The frequency with which a variant occurs is inversely correlated with the degree of saliency (infrequent variants are relatively salient)
- b. Ideologies associated with a variant contribute to the degree of saliency (stereotypical variants are relatively salient).

(2) Phonetic Saliency

The value along any acoustic dimension characterizing a variant is directly correlated with the degree of saliency (variants exhibiting acoustic extremes are relatively salient)” (Podesva 2006: 18).

Once a linguistic unit or variant achieves saliency in one (or more) of these ways, they can begin to acquire social meaning. Podesva (2006) argues that sufficiently salient variables have a ‘core’ social meaning that exists across a community but that

this vague core social meaning is ‘sharpened’ or becomes more specific as the variant is used in particular contexts and by particular speakers.

One advantage of assuming that social meanings are, at their core, vague and underspecified is that they are then inherently capable of change which, Podesva suggests, takes place specifically through a process of bricolage (Hebdige 1979). This is the process by which certain aspects of the core or original meaning are used to create new meanings in new contexts. A further advantage of this approach is that it enables a single linguistic feature to be used in the construction of many, often quite divergent, styles through a process of indirect indexicality (Ochs 1992).

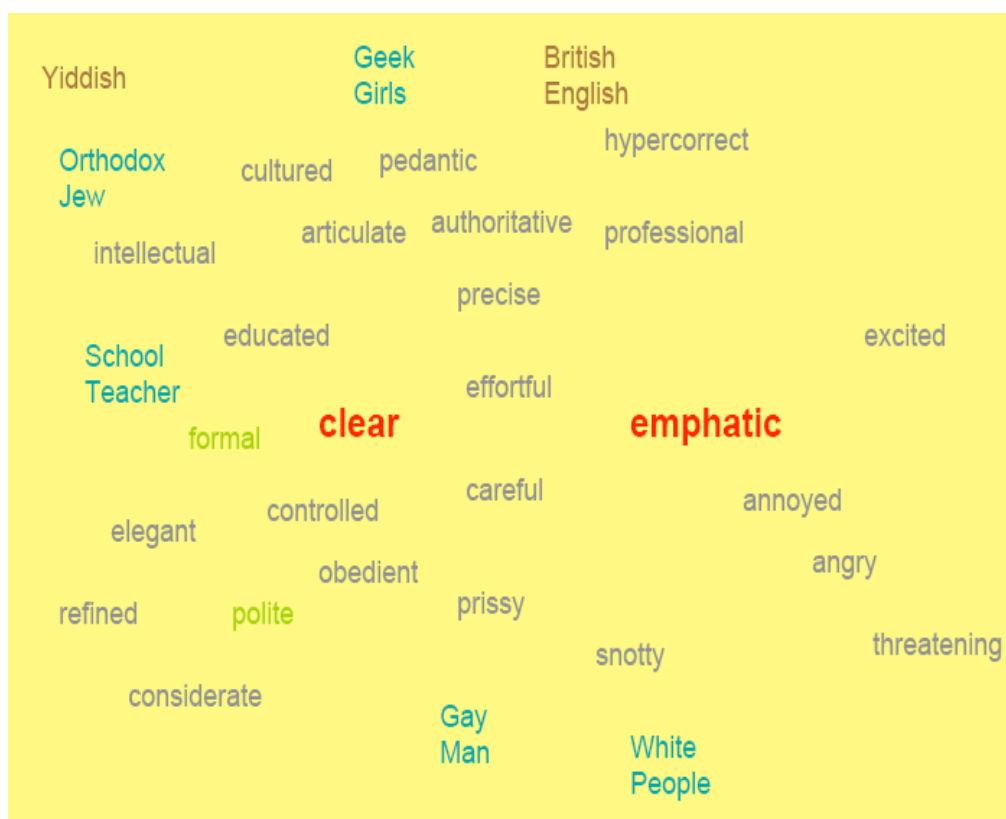
An index is “simply a connection or link between a symbol and a contextual meaning” (Moore 2007). For instance, as Podesva (2006) explains, cooperative discourse strategies, such as tag questions, are often found in the speech of some groups of women (e.g. Tannen 1990) and gay men (Leap 1996). Rather than suggesting that tag questions index women or gay men directly, it is possible to explain the relationship between these two groups of users by uncovering the ‘core’ meaning or direct index of this discourse feature which may be something like ‘conducive’ (Moore 2007) or ‘supportive’ (Podesva 2006). Through time, this discourse feature may of course become interpreted as directly indexing category identity, it is important to recognise that this is not the first stage of meaning-making. Rather, initially, the link between ‘females’ and cooperative discourse strategies is made indirectly through the recognition (and creation) of ideologies that are associated with these social types (such as ‘supportiveness’).

The example Podesva provides to illustrate his point is the example of fortis realisations of the interdental fricative (th/dh) in New York and Wisconsin. Podesva recognises that the origin of this feature in both of these locations is independent but he claims nonetheless that there is a “kernel of similarity” (Podesva 2006: 20) between the social meanings of this variant in both communities, evidence for which comes from the similar class-based distributional patterns of the variation in New York and Wisconsin. This ‘kernel of similarity’ is the core social meaning of the feature which then acquires more specific local social meanings as it appears in the context of actual speech.

Eckert (cited in Moore 2007 as personal communication) suggests that the social meanings of linguistic features are interpretable and that we view them relative to 'indexical fields' or the range of social or indexical meanings that could potentially be applied to a linguistic feature. Rejecting the notion that linguistic choices index social categories directly, the third wave approach argues that linguistic variables may be associated with fairly abstract social meanings that then take on more specific social meanings associated with the practices of a particular CofP. For instance, Bucholtz (1996) noted that a group of Californian high school girls, who saw themselves as more intelligent than their teachers, used final released /t/ in their development of an 'intellectual' style. Benor (2001) examined the use of the same variant in an Orthodox Jewish community and found that it was linked to masculinity and Talmudic study, providing examples of boys using final released /t/ more when they were making a point in a Talmudic discussion. Finally, Podesva (2006) describes exaggerated final released /t/ (i.e. long bursts of /t/-release) as a marker of a 'bitchy diva' persona in a gay community. Eckert (2004) argues that the more abstract social meaning associated with /t/ release is something like 'clear' or 'emphatic' and suggests this is derived from the typically American view of "the age-old stereotype of the British, and British English, as superior, intelligent and educated" (2004: 8-9). This provides American speakers with a resource for signalling superiority that is primarily related to intelligence, education and articulateness (Eckert 2004: 8). Below is the indexical field that Eckert proposes for mapping the social meaning of t-release in American English.

**Figure 3.9: Indexical field for mapping the social meaning of t-release in American English** (from Eckert

<http://www.stanford.edu/~eckert/Institute2007/index.html>)



Highlighted in red are the core social meanings (in the sense of Podesva 2006) or the social meanings which have developed as direct indexes (in the sense of Ochs 1992). The other social meanings in this diagram have therefore developed as the direct or core social meanings have been employed in a number of different social and linguistic contexts and so they have been interpreted as entailing some other social property besides clarity or emphasis. “In this way, we have a process of indexical layering which starts with a direct index and tracks recursively outwards onto a series of indirect indexes” (Moore 2007).

The previous discussion of indexical fields provides a framework for understanding how social meaning becomes more specific at the macro level. However, some linguistic variants are undoubtedly associated with macro-social categories like ‘female’ or ‘working class’. How does this stage in the meaning-making process take place? Following Bucholtz and Hall (2005), Moore (2007)

proposes that firstly, individual speakers articulate core social meanings when they express particular ‘stances’ or ‘orientations’ in the course of their discourse. For example, The geek girls in California not only have a higher frequency of t-release than their adolescent peers but they use this variable in the construction of their intellectual style (e.g. when debating). These stances can then become associated with local groups and CofPs if particular groups repeatedly take the same stance in their actions (again, as in the case of t-release in California). When these speakers are then associated with macro category group membership (such as middle class), the social meaning of variation also tracks recursively outwards.

### **3.7 The social meaning of th-fronting in WFHPB**

Having summarised the current mainstream theoretical framework on the relationship between linguistic variation and social meaning in sociolinguistics, I now attempt to interpret the social meaning of th-fronting in WFHPB within this framework.

As Podesva (2006: 91) explains, before speculating on the social meaning of variation, it is necessary to ensure that the variation is sufficiently salient to index social meaning. Recall that a category becomes salient either because it occurs relatively infrequently or because it is recognised as ideologically salient<sup>66</sup>. In relation to th-fronting, the frequency criterion is difficult to apply as the definition is too vague. To illustrate the criterion, Podesva (2006: 17) states that “if the word *ain’t* is uncommon in my speech, it stands out when I use it”. This implies that the criterion of frequency is not applicable across a corpus of speech but can only be invoked with reference to individual speaker variation. While this in itself is not problematic, there are several problems that arise from this. In WFHPB, several speakers show fairly high frequencies of use of (th): [f] while others show lower frequencies. This suggests that different speakers not only have different frequencies of use of the variant but perhaps also different levels of conscious awareness of its use. Since Campbell-Kibler (2005: 9) argues that “the degree of consciousness that

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<sup>66</sup> Phonetic salience is not relevant to the discussion of th-fronting as it is a categorical variable.



listeners have for a particular variable is likely to affect the ways in which they respond to its presence in the speech of others”, is it then the case that social meaning is only ‘attached’ to th-fronting when used by a low-frequency user (because it is only salient in this context)? With only a limited amount of conversation from each speaker, uncovering low-frequency variants (which are more likely to become indexical markers of social meaning) is more difficult than finding high-frequency variants.

It seems that the frequency criterion is unhelpful in this instance. However, ideologies linked to a variant may also enable it to have categorical salience. The (th): [f] variant seems to come closer to a linguistic stereotype (in the sense of Labov 1972c), because, for certain people at least, it is overtly commented on. For instance, an article entitled “In need of some speech therapy” appeared in *The Scotsman* on 25<sup>th</sup> September 2002, commenting on the increasing use of th-fronting among adolescents in schools in Glasgow. Concluding the piece, the author states “...surely a school shouldn’t be an environment where idiocy is worn like a badge”, and so expresses a clearly negative view of th-fronting.<sup>67</sup>

In Podesva’s discussion of t/d deletion, the argument proposed for the existence of a core social meaning of deleted t/d is that “since it occurs in the speech of so many different communities of speakers, [it] must have a vague meaning” (2006: 92). By invoking this reasoning, it is also reasonable to assume the existence of a core social meaning for (th): [f] since, as was shown at the beginning of this chapter, th-fronting is one of a number of consonantal changes taking place in non-standard varieties of British English.

Podesva explains that the typical approach to uncovering the social meaning of variation is to examine how speakers embed their linguistic practices in the context of other, non-linguistic practices and this is achieved through methods of participant observation. Podesva uses a slightly different technique – he examines the ways in which 3 different speakers use variants across different situations as they highlight different aspects of their identity and compares this with previous findings. For instance, Podesva (2006: 92) claims that t/d deletion correlates with casual style in a number of studies, thus suggesting that the meaning approximates something

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<sup>67</sup> The article in question can be found at the following web link: <http://news.scotsman.com/ViewArticle.aspx?articleid=2364064>.

like ‘informal’. Similarly, one ‘vague’ or core meaning of t-release is perhaps ‘competent’ because in a number of studies (including Podesva 2006), there is some underlying context in which speakers who use t-release (particularly exaggerated t-release) are attempting to sound competent in the conversation.

Th-fronting is a consonantal change taking place in Scotland that appears to be moving in the direction of a Southern English model of pronunciation. In Scotland, this has led to a number of media speculations that Scottish youngsters are being “influenced by Frank Butcher and other Cockneys in *Eastenders*” (*Daily Record*, 27<sup>th</sup> June 2000; cited in Stuart-Smith *et al.* 2007: 221). However in this community (as in many working class communities across Scotland) there remains a strong anti-English attitude:

Extract 18

Sean: English. Well see the English maist folk’ll just hink eh pricks

LC: aye?

Sean: aye

Indeed, one speakers expressed the opinion that th-fronting was a local Fife feature:

Extract 19

LC: dae you associate it wi’ English folk?

N: what thanks wi’ a-an f?

LC: mm

N: nu’ I wid eh said it wiz em, nah more a Fife way eh saying it

It therefore seems unlikely that the speakers who are th-fronting in this community are consciously accommodating towards a linguistic variety that they associate with an ‘English’ stereotype.

Because th-fronting (as with other consonantal changes including l-vocalisation, t-glottaling and the use of labio-dental /r/) is being driven by adolescents, this has led several researchers (e.g. Docherty and Foulkes 1999: 15, Milroy and Gordon 2003: 134) to suggest that these changes may represent a new set of ‘youth norms’ that are associated with ‘trendy and hip London lifestyles’ and ‘youth culture’ (Dyer 2002:108). These ‘youth norms’, although originating in the south of England, are no longer associated with geographical or regional space but

arguably exist in cultural or ideological space and represent a set of features which adolescents can orientate towards (Anderson 2000, cited in Stuart-Smith et al 2007).

Also, because th-fronting is a feature that is typically used by speakers in the lower-socioeconomic categories, it may mean something like ‘rough’. Indeed the term ‘rough’ was used repeatedly by members of WFHPB to describe the speech of the group:

Extract 20

Nathan: \*\*\*the wans that have been in the band for a while or a couple eh years anyway an they talk rough like

LC: what dae ye mean talk rough?

Nathan: [laughing] I know it’s guid coming fae me but they talk real rough [laughs]

It is no surprise then to find that the groups of friends/CofPs that favour the labiodental variant in the multivariate analysis of th-fronting presented above (table 3.4) are those which are perceived by others in the band as youthful and/or ‘rough’.

	Factor weight	% of (th): [f]	N
B “Tiny wee pipers”	0.94	93	56
C “The new folk”	0.88	85	59
F “Fun/up for a laugh, not very serious”	0.77	75	24
P “Novice tenor section ‘WILD’ !!”	0.77	78	45
A “They act hard all the time”/ “fancy tune folk”	0.71	67	49

The ‘tiny wee pipers’ and ‘the new folk’ are two CofPs which consist of the youngest and most inexperienced pipers in the band. They ‘tiny wee pipers’ are between 12-13 years old and none of them have yet competed with the band<sup>68</sup>. Because of their inexperience, they are often asked to sit to the side when the band is practicing and so they have formed their own friendship group by default. ‘The new folk’ are a little older (13-14) but have been in the band less than a year and are still learning the music and trying to break into the group. The frequency with which groups B and C use this variant is fairly high which implies that it may have little social meaning for

<sup>68</sup> Playing with the band in competition is a rite of passage to full membership – until this is achieved, it is very difficult to claim membership of the band.

these speakers. Certainly, it is difficult to see the significance of the social meaning of th-fronting through the co-occurrence of other variables for these speakers and, as there are no examples of style shifting in the extracts in this corpus, it is even more difficult to infer the social meaning of variation<sup>69</sup>. However, although groups B and C may be using the variant unconsciously, the very fact that they use it at all changes the social meaning that it can have for other speakers in this community. It no longer simply means ‘young’ but it also takes on some of the social characteristics of these groups of younger speakers such as ‘immaturity’ and ‘inexperience’.

The group labelled ‘fun, up for a laugh, not very serious’ consists of Daniel, Campbell and Brandon. These three men range in age from 20-33 but they typically enjoy living a bachelor lifestyle. For instance, on the day that I recorded Brandon and Daniel, Brandon (aged 33) explained, within the first five minutes of the recording, that he had been to a night club the previous evening and had had two hours of sleep before going to work. I marvelled at his stamina and stated that I used to do that when I was eighteen and he responded by saying “I’m still eighteen”. He also turned up to the band practice that evening wearing a t-shirt with the words “Don’t be shy, give me a try” embossed in large letters across the front and in commenting on their suitability to perform the envelope game, Daniel explains: “a hink we’ll be better than Ted cos he’s...auld, eh”. They also see themselves as jokers and while they take seriously the task of playing in the band, they are aware that they take responsibility for making sure that practices never become too heated and remain fun:

Extract 21

Brandon: ye ken when ye can get away wi it wi Ted and if he’s really crabbit,  
 that’s the best time tae fling wan in cos it lightens the mood up straight away  
 Daniel: /aye aye /he changes his face  
 Brandon: /nine times oot  
 eh ten it’ll be me’ll say somehing, no directly at him but I’ll rip-slag somedy  
 else in the band or I’ll slag masel or somehing like that an that’s it, it’s calmed  
 doon again eh.

By interpreting the use of th-fronting by group F in the theory of social meaning reviewed here, it is possible to suggest that this group are actively (consciously?)

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<sup>69</sup> See chapter 6, section 6.2.1 for further discussion of th-fronting in groups B and C.

employing the variable as one more way of signalling their ‘youth’ identity. Again, however, by doing so, it takes on other social meanings in the context of use of this group such as ‘fun’ and ‘cheeky’.

The group labelled ‘Novice tenor section WILD!!’ consists of four adolescent girls who play the tenor drum in the band and who are best friends both in and out of band (two of them are twin sisters). Although they are only 13 years old, they spend a large amount of their time taking part in more adult-based social practices such as drinking and meeting their boyfriends. Their willingness to take part in daring activities such as underage-drinking means that they are viewed as tough and fearless. They are also very open with opinions on other peoples’ behaviour; indeed they were frequently described by others in the band as ‘bitchy’. For instance, the following extract occurred as the girls were entering the room to begin recording:

Extract 22

Suzy: ye want tae seen aw the lassies

LC: what were they like?

Chloe: they were dancers

Suzy: /they had-they had skirts right up their bum

Rebecca: /they had the wee, oh

Chloe: an their troosers were like away doon and then flairy at the end

Suzy: aye they were like zebra or somehing

LC: they were like what?

Suzy: zebra

Rebecca: noh, they’re like leopard but pink an black, aye

Suzy: it’s horrible

I would suggest that group P are therefore not employing th-fronting in a similar way to group F. The point of using this variable is not to sound younger but to enhance the tough image of these girls. This group are not directly indexing the ‘youthful’ meaning of th-fronting; instead they’re directly indexing the ‘rough/tough’ social meaning and again, through their use of the variant, it takes on other more specific meanings (like bitchy) in this community.

Finally, the group labelled “They act hard all the time”/ “fancy tune folk” is a group of 4 teenage boys aged between 12-15. They tend to wear expensive tracksuits and football tops to band practice and they project a confident, self assured, macho

image. The following extract from Leon and Alex ('the new folk') summarises how many people in the band view this group:

Extract 23

LC: what is it that makes them-that makes ye hink they're similar?

Leon: just the way they act, they aw act the same

\*\*\*

LC: what dae ye mean, how dae they act?

Leon: a dunno they aw act like

Alex: loud

Leon: loud an smart

\*\*\*

Alex: hink-they hink they're hard

Leon: yeah

Alex: they hink they're solid

They are confident in their appearance and also in their ability as pipers. During the winter practice, the pipers are often split into small groups to work together on perfecting their technique. Rather than repeat the movements they have been asked to practice, these boys will often show off to the others by playing music that is beyond the capabilities of most of the other pipers and this adds to their confident, image. I would therefore suggest that, as with group P, group A are not employing a high proportion of th-fronting in order to sound 'young' (as group F may be) but to sound 'tough' and, through their use of the variant, th-fronting in this community takes in further social meanings of confidence and also arrogance.

This discussion has suggested the existence of a number of possible social meanings of th-fronting in WHFPB which are indirectly indexical of the core social meanings of roughness and youth. Following Eckert, this picture below charts a possible indexical field for th-fronting and so shows the range of meanings that may exist and be available for use with respect to th-fronting in WFHPB

**Figure 3.10: possible indexical field for th-fronting in WFHPB**



Just as the social meaning of t-release develops from core ‘vague’ meanings of ‘clear’ and ‘emphatic’ to specific meanings such as ‘Orthodox Jew’ or ‘Gay Man’ (because the direct index is interpreted as being associated with these social properties), so too this process of ‘indexical layering’ (Moore 2007) is apparent in WFHPB and we can begin to see a process whereby the direct social meaning of th-fronting (i.e. rough or young) is becoming more specific in certain local friendship groups and communities of practice as core social meaning is indirectly indexed.

Further evidence in support of the social meaning of th-fronting comes from the fact that the groups which strongly disfavour the labiodental variant are characterised by maturity, seniority and ‘geekiness’- opposite qualities to those that favour the labiodental variant.

	Factor weight	% of (th): [f]	N
D “Pipe band geeks”/ “Ex-Dream Valley”	0.08	7	27
H “Senior drummers”/ “Pipe band geeks”	0.09	9	76

The group labelled “Pipe band geeks”/ “Ex-Dream Valley” corresponds to group 2(a) in table 2.7 of chapter 2 (see chapter 2 for a description of this group). They hold professional jobs outwith the band and they project a professional image within the band.

The group labelled “Senior drummers”/ “Pipe band geeks” (Lewis, Connor and Pete) have known each other for a number of years and they also all hold professional positions both inside and outside the pipe band (they are all involved in teaching within the band). WFHPB travel to and from competitions on a hired bus. The back seats of the bus are typically noisy and unruly – it is a place to sing songs, smoke and drink alcohol. In the following extract, Pete explains that the non-sense attitude of his friendship groups is typified by the place that they occupy on the band bus:

Extract 24

Pete: at the front ye normally get me, Lewis, Connor\*\*\*

LC: right

Pete: guys that just like tae travel there, read their paper, have a laugh about what wiz on the telly

LC: aye

Pete: an talk about the fitbaw an stuff like that like Bobby used tae be on oor bus fae Dream Valley, we used tae have a quiz an stuff like that in the mornings an stuff like that eh. That’s what it wiz that’s-that’s the wiy we did it. I dinnae mind

To summarise, just as the precise meaning of /t/ release in American English is dependent upon the style in which it is incorporated into (Orthodox Jewish – learned, California Geek Girl – smart, bitchy diva – prissy), so too in this community it is possible to suggest that the precise social meaning of th-fronting is dependent on the type of speakers using the variant and the style in which it is incorporated into. In some respects, the social meaning it acquires in each community of



practice/friendship group is even contradictory. While the use of the labiodental variant by groups B and C entrenches the ‘youth’ meaning of this variant, through association with these groups it also acquires an association with ‘inexperience’. However, group A, the most experienced pipers in the novice band, associate the use of the labiodental with a tough, macho image. In this way both the youngest, most inexperienced group and the oldest, most experienced group are among the heaviest users of the labiodental in the novice band. The group of young tenor drummers (who are characterised by their engagement in adult social practices) also associate the use of the labio-dental with a tough, macho image. However, group F associate the use of the labiodental with youthfulness and by combining it with their laid-back, easy-going style, it acquires a less macho meaning.

“The bottom line is that more than one group of speakers can use the same variable – but differences in the practices of these speakers will imbue that *same* variable with *different* meanings.” (Moore 2003: 11)

### **3.8 Limitations**

The main advantage to employing a traditional, quantitative approach to variation is that, through varbrul, we have the capability to model both social and linguistic factors simultaneously impacting on a speaker’s choice of variants and to rank their relative strength and significance. We have seen from the above analysis that a number of linguistic and social factors are important in influencing this variation but none more so than community of practice membership. However, as Guy (1998) warns, statistical analysis does not in itself *explain* variability: “varbrul only performs mathematical manipulations on a data set. It does not tell us what the numbers mean, let alone do linguistics for us” (Guy 1998:133). In order to interpret these findings, it is therefore important to understand the social practices that these different communities of practice engage in. Abstraction over groups of speakers or linguistic items is a necessary part of quantitative sociolinguistics and perhaps the only way to formulate generalisations about the constraints operating on variation

across a data set. However, even at this very local level of abstraction (i.e. the friendship group/community of practice), this method of quantification hides a great deal of inter-speaker variation. For instance, of the four speakers who comprise the group labelled “On the fringe” in table 3.4, there is massive variation in their use of the variants of (th). Rob and Greg both use the dental variant categorically, Lucy uses the labiodental variant with a frequency of 15% and Kate uses the labiodental with a frequency of 36%. Furthermore, while Rob and Greg showed no evidence of th-fronting in the 2005 corpus (see Clark 2005), Kate and Lucy’s levels of th-fronting have changed significantly (df 3, Chi squared 23.09,  $P \leq 0.001$ ) since 2005: Kate has gone from categorically using the dental variant in the 2005 recording to a frequency of 36% of (th): [f] in 2007. Lucy, on the other hand, has gone from a frequency of 58% use of the labiodental variant in 2005 to a frequency of 15% in 2007 (possible reasons for this shift in frequency are discussed in chapter 6, section 6.2.1). This difference becomes apparent when the data are examined at the level of the individual speaker. Moreover, 21 speakers in this corpus showed no variation in (th) - they were categorical users of either [θ] or [f]. The lack of variation shown by these speakers is theoretically interesting (both socially and linguistically) but their data cannot be included in the multivariate analysis because they do not vary.

The analysis of the social meaning of (th) presented in this chapter provides a coherent ‘story’ of the variation but there are also some problems associated with this method. The entire approach is based on the assumption that a shared core social meaning of variation exists across a large number of speakers. The suggestion is that speakers are able to tap into this shared core social meaning in order to construct more specific, less vague meanings within their own communities. But how much reality is there in the idea of a shared social meaning across a community? How great is the distance over which speakers might be expected to share a social meaning? If variants of a variable are used in different ways by different groups of speakers, how can we possibly be sure that these speakers have access to a shared social meaning? These are also questions that were raised recently by Meyerhoff and Niedzielski (2003) in an examination of the vernacular variants that are typically associated with British and American English but that are being increasingly used in New Zealand. Meyerhoff and Niedzielski provide evidence that many New

Zealanders are unaware that these new variants are not traditionally features of NZ English; they have become (or are becoming) localized and so they question to what extent the ‘original’ social meaning of these variants is passed on and, indeed, whether we should even be calling them the same variable in both communities. The same concerns are applicable in this case; for instance, most of the speakers in WFHPB, when questioned, were either unaware of th-fronting or had no idea that th-fronting was anything other than a feature of their local dialect. If these speakers have no awareness of th-fronting outside of their local community, how is it possible to claim that they share the same core social meanings of th-fronting as speakers in other areas of Britain in which th-fronting is also taking place?

One final difficulty with the application of Podesva (and others) ideas about social meaning to variation in th-fronting in WFHPB is the lack of stylistic variability in the WFHPB corpus. Podesva (2006) is able to show that although individual linguistic variants are capable of carrying social meaning, this meaning is more apparent when consideration is also given to a number of other linguistic variants that co-occur to create styles. This view also finds support in the social psychology literature:

“The construction of social meaning is the result of multiple, mutually interacting influences among numerous pieces of information. Isolated social behaviours rarely have a clear meaning separate from the context in which they occur. They can only be understood when integrated with a range of other information, such as other behaviours, the situation, the individual’s personality and so forth” (Read, Vanman and Miller 1997:27)

However, the methods used in the collection of this corpus were not designed to elicit a shift in style and so it is difficult to find clear examples (as in the case of Podesva 2006) which support the claims made on the social meaning of th-fronting in WFHPB. This is complicated further by a reliance only on sociolinguistic methods of data collection with no attempt to uncover the social meaning of variation using psycholinguistic methods (see, for example, Campbell-Kibler 2005). Although a reliance only on sociolinguistic methods does not allow for a more thorough analysis of the perceived relationship between th-fronting and social meaning in WFHPB, the aim of the thesis is to test the viability of a synthesis between

sociolinguistics and usage-based linguistic theories and this necessarily implies the use of sociolinguistic methods of data collection.

### **3.9. Conclusion**

This chapter dealt with the patterning of variation in ‘th-fronting’ in West Fife High Pipe Band, a phonological change in progress currently underway in many varieties of British English. Although this variable has received a great deal of attention in variationist literature over the last ten years, all of this discussion has been conducted within the ‘first wave’ i.e. studies that are characterised by an attempt to correlate linguistic variation with global social categories such as age, sex and social class. Also, few accounts of th-fronting have considered the potential motivating role of ‘linguistic’ factors in the analysis of variation. The varbrul analysis conducted in this chapter not only included various linguistic factors groups and the traditional ‘first wave’ or macro factor groups, it also included more locally based social categories that were meaningful to speakers in this particular community. The results of the varbrul analysis suggest that:

- (a) a number of linguistic factors are significantly correlated with th-fronting in this community and so are responsible for a portion of the variation. These are:
  - Preceding [f] in the word
  - Syllable structure/place of (th) in the word
  - Type of lexical item
- (b) friendship group membership/community of practice membership substantially outranks all other factors influencing the variation in this community (including the macro factor groups of speaker age and sex). This provides evidence that th-fronting is a socially meaningful variant in this community.

Section 3.6 applied some of the suggestions in Podesva (2006) to this data in an effort to uncover the social meaning of th-fronting in this community and although it

was possible to arrive at a coherent explanation of the social meaning, problems with this analysis (highlighted in section 3.7) have led me to question whether the results of this analysis are as conclusive as they at first appear and whether there may indeed be other constraints operating on this variation. In chapters 5 and 6, I attempt to better understand the pattern of th-fronting in this community by situating these findings against research on the progression of sound change more generally. In the following chapter, however, I present a socio-phonetic analysis of a stable vocalic variable in WFHPB which should provide a contrast to the variation analysed in this chapter.

## Chapter 4: BIT in WFHPB

The previous chapter examined the various social and linguistic factors affecting th-fronting, a consonantal change in progress in the WFHPB community. This chapter provides a contrast to this by examining a vocalic variable that is reported to show stable sociolinguistic variation. The variable in question is the realisation of the short front high /i/ vowel, often referred to as the BIT vowel in Scottish English (Aitken 1984). This roughly corresponds to Wells' (1982) KIT lexical set. As with the discussion of th-fronting in the previous section, the main aim here is to discover the primary motivating factors in the variation displayed in the BIT vowel in the WFHPB corpus using techniques typical of modern quantitative sociolinguistics. In part III of the thesis, I return to the variation in BIT and ask how much further an investigation which is grounded on the theoretical assumptions of the usage-based thesis can add to this analysis of variation. Again, as with the discussion in the previous chapter, this chapter begins by briefly highlighting the patterns of variation and change that have been found with respect to this variable in Scottish English in order that the discussion which follows can be situated against current research on this variable.

### ***4.1 Introduction***

The KIT vowel has received considerable attention in English linguistics as it has been involved in a number of chain shifts which have affected the short front vowel system. In North America, this vowel has been lowering in quality as part of an interrelated chain shift called the Northern Cities Shift (see Labov 1994, 2001). In the Southern Hemisphere, the quality of the vowel in KIT has also undergone some changes, although the exact nature of the change is different across varieties. In Australian English, for instance, KIT has raised and fronted to [i] (Cox 1996, cited in Langstrof 2006) whereas in New Zealand English, it has lowered and laxened to [ɐ]

(Langstrof 2006). In South African English, the vowel has shifted in both of these directions by undergoing a process of allophonisation (Wells 1982).

In varieties of English in Britain, the KIT vowel has “shown considerable stability since Old English” (Gimson 1962: 98). In other words, despite reports of a number of different variants of this vowel in the dialectology literature (e.g. Cockney, conservative forms of RP, modern Milton Keynes and the Birmingham dialect are all reported to have a phonetically raised variant of the /ɪ/ vowel: [ɪ̟]. See Gordon *et al.* 2004: 115 for details), most words that contain a short front high vowel in present day English have always had a short front high vowel in English.

In Scots and Scottish English, the variants of this vowel are typically described as “somewhat lower than the corresponding vowel in English” (McClure 1994: 65). Grant and Robson (1926) suggest the existence of six variants of the vowel in Scots ([ɛ̟, ɛ̟, ə̟, ʌ, ɪ, ɪ̟]) and McAllister (1963: 140-1) suggests that there are three main variants – “a vowel produced with the tongue slightly lower than it is for [i]”, “a form of [ɪ] made with the tongue slightly further back than it is for [i]” and “another very frequent Clydeside variant, produced by giving the vowel half rounding”. McAllister (1963: 141) suggests that phonetic environment plays a significant role in the realisation of this vowel in Clydeside varieties, stating that “speakers of local dialect will find it most difficult to maintain the vowel at its brightest pitch when it comes immediately before or after [l, m, n, ŋ, s]”. Johnston (1997b: 468) also suggest that certain phonetic environments favour the lower centralised variants of this vowel, specifically that a preceding /w/ or /ʌ/, a following /l/ or a following /r/ are all environments which encourage a lower, centralised realisation.

A small body of research on Scottish English exists which considers variation in the BIT vowel as a sociolinguistic variable and correlates the realisation of the vowel with various social factors. This research examines variation in urban Scots and, as with studies of th-fronting discussed in chapter 3, this research employs ‘first wave’ sociolinguistic methods. I review these findings in the following section before presenting an analysis of variation of BIT in the WFHPB corpus.

### 4.1.1 Macaulay and Trevelyan (1977)

The first sociolinguistic investigation of the BIT vowel in Scotland was conducted in Glasgow by Macaulay and Trevelyan (1977) using methods that can be situated within the classic Labovian approach to variation. The data were collected using a quota sample in order that the corpus would contain an equal number of speakers of both sexes from three age groups (10 year olds, 15 year olds and adults) and four social classes (I, IIa, IIb and III, ranked higher to lower and according to occupation).

Macaulay coded variants of the BIT vowel on a five point scale as follows:

1 = [ɪ]

2 = [ɛ̂] and [ɪ̞]

3 = [ɛ̃] and [i̞]

4 = [ə̂]

5 = [ʌ̂]<sup>70</sup>

Only tokens in fully stressed syllables were included in the analysis<sup>71</sup>. The sociolinguistic results of Macaulay and Trevelyan's analysis of the BIT vowel in their Glasgow corpus are provided in figure 4.1.

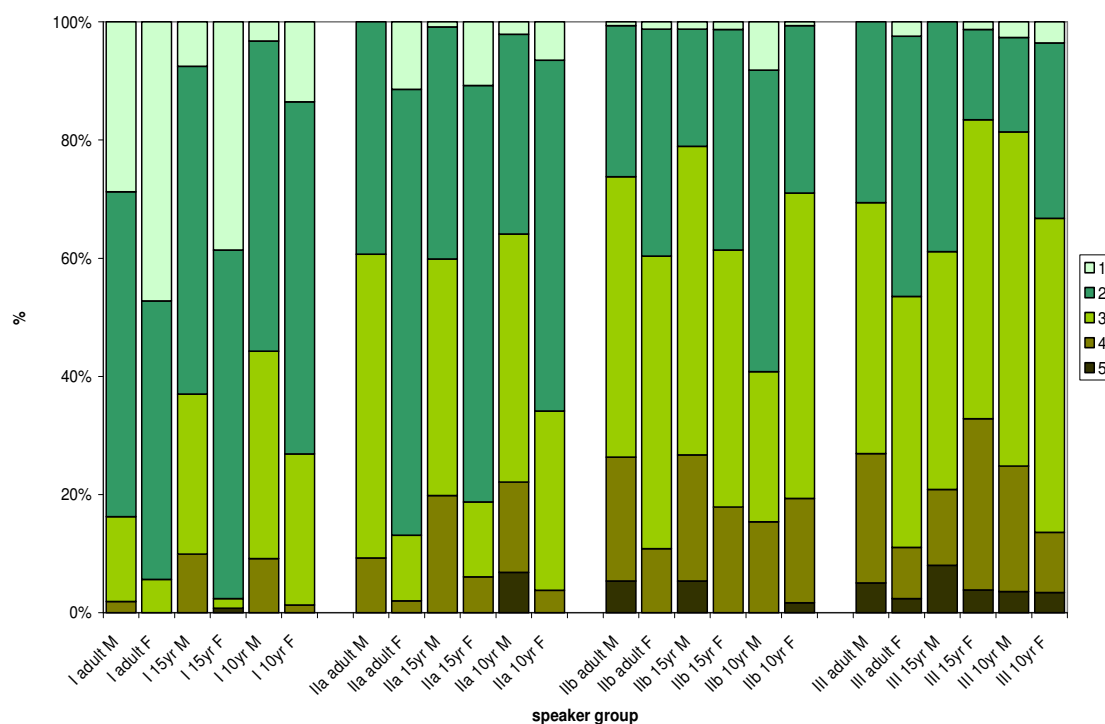
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<sup>70</sup> The diacritics used by Macaulay and Trevelyan (1977) are not standard IPA but it is clear that they represent a range of variants from high front vowels to lower, centralised vowels.

<sup>71</sup> Macaulay and Trevelyan (1977:31) also state that instances before /r/ were omitted from the analysis "since they require separate investigation". It is not made clear in Macaulay and Trevelyan (1977) why these forms require separate investigation although this is presumably because in the history of English, the front lax vowels have undergone mergers before /r/ in other dialects.



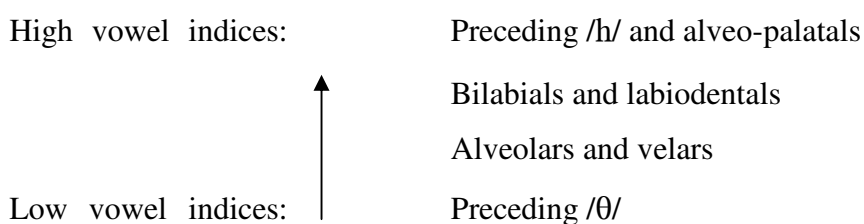
**Figure 4.1: Social stratification of (BIT) in Macaulay and Trevelyan (1977)** (data taken from appendix c, pp162-4)



These results suggest that there is social stratification in the use of this variable in Glasgow with apparent correlations between the realisation of the vowel and the social factors age, sex and social class of the speaker. Speakers from the lower social categories typically have lower and more retracted realisations of this vowel than speakers of higher social classes. There is also an interaction between the social factors ‘speaker sex’ and ‘social class’. In each social class group, the mean indices of the variants are lower for women than men (and so women have higher, fronter realisations of the vowel than men typically do). Also, the greatest difference between the variant realisations for males exists between social class I and IIa whereas for females, the greatest difference is between social class IIa and IIb. Lastly, there appears to be a correlation between the realisation of this variable and the age of the speaker. Not only do younger speakers tend to use a vowel that is more lowered and retracted than adults (because the mean indices for the 10 year olds and the 15 year olds are generally higher than those for the adults) but, again,

there is a substantial interaction between this social factor and the sex and social class of the speaker. The fact that the realisation of the variable in the speech of 15 year old girls is closer to the adult norm (in each social class) than with their male peers leads Macaulay and Trevelyan to conclude “either that the girls are more aware of the social significance of this variable or that the boys are more resistant to social pressures to conform to the adult standards of their social class group” (1977: 38).

Macaulay and Trevelyan (1977) also consider the role of phonetic environment as a motivating factor in this variation. They find that laterals have the greatest effect, producing much higher values of the variable (and so lower, more retracted realisations) whether they precede or follow the vowel. Preceding nasals also tend to produce higher values of the variable whereas following nasals correlate instead with lower vowel indices (i.e. higher, fronter realisations). Bilabials and labiodentals are associated with slightly higher values of the variable (and so lower, retracted realisations) than alveolars and velars. They suggest the following tentative ranking of the effect of place of articulation on the height of the BIT vowel (1977: 36):



The exact nature of the role of phonetic environment on variation in the BIT vowel is, however, a little unclear in this study, a criticism that has been noted in Milroy (1979) and Eremeeva (2002)<sup>72</sup>. As Macaulay and Trevelyan’s (1977) analysis of variation only employs descriptive statistics, it is difficult to determine how accurate suggestions such as the above ranking of the importance of place of articulation are. However, there is no doubt that this study provides an indication of the existence of quite complex correlations between the various realisations of the BIT vowel in Glasgow and the social categories age, sex and social class.

<sup>72</sup> For instance, on some occasions Macaulay and Trevelyan specify whether they are claiming that the preceding or following phonological environment is important but on others their descriptions are vaguer, only alluding to ‘the environment of voiceless consonants’.

#### 4.1.2 Eremeeva (2002)

Eremeeva's (2002)<sup>73</sup> investigation of the variation into BIT in Glasgow provides an interesting follow-up to the previous research and, as there is a time gap of over twenty years between these two studies<sup>74</sup>, it is possible, with some caution, to interpret comparisons of these results as real time evidence<sup>75</sup>.

The data analysed in Eremeeva (2002) are drawn from a sub-sample of the 1997 corpus collected to investigate language variation and change in Glasgow (Stuart-Smith and Tweedie 2000). The data from 16 speakers were analysed (from a total of 32 in the corpus). Eremeeva only selected male speakers and so it is not possible to make comparisons between this research and Macaulay and Trevelyan's findings for speaker sex. However the speakers in this sample were stratified by age (adolescents and adults) and social class (middle class and working class). Previous research on the BIT vowel in Scotland has suggested a correlation between the realisation of the vowel and the phonetic context in which the variable occurs, specifically with the contexts /l/ and /r/, and so Eremeeva chose to omit these contexts of variation from the analysis. With this done, there was no longer a significant correlation between the realisation of the BIT vowel and phonetic environment.

Both auditory and acoustic analyses were carried out in this study in word list and conversational data. Previous to this, no acoustic analysis had been conducted on vocalic variables of Urban Scots<sup>76</sup>. In the auditory analysis of the data, a number of variants of the BIT vowel were recorded. These were then grouped into four main variants as follows (Eremeeva 2002: 39):

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<sup>73</sup> Some of these results were also published in Eremeeva and Stuart-Smith (2003), however the unpublished manuscript Eremeeva (2002) contains a more detailed analysis and so I will review the unpublished version.

<sup>74</sup> Macaulay's fieldwork was carried out in 1973 and the corpus employed by Eremeeva was collected in 1997.

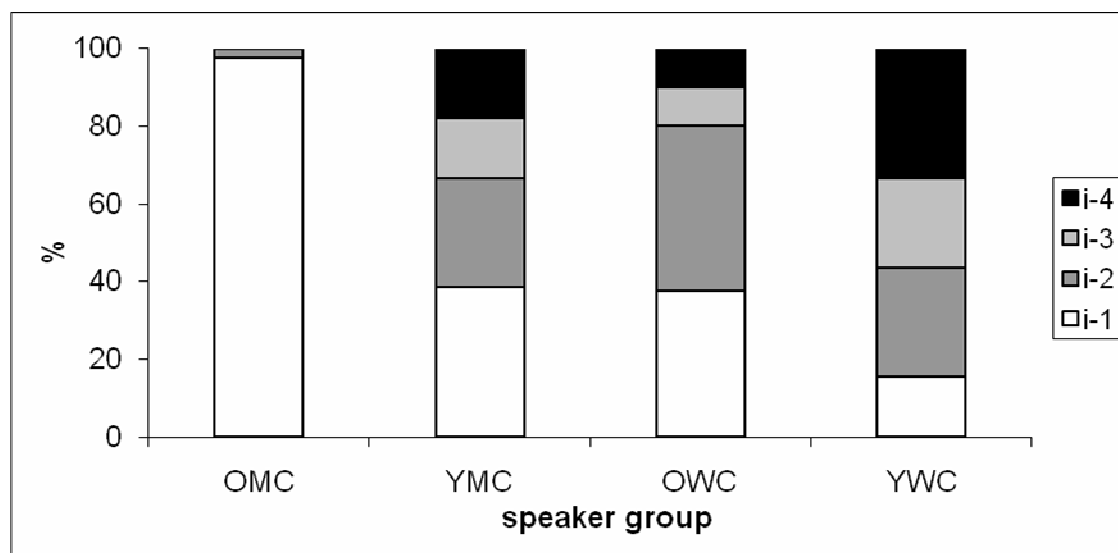
<sup>75</sup> Stuart-Smith (2003) compares the analysis of the OUT vowel in both of these studies but treats all comparisons made between the two corpora with a great deal of caution since there were a number of differences in the methods used in collecting the data.

<sup>76</sup> Stuart-Smith and Tweedie (2000) investigated variation in a number of consonantal variables in Glaswegian.

1	[ɪ]	ɪ, ɪ, ɪ, ɪ, ɪ, e, ɪ, ɪ, e
2	[ë]	ë, ë, e, ε, e, e, ɨ
3	[ɛ̃]	ɛ̃, ε, ε, ə, ε, ε
4	[ʌ]	ʌ, ə, ʌ, ʌ, ʌ

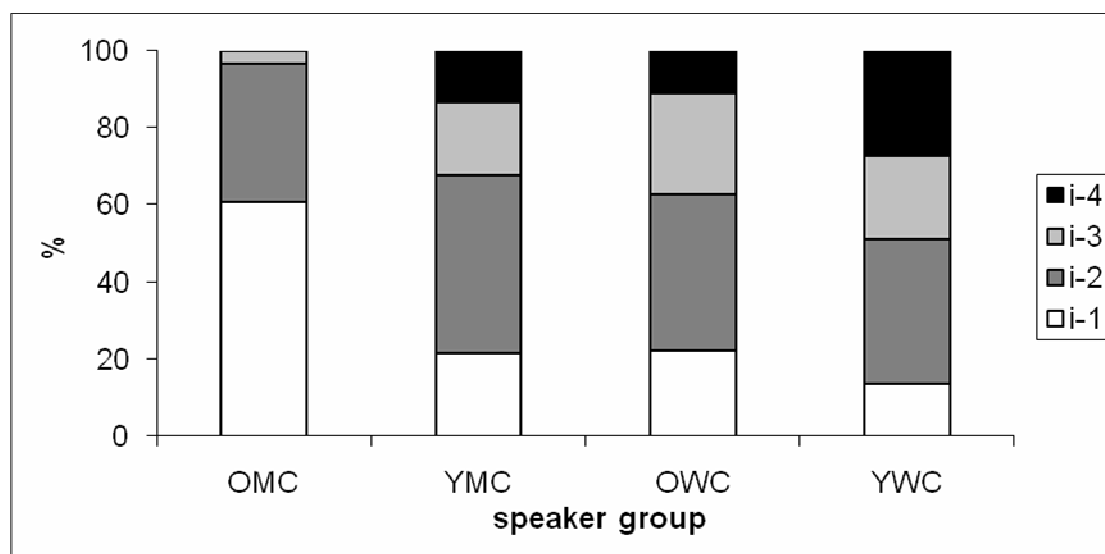
The results of the auditory analysis of the word list data show a clear relationship between the realisation of the variable and both the age and social class of the speaker.

**Figure 4.2: Distribution of variants of BIT vowel in word list data (auditory analysis).**



Both the middle class adults and, to some extent, the adolescents show a preference for the high, front variant [ɪ]. The working class speaker groups show a range of variation with preferences for [ë] and, among the younger speakers, [ʌ]. The pattern found in the conversational data is similar to the word list data with the exception that, overall, speakers display a greater range of variation in conversation.

**Figure 4.3: Distribution of variants of BIT vowel in conversation data (auditory analysis)**



In the conversation data, there is significant age variation within both classes ( $p < .05$ ) and highly significant class variation within the adults ( $p < .000$ ). However, there is no significant class variation between the adolescents.

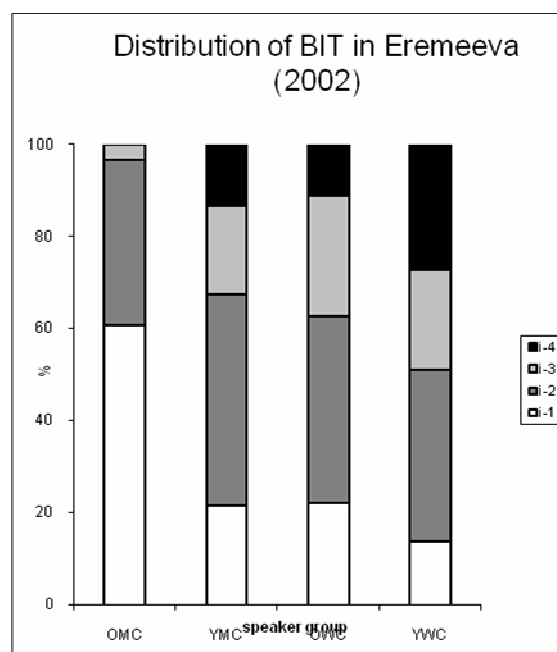
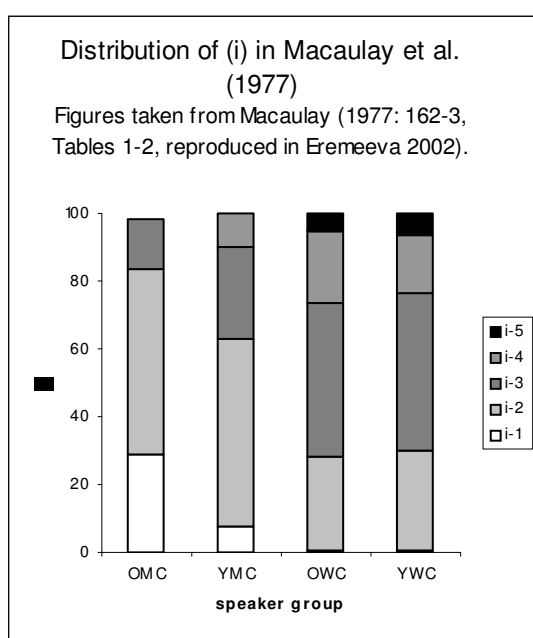
Statistical analyses (ANOVA and Tukey) were also carried out on the acoustic results of the word list and conversation data and this time, these were run separately on variation in the first formant value (which represents the height dimension) and the second formant value (which represents the front/back dimension).

Overall, these confirmed the findings of the auditory analysis by showing similar significant class and age differences for both the height and front/back dimensions of variation. Specifically, on the height dimension, there is significant class variation among the adults and significant age variation among the middle classes. On the front/back dimension, there are significant class differences within both age groups.

The results of this study show clear evidence of social stratification of the realisation of the BIT vowel in Glasgow, both in terms of speaker age and speaker sex. There is highly significant stratification by class among the adult speakers: middle class adults clearly prefer high, front variants while working class adults use

more retracted and/or lower variants. This leads Eremeeva to conclude that “the BIT vowel is a social indicator for adults” (2002: 85).

Despite the fact that the stratification by age seems less clear (age differences seem to be clearest within the middle classes, with adolescents using more lower and retracted variants than adults), Eremeeva nonetheless claims that “we are witnessing an apparent time change” in the BIT vowel. This conclusion is difficult to support, however, partly as a result of the complicated interaction between age and social class and partly as a result of the design of the study – with only two age categories, it is impossible to rule out the effects of age grading in the data (see Meyerhoff 2006). Comparison of Macaulay and Trevelyan’s (1977) data with Eremeeva’s (2002) data do not shed a great deal of light on the problem.



According to Stuart-Smith (cited in Eremeeva 2002: 99 as personal communication) Macaulay and Trevelyan’s (1977) variants 1 and 2 can be interpreted as corresponding to Eremeeva’s (2002) variant 1. If this is the case, then the general pattern remains the same in both corpora: the lower social classes generally favour a lower and more centralised variant than the higher social classes and this is especially true of the adults in the corpus. There is perhaps an increase in use of the lower, retracted variants in the speech of the younger speakers but the apparent lack

of these variants in Macaulay and Trevelyan's (1977) study may simply be a result of the more formal methods of data collection used<sup>77</sup>. These data appear to show a much clearer pattern of stable variation across time that is stratified for social class and age than of any change in progress.

To summarise, a brief overview of some of the literature on variation in the BIT vowel in the urban Scots of Glasgow reveals a number of points for consideration when analysing the variation in the WFHPB corpus. The main suggestions seem to be that

1. Variation towards a lower and/or retracted variant is influenced by phonological context
2. Variation towards a lower and/or retracted variant is favoured by working class adolescent males in most communities.
3. This variation is stable.

In section 4.2, I present the results of the analysis of variation in the BIT vowel in WFHPB. However, it is first necessary to explain the processes involved in identifying and defining the variable in this corpus, particularly as various additional factors need to be considered than was the case with the variable (th).

## **4.2. The BIT vowel in WFHPB**

### **4.2.1 Acoustic analysis: circumscribing the variable context**

Variation in the realisation of BIT is gradient and, therefore, more problematic for auditory analyses (Milroy and Gordon 2003: 151). Although it is possible to conduct an auditory analysis of this vowel (e.g. see Eremeeva 2002), the problem is compounded when dealing with a corpus of naturally occurring speech such as the WFHPB corpus. I therefore employed a more objective instrumental approach and

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<sup>77</sup> Macaulay used formal interviews to collect the data for this study but the data discussed in Eremeeva are based on a corpus of naturally occurring conversation which were recorded without the presence of an interviewer.

used the PRAAT program ([www.praat.org](http://www.praat.org)) for acoustic analysis which is widely used in (socio)phonetics for obtaining formant measurements from digitised speech waves.

In extracting the data to be considered in the analysis, the aim was to achieve 30 tokens of the short front high vowel (BIT) from each speaker in the corpus which would have resulted in a data pool of 1620 instances. This was not achievable, however, due to a number of uncontrollable factors resulting from the nature of the recording environment<sup>78</sup>. It was therefore only possible to extract around 1500 BIT tokens from the corpus. Only stressed tokens in CVC environments were included in the analysis. This was done partly to ensure that the quality of the data was consistent across speakers; partly to ensure that the number of possible phonetic environments preceding and following the variable could be controlled and partly as an attempt to reduce the influence on formant values from lexical stress.

It is widely accepted in phonetic research that “acoustic analysis of energy concentrations in vowel spectra is a valid way of ...assessing vowel quality” (Langstrof 2006: 12) and that a strong correlation exists between the perception of a vowel and the first two bands of energy (or formants) in the wave form. The first formant (F1) correlates inversely with vowel height and the second formant (F2) correlates positively with frontness.

A common method of formant extraction from acoustic data is to begin by identifying a section of the vowel known as the ‘vowel target’. This is the part of the vowel that is presumed to be the least influenced by context and is of a relatively ‘steady-state’. In monophthongs, this typically occurs near to the vowels temporal mid-point<sup>79</sup>. Harrington and Cassidy (1999:59) describe two main ways to measure this. Either the acoustic vowel target is defined as an entire section of the vowel and the formant measurements are taken as the mean of this section or the vowel target is defined as the single mid-point of the vowel trajectory and so formant values are extracted directly from there rather than over an interval of time. Van Son and Pols

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<sup>78</sup> Recording in the vicinity of a pipe band naturally results in large periods of background noise which is less problematic for auditory analysis but not conducive to instrumental analysis. Also, recording the data in groups of speakers means that often speakers talk simultaneously. Both of these factors distort the wave form and can lead to spurious formant values.

<sup>79</sup> The concept of a ‘steady-state’ vowel is understood to be an idealisation since in reality many monophthong vowels have no clearly identifiable steady-state or else the steady-state is slightly different for each formant (Di Benedetto, 1989).



(1990) present a detailed comparative study of the different methods of measuring vowel targets and conclude that there is no significant difference between methods and so “the method that is most convenient can be used”. I chose to use the second method described by Harrington and Cassidy (1999) and collected formant frequency values from a single mid-point in the vowel.

The BIT vowel was first circumscribed in PRAAT by inserting a boundary at the release of constriction of the preceding consonant and the re-appearance of constriction of the following consonant. Of course, this process could be achieved more accurately when the consonants surrounding the BIT vowel were oral stops or fricatives (the release of a lateral, for instance, is less obvious but is nevertheless marked by a rise in amplitude and a shift in formants). The formant measurements were obtained from each token of (BIT) by using a script designed by Bert Remijsen to extract formants in praat (see <http://www.ling.ed.ac.uk/~bert/praatscripts.html>). The script calculates F1 and F2 at the midpoint of a segment in a TextGrid file. F1 and F2 are calculated using 'To formant (burg)' and the formant tracker in praat. The Picture window generates the spectrogram and formant tracks (F1 & F2) and the F1 and F2 values also appear in the window. In this way it is possible to visually check the spectrogram for each token and discard any that are obviously incorrect (i.e. where the formant tracker does not adhere to the band of energy in the spectrogram).

#### **4.2.1.1 Vowel normalization**

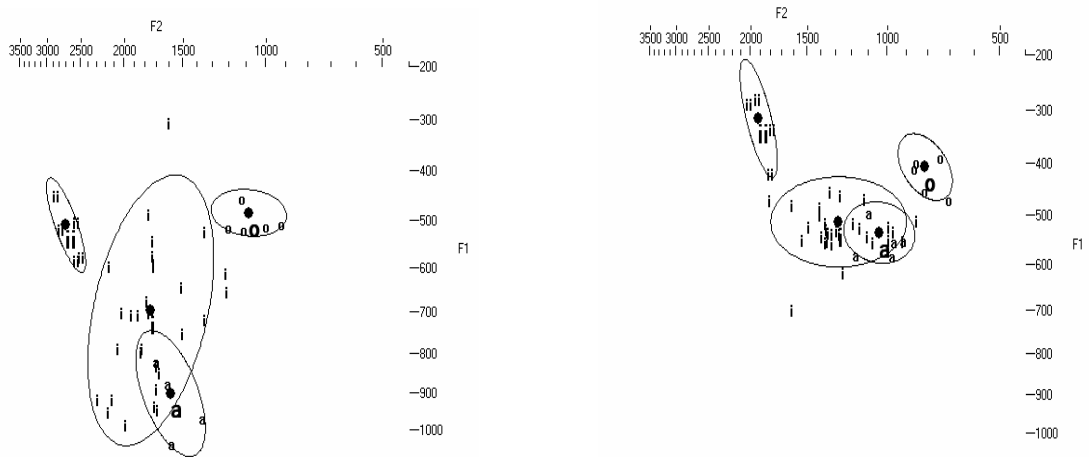
One of the inherent problems associated with comparing formant values across speakers is that physiological differences between speakers introduce another dimension of variance in the F1/F2 plane. This is because speakers with shorter vocal tracts (females and children) tend to have higher formant values. For instance, compare the following raw formant frequency data from two speakers in WFHPB. The data in the formant plot on the left of the page represents the vocal tract of an adolescent female in WFHPB and the data in the formant plot on the right represents an adult male. Exact raw formant frequencies are plotted for four vowels on each graph in the following way:

[i] = ii

[ɪ] = i

[a] = a

[o] = o



The differences between the realisations of BIT by these two speakers appear to be extreme but by simply comparing the raw formant values, it is impossible to know whether these differences are simply a product of the size of their vocal tract. It is therefore necessary, when comparing speakers with different vocal tract sizes, to normalize the raw frequency data.

For sociolinguistic purposes, acoustic vowel normalization needs to minimize the acoustic consequences of physiological sources of variation while simultaneously preserving sociophonetically relevant information. Several different types of acoustic vowel normalization transformation have been proposed. These different techniques are generally differentiated into two methods: extrinsic and intrinsic. Extrinsic methods, according to Langstrof (2006: 29), typically involve normalising a given vowel token by relating the F1/F2 frequencies of that token to the F1/F2 frequencies of other vowels within the speaker's range. Intrinsic methods, on the other hand, involve re-scaling raw F1/F2 values (in Hz) onto another scale such as Bark (Zwicker & Terhardt 1980), mel (Stevens et. al (1937)) or ERB (cf. Glasberg & Moore 1990).

Adank (2003) presents a thorough investigation into the problem of which normalization method is most suitable for use in sociolinguistics in which she rigorously compares 12 different methods of normalization. Adank found that the normalization method proposed by Lobanov (1971) most effectively reduced the physiological variation in the vowel variation while retaining a significant portion of sociolinguistic variation. Following Adank (2003), the normalization values employed here are derived from this technique.

The Lobanov (1971) method is based on the assumption that inter-speaker differences can be minimized by using the centre of each speaker's vowel space and the average dispersion from that centre following the equation below (reproduced in Langstrof 2006:29):

$$F_{norm} = \frac{F_i - \overline{F_i}}{SD_i}$$

where  $F_i$  is the raw frequency of a particular formant,  $\overline{F_i}$  is the average frequency of all formants for the speaker and  $SD_i$  is the standard deviation. This can be done in SPSS simply by performing a z-score transformation on the raw frequency data. The z-score is simply a method of transforming raw data into a standardised format to make it comparable. The z-score transformation is a linear transformation which means that it does not alter the relative position of data points nor does it change the shape of the distribution of data. The mean value of the standardised z-score is equal to 0 and the standard deviation is equal to 1.

In Lobanov's original formulation of the transformation, formant frequencies from all monophthongs must be included in order to achieve a valid  $\overline{F_i}$ . However, this is a major disadvantage to the formula since it is much more time consuming than other transformations. Adank (2003: 18) therefore tests the validity of this hypothesis and finds that it is sufficient simply to obtain F1 and F2 measurements of the '3 point' vowels for each speaker's system as there is a strong correlation

between measurements obtained from scale factors estimated using only the 3 point vowels and those measurements which obtained scale factors estimated from all 9 Dutch monophthongs.

The 3 point vowels are typically considered to be the cardinal vowels /i, a/a, u/ because they represent the extremes of the articulatory space and therefore extreme formant values for each speaker. However, in varieties of lowland Scots and Scottish English, the quality of the vowel /u/ is further forward in the vowel space and is realised as [ʉ], having fronted in a process Johnston terms ‘OUT-fronting’ (1997b:474). In this analysis, the /o/ vowel was therefore used instead in the 3 point vowel system in order to achieve a better indication of the range of the front/back dimension.

In order to perform the Lobanov normalisation, I attempted to collect F1/F2 values from 5 tokens of the vowels /i/, /a/ and /o/ per speaker. However, as with /ɪ/, this was at times tricky and although 5 tokens of each were extracted, some of these were discarded during closer inspection when running the script. It was mostly possible to obtain between 3-5 tokens of each point vowel per speaker.

#### **4.2.2 Analysis of variation of (BIT) in WFHPB**

Before an analysis of variation on the BIT vowel is carried out, it is first necessary to consider how many dependent variables should be analysed. As previously stated, variation in the first formant corresponds (inversely) with variation in vowel height and variation in the second formant corresponds with variation in vowel fronting. However it may be possible that there is a linear relationship between these two dimensions. In other words, if it is the case that as the vowel is retracted it is also lowered, then there is no need to conduct two separate analyses; one dealing with variation in vowel height and one dealing with vowel backing. Such a correlation is assumed to exist by Macaulay and Trevelyan (1977) who conflate these two dimensions in their analysis of the BIT vowel.

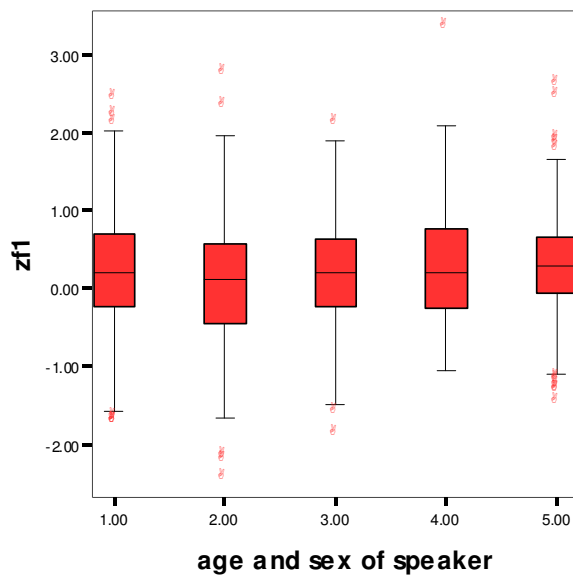
A simple Pearson's correlation shows that, in WFHPB at least, this is not the case (Pearson's Correlation = -0.004;  $p = 0.886 > 0.05$ ). This lack of correlation suggests that the factors influencing variation in the height dimension are likely to be unrelated to the factors influencing variation in the front/back dimension and so it is necessary to conduct two separate analyses on the BIT vowel, one dealing with variation in height and one dealing with variation in the front/back dimension.

#### **4.2.2.1 Distribution of variation by age and sex in WFHPB**

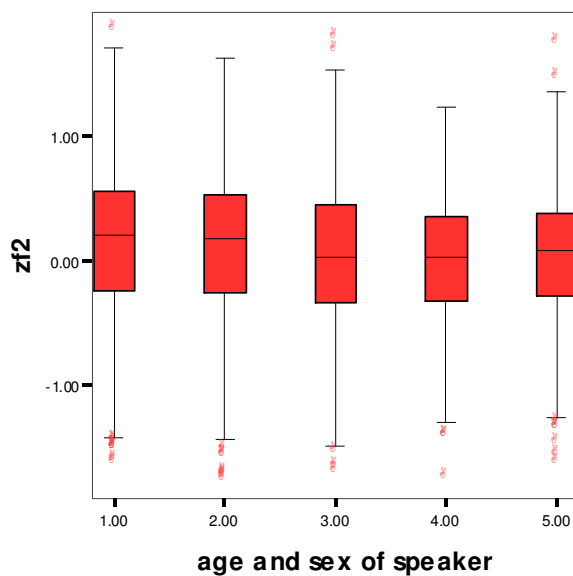
The data for (BIT) in WFHPB, when stratified by age and sex, are given below in boxplots created in SPSS. In the boxplots, y-axes show the z-transformed F1/F2 values and the x-axes represent the following categories:

- 1 = 12-15 year old males
- 2 = 12-15 year old females
- 3 = 16-24 year old males
- 4 = 16-24 year old females
- 5 = 25+ year old males

**Figure 4.4: Boxplot showing mean values of z-transformed F1 and range of variance across age and speaker sex.**



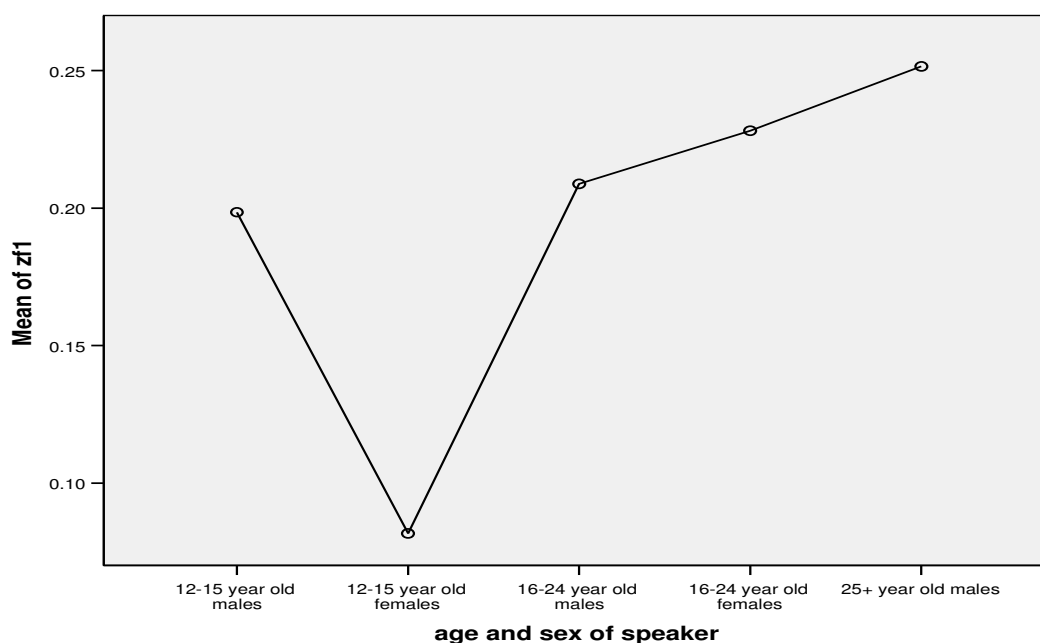
**Figure 4.5: Boxplot showing mean values of z-transformed F2 and range of variance across age and speaker sex**



The bottom horizontal line on each boxplot shows the lowest value of the z-transformed F1/F2 data (hereafter z-F1/z-F2) and the top horizontal line shows the highest value. The range inside the box is the interquartile range, which is the middle 50% of the data; the 'whiskers' extend to 1.5 times the IQR on either side of the box and the more extreme points are outliers.

Simply looking at these descriptive statistics does not seem to indicate a great deal of difference between these categories. Males and females of all ages have similar mean scores and show similar ranges of variation on both z-f1 and z-f2. It would appear from this data that age and speaker sex may not be influential factors in motivating variation in the BIT vowel in WFHPB. Of course, boxplots only act as a rough guide to understanding the variation. In order to test the significance of these categories, it is necessary to conduct statistical analysis on the data and, when comparing means between groups such as these, it is necessary to use ANOVA (analysis of variance). ANOVA tests the hypothesis that the mean values for 3 or more categories are equal. It tests the overall experimental effect (i.e. the fit of the model overall) and then multiple comparisons between each group highlights areas where there is significant variation. Two separate ANOVAs were run on this data, testing for effects of gender and age first in the variation in F1 and then in the variation in F2. The F1 ANOVA overall model suggests that variation between mean values of F1 across these groups is significant  $F = 2.55, p < 0.05 (0.038)$  but that variation in F2 is not significant  $F = 1.94, p > 0.05 (0.19)$ . The multiple comparisons between groups, however, suggests that the significant result in F1 variation is only caused by differences between 12-15 year old females and 25+ males. The difference between the means for these two groups was the only difference that reached significance in the multiple comparisons. These differences are charted in figure 4.6 below:

**Figure 4.6: Mean differences in z-F1 between groups arranged by age and sex of speaker. SPSS output from ANOVA.**



The results of this ANOVA suggest that 12-15 year old females in WFHPB have, on average, significantly lower F1 frequencies for the BIT vowel. In other words, their realisation of the BIT vowel tends to be higher in the vowel space than others. In Scottish Standard English, the BIT vowel articulation is both front and high [ɪ] (Stuart-Smith 2003) and this is typically considered the ‘standard’ or prestige variant. We would therefore expect gender differences to display patterns similar to that of Labov’s (2001: 266) *Principle 2*: “for stable sociolinguistic variables, women show a lower rate of stigmatised variants and a higher rate of prestige variants than men”. And yet, while this appears to be the case for young females in the group, older adolescent and young adults are not conforming to this pattern – the mean difference between the 16-24 year old females is not significantly different from their male counterparts. In fact, this significant ANOVA disappears when the results of two 12-15 year old girls (Lois and Rose) are removed from the sample ( $F = 2.51$ ;  $p < 0.05$  (0.72)). See section 4.2.2.6 for further discussion of the linguistic behaviour of these



girls. They are included in subsequent analyses because their range of variation is socially important.

While an analysis of variation that compares across mean values for groups of speakers can highlight general patterns in the data, this type of statistical technique is limited in its ability to contribute to our understanding of the motivations of variation within category membership. Again, as with variation in (th), more sophisticated statistical methods must be employed to reach a clearer understanding of the nature of the variation in this vowel.

#### **4.2.2.2 Multiple Regression Analysis**

Multiple regression is a statistical technique that allows the researcher to assess the relationship between one dependant variable and a number of independent variables. The dependent variables here are:

- (1) range of variation in F1
- (2) range of variation in F2

The independent variables to be included in the analyses are presented below. The social factor groups that were included in the analysis of BIT are the same as those presented in table 3.3 in the varbrul analysis of (th). Table 4.1 shows the independent linguistic variables that were included and the corresponding variants.

Table 4.1: Independent linguistic variables and corresponding variants.

<b><i>Independent Variable</i></b>	<b><i>Variants</i></b>
<b>Preceding phonological segment</b>	Approximant Nasal Labial stop /h/ Dental Velar/glottal
<b>Following phonological segment</b>	Approximant Nasal Labial stop Dental Velar/glottal
<b>Lexical category</b>	Noun Pronoun/proper noun Ordinal Verb Adverb/adjective
<b>Voicing of following consonant</b>	Voiced Voiceless

One of the requirements of a multiple regression analysis is that the independent variables should be measured on a ratio, interval, or ordinal scale. In other words, the independent variables must either be measured on a scale along the whole of which intervals are equal, such as age in years; or, at the very least, the data should be ordered in a meaningful way (e.g. 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>). However, the variants of (most of) the independent variables to be included in these analyses are nominal i.e. the numbers used to represent these data in a statistical analysis merely represent names and have no other meaning. A variable such as this is legitimate in multiple regression but only if it is dichotomous, i.e. there are no more than two categories. For example, speaker sex is acceptable (where male is coded as 0 and female as 1) but Community of Practice membership cannot be coded as a single variable. In order to include variables such as these in a multiple regression analysis, it is necessary to recode the variables into ‘dummy variables’ (see Field 2005: 208; Tabachnick and Fidel 2000:155-157). This means that in order to include the categorical variables in the regression equation, it is necessary to convert each level

of each of the categorical variables into a variable of its own, coded 0 or 1. This is done for all but one of the levels of the categorical variable, and the remaining level is used as the reference category. For example, in order to include the independent variable in table 4.2 ‘lexical category’ in a multiple regression, it is necessary to create the following new dummy variables:

	Dummy 1	Dummy 2	Dummy 3	Dummy 4
Noun	0	0	0	0
Pronoun/proper noun	1	0	0	0
Ordinal	0	1	0	0
Verb	0	0	1	0
Adverb/adjective	0	0	0	1

While this is an acceptable solution to the problem of dealing with categorical variables in a regression analysis, it vastly increases the number of independent variables to be included in the analysis. For example if all of the independent social and linguistic variables were to be recoded, this would result in 104 independent variables. This is a problem because the more independent variables that are included in the analysis, the weaker the model becomes. Tabachnick and Fidell (2000: 122) recommend only including the smallest number of independent variables that can account for the largest proportion of variance in the dependent variable. However, it is not always clear exactly which of these predictor variables are the ones which are highly correlated with the dependent variable (hence the need to use multiple regression). It is possible to attempt to discover which of these variables are most important by using the stepwise method of regression in SPSS. In this case, the order in which the variables are entered into the regression analysis is determined by the strength of their correlation with the dependent variable. This method *should* therefore produce the smallest possible set of predictor variables for the dependent variable. However, as Field (2005: 161) points out, stepwise methods rely on the statistical package selecting variables based entirely on mathematical criteria which takes the decision out of the researchers’ hands. Furthermore, these ‘decisions’ regarding the inclusion/exclusion of variables are often made on very slight differences in the semi-partial correlations (i.e. not correlations across the whole

model). For this reason, Field (2005: 161) recommends *not* using this method for exploratory model building. In order to attempt to discover which variables may be influencing the variation in the BIT vowel most (and so which variables to include in the multiple regression analysis), I began instead by using varbrul as an exploratory technique (see appendix 1 for details of this procedure).

As a result of the varbrul analysis, the following factor groups were included for consideration in the multiple regression analyses of the BIT vowel:

<i>Independent variable</i>	<i>F1 multiple regression</i>	<i>F2 multiple regression</i>
Following phonological context	X	X
Preceding phonological context	X	X
Grammatical Category	X	X
Voicing of the following segment.	X	X
CofP (recoded as Valley Lassies vs Rest of WFHPB <sup>80</sup> )	X	
Age of speaker	X	

Hierarchical multiple regressions require that the variables are entered into the model in a specified order and this order should reflect some previous findings or theoretical considerations. It is therefore good practice to enter known predictors into the model first in the order of their importance. The order in which the variables were entered into the multiple regression is the order in which they appear in the list above. This order was reached by assessing a combination of factors resulting from the varbrul analyses such as which factor groups were selected as significant in predicting both high and low vowels and how large the range was within each factor group.

The only factor group that was significant in the varbrul analysis but did not result in a significant contribution to the model in either the F1 or F2 multiple

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<sup>80</sup> See appendix 2 for details of this recode.

regression analyses is ‘voicing of following segment’. These results are therefore not reported. The results of the multiple regression analysis for F2 are presented in tables 4.2 and 4.3 below. The results of the multiple regression analysis for F1 are presented in tables 4.4 and 4.5 below.

Table 4.2: Regression analysis for F2

Model	Predictors for multiple regression	F2	B	SE B	$\beta$	Sig.
	(Constant)		-.052	.094		
Step 1: preceding phon. context	labials vs. glottals		0.676	0.081	0.343	.000**
	labials vs. alveolars		0.287	0.075	0.209	.000**
	labials vs. /h/		0.389	0.089	0.151	.000**
	labials vs. approximants		-0.307	0.08	-0.146	.000**
	labials vs. dentals		-0.028	0.075	-0.021	0.71
Step 2: following phon. context	labials vs. approximants		-0.765	0.058	-0.49	.000**
	labials vs. glottals/velars		0.232	0.055	0.182	.000**
	labials vs. alveolars		0.103	0.06	0.063	0.087
	labials vs. dentals		-0.186	0.078	-0.059	.018**
Step 3: grammatical category	noun vs. verb		-0.103	0.036	0.072	.004**
	noun vs. proper noun		0.088	0.041	0.058	.033*
	noun vs. ordinals		-0.108	0.06	0.04	0.072
	noun vs. adj and adv		0.037	0.039	0.023	0.35

Table 4.3: Regression model results for F2

Model to account for variation in F1	R Square	Adjusted R Square	R Square Change	Sig. Change
1	.124	.121	.124	.000**
2	.425	.421	.301	.000**
3	.435	.430	.011	.000**

Table 4.4: Regression results for F1

Model	Predictors for multiple regression	F1	B	SE B	$\beta$	Sig.
	(Constant)		152	.130		
step 1: following phon. context	nasals vs.. velars/glottals		0.287	0.062	0.198	.000**
	nasals vs.. dentals		0.347	0.099	0.1	.000**
	nasals vs.. approximants		0.149	0.062	0.086	.017*
	nasals vs.. labials		0.483	0.154	0.081	.002**
	nasals vs.. alveolar		0.064	0.071	0.031	0.367
step 2: preceding phon. context	nasals vs.. alveolars		-0.392	0.102	-0.259	.000**
	nasal vs.. labials		-0.297	0.106	-0.188	.005**
	nasals vs.. velars/glottals		-0.3	0.112	-0.138	.007**
	nasals vs.. approximants		-0.271	0.112	-0.117	.016*
	nasals vs.. /h/		0.173	0.126	0.061	0.169
	nasals vs.. dentals		-0.148	0.121	-0.059	0.219
step 3: grammatical category	noun vs.. adj and adv		-0.226	0.055	-0.128	.000**
	noun vs.. proper noun		0.2	0.057	0.119	.000**
	noun vs.. verb		0.13	0.051	0.083	.011*
	noun vs.. ordinals		0.028	0.092	0.009	0.762
step 4: CofP (recode)	WFHPB vs.. Valley Lassies		-.409	.093	-.111	.000**
step 5: speaker age	real age in years		.007	.003	.064	.013*

Table 4.5: Regression model results for F1

Model to account for variation in F1	R Square	Adjusted R Square	R Square Change	Sig. Change
1	.011	.007	.011	.007**
2	.051	.044	.041	.000**
3	.087	.078	.036	.000**
4	.102	.092	.014	.000**
5	.105	.095	.004	.013*

### 4.2.2.3 Multiple Regression Results

Tables 4.2 and 4.4 show the results of each individual factor group as the independent variables are added to the hierarchical regression and tables 4.3 and 4.5 show how the overall fit of the model changes as the independent variables are added.

The R square value presented in tables 4.3 and 4.5 indicates the proportion of the variance in the dependent variable that is accounted for by the model. In table 4.3, this is therefore a measure of the proportion of the variance in the F2 values of the BIT vowel which is accounted for by the independent variables. However, R square tends to over-estimate the success of the model when applied to the real world, so an Adjusted R Square value is calculated which takes into account the number of variables in the model and the number of cases on which this particular model is based. This Adjusted R Square value is the most useful measure of the success of the model. The R Squared Change column shows the change in the value of R Squared as each block in the hierarchical model is assessed. The significance of this change is reported in the last column.

The first Adjusted R Square value in table 4.3 is .121 which means that preceding phonological context can explain 12.1% of the variance in the F2 dimension of the BIT vowel. This figure increases to .43 (or 43 %) by the end of the regression. The largest increase in Adjusted R Square occurs with model 2 which means that following phonological context accounts for the greatest proportion of the variation in this data (30%). In table 4.5 the first value in the model is .011 and so following phonological context can only explain 1.1% of the variance in the F1 dimension of the BIT vowel. This figure increases to 9.5% of the variance at the end of the regression. The largest increase in Adjusted R Square occurs again with model 2 and so in this case preceding phonological context accounts for the greatest amount of variation in the F1 data (around 4.1%). In the varbrul analysis, preceding phonological context was most relevant for predicting low realisations of F1 but following phonological context was more relevant for predicting high values of F1. When all of the data are considered together, however, preceding phonological context is the greatest predictor variable. The smallest change in the F1 model



(while remaining significant) occurs when the real age of the speaker is added to the hierarchical regression. This means that speaker age accounts for the smallest amount of variation in the F1 data (around 0.4%). Given the number of independent variables in the analysis, this is a fairly low value. However, as the last column of table 4.5 shows, each stage in the regression is significant. In other words, although the independent variables included in the analysis cannot account for a great deal of the variation in the F1 dimension of the BIT vowel, we can still account for a significant (in the statistical sense of the word) proportion of the variation.

Tables 4.2 and 4.4 show the model parameters for each step in the hierarchical regression. The beta value (B) is a measure of how strongly each independent variable influences the dependent variable. If the value is positive, this means that there is a positive relationship between the dependent and independent variable and, similarly, a negative value indicates a negative correlation. The standardised beta ( $\beta$ ) is a more straightforward measurement of the correlation between the independent and dependent variables because this does not depend on the units of measurements of the variable; instead the standardised beta value is given in units of standard deviation. For example, a standardised beta value of 2 indicates that a change of one standard deviation in the independent variable will result in a change of 2 standard deviations in the dependent variable. Thus, the higher the beta value the greater the impact of the independent variable on the dependent variable. The data have been arranged in tables 4.2 and 4.4 by standardised beta value in descending order.

The column labelled SE B provides details of the standard errors of each beta value and these standard errors are used to determine whether the beta values differ significantly from zero. The significance of each independent variable is given in the final columns. The number of asterisks denotes the value of this significance i.e. \* $p < .05$ , \*\* $p < .01$ .

The main finding from both the varbrul and multiple regression results is that 'linguistic' independent variables are overwhelmingly the most important in both of these regression analyses, and in the F2 dimension, *only* linguistic variables correlate

with the variation. I will therefore begin by discussing these before considering the social factors that may also be involved in this variation.

#### **4.2.2.4 ‘Linguistic’ Independent Variables**

##### **Following and Preceding Phonological context:**

The standardised beta value in a multiple regression analysis typically represents the amount that the dependent variable increases (or decreases if the correlation is negative) when the independent variable associated increases by one standard deviation. The interpretation of standardised beta coefficients is different when dummy variables are present. In that case, the standardised beta value represents how much more the dependent variable increases (or decreases) when the dummy variable increases by one unit compared to the reference category. In this case, a unit change in the independent variable is a change from 0 (the reference category) to 1. This shift is the difference between the two group means.

When assessing the role of phonological context in F1, the category ‘nasal’ was taken as the reference category and coded as 0 and in F2, the category ‘labial’ was used. This choice was based on the fact that in the varbrul analysis of BIT (appendix 1), the factor weights for nasals were close to 0.5 in F1 and the factor weights for labials was close to 0.5 in F2. In the F1 multivariate analysis, the regression compares the values of F1 in instances which have a following velar or glottal as opposed to a following nasal, a following dental as opposed to a following nasal, a following approximant as opposed to a following nasal, a following labial as opposed to a following nasal and a following alveolar as opposed to a following nasal (the same process applies in the F2 analysis with labials). The beta value represents the shift that occurs in the F1/F2 values of instances which have a following nasal/lateral compared with instances which have one of the above following segments. In other words, the beta value provides the relative difference between each of the preceding/following segments and the segment that was chosen as the reference group (i.e. nasal for F1 and lateral for F2). If the result is significant it means that the mean F1/F2 values with the following/preceding segment coded as

1 were significantly different from the mean F1/F2 values of the segment coded as 0 (i.e. the reference groups 'nasal' and 'lateral').

In the F1 results for **following phonological context**, the largest difference occurs between the nasals and velars/glottals. This suggests that when an instance of the BIT vowel is followed by a velar or glottal, it will be significantly different than if it is followed by a nasal. For all of the results in this step of the regression, the value of the correlation is positive (with the exception of a following alveolar which did not produce a significant result) which means that the value of F1 increases significantly with a following velar/glottal, dental, approximant or labial than with a following nasal. Bearing in mind that higher values of F1 = lower vowels, all following phonetic contexts (with the exception of following alveolars) produces a significant lower effect on the realisation of the BIT vowel.

**Preceding phonological context** has, as we have seen in table 4.5, a greater overall effect on variation in the F1 dimension of BIT but, as the results in table 4.4 show, this effect seems to be caused by fewer variants. In this case, preceding alveolars, labials, velars/glottals and approximants all have a significantly greater effect in the realisation of the BIT vowel than nasals, preceding /h/ or dentals. Also, unlike the correlations with the previous dummy variables, all of these correlations have a negative result and so this means that the value of F1 decreased significantly (or that the vowel was more raised) when it occurred in these environments (compared with when it occurred with a preceding nasal). The greatest effect on the realisation of BIT in this set of dummy variables is a preceding alveolar. These results suggest that the vowel is likely to have a lower F1 value (or higher realisation) when it occurs following an alveolar consonant than when it occurs following a nasal<sup>81</sup>.

In the F2 results for **preceding phonological context**, the largest difference occurs between the labials and glottals. This suggests that when an instance of the

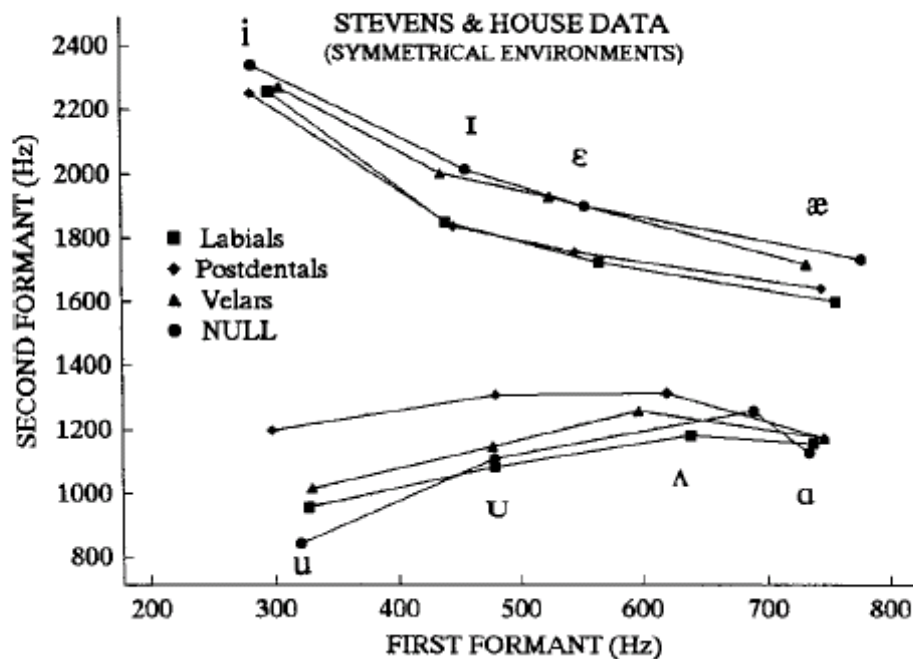
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<sup>81</sup> There is an extensive literature on the relationship between following nasals and (perceived) vowel height, duration and nasality. One study (Krakow et al 1988) found that nasal vowels are perceived as qualitatively lower than non-nasal vowels or vowels in a non-nasal context. In other words, the findings from WFHPB could be interpreted differently in light of this research: rather than suggesting that the BIT vowel has a higher realisation when followed by a (hard) alveolar compared with a nasal, it is possible to instead suggest that the BIT vowel is lower when followed by a nasal as opposed to a (hard) alveolar. Of course, the study by Krakow et al (1988) deals with perception data rather than production data and so more research is needed to fully test this claim.

BIT vowel is preceded by a glottal consonant, it will be significantly different than if it is preceded by a labial consonant. Again, as the value of the correlation is positive; this means that F2 increases significantly more with a preceding glottal than a preceding labial, or that the vowel is more fronted in this case.

**Following phonological context** has the largest effect on the front/back dimension in this vocalic variable and the largest correlation this time occurs with labials vs. approximants. In this case, a significant negative correlation exists which suggests that the BIT vowel is likely to be articulated further back in the vowel space when followed by an approximant (which, in this case, means /r/or /l/).

Research in acoustic phonetics has firmly established that preceding and following consonant environment does have an effect on vowel formant patterns (and so on vowel realisations). The classic study on this was conducted by Stevens and House (1963). This study reported the results of an experiment which measured formant values in 8 vowels from three men. The vowels were produced in isolation, in a 'null' context (i.e. in the context /hVd/) and in 14 consonantal pairs of symmetrical CVC syllables. It was possible to examine the effects of consonant context on vowel formant values by comparing the formant values of the vowels produced in symmetrical CVC syllables with those produced in the 'null' context. The results of this study are summarised in figure 4.7 below.



**Figure 4.7: Data showing the effects of consonant environment on steady-state vowel formants (Stevens and House (1963))**

Essentially, the study found that the symmetrical CVC consonant environments typically had the effect of shifting the formant frequencies towards more centralised schwa-like values and that this effect was most prominent in the second formant.

The articulatory process that is thought to underlie this vowel reduction phenomenon is often referred to as ‘target-undershoot’ (Harrington and Cassidy 1999: 69). The assumption is that the target vowel (i.e. the vowel as it would be produced in a citation or context-free form) cannot be attained because of the effects of phonetic context. The result is either (a) centralisation i.e. the vowel is displaced towards a more schwa-like position or (b) contextual assimilation in which case the quality of the vowel changes in the direction of the context of the influencing consonant and takes on a formant structure that is similar to the surrounding consonants.

Hillenbrand *et al.* (2001) conducted a replication and extension of the original Stevens and House (1963) study. One of the main differences in method however was that the CVCs were recorded in both symmetrical and non-symmetrical contexts “since consonant context effects are nearly certain to be more complex in the non-

symmetrical environments that typically prevail in natural speech” (2001:794). In this way, it was possible to ascertain whether the preceding or following consonant has the most effect on vowel reduction. The effect of preceding consonant on vowel realisation is presented in figure 4.8 and the effect of following consonant on vowel realisation is presented in figure 4.9.

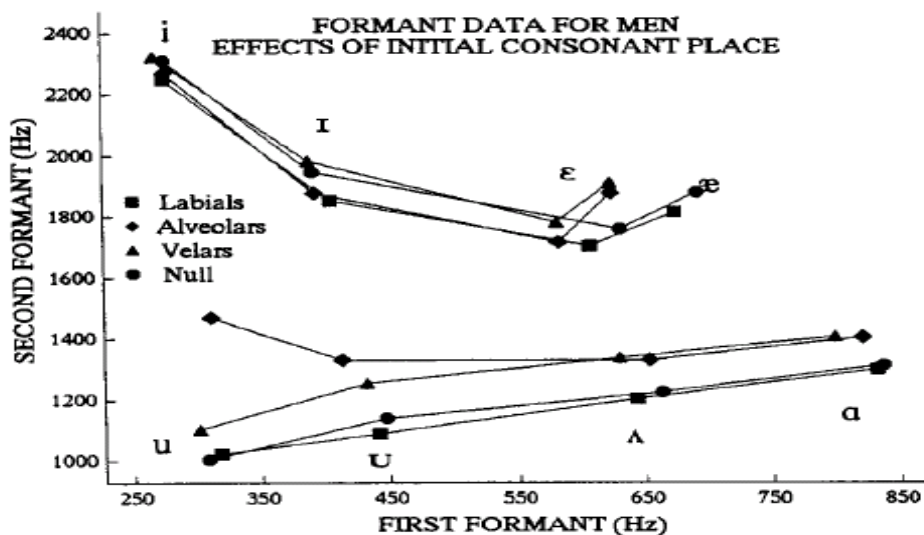
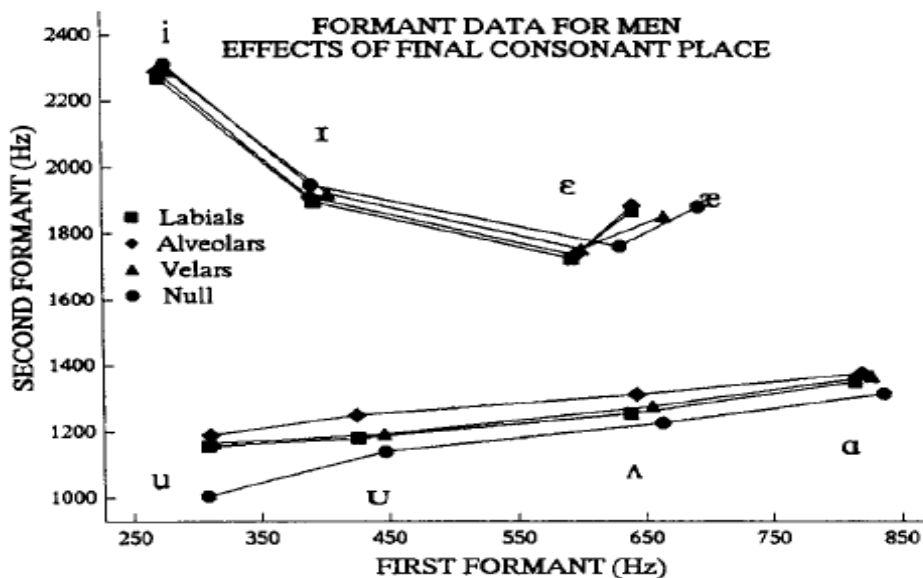


Figure 4.8: Average formant frequencies for men at steady state as a function of the place of articulation of the preceding consonant (Hillenbrand 2001: 755).



**Figure 4.9: Average formant frequencies for men at steady state as a function of the place of articulation of the following consonant (Hillenbrand *et al.* 2001: 755).**

It is clear that the general pattern in Hillenbrand *et al.* (2001) study is similar to the original Stevens and House (1963) study. Some specific features emerging from this study are that there are large upwards shifts in F2 of up to 600Hz for /u/. In relation to the BIT vowel, however, the biggest movement is shown in the F2 dimension and the biggest influence is the place of articulation of the preceding consonant. There is a tendency for the /ɪ/ vowel (as with all of the front vowels) to show a slight downward movement in F2 (i.e. more retracted articulation) when the preceding consonant is a labial or alveolar. The F1 results in Hillenbrand *et al.* (2001) show very little influence of phonological context on the realisation of the /ɪ/ vowel.

These data support the general finding from the WFHPB corpus of the importance of the preceding phonological context; however the significant negative correlation between F2 values and preceding labials/alveolars that was found in Hillenbrand *et al.* (2001) is not apparent in the WFHPB corpus. Indeed, the opposite pattern appears to have emerged – preceding alveolars are positively correlated with F2 and so are more likely to occur with a fronted articulation. Furthermore, the WFHPB data do not wholly support a target-undershoot interpretation of this variation by phonological context. The target-undershoot model would hypothesise

that vowels assimilate to the consonant structure of their preceding and following phonetic environments; in other words, front vowels that occur in a CVC sequence between two back consonants are more likely to have lower F2 values. This is a plausible argument to explain some of the variation in this vowel. For instance, the BIT vowel is correlated with fronter realisations when preceded by an alveolar consonant. However, front vowels are also correlated with preceding velar and glottal consonants. Similarly, a following dental consonant is correlated with the occurrence of low F2 values and so more backed realisations of the vowel.

There are a number of reasons why the results in the WFHPB corpus may differ from the Hillenbrand *et al.* (2001) study. For instance, not only were these two studies using different varieties of English (American English vs. Scottish English) but the methods employed were radically different – the WFHPB corpus is compiled of spontaneous speech and the Hillenbrand *et al.* (2001) research employs word list data. Also, the Hillenbrand *et al.* (2001) study assumes a strong correlation between F1 and F2 (i.e. vowels which are backed are also centralised) and, as discussed above, there is no such correlation in these WFHPB data. It is therefore very difficult to draw firm conclusions about the similarities and differences of these two findings, except to say that both appear to highlight the importance of phonological context in the realisation of the BIT vowel. However, as the target-undershoot model is difficult to uphold as an explanation for variation according to phonological context, there must be some other explanatory factor(s) (I return to this point in chapter 5).

### **Grammatical category**

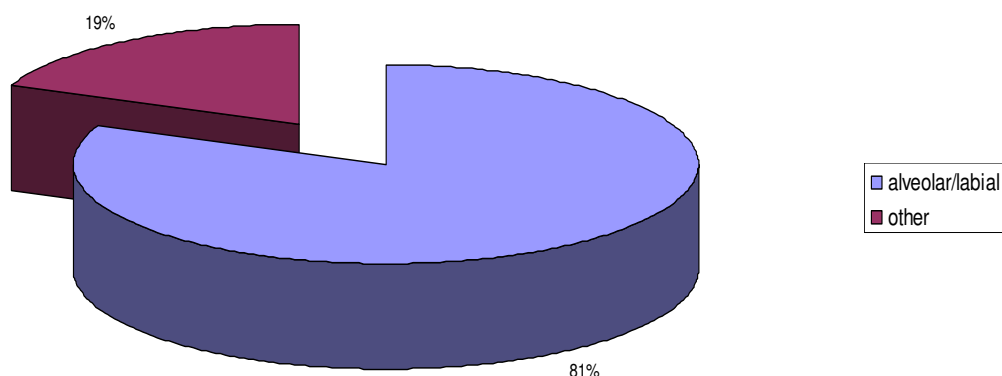
Previous analyses of variation in the realisation of the KIT vowel have considered phonological and/or social motivations for the variation. There is no discussion in the literature of the effects that the grammatical category of the lexical item may have on the realisation of the vowel<sup>82</sup>. Based on the assumption that this vowel is not undergoing change, the null hypothesis was that there would be no significant influence from grammatical category. However, the multiple regression analysis on

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<sup>82</sup> Mendoza-Denton (1997) goes part-way towards addressing this issue by coding Th-Pro forms (e.g. *thing, anything, nothing, something* etc.) separately in the statistical analysis.



these data predicts that adjectives and adverbs (as one category)<sup>83</sup>, proper nouns and pronouns (as another category) and also verbs will have significantly different F1 values from nouns or ordinals. Specifically, the correlation between the realisation of F1 and the difference between nouns and adjectives/adverbs is negative, hence the value of F1 decreased significantly when it occurred in adjectives or adverbs compared with when it occurred in nouns (or the vowel realisation was higher in the vowel space). Furthermore, the F2 regression suggests that the BIT vowel will be significantly more fronted in verbs and proper nouns than with nouns. However, there is no good reason why this should be; there is nothing inherent in, for instance, adverbs or adjectives that should cause them to have more raised variants of a particular stable vocalic variable than any other lexical category. Indeed, on closer inspection, these results may simply be a product of multicollinearity (i.e. high correlations between independent variables). For instance, in the case of the variable nouns vs. adjectives and adverbs, a large majority of the lexical items in this category also have an initial consonant that is either an alveolar or a labial, factors which we know plays a part in both the F1 and F2 value of BIT.



**Figure 4.10: Proportion of the category ‘adjective and verbs’ in which the segment preceding the vowel is an alveolar or labial consonant.**

Multicollinearity is virtually impossible to avoid, particularly when dealing with data collected outwith an experimental setting, and multiple regression analysis in SPSS can tolerate a certain degree of multicollinearity. One way of assessing

<sup>83</sup> Only 2 lexical items were extracted which were adverbs and so this category had to be merged with another because there were too few tokens.

multicollinearity in the data is to obtain values for the variance inflation factor while running the regression. Field (2005: 174) explains that it is difficult to determine an exact cut-off point for the variance inflation values but suggests that a variance inflation value of over 10 for a particular variable is an indication of too much multicollinearity. The variance inflation for the variable nasals vs. labials in the final stage of the F1 analysis is 8.31 and for nasals vs. alveolars, the value is 7.83. There is certainly a degree of multicollinearity in these two variables and this, therefore, may be the cause of the correlation between high vowels and adjectives/adverbs.

#### **4.2.2.5 Linguistic factors not coded in the analysis**

It is important to recognise at this stage that a number of independent ‘linguistic’ variables that have also been shown to affect variation in vowel formant structure were not coded and included in the analysis. For instance, according to Harrington and Cassidy (1999:73), when speakers are instructed to produce their words as clearly as possible, vowels are lengthened and so become more peripheral. Clarity of speech has also been shown to vary according to the extent to which words are predictable from context (Harrington and Cassidy 1999: 73). Discourse new information is more likely to be produced with maximum clarity hence affecting the extent to which centralisation/reduction takes place. Speech tempo also plays a part as one of the consequences of increased tempo is a decrease in vowel duration which leads to vowel reduction/centralisation. The prediction would therefore be that vowels which are uttered at a slower than average pace should tend to occupy more peripheral areas of the vowel space and vowels uttered at a faster than average pace should undergo more reduction. The results of research conducted into this hypothesis are not straightforward, however. For instance, Gay (1978) found that the midpoint formant frequencies of vowels did not vary significantly as a function of speech tempo but in fast speech, found that the onset of F2 transitions were closer to their target frequencies. Gay (1978) interprets this as evidence that movement towards the vowel target begins earlier in fast speech situations. Fourakis (1991), on the other hand, does find a significant relationship between fast speech and vowel

reduction in the predicted direction (i.e. fast speech is correlated with more vowel reduction) but this effect was also correlated highly with sentence stress. Research indicates that vowels occurring in an accented or stressed position in the sentence are more peripheral (e.g. Liberman 1960). The explanation for this is that accented words tend to have greater intensity and are given longer duration by the speaker and so are therefore phonetically more peripheral. Given the nature of the data in this corpus (i.e. natural, spontaneous conversation), these factor groups proved too difficult to accurately code or categorise. It is also difficult to avoid multimulticollinearity with these variables since, very simply, as speech rate/tempo increases, clarity and intensity decreases. It is difficult to disentangle these effects outwith an experimental situation where certain factors can be controlled. However, it must be borne in mind that these linguistic factors are likely to also account for a significant proportion of the variation in the BIT vowel in this corpus, especially given that only around 10% of the variation in the F1 dimension has been accounted for in this analysis.

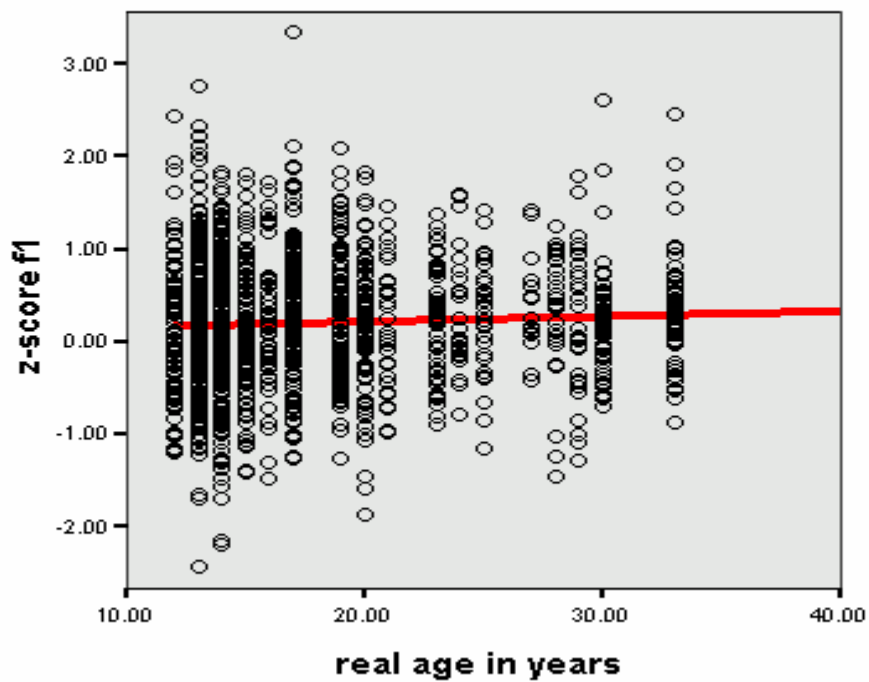
#### **4.2.2.6 ‘Social’ Independent Variables**

Social variables play a fairly small part in the realisation of the BIT vowel in WFHPB and are only significantly correlated with variation in the height dimension. This suggests that only variation in vowel height may carry some social meaning in this community; variation in front/backness of the vowel is, it seems at this stage, entirely ‘linguistic’.

**Real age in years.** The standardised beta value here is 0.64. This is the only independent variable that is not coded as a dummy variable and so in this case, the value indicates that as the age of the speakers in WFHPB increases by one standard deviation (6.71 years), the z-transformed value of F1 increases by 0.64 standard deviations. The standard deviation of F1 is 0.704 and so this constitutes a change in z-F1 of 0.45 (0.64x 0.704). Therefore, for every increment of around 7 years (6.71),

there is an increase in the F1 value by 0.45 among the speakers in WFHPB which, in reality, constitutes a lowering of F1 with age (since vowel height is the inverse of F1). Put simply, older speakers are apparently more likely to use lower variants of the BIT vowel than younger speakers. This would typically indicate a change in progress. However, unlike with th-fronting, there is no clear pattern of change in progress in these data, as we can see from figure 4.11 where real age is plotted against variation on the F1 plane.

**Figure 4.11: Instances of z-F1 plotted against age in years**



Also, there are very few speakers in this corpus over the age of 30 and so it is difficult to support an argument of change in progress without additional data.

### **Valley Lassies vs. WFHPB**

Unlike in the analysis of th-fronting presented in the previous chapter, the realisation of the vowel in BIT was not commented on overtly by any of the informants in WFHPB as a salient linguistic feature. It is therefore very difficult to access what (if any) the social meaning of variation in BIT may be, particularly as there was no evidence of stylistic variation or variation according to community of practice/friendship group membership. As stated previously, the only group that did show significant variation from the normal variation was the Valley Lassies. Lois and Rose, the two girls that form this group, are peripheral members of that band and are different from the majority of WFHPB in a number of ways: they both live in a prestigious area to the north-west of this part of Fife; they both attend a fee-paying school in this area; they are the only members of WFHPB who are privately educated; they are also the only members of WFHPB who play for another pipe band.

The school that these two girls attend has its own pipe band and they have joined WFHPB only in order that they can practice and receive more tuition in drumming. They are very open with me and others in the band about their motives for being there. They are using WFHPB for their own gain. This is in stark contrast to the feelings of commitment and loyalty to the band that are expressed in extracts from chapter 2.

For the Valley Lassies, their participation in the social aspect of the band is limited – they never attend pipe band social events such as the annual end of season dinner-dance or the annual race night and even when they attend competitions, their parents drive them there (they do not use the pipe band bus) and they leave as soon as they have played in the competition, rarely waiting with the rest of the band until the end of the day when the prizes are announced. Many of the other young players, by contrast, spend a great deal of their time with the band, finding ways to limit the amount of time that is spent practicing, and instead increase their time spent socialising. This is a source of tension between these girls and other members of the band, particularly in the novice juvenile drum corps where they play. This tension is noted and described by Connor in the following extract:

### Extract 25

Connor:\*\*\*When they first came, Barney an Abbey couldnae stand them eh

LC: nah, whiy?

Connor: this is exactly what we've just been talking about, aw the two Valley lassies wanted tae dae wiz play aw their instruments, play aw the stuff they ken on the pianie an stuff, play the drums, keep try oot new hings...eh an their obviously school uniform an that eh so Barney an Abbey were like 'dinnae hink so, eh, no mixin wi' them'. An I hink, I dinnae ken how Lois an Rose were about it but I think there wiz a –obviously Barney an Abbey arenae gonnie go an talk tae them cos they're awfie quiet eh

LC: mm

Connor: so there wiz an awfie them an us sortae attitude an eh I hink probably Lois an Rose sortae looked at them an kent they were locals eh so they didnae really ken-they're-they're used tae dealing wi' aw their pals that go tae Valley High as well so they're used tae being around their ain sortae kind an then they come up-come up against Barney an that they dinnae ken how tae deal wi' it eh

Despite the differences that exist between the Valley Lassies and the rest of WFHPB, Lois and Rose apparently make little effort to reduce these differences and accommodate towards their fellow band members. One striking example of this can be seen from the way that they dress. Lois and Rose wear their school uniform to WFHPB practices and this uniform is very distinctive - it involves wearing a tartan skirt. The way in which these two girls *choose* to dress is something that is commented on repeatedly in the corpus, particularly by many of the younger members of WFHPB. For instance, Judy believes that the reason they wear their school uniform to the practice is because “they just want tae show aff that they're posh”. The girls are aware that their choice of attire separates them from the rest of WFHPB as Rose comments “we know everyone's just gonna be like 'look at them' [laughs]”. Yet they continue to do so. When questioned on this, Rose provides an unconvincing argument that “if we were to change and wear our own clothes I think I don't really have enough for every different time I come to [WFHPB]”.

The Valley Lassies have a phonological system that can be clearly categorised as Scottish Standard English. They are aware of the many phonological differences that exist between them and the majority of the group and claim not to accommodate towards the phonological systems of their WFHPB interlocutors:

Extract 26

LC: would ye start saying things like hoose?

Rose: nah I don't think it'd be that bad

\*\*\*

LC: would you say things like hame instead eh home?

Rose: mm, nah [laughs]

LC: never?

Lois: nah

Rose: nah

LC: what about em, I'm trying to think, what about things like gress?

Rose: oh like instead eh grass

LC: /instead eh grass

Lois: /instead /oh right grass?

Rose: I don't think it'd be that

They are aware to some extent that the variety they use is considered Standard in Scotland and they seem to view the variety used by the majority of speakers in WFHPB negatively (cf. Rose's comment above: *don't think it'd be that bad*). They compare the linguistic differences between themselves and the rest of WFHPB to the differences that exist between varieties of English north and south of the Scottish/English border:

Extract 27

Rose: everyone can understand each other an then I'll be like 'why are you speaking foreign?'

\*\*\*

Lois: cos I-I just sort of think of it as like-like em, I dunno like when we come here like

Rose: [inaudible]

Lois: /Scottish cos we're like like

Rose: it seems like we're kinda coming from England to Scotland, I dunno

There is therefore evidence that the Valley Lassies are aware of both the social and linguistic differences that exist between themselves and the rest of WFHPB. On the whole, they make little effort to reduce these differences by, for instance, choosing to wear their school uniform and choosing to avoid socialising at band practices. They do not (consciously) accommodate towards the members of WFHPB at the phonological level either and so the frequency with which they use high variants of the BIT vowel is to be expected from their social practices. The only effort they

apparently make to reduce these differences is at the lexical level and even here, they do not choose to employ 'in group' lexical features (such as local Scots lexical items) in their repertoire, only to avoid using certain lexical items that they consider to be 'out group' markers:

Extract 28

R: yeah well sometimes if I say something that sounds like I don't wanna say like a big word or something incase like people don't understand it or like they just think that like 'oh big posh word'

LC: ok

R: stuff like that, dunno [laughs]

LC: so you make-so what do you do then? Choose a different word instead?

R: just talk like really stupid just like or just don't say anything, I dunno

LC: so you try an not sound...

R: intelligent

LC: yeah

R: well I dunno

LC:ok

These two girls are privately educated and live in a prestigious area. These factors alone would allow them to be categorised as clearly 'middle class' and so it would be possible to re-code these data according to social class because the cut-off point between working class and middle class would be the same as between this community of practice and the rest of WFHPB. It is clear that the socioeconomic class of these two girls may constrain their social (and linguistic) behaviour in certain ways. For instance, their higher social class allows them to live in a prestigious area and attend a prestigious school and this serves to limit their participation in WFHPB by default; they simply cannot participate in some of the social practices of certain younger speakers in the band such as walking home together after practice or hanging out at weekends. However, simply noticing the existence of a relationship between social class and language variation cannot explain *why* this relationship exists. As Moore states "socioeconomic class in itself cannot make speakers or their language mean anything" (2003:94); such an account of this variation would not be incorrect but it would fail completely to capture the interesting relationship between the social class of these two girls, their linguistic behaviour and their social practices.



### **4.3 Conclusion**

This chapter examined variation in the BIT vowel in WFHPB, a vocalic variable that is reported to show stable sociolinguistic variation in Scottish English. There were a number of methodological problems in this analysis caused mainly by combining phonetic vowel measurements with spontaneous speech data and gradient values with multiple regression but it was possible to overcome most of these and present an analysis of variation of the BIT vowel in WFHPB. The results suggest that ‘linguistic’ factors account for a greater proportion of the variation in this variable than ‘social’ factors and that the place and manner of articulation of the preceding and following consonant greatly affect both the vowel height and the position of the vowel on the front/back dimension. Social factors such as the age of the speaker or their membership in one particular community of practice/friendship group (the Valley Lassies) are also influential factors which motivate variation in the F1 dimension but not F2; only linguistic factors correlate with variation in F2.

### **Part II: Conclusion**

The aim in part II of the thesis was to explore what quantity of the variation in an analysis of variation could be accounted for using only traditional (variationist) sociolinguistic methods. Part II first presented a review of the sociolinguistic methods used in collecting the corpus which would form the basis of this discussion. Chapter 2 focused on an attempt to combine ethnography with SNA and a community of practice approach in an effort to understand the local categories and groups that are important to the speakers in WFHPB. Chapters 3 and 4 presented a quantitative approach to variation in two contrasting variables from the WFHPB corpus: (th), a consonantal variable with discrete variants undergoing a change in progress and (BIT), a vocalic variable with phonetic gradience and stable variation. The main advantage to employing this quantitative approach is that it allows us the capability to model how both social and linguistic factors can simultaneously impact

on a speaker's choice of variants. The analyses presented in part II of the thesis have shown that a number of social and linguistic factors are important in influencing variation in both of these variables. Specifically, community of practice/friendship group membership is an important motivating factor with respect to the (th) variable in this community, whereas variation in (BIT) is mainly constrained by phonetic context.

The main concern in part II of the thesis has been to conduct a relatively typical sociolinguistic analysis of variation and, in doing so, to understand how the social practices that these different communities of practice/friendship groups engage in can help us better understand linguistic variation within and between speakers in this community. Part II of the thesis was motivated by a desire to move away from the programmatic accounts of a synthesis between usage-based models of language structure and sociolinguistics (some of which were discussed in chapter 1) that have been heavily weighted on the theoretical side and have provided only weak analyses of the social motivation for language variation and change. Part II has therefore provided a sociolinguistic analysis of variation on which to ground the remaining theoretical discussion. This should also encourage the reader to view the arguments to be presented in part III as an extension to the variationist tradition, rather than as a competing alternative.

Part III of the thesis is now concerned with the synthesis between the approach to social and linguistic variation outlined in part II and usage-based linguistic theory. The aim here is not to focus in on one particular linguistic theory; rather I will explore the general principles of a number of theories that can be situated broadly within the usage-based approach to language structure.

**PART III: USAGE-BASED APPROACH TO SOCIOLINGUISTIC  
VARIATION AND CHANGE**

### ***Part III: Introduction***

Part II of the thesis presented an analysis of variation of two different linguistic variables ((th) and (BIT)) in a particular community in Fife. This was carried out using methods of data collection and analysis that are fairly typical of variationist sociolinguistics and have been employed in a number of other studies in this field. Having presented an analysis of variation that is faithful to these established norms, the remainder of the thesis will be concerned with expanding this analysis beyond that which has previously been considered mainstream in variationist sociolinguistics. Specifically, I return to the arguments presented in part I of the thesis and address the following questions:

1. To what extent is it possible to synthesise sociolinguistic methods of data collection and analysis with usage-based models of interpretation?
2. Is such a synthesis beneficial?

No single linguistic theory has been selected as a testing ground for these questions; instead (as discussed in chapter 1) the remainder of the thesis is concerned more generally with the shared set of assumptions (in grammar and phonology) that exists between different Cognitive Linguistic, exemplar and connectionist theories regarding the relationship between language structure and language use. Following Barlow and Kemmer (2000), the term ‘usage-based’ is employed as a cover term for these models.

To briefly re-cap, the main tenet of the usage-based thesis is that there is assumed to be an unquestionable relationship between language structure and language use and language use plays a defining role in shaping the grammar of individual speakers. Because of this, the grammar that results from such a model is acquired ‘bottom up’ from previous experience, is non-modular (and often modelled as a series of activation networks) and, crucially, can incorporate both inter- and intra-speaker variation.

As discussed in chapter 1, research on lexical frequency has played a large part in discussions of usage-based models of language variation and change because

frequency effects in language represent one way to show the existence of a relationship between language structure and language use. For this reason, chapter 5 explores the role of lexical frequency as a motivating factor in the variables (th) and (BIT) in WFHPB, in addition to the independent social and linguistic variables already discussed in part II of the thesis. However, usage-based models make a number of predictions other than the expected relationship between variation, change and lexical frequency, one of which relates to the way that social and linguistic information is stored, categorised and accessed in cognition. This is therefore the topic of discussion in chapter 6.

## **Chapter 5: Lexical frequency and a usage-based approach to phonological variation and change**

### ***5.1 Introduction***

Research on lexical frequency has played a prominent role in usage-based models of language structure and so the focus of this chapter is the relationship between lexical frequency and phonological variation and change. The first part of this chapter deals with lexical frequency and language change, with specific reference to th-fronting in WFHPB. The second part of the chapter deals with lexical frequency and stable variability, exemplified by the stable variable (BIT) in WFHPB. My claim in this chapter is that, although the frequency effects that are present in the WFHPB data do not conform exactly to the predictions of usage-based theorists, these results must still be explained and this can *only* be done by adopting certain theoretical assumptions of the usage-based approach. Before it is possible to make this claim, however, it is first necessary to briefly review a small collection of research that has attempted to explain frequency effects in language outwith the usage-based approach. As with the attempts to include variation in generative theoretical models (discussed in chapter 1), this section will suggest that generative models such as OT can only account for frequency effects by incorporating a more causal link between language structure and language use. In other words, generative models can only account for frequency effects by becoming more usage-based.

### ***5.2 Phonological theory and lexical frequency***

#### **5.2.1 Frequency effects in generative models of language change**

The role of lexical frequency in phonological variation and change has received little attention in the generativist literature but there have been some recent attempts to account for frequency effects, particularly within an OT framework. Perhaps the

first mention of the role of lexical frequency in sound change within an OT framework is in Hammond (1999) in his discussion of the ‘Rhythm Rule’ in English. This refers to the shift in main stress that can occur when a lexical item is in a modifying relationship with a following word which has initial stress e.g. compare the stress patterns of the lexical item *thirtéén* when it occurs in a phrase before an initially stressed word such as *thírteen mén*. In this study, Hammond found that high-frequency<sup>84</sup> modifiers like *antíque* in, for example, *ántique book* undergo the stress shift in the Rhythm Rule more frequently than infrequent modifiers like *arcáne* in, for example, *arcáne sort* (1999: 334).

Since mainstream Optimality Theory posits that phonological generalisations are expressed by universal constraints which are strictly ranked with respect to each other, an orthodox OT model would therefore account for the Rhythm Rule by positing the existence of a constraint in the grammar (\*CLASH) which avoids adjacent main stresses. In addition to this, in order to account for the fact that this stress shift does not take place when the stress shift would fall on a ‘stressless syllable’ (e.g. there is no stress shift in *matúre horse*) there is also a constraint against this (\*MAINSTRESSLESS) which is ranked above \*CLASH in the grammar. The problem with the mainstream approach, however, is that it is very difficult to model the frequency effect found in Hammond (1999) and so Hammond suggests an OT account of this data where the constraints are not universal but ‘parochial’ i.e. the constraints are (at least partly) a function of lexical content.

Hammond proposes the introduction of constraints for particular lexical items that require prosodic identity in isolation and in context:

#### Isolation-Context Correspondence Constraint [c(X)]

The stress of context forms for some form X must mirror that of the isolation form of X (Hammond 1999: 354)

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<sup>84</sup> Frequency counts in this study were taken from ‘phondic.english’, an online dictionary of 20,000 English words.

The ranking of this constraint with respect to the constraint which avoids adjacent main stress (\*CLASH) reflects the frequency of lexical items. Low frequency lexical items rank above the \*CLASH constraint and high frequency lexical items rank below it.

While this analysis provides a method of formalizing the reluctance of some low frequency forms to undergo the stress shift, it seems that this formalism cannot capture the gradient nature of the relationship between lexical frequency and patterns of language use, nor can it explain why the results of the experiment in Hammond (1999) show a quantitative pattern i.e. the application of this 'rule' is variable and there is only a tendency for higher frequency forms to undergo the stress shift more readily than low frequency forms. Furthermore, while the formalism itself may be descriptively accurate, it lacks explanatory power because it cannot explain why these parochial constraints should be ranked according to frequency. Hammond (1999) is aware of this and in his effort to remedy this, he draws on ideas from a usage-based framework: "The more frequent an item is, the more ingrained it is in the phonology of the language" and so "the constraints corresponding to that item become lower ranked and hence susceptible to more of the phonological generalisations of the language in question" (Hammond 1999:355).

Another attempt to include frequency effects in OT is provided by Gees (2003) in his discussion of Old French syllable-final consonant loss. He suggests that adopting a 'register dependent' phonology ranking as part of the postlexical constraints allows stylistically marked variation to be modelled in OT. In this model, as sound change spreads, the ranking corresponding to the innovative form increases and once this applies to over one half of the lexical items, the register dependent ranking is reversed and phonological outputs that do not display this change become associated with formal speech styles. Furthermore, "there will also be two rankings in the lexical phonology. The dominant ranking will reflect the properties of individually less frequent, but numerically greater...forms. A less common ranking will reflect the lexicalization of the change in some of the most common words" (Gees 2003: 77). Again, however, although this method attempts to incorporate variation in the output and relate this variation to lexical frequency, "it is clear that



the grammar is not expected to explain frequency effects, only to record changes as they happen” (Phillips 2006: 20).

Finally, Zurawa (2003) attempts to incorporate frequency into a stochastic optimality-theoretic grammar (of the type proposed by Boersma 1997; Boersma and Hayes 2001). The data in question examine the variation found in Tagalog nasal coalescence, which variably fuses a prefix-final nasal with a stem initial obstruent as in the following example from Zurawa (2003: 164):

Stem	Nasal-coalesced
bákat (scar)	mamákat (to leave a scar)

Zurawa’s account invokes the notion of ‘lexical strength’ (Bybee 2001: 6-7) to explain the variability in this pattern claiming that “the strength of a lexical entry grows gradually as instances of the word are encountered” (2003:165). Zurawa relates the strength of the lexical entry directly to the probability of its use as he claims that a lexical entry with the strength 0.5 will be available for use only half of the time. To ensure that this is the case, Zurawa proposes the existence of the constraint USE-LISTED: “Thus, in 50% of all utterances, USE-LISTED and the faithfulness constraints will enforce the memorized pronunciation of such a half-strength word, but in the other 50% of utterances, the lower ranking constraints will decide” (2003: 165). Phillips is again critical of this account because it cannot incorporate the gradient nature of lexical frequency. Also, as with Gees (2003), this attempt only incorporates variation resulting from sound change which affects the most frequently used words first but some sound changes affect the least frequent words in a language first (see section 5.2.2.1.1 below).

It seems that attempts to incorporate frequency effects into the structuralist tradition are made possible by rejecting the mainstream version of OT and incorporating more flexibility in the grammar and more consideration of the relationship between language structure and language use. It is therefore clear that certain assumptions of the usage-based approach are necessary in order to be able to account for frequency effects in language change. The direct relationship between entrenchment in the mind of the speaker and frequency of use is perhaps the most

necessary. By adopting certain key theoretical assumptions of the usage-based approach, the frequency effect patterns we see in language change can begin to be explained. Without adopting, at the very least, some recognition of the existence of a correlation between lexical frequency and cognitive entrenchment, it is very difficult to move beyond simply a descriptive account of frequency effects in language.

In research on frequency effects in language change, the assumed direct relationship between entrenchment and lexical frequency has led to several generalisations on the nature of this relationship and predictions of language change in usage-based models. However, there is considerable debate in this area and often the evidence is contradictory. In order to contextualise the findings from the WFHPB data against this literature, I begin by providing a summary of three contrasting positions held by Bybee (2007), Phillips (2006) and Labov (2006) as a representative sample of some of the most recent research to emerge on this topic<sup>85</sup>.

## **5.2.2 Frequency effects in usage-based models of language change**

### **5.2.2.1 Bybee (2007)**

Following a number of cross-linguistic studies on the nature of sound change and lexical frequency, Bybee (2007) has suggested the existence of several frequency effects that emerge as general principles in sound change.

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<sup>85</sup>It may appear that this is a small amount of literature to review in order to cover such a well-researched area but this is not the case. Bybee (2007) is a compilation of 15 single and co-authored papers that Joan Bybee has published on frequency effects over the years; Phillips (2006) is the most recent book Betty Phillips has published on frequency effects and it summarises and expands on much of her earlier work, and Labov (2006) is the only publication where he deals directly and exclusively with the problem of frequency effects in variation and change.

### **5.2.2.1.1 Token Frequency: The Conserving Effect**

Token frequency refers to the number of times an individual linguistic unit appears in a text. Bybee claims that analogical levelling or regularization tends to affect words and constructions with low token frequency before words with high token frequency. For example, with respect to morphosyntactic constructions in English, Tottie (1991), cited in Bybee (2006), shows that there is variation between a ‘negative incorporation’ construction (e.g. *I know nothing about it*) and a ‘not negation’ construction (e.g. *I don’t know anything about it*). The older negative incorporation construction is used in high-frequency contexts such as with existential constructions and constructions with possessive *have* and copular *be*. In other words, the older construction has remained in high token-frequency contexts but has been lost in lower token-frequency contexts. Another example of higher-frequency forms resisting regularization can be found in irregular verbs in English. There is a general trend towards adopting the regular *-ed* form to express past tense in English e.g. *wepted, leaped, creeped*. However, high-frequency verbs appear to be resisting this change: *sleep* and *keep* are retaining their irregular forms. Bybee labels this process ‘the Conserving Effect’. Another aspect of the Conserving Effect that is illustrated in the *-ed* example is the fact that it is the higher frequency forms that serve as the basis for the reformation. For example in the case of *weep*, it is the higher frequency present form that serves as the base for the new form *wepted*, as opposed to the possible situation in which the base is formed from *wept*, creating *wep* as the new base. The explanation Bybee provides for the conserving effect is that repetition strengthens memory representations of morphosyntactic form and makes these lexical items more accessible. The strength of representations in memory (or lexical strength) explains why certain lexical items or constructions are capable of resisting change on the basis of analogy.

### **5.2.2.1.2 Token Frequency: The Reduction Effect**

The second effect of token frequency seems at first to contradict the first: phonetic change often progresses more quickly in items with higher token frequency. Some

examples of this discussed by Bybee include schwa deletion in American English (Hooper 1976), t/d deletion in American English (Bybee 2000) and [ð] deletion in Spanish (Bybee 2002). The explanation Bybee provides for this observation is that phonetic reduction is directly linked to neuromotor processing and as neuromotor processes become more efficient there is an increase in overlap and reduction of the gestures involved which, in language, leads to reduction and assimilation processes. Higher frequency words have more exposure to this reduction and so undergo phonetic reduction more rapidly.

Reductive sound change tends to affect high frequency words before low frequency words but analogical levelling or regularisation tends to affect low frequency words before high frequency words. Although these two processes appear contradictory, Bybee solves this apparent contradiction by arguing that they apply to different types of change: “High frequency encourages phonetic change but it renders items more conservative in the face of grammatical change or analogical change” (Bybee 2001:12).

#### **5.2.2.1.3 Token Frequency: The Autonomy Effect**

Bybee and Brewer (1980) define autonomy as “the extent to which a word is likely to be represented in the speaker’s lexicon as a whole unit” (cited in Bybee 2007:50). Bybee explains that highly frequent words have weaker connections to other related words and so can be accessed independently in cognition. Bybee provides evidence of autonomy in operation through grammaticalisation (e.g. the possessive *have* and perfect *have* in English are no longer the ‘same’ item – Hopper 1991); and in inflectional morphology (e.g. as the past form *went* split from *wend* and became the past form of *go* – Bybee 1985).

#### **5.2.2.1.4 Type Frequency**

Type frequency refers to the patterns in a language and the number of times these patterns are instantiated. For instance the English past tense pattern exemplified by

*know~knew* and *blow~blew* has a lower type frequency than the regular method of forming the past tense in English by adding the *-ed* suffix because this type is instantiated by a much smaller number of tokens. Type frequency relates to productivity; constructions with a low type frequency (such as the irregular past tense in English) also tend to be less productive. This is related both to the ‘Conserving Effect’ and the ‘Autonomy Effect’; items with high token and type frequency have weaker connections to related forms and so are more likely to become independent, which means that they are also less likely to contribute to the formation of productive paradigms or be affected by changes occurring in productive paradigms.

To summarise, Bybee proposes the following generalisations regarding the relationship between lexical frequency and sound change:

- Lexical items with high token frequency have greater lexical strength and therefore resist morphological or analogical change, serve as the basis for change and have greater autonomy.
- Lexical items with high token frequency are more likely to undergo phonetic reduction and have greater opportunity to be affected by phonetic processes.
- Lexical items with high token frequency have weaker connections to other related words and so have higher levels of autonomy.
- Patterns with high type frequency are more productive than patterns with low type frequency.

### **5.2.2.2 Phillips (2006)**

Phillips’ (2006) discussion of frequency effects in sound change focuses mainly on diachronic studies of sound change rather than change in progress and invokes frequency effects to explain a number of sound changes in Old and Middle English.

In some early research on frequency effects in sound change, Phillips (1984) reviewed evidence from three sound changes that have affected the least frequent words in the language first (e.g. unrounding of /ö(:)/ in Middle English, diphone

formation in English and glide deletion in Southern US English). Contrasting these with evidence from studies of sound change which have found a tendency for the most frequent words in a language to change first (e.g. Hooper's (1976) investigation of schwa deletion in American English and Phillips' (1980) discussion of the raising of Old English /a/ to /o/ before nasals), Phillips (1984) concludes with a generalisation on the relationship between lexical frequency and language change entitled the 'Frequency Actuation Hypothesis' (hereafter FAH):

“physiologically motivated changes act on surface forms, and affect the most frequent words first; other sound changes act on underlying forms and affect the least frequent words first” (1984:337).

The first part of the FAH is similar to Bybee's 'Reduction Effect' in that sound changes which affect lexical items with high token-frequency first are physiologically motivated and therefore originate in the articulatory parameters of the vocal tract. The second part of the FAH recognises (as with Bybee's 'Conserving Effect') a link between non-physiologically motivated sound change and analogical levelling but, rather than attributing this type of change to the heavy entrenchment of constructions with high token frequency, Phillips (1984) attributes to these changes the apparent ability to affect underlying representations before surface forms.

However in 2006, as a consequence of an investigation in Phillips (1998) on changing stress shift patterns in verbs with the *-ate* suffix in English, Phillips reformulates the FAH and distances it still further from Bybee's generalisations on lexical frequency and sound change. The study in question examined the relationship between lexical frequency and stress placement in English verbs like *lactate*, *pulsate* and *stagnate* (where the stress placement is variable but typically initial) compared with verbs like *frustrate* and *dictate* (where the stress is final). Phillips (2006:41) explains that this stress shift has been in progress for over a century but unlike the diatonic stress shift in English, this change is affecting the most frequent words first. The problem this data caused for the original formulation of the FAH is that this sound change is not physiologically motivated and yet it follows a pattern often associated with reduction and assimilation processes.

In the (2006) reformulation of the FAH, Phillips invokes the concept of ‘lexical analysis’ to explain her most recent interpretation of the relationship between sound change and lexical frequency:

“changes which require analysis...during their implementation affect the least frequent words first, others affect the most frequent words first” (2006: 56).

Sound changes which affect only the phonetic realisation of lexical items, without first invoking the abstract generalisations (or schemas) that have emerged from these word forms in the grammar, affect the most frequently used words first. These changes are typically (although not always) physiologically motivated changes such as assimilations and reductions. Changes which require access to a deeper level of lexical representation affect the least frequent words in the language first. These changes typically involve analogical levelling.

Explanations for the generalisations proposed by Phillips (2006) are based on the discussion of lexical analysis in Bybee (1985: 118). In this, Bybee argues that lexical items which have high token frequency are less dependent on their related base words, are more autonomous and therefore less likely to undergo ‘analysis’ than items with low token frequency which, by contrast, tend to require more access to information in the ‘lexical entry’ including generalisations drawn on the part of the speaker across related or similar items in the grammar.

To summarise, Phillips (2006) proposes the following frequency effects that emerge in studies of sound change:

- Phonetically gradual and phonetically abrupt changes are both diffused through the lexicon.
- The level of lexical analysis required in order to implement the sound change is the determining factor in the relationship between sound change and lexical frequency.
- Changes that require no analysis beyond the phonetic implementation of the change will affect most frequent words first; changes that require analysis at a deeper level of language structure (e.g. word class, syllable structure, phonotactics) will affect the least frequent words first.

### 5.2.2.3 Labov (2006)

Despite the large body of evidence suggesting the importance of frequency effects in the progression of sound change, Labov's (2006) discussion of some of the vocalic changes taking place in American English at present do not support the predictions made by previous research on frequency effects in phonological change. In compiling the Atlas of North American English, Labov *et al.* (2006) have systematically tested for the type of frequency effects predicted in previous research in the following sound changes: raising and tensing of short -a, Canadian raising of /ay/ before voiceless consonants and the fronting of /uw/ and /ow/ before liquids. In all of these cases, the results point to the supremacy of a single phonetic effect in the analysis of variation with very little evidence of a significant effect for frequency. For instance, in the case of raising and tensing of short-a, in all words with following nasals in coda position the vowel is tense and typically high-front; in all other positions, the vowel is lax and in a low front-central position. Similarly, in the case of the fronting of /uw/ and /ow/, all words not before liquids are shifted to high front nonperipheral position, again irrespective of frequency. This leads Labov to conclude that "the new and vigorous changes that are operating in North America as a whole, or in particular regions, appear to be regular sound changes in just the sense that the neogrammarians intended" (Labov 2006:511). Labov does not, however, suggest that token frequency may never have an effect in the spread of this change: rather, "as the change progresses, it is still dominated by phonetic factors, but within these constraints, the variation can show small lexical as well as social effects" (Labov 2006: 511). Thus the relative importance of lexical frequency with regard to other factors in the change is an aspect of Labov's analysis but its importance is minimised compared with the emphasis that is placed on frequency effects by both Bybee (2007) and Philips (2006).

Research on the role of frequency effects in the spread of sound change therefore reveals something of a paradox: some researchers find little evidence for frequency effects in phonological change (Labov 2006) while others (Bybee 2007;



Philips 2006) find very strong evidence for the importance of frequency effects in the spread of sound change and yet reach different conclusions regarding the nature and directionality of these effects (c.f. the Reduction/Conserving effects and the FAH). No consensus has yet emerged about how best to handle word frequency effects in sound change. It is within this context that I investigate the effect of lexical frequency in the development of th-fronting in WFHPB.

### **5.3 The role of lexical frequency in th-fronting in WFHPB**

In order to discover whether there is a significant correlation between lexical frequency and th-fronting in WFHPB, it is first necessary to consider how best to measure lexical frequency in these data. This is problematic because, as Bybee explains, “there is no one method for doing frequency research” (Bybee 2007: 16).

Often researchers interested in frequency effects take the frequency value of a particular lexical item from a large corpus such as the Brown Corpus (e.g. Dinking (to appear)) or from a list of frequency counts such as that provided by Baayen *et al.* (1995) in the form of the CELEX lexical database<sup>86</sup> (employed by Hay (2001)). However, certain lexical items (particularly local place names, nicknames and other non-standard lexical items) that occur fairly frequently in the WFHPB corpus are much less frequent in a 100 million word corpus of British English (BNC <http://www.natcorp.ox.ac.uk/>) or even a more local corpus of Scottish English (SCOTS corpus <http://www.scottishcorpus.ac.uk/>).

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<sup>86</sup> Frequency counts in the CELEX database (Centre for Lexical Information) are based on the COBUILD corpus.

Table 5.1: Comparison of frequency counts for local placenames and nicknames across three corpora

	<b>BNC (100 million words)</b>	<b>SCOTS (3,700,000 words)</b>	<b>WFHPB (360,000 words)</b>
Methil	(14) 0.014	(2) 0.118	(22) 6.11
Cowdenbeath	(25) 0.025	(3) 0.176	(24) 6.67
Glenrothes	(40) 0.04	(10) 0.589	(16) 4.44
Methan	(0) 0	(0) 0	(43) 11.94
Goth	(59) 0.059	(1) 0.059	(21) 5.84

The numbers in brackets are the raw number of tokens from each corpus and the figure next to that is a normalised value: number of tokens per 100,000. Clearly, if I had taken the frequency counts for these words from some larger corpus of ‘British English’ or ‘Scottish English’, the frequency value that would have been assigned to these words in the analysis would not have been an accurate representation of the frequency with which these words were used by these particular speakers. I therefore used frequency counts from the WFHPB corpus.

In Bybee’s (2000) study of t/d deletion in American English, lexical frequency was divided into only two categories – ‘high frequency’ and ‘low frequency’ with a cut-point of 35 words per million. Bybee (2000) explains that this cut-point was chosen partly because a number in this range is often used in the psycholinguistics literature when measuring frequency effects and partly because, with reference to the past-tense forms of t/d, a frequency of 35 per million divides English inflected forms exactly in half in the frequency list provided by Frances and Kučera (1982). The result of dividing the corpus in this way was that 20% of the tokens fell into the ‘low frequency’ category and 80% fell into the ‘high frequency’ category. Other researchers interested in the role of frequency in language change (e.g. Myers & Guy 1997)<sup>87</sup> also used this method of categorisation in order to make their data comparable with Bybee’s. However, in Bybee’s (2000) study of [ð] deletion in Spanish, a different method of measuring frequency was employed. In this instance, an arbitrary cut-point between ‘high’ and ‘low’ frequency was chosen

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<sup>87</sup> Myers and Guy (1997) reference Bybee’s (2000) research as appearing in oral presentation in 1996 which is why their paper follows from Bybee’s methods, despite appearing in print earlier.

in order to make the number of tokens in each category approximately equal<sup>88</sup>. Furthermore, in her critique of Labov's (1994) frequency correlations, Bybee (2001) claims that the reason Labov found no significant correlation between vowel shift and lexical frequency in American English is that the lexical items he considered "occurred three or more times in the interview and thus must be considered high frequency" (2001: 276)<sup>89</sup>. Perhaps this is yet another potential method for measuring lexical frequency. Abramowicz (2007), using a small corpus of 11 speakers makes a 3-way distinction between 'low', 'mid' and 'high' frequency but codes frequency according to occurrence in his own data set. For Abramowicz (2007), lexical items occurring less than 3 times are rare, 3-10 times are relatively frequent and more than ten times are frequent. Dinkin (to appear), using the Brown Corpus, also makes a three-way distinction between 'low', 'mid' and 'high' frequency but considers items with a lexical incidence of  $\leq 200$  in a million word corpus to be 'low frequency'. This cut point is significantly higher than the cut point of 35 per million in Bybee's original technique.

As Bybee (2007) explains, forcing lexical frequency into discrete categories is inherently problematic because if the cut-point between these two categories is made such that the tokens in each category are roughly equal, there may be very few types in the high frequency category; and if the cut point is made such that the type distribution is roughly equal in both categories, the number of tokens in the 'high frequency' category will vastly outnumber the amount in the 'low frequency' group (as was the case with Bybee's original method for measuring lexical frequency in t/d deletion). Despite recognising the problems associated with these methods of measuring lexical frequency, Bybee continues to invoke such methods in her treatment of frequency in the hope that "as more empirical studies appear, absolute frequency ranges for each phenomena will eventually be specifiable" (2006: 6). In order to avoid the inherent problems associated with creating discrete categories from continuous data, I initially followed Hay (2001) in treating frequency as a gradient phenomenon.

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<sup>88</sup> No indication is given in Bybee (2000) for the reasons behind employing this new method or, indeed, of its success.

<sup>89</sup> In Labov's (2008b) frequency correlations for t/d deletion, lexical frequency is divided into 7 categories of 1, 2, 3-5, 6-10, 11-16, 17-39 and >40 tokens. No explanation is provided for grouping frequency in this way.

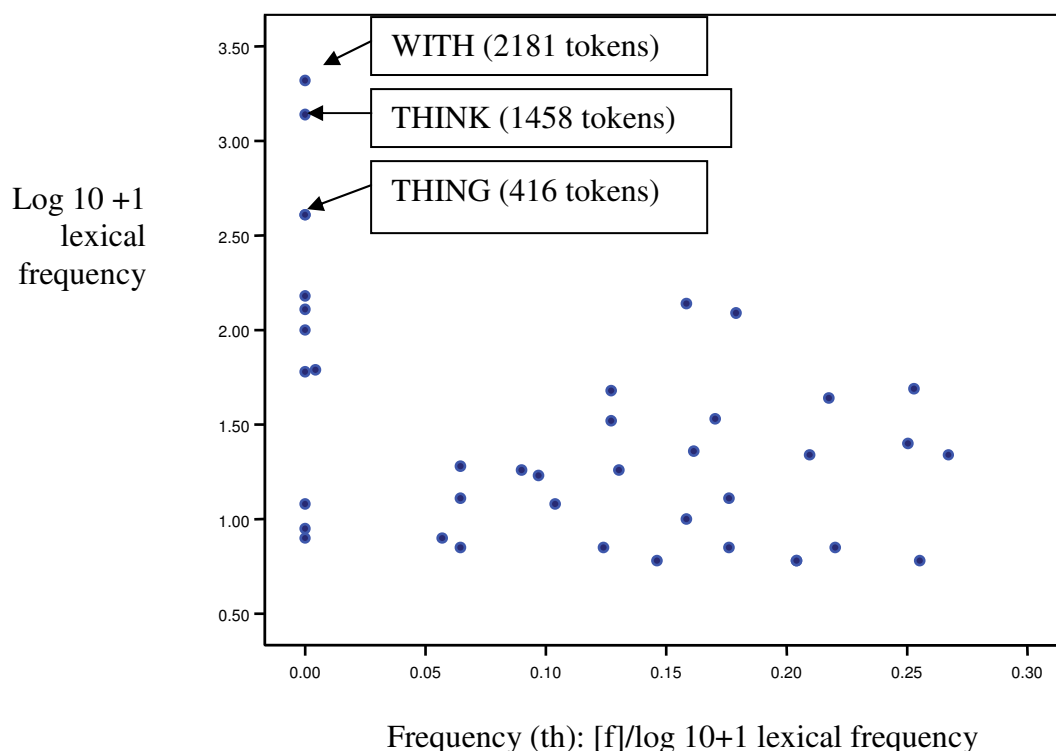
### 5.3.1 Correlating lexical frequency and phonological change

A Pearson's correlation was used to measure the extent to which values on the variables 'lexical frequency' and '(th): [f]' co-vary. Also, following Hay and Baayen (2002), I converted the measurements of lexical frequency and token frequency of (th): [f] into a log frequency rather than using raw frequency data as "there is evidence that humans process frequency information in a logarithmic manner – with differences amongst lower frequencies appearing more salient than equivalent differences amongst higher frequencies" (Hay and Baayen 2002: 208). The data were normalized using the Log10 logarithmic transformation. This transformation was selected because in its raw form, the data has a moderate positive skew based on the analysis of kurtosis, skewness and Kolmogorov-Smornov Z test of normality (see de Vaus 2002: ch11 for details of these tests for normality). Also, because some of the raw frequency data for (th): [f] contains a value of 0, and there is no logarithm of the value 0, it is necessary to add a constant to the original values in the transformation. In this case, I simply added the value of 1 to the raw frequency scores to ensure that the statistical software package (SPSS) could accurately transform the data.

The lack of a standard method to conduct correlations on frequency research led me initially to correlate word frequency with the number of tokens of a particular word in which the variable is realised with one variant (in this case, the number of tokens of (th) realised as [f]). However, as Kapatsinski (pc.) points out, it is possible that these two variables may correlate independently of any frequency effect using this method. In order to combat potential interference, it was therefore necessary to instead correlate word frequency with frequency of (th): [f]/word frequency. In other words, this method correlates the proportion of each word in the corpus which appears with (th): [f] against the lexical frequency of that word. While this may be a more accurate method of calculating lexical frequency in a large corpus, this method may be less well suited to a smaller corpus such as the WFHPB corpus or to low-frequency lexical items (only those lexical items with 3 or more tokens were

included in the analysis) because it depends on large numbers for accurate results. This method of correlating lexical frequency with phonological change is therefore only likely to find a significant result if the effect of lexical frequency is very large. The results of this correlation are charted in figure 5.2.

**Figure 5. 1: Correlation of log lexical frequency and th-fronting**



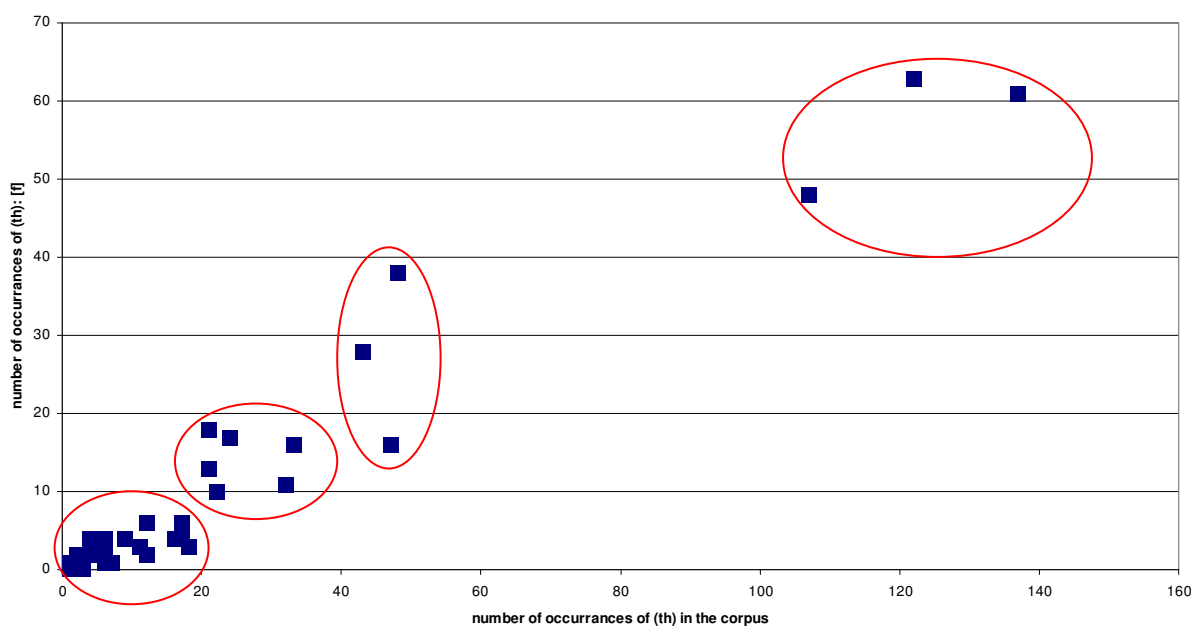
Notice that there are a large number of lexical items, some of which have very high frequency counts, which are resisting this change. As discussed in chapter 3, the lexical items that are resisting this change in the WFHPB corpus are WITH and the lexemes THINK and THING and their derived forms (such as *thinking* and *anything*). Not only do these lexical items allow other variants of (th) in this variety<sup>90</sup>, but WITH, THINK and THING are also the three highest frequency lexical items in the corpus with respect to the variable (th). When these very high frequency lexical exceptions and their lower frequency derivatives are removed from the analysis, the simple correlation coefficient is 0.171 and is not significant. This means that there is no large correlation between th-fronting and lexical frequency in

<sup>90</sup> Variants of (th) in WITH are [θ] and a zero variant of which the zero variant is near categorical; variants of (th) in THINK and THING include [θ]~[h]~[ʔ]~[f] and a zero variant.

these data. Indeed, given the large effect of Community of Practice/Friendship group membership that was found in chapter 3, we would perhaps not expect to also find a large effect for lexical frequency.

A multiple regression analysis (such as varbrul) can, however, spot smaller effects because while computing the effect of one independent variable, it can explicitly control for the effects of all other independent variables, therefore reducing the statistical ‘noise’ that can interfere in a simple linear correlation. To test whether lexical frequency has a smaller effect on the variation in th-fronting, another factor group which coded for lexical frequency was included into the multivariate analysis of th-fronting presented in chapter 3. Because varbrul requires discrete variants of all variables, it was unfortunately necessary at this stage to convert the continuous measurement of lexical frequency adopted in the Pearson’s correlations into discrete categories. Rather than create arbitrary cut points in the data or force category divisions in order that the number of tokens in each was approximately equal, the raw results for (th): [f] in all variable lexical items were plotted against lexical frequency in a scattergram and natural ‘bunches’ in the data were highlighted (see figure 5.2).

**Figure 5. 2: (th): [f] plotted against lexical frequency in the WFHPB corpus  
(excluding lexical exceptions to th-fronting)**



4 natural categories emerged in the data (circled in red in the graph) and these have been coded into the following factors:

- Low frequency = up to 20 instances
- Low-mid frequency = 21 to 33 instances
- High-mid frequency = 43 to 48 instances
- High frequency = 107 to 137 instances

While these categories do not contain an equal number of tokens or types, they represent the frequency categories that naturally emerged from the data.

When the factor group ‘lexical frequency’ as defined in this approach is included in the varbrul analysis, the results are as follows (see table 5.2):

Table 5.2: Multivariate analysis of the contribution of factors selected as significant to the probability of (th): [f]. Factor groups not selected as significant are not shown in this table. Factor group ‘frequency of lexical item’ included in the analysis.

Corrected mean			0.52
Log Likelihood			-
			401.980
Total N			784
	Factor weight	% of (th): [f]	N
<b>Community of practice membership</b>			
A “They act hard all the time”/ “fancy tune folk”	0.71	67	49
B “Tiny wee pipers”	0.95	93	56
C “The new folk”	0.89	85	59
D “Pipe band geeks”/ “Ex-Dream Valley”	0.10	7	27
E “comedians” /“Same dress sense, same music taste, same easy going attitude”	0.32	32	28
F “Fun/up for a laugh, not very serious”	0.75	75	24
G “that’s a fake ID son”	0.58	59	34
H “senior drummers”/“pipe band geeks”	0.09	9	76
I “one big happy family”	0.45	45	20
J “On the fringe”	0.21	23	57
K “13 goin on 30”	0.60	59	39
L “goths”/ “new lassie pipers”	0.51	55	87
M “Lazy PPI!”	0.31	30	78
O “Under agers”	0.48	44	32
P “Novice tenor section ‘WILD’!!”	0.79	78	45
Q No CofP affiliation	0.35	34	73
Range	86		
<b>Preceding [f] in the word</b>			
Preceding [f]	0.81	68	22
No preceding [f]	0.49	48	762
Range	32		
<b>Syllable structure/place of (th) in the word</b>			
(th) in onset position	0.37	38	486
(th) in coda position	0.58	55	298
Range	21		
<b>Type of lexical item</b>			
Place names and proper names	0.42	48	351
Ordinals	0.42	39	324
All other lexical items	0.61	53	109
Range	19		
<b>Frequency of lexical item</b>			
Low frequency	0.41	39	242
Low-Mid frequency	0.47	57	148
High-Mid frequency	0.53	60	139
High frequency	0.58	48	255
Range	17		



### 5.3.2 Interpreting the results

How do the results for frequency effects in th-fronting in the WFHPB corpus compare with the generalisations that have been established in the literature on frequency?

#### 5.3.2.1 Bybee's (2007) frequency generalisations

Results of the Pearson's correlation and the multiple regression analysis in which th-fronting was included suggest that the sound change TH-Fronting may be displaying patterns associated both with Bybee's reduction effect *and* conserving effect.

On the one hand, in lexical items that are not resisting the change (i.e. all words except WITH, THINK, THING and their derivatives), the varbrul analysis shows a significant 'reduction effect' pattern – words with higher token frequency are adopting the innovation at a faster rate than words with lower token frequency (see the last results of the last factor group in table 5.2). Bybee's explanation for the reduction effect is that language production is a neuromotor activity and as neuromotor activities are repeated, their execution becomes more efficient and gestures are reduced which (in language) leads to assimilation and reduction processes. As words with a higher token frequency are more exposed to this reduction, they change more rapidly. However, while this explanation is suitable for processes of assimilation and reduction in language, it cannot explain the 'Reduction Effect' pattern found in these data because th-fronting is not a reduction; it is not a phonetically motivated sound change. If the sound change [θ] to [f] was 'reductive', we would expect to find significant correlations of the type tested for with the factor groups preceding and following phonological context in the multivariate analysis presented in chapter 3. In other words, if this sound change was to be successfully attributed to a decrease in muscular activity of the tongue, we might expect to find some evidence of a correlation between the dental fricative and 'front' segments or the labiodental fricative and centralised or back segments (as the tongue position is

neutral in the articulation of [f]). The fact that there are no apparent correlations in the data make it very difficult to support an argument in favour of construing this sound change as ‘reductive’, as described by Bybee. Rather, this sound change pattern more like lexical diffusion (Wang 1969, 1977); it is “the result of the abrupt substitution of one phoneme for another in words that contain that phoneme” (Labov 1994: 524).

Patrick Honeybone (personal communication) suggests that perhaps the problem lies not in the usage-based approach but simply in the definition of the ‘Reduction Effect’ given to this process by Bybee. Honeybone proposes expanding this category slightly to include processes of change that are phonologically natural (most of which also include some form of phonological reduction). By assuming that the loss of /θ/ is a natural process (evidence for this position comes from the fact that only a small number of languages in the world have this sound and it is often weakened to a stop or lost entirely) then the pattern apparent in th-fronting in WFHPB is exactly as it should be, given the predictions of a usage-based model.

There is, however, also evidence of a type of Conserving Effect here but only in the lexical items WITH, THINK, THING and derivatives of THINK and THING. These very high frequency lexical items (and their derivatives) are entirely resisting the spread of the [f] variant. Bybee typically invokes the ‘Conserving Effect’ to explain the pattern of change often found in grammatical and analogical change. The explanation for this pattern is that high frequency words become more entrenched in their morphosyntactic structure and resist change on the basis of more productive patterns in the language. Again, however, lexical frequency can only go some way to explaining the pattern of frequency effects found in these data. For instance, while it is possible to explain the resistance to th-fronting shown by the very high frequency lexical items THINK, THING and WITH (they are more entrenched), frequency alone cannot explain why lower frequency derivatives of these lexemes are also completely resisting this change. For instance, the word ‘anything’ occurs 127 times in the corpus and so has the same frequency value as a word such as ‘thought’ which is in the ‘high frequency’ category in the varbrul analysis. Frequency research would suggest that both of these words should be undergoing the change to th-fronting at roughly the same rate because they occur with the same

frequency and yet there are no tokens of th-fronting in the word ‘anything’ in WFHPB<sup>91</sup>.

### **5.3.2.2 Phillips’ (2006) frequency generalisations**

In order to explain the different frequency patterns found in WFHPB with the generalisations proposed by Phillips (2006), it is necessary to assume that the lexical items that allow th-fronting require no lexical analysis beyond phonetic coding in order for the change to take place. This means that information contained within the ‘lexical entry’ and generalisations extracted from these word forms are unimportant to the spread of this sound change. In other words, there is no need for the speaker to access more abstract units (or schemas) such as syllable structure, word class or phonotactic generalisations in order to implement this change; the change simply requires ‘shallow access’ (Phillips 2006: 75) to the phonetic form of the word. However, if it was the case that th-fronting was simply a change that affected the realisation of the word form and required no ‘deeper’ level of lexical analysis in its implementation then we would expect to find no correlation between th-fronting and word class or syllable structure. The analysis of variation presented in chapter 3 shows that this is clearly not the case. Not only is there a statistically significant relationship between word class, syllable structure and the realisation of the labiodental fricative, which suggests that more abstract generalisations or schemas are important to the spread of this sound change, but these factor groups actually account for more of the variation in this data than lexical frequency (and so are perhaps even more important in the spread of th-fronting).

Phillips’ (2006) model would necessarily explain the resistance to th-fronting shown by the lexical exceptions as a result of their high frequency. Very high frequency leads to entrenchment since the more frequent a word is in the language, the more entrenched it becomes in the mind of the speaker and so the less likely it is to participate in certain types of change. However, Phillips (2006) also invokes the assumption that high frequency leads to autonomy. If it is the case that highly

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<sup>91</sup> See Clark and Trousdale (forthcoming) for a more detailed discussion of these exceptions to th-fronting and possible explanations for their resistance to the change.

frequent words have weaker connections to other related words then it is difficult to explain why, in this case, low frequency derivatives of the high frequency lexical items THING and THINK are also resisting this change.

### 5.3.3 Lexical frequency and the analysis of variation

One final point must be addressed on the inclusion of lexical frequency as a factor group in an analysis of variation. Most frequency research to date has examined the effects of lexical frequency on variation and change in isolation. Very few researchers interested in the role of lexical frequency in language change consider how other social or linguistic factors that can also motivate variation and change interact with the effect of lexical frequency<sup>92</sup>. This is particularly surprising as we know that there is rarely ever one single motivating factor responsible for the spread of a linguistic change:

“Explanations of language which are confined to one or other aspect – linguistic or social – no matter how well constructed, will fail to account for the rich body of regularities that can be observed in empirical studies of language behaviour” (Weinreich *et al.* 1968:188).

It is therefore important to consider the relevance of lexical frequency effects in relation to other factors that have been found to be motivating the spread of th-fronting in WFHPB. When the factor group testing for the effect of lexical frequency is included in the analysis, the varbrul results show that lexical frequency is a significant motivating factor. However, lexical frequency is the last significant factor group to remain in the analysis. In other words, of all the factors influencing variation in these data, lexical frequency has the weakest effect. Community of practice/friendship group membership continues to outrank all other constraints on this variation. Lexical frequency is only one of a number of factors influencing the direction of change in th-fronting. I propose therefore that it is vital not only to consider the role of lexical frequency as an explanatory factor in the spread of sound change but to consider this alongside other motivations for variation and change. As

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<sup>92</sup> The only exceptions to this that I am aware of are Labov (2006) and Abramowicz (2007).

discussed in section 5.2, this can only be done by adopting certain theoretical assumptions of the usage-based approach.

To summarise, the patterns of th-fronting in WFHPB show some evidence of frequency effects but this result is highly dependent on the methods employed in quantifying lexical frequency and the level of granularity in the statistical techniques. Furthermore, while usage-based concepts such as entrenchment and lexical strength are useful in interpreting these results, these alone are unable to account for the full range of variation apparent in the process of th-fronting in WFHPB.

#### ***5.4 Lexical frequency and stable variation***

The majority of literature on lexical frequency and the usage-based approach is concerned with language change. As we have seen previously in this chapter, a usage-based approach is particularly well-suited to accounting for language change in ways that a generative model cannot. This is partly due to the fact that in the usage-based approach, the linguistic system is not considered to be a static or fixed set of rules; it is an experience-driven dynamic event that continues throughout the lifetime of the speaker (although not at the same rate across the lifespan). Language change is therefore predicted by the usage-based approach and, as variation is often a prerequisite to change, inter-speaker variation can also be accounted for in this framework.

However, not all variation necessarily leads to change. In some cases, periods of stable variation exist with apparently no change in the direction of this variation from one generation to the next. There is very little discussion of the possible role of lexical frequency in cases of stable variation in the literature. Indeed, it would appear that the existence of stable variation may pose a problem for the usage-based approach. How can a situation of variability exist in such a model without the more frequently used variants becoming more entrenched over the lifetime of the speaker and eventually winning out?

This is also the question posed by Abramowicz (2007) in one of the only attempts to examine the role of lexical frequency in a stable sociolinguistic variable<sup>93</sup>. This research deals with variation in the (ing) variable (i.e. variation between [ŋ] ~[ŋ] in the final segment of unstressed syllables such as ‘-ing’ in ‘walking’) in a white lower-middle class community in Philadelphia. The (ing) variable is one of the most widely studied variables in English sociolinguistics and, according to Abramowicz (2007), it has remained stable for around 50 years (see Hazen 2006 for an overview of research on this variable). Abramowicz hypothesises that “if usage-based theorists are correct about the overarching role of frequency in linguistic production, we should expect to find frequency effects also in (ing), despite the fact it is a stable variable” (2007: 3). However, as discussed earlier in this chapter, different predictions have been made about the nature of the hypothesised frequency effects. If we assume that a change from [ŋ] to [ŋ] constitutes a case of phonetic reduction, the null hypothesis, according to Bybee’s (2006) Reduction Effect, is that high frequency lexical items are more likely to be realised with the apical variant. However, as Abramowicz points out, there is no evidence that the apical nasal involves less articulatory effort than the velar nasal. If this is not a case of phonetic reduction then the usage-based approach adopted by Bybee makes no predictions regarding the role of lexical frequency in such variable data. If, on the other hand, a shift from [ŋ] to [ŋ] constitutes a change which affects only the phonetic realisation of a segment (i.e. there is no deeper level of lexical analysis), then, following Phillips (2006), the null hypothesis would be that high frequency words would display more apical variants than low frequency words. In other words, the idea that “we should expect to find frequency effects also in (ing), despite the fact it is a stable variable” (Abramowicz 2007: 3) depends entirely on how the variation in (ing) is interpreted within a particular theoretical framework.

The likelihood of finding a frequency effect with (ing) also seems (based on the discussion of th-fronting above) to depend on the way in which frequency is measured. Abramowicz employs a variety of different methods of measuring

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<sup>93</sup> Abramowicz (2007) is the only *explicit* examination of the role of lexical frequency in a stable sociolinguistic variable; Bybee’s (2000) work on t/d deletion is also an exploration of a stable sociolinguistic variable, although in this case it appears to be used in support of theories of language change.

frequency within a varbrul analysis but reports similar results for each method. However, it is necessary to bear in mind that, because varbrul was used, each of these methods involved re-coding raw frequency data into discrete categories. It is unclear whether a significant frequency effect would have emerged had the statistical analysis coded lexical frequency as gradient rather than categorical. Abramowicz (2007) concludes that lexical frequency is not a motivating factor in the stable variable (ing) in his corpus.

In order to test whether lexical frequency has any effect on variation in the stable BIT vowel, I coded the Log 10 lexical frequency of each lexical item against the corpus (as with the Pearson's correlation in th-fronting) and then entered this as a factor in the last step of the hierarchical regression analysis on both the F1 and F2 data presented in chapter 3. The results for the F2 analysis are not significant ( $\beta = -0.42$ ;  $p > 0.05$  (1.00)). Lexical frequency is not a significant predictor of variation in the F2 plane of the BIT vowel in WFHPB. The results for variation in the F1 dimension are, however, significant. These results are presented in tables 5.3 and 5.4 below.

Table 5.3: Regression analysis for F1 (including lexical frequency)

Model	Predictors for F1	B	SE B	$\beta$
	(Constant)	.257	.135	
Step 1: following phon. Context	nasals vs velars/glottals	0.287	0.062	0.198
	nasals vs dentals	0.338	0.099	0.097
	nasals vs approximants	0.14	0.062	0.081
	nasals vs labials	0.404	0.157	0.067
	nasals vs alveolar	0.073	0.071	0.035
Step 2: preceding phon. Context	nasals vs alveolars	-0.337	0.104	-0.223
	nasal vs labial	-0.196	0.112	-0.125
	nasals vs velars/glottals	-0.261	0.113	-0.12
	nasals vs approximants	-0.26	0.112	-0.112
	nasals vs /h/	0.293	0.133	0.103
	nasals vs dentals	-0.081	0.123	-0.033
Step 3: grammatical Category	noun vs proper noun	0.239	0.059	0.142
	noun vs verb	0.176	0.053	0.112
	noun vs adj and adv	-0.169	0.059	0.095
	noun vs ordinals	0.055	0.093	0.018
Step 4: CofP (recode)	WFHPB vs.. Valley Lassies	-0.395	.093	-.107
Step 5: speaker age	real age in years	.007	.003	.065
Step6: lexical frequency	lexical frequency	-.092	.033	-.090

Table 5.4: Regression model results for F1 (including lexical frequency)

Model to account for variation in F1	R Square	Adjusted R Square	R Square Change	Sig. Change
1	.011	.007	.011	.007
2	.051	.044	.041	.000
3	.087	.078	.036	.000
4	.102	.092	.014	.000
5	.105	.095	.004	.013
6	.110	.099	.005	.006



The standardised beta value for this last stage in the regression indicates that as the frequency of the lexical item increases by one standard deviation (0.69 units, measured in log 10), the z-transformed value of F1 decreases (because the correlation is negative) by 0.090 standard deviations. The standard deviation of F1 is 0.704 and so this constitutes a change in z-F1 of 0.063 (0.090x 0.704). Therefore, for every increment of around 0.7 units of frequency, there is a decrease in the z-transformed F1 value by 0.063. This decrease may seem like a very small amount but it is enough to cause a significant correlation and to account for around 0.5% of the variation in the height dimension of this vowel (see table 5.4). These results therefore suggest that there is a significant correlation between lexical frequency and variation in the height dimension of the vowel in BIT. The correlation is negative which suggests that the F1 value is lowered as lexical frequency increases. Bearing in mind that vowel height is the inverse of F1, in real terms this constitutes a slight but significant correlation between higher vowels and more frequent lexical items. If we accept that variation away from the high front variant in the height dimension of F1 constitutes a case of vowel reduction, this finding is exactly the inverse of that which is predicted by Bybee (2006) i.e. that lexical items with high token frequency are more likely to undergo phonetic reduction because they have greater opportunity to be affected by phonetic processes.

The result poses two questions:

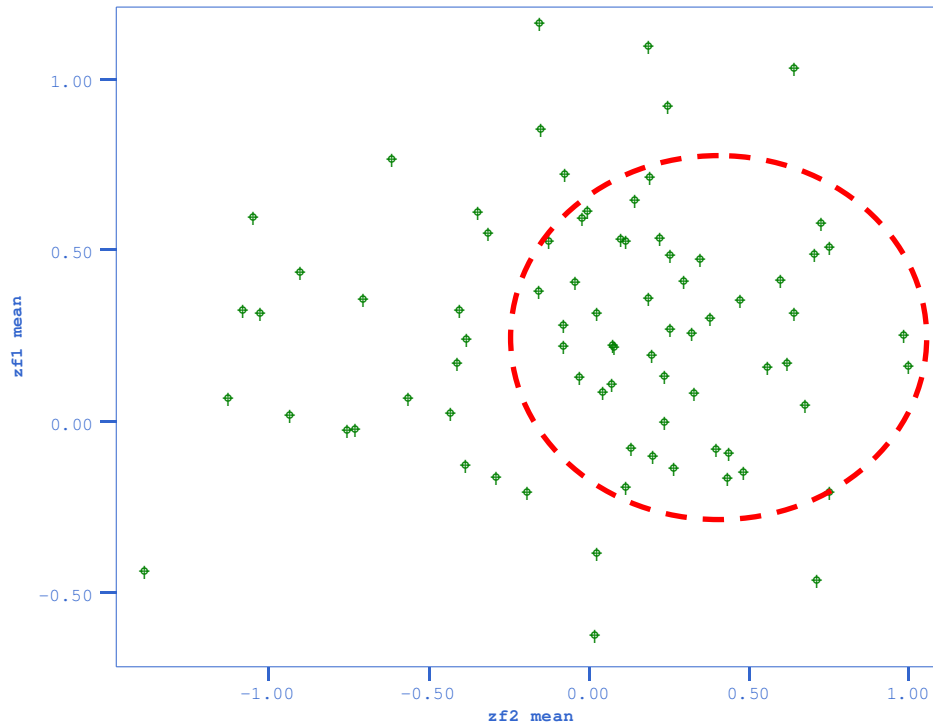
- Why is lexical frequency patterning in this way in the BIT data?
- Can a usage-based model still be useful in interpreting these data?

### **5.4.1 Word Specific Phonetics**

In order to understand the variation in BIT more clearly, it is necessary to reduce the level of abstraction yet further in the analysis. Until now, I have followed previous sociolinguistic research on BIT in Scotland and assumed that all instances of the high front vowel in CVC environments are essentially 'the same'. In this case, we should expect to see a range of variability that patterns in a particular way across all lexical items in the corpus, particularly those that share the same preceding and following



**Figure 5.4: cluster of similar values of BIT in the mid-front region of the vowel space**

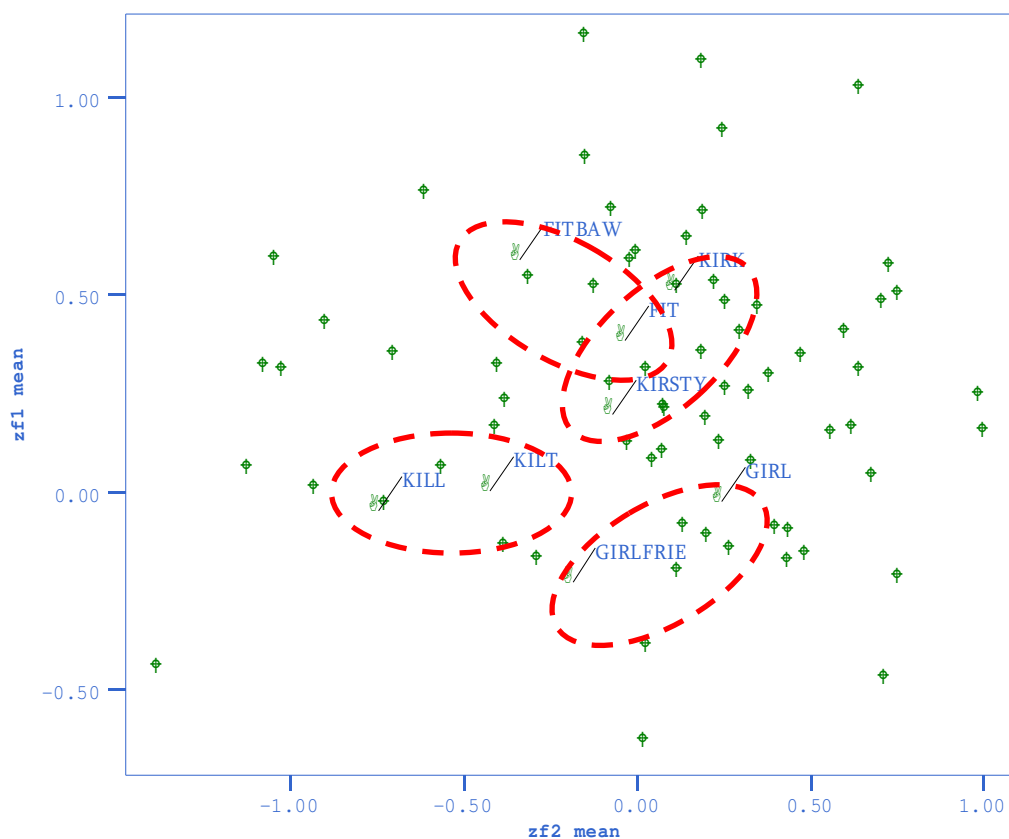


Although this cluster contains the majority of values of BIT, a number of lexical items remain outside of this cluster, some with much more extreme values, particularly on the F2 plane. Interestingly, even some lexical items which have similar preceding and following phonetic environments do not have such similar mean values. Looking at these words may help to distinguish between the effect of phonological context and the effect of the specific lexical item. This is highlighted in figure 5.5 with the pairs of lexical items KILL~KILT, GIRL~GIRLFRIEND<sup>94</sup>, FIT~FITBAW and KIRK~KIRSTY.

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<sup>94</sup> In figure 5.5, it is impossible to fully represent the word 'girlfriend' – the package used to create this figure does not allow labels with more than 8 characters.

**Figure 5.5: differences in mean F1/F2 values in lexical items with similar phonetic environment.**



There is therefore some evidence to suggest that the lexical item in which the BIT vowel appears may have a significant effect on variation. To test this hypothesis, the varbrul analysis of variation for BIT (presented in appendix 1) was re-done including another factor group coding for lexical item<sup>95</sup>. Again, only those lexical items with 3 or more tokens were included. This resulted in a factor group with 79 factors (or lexical items). However, many of these factors were necessarily omitted from the

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<sup>95</sup> A more accurate method would have been to include the factor group in a further run of the multiple regression analysis. However, each lexical item would have had to be categorised as a dummy variable and so this would have resulted in adding a further 78 variables to the regression. See discussion in chapter 3 for problems with such an approach.

regression analysis due to a lack of variation. For instance, lexical items that were consistently realised somewhere in the area defined in appendix 1 as ‘back’ (i.e. with a normalised n F2 score of  $<-0.580$ ), were considered invariant in varbrul and so were excluded from the analysis. The results of the varbrul which codes for lexical can be found in appendix 2.

The varbrul results show that in both the F1 and F2 dimensions, the factor group testing for the effect of individual lexical item is the most significant factor group. Both the description of variation between means of individual lexical items and the varbrul analysis suggest that it is necessary to consider the role of individual words in describing this variation<sup>96</sup>.

There is a considerable body of evidence which shows the existence of word-specific allophonic detail. The majority of this comes in the form of patterns relating to word frequency effects (such as that reviewed earlier in this chapter). However, word-specific effects are not confined to word-frequency effects. Pierrehumbert (2001) discusses several cases of word-specific phonetics that have been reported in recent years. For instance, Yaeger-Dror and Kemp (1992) and Yaeger-Dror (1996) provide evidence of a vowel change currently affecting Quebecois French. This change has failed to take place in a particular group of words that are not distinguished in any way phonologically from others affected by the change; the only difference is that these words belong to semantic categories that are associated with the church, the military and schools. A further example is provided in the analysis of the KIT vowel in Mendoza-Denton (1997). In California, this vowel is raising and fronting. Mendoza-Denton found that a particular sub-class of lexical items that she labels Th-PRO forms (e.g. *something*, *anything*, *nothing* etc.) are showing the most extreme fronting and raising of this vowel. These words are not only higher in frequency than other KIT words in Mendoza-Denton’s corpus, they also function as sociolinguistic markers in this community. For instance, fronting and raising of KIT was most extreme in the word *everything*, which is a discourse marker in this variety. Finally, the pattern of variation in th-fronting presented above provides further evidence of the existence of word-specific phonetics. Certain lexical items are

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<sup>96</sup> Of course, it is possible that the range value for the factor group lexical item may be inflated simply because with such a large number of factors in the factor group, there is more possibility of finding a correlation by chance. This is unfortunate but I can see no way to control for this possibility.

resisting the realisation of (th): [f] in these data and while some of these are high frequency (WITH, THING, THINK), others are lower frequency derivatives of these words (such as *thingwie* etc.). Frequency alone therefore cannot explain these results.

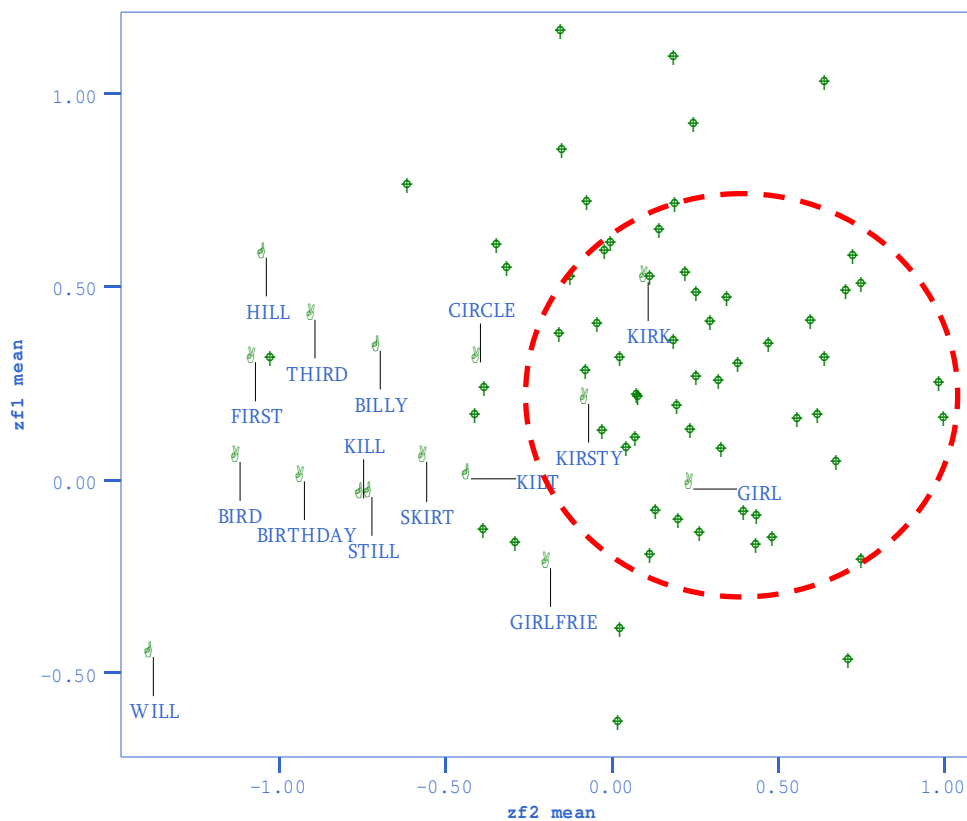
These studies all suggest that phonetic detail may be associated not only with accents or varieties, but that it may be learned with specific words. A usage-based model of grammar can account for this pattern of variation. Since the model assumes that the structure of the linguistic system is acquired 'bottom-up' i.e. it is acquired gradually through encounters with actually occurring expressions, it is simply a matter of suggesting that the memories that are abstracted are associated, at some level of abstraction, with individual words. This is already the driving assumption of several usage-based theoretical frameworks (such as Pierrehumbert's (2001) discussion of *Exemplar Theory* and Hudson's *Word Grammar* (1990, 2007)). Moreover, not only is it possible for a usage-based model to account for the phenomenon of word-specific phonetics, standard generative phonological frameworks cannot. In generative phonological theory, the lexicon and the phonology are distinct and placed in separate modules of the grammar. The phonetic output of a lexical item is not stored in the lexicon but is arrived at once the lexical item has been retrieved from the lexicon and processed by the rules of the (phonological) grammar. This output is then fed to a phonetic implementation component which provides the acoustic targets with which the word should be realized in real speech. However, as Pierrehumbert (1994, 2001) explains, this process applies in exactly the same way to all surface phonological representations. In other words, there is no possibility for the phonetic implementation rule to be gradient and so there is no explanation in such a framework for word-specific phonetics.

In answer to the question posed at the beginning of this section - can a usage-based model still be useful in interpreting these data? - the answer, it seems, is yes. Not only is a usage-based model capable of accounting for the patterns of word-specific phonetics apparent in variation in the BIT vowel (and with variation in the (th) variable), but it is unique in its ability to do so. It seems that there is a paradox: on the one hand, certain lexical items show evidence of word specific phonetics, a phenomenon which can only be accounted for in a usage-based model of language structure; on the other hand, the frequency effects in these data (however small) are

not consistent with a pattern expected of phonetic reduction in a usage-based model. This may be problematic to an account of stable variation within a usage-based framework, given the very heavy emphasis placed on frequency effects in the usage-based approach.

Perhaps part of the reason for this paradox is due to the nature of the variable. As stated, the method adopted so far has assumed that variation in all instances of the short front high vowel can be categorised as variation in the same variable. However, Figure 5.4 displays a large amount of variation outwith the cluster of variation in the front-mid section of the vowel space. When this variation is examined in more detail, it is apparent that the large majority of lexical items that occur outwith this main cluster of variation share certain phonetic features in common i.e. the vowel is followed by a liquid. This is detailed in figure 5.6 below.

**Figure 5.6: Phonetic similarity in variation outwith the main cluster of variants of BIT**



It seems to be the case that the BIT vowel is more retracted in lexical items with a following liquid consonant. Is it possible then that, in contexts before /l/ and /r/, there is something ‘different’ about this vowel. Could it be the case that, before liquids, this is a different context of variation that should be analysed separately from the main results?

#### **5.4.1.1 BIT vowel preceding liquids**

Historical dialect data presented in Johnston 1997a and 1997b, suggest that the realisation of the BIT vowel has been variable in Scotland since at least the



fourteenth century in some varieties. For instance, Johnston (1997a: 79) cites fourteenth century spelling evidence of the BIT vowel as <e> in, for example, <wesh> (wish), <fesh> (fish), <beg> (big), <blenk> (blink) and <ferst> (first). Variation on the F1 dimension between [ɪ] and [ɛ] is referred to by Johnston as ‘High Non-Peripheral Vowel Lowering’ (1997a: 79).

In the F2 dimension, historical evidence suggests that a process of ‘BIT-Retraction’ has taken place (Johnston 1997b: 468) in which BIT lexical items were transferred to the CUT vowel. Again, Johnston cites spelling evidence, this time from the fifteenth century, as evidence of this retraction. In these cases, the vowel appears with a <u> or <o> spelling in the WILL and PILL subclass (i.e. in lexical items with a preceding /w/ and a following /l/ or a preceding labial and a following /l/). Johnston suggests that this process began to affect the BIT vowel in the context of a following /r/ in the sixteenth century. However, Johnston does not cite his sources and so it is unclear whether these changes are reported to have taken place across the country or only in certain dialect areas.

There is some evidence in Johnston (1997b), however, that this process of BIT-Retraction may only be common historically in the environment of a following /l/ in Fife and that retraction before /r/ may be a change in progress. Johnston states that “In Fife and the Lothians, backing only occurs in *wind* and *pill*” (1997b:470) and he goes on, in his discussion of lexical items that have transferred to the CUT lexical set, to suggest that “the West Mid group, and neighbouring West Lothian and Stirlingshire, add *hill* and, increasingly, *girl*, to this transfer list and tendencies to do so are increasing over time, spreading eastwards and southwards” (Johnston 1997b: 470). Data from the Linguistic Atlas of Scotland (Mather and Speitel 1986) shows that the high front vowel is variably retracted in the context of a following /r/ in this dialect area. Specifically, in the region of Fife that is closest to the area in which WFHPB are situated, the lexical items *bird* and *fir* are reported as having retracted variants but *firth*, *kirk* and *kirn* are not<sup>97</sup>. Giegerich (1992: 63) also suggests that variation in the BIT vowel before (rhyme) /r/ may be a change in progress in

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<sup>97</sup> Thanks to Warren Maguire for help with extracting this data from the LAS.

varieties of English in Scotland: “the phonemes /ʌ/, /ɪ/ and /ɛ/ are unstable in this context: some speakers rhyme *word* and *bird* (having /ʌ/) in both...”<sup>98</sup>

Evidence from these sources suggests that the quality of the BIT vowel in the context of a preceding liquid may be retracted in varieties of Scots. While there is evidence that retraction before /l/ is historically a feature of the Fife dialect, variation in BIT preceding /r/ was historically much less prominent in this variety. Therefore, the existence of a good deal of retracted realisations of BIT before /r/ in the WFHPB corpus could be indicative of a change in progress.

The apparent time hypothesis (Labov 1994; 83-84) predicts that in patterns of classic phonological and morphological change in progress, there should be a correlation between the use of the incoming/innovative variant and the age of the speaker – younger speakers should show higher levels of use of the innovative variant. When instances of BIT before /r/ in the WFHPB corpus are correlated with speaker age, this correlation is not significant (Pearson’s correlation = 0.50.  $P = 0.516 > 0.05$ ). These data therefore do not show the pattern of a classic change in progress. However, it is necessary to bear in mind that the age range of these speakers in WFHPB is limited to a span of only 30 years (roughly one generation). In these data, speaker age is therefore only helpful in recognising changes that are spreading rapidly throughout the community and throughout the lexicon. It may simply be the case that BIT-Retraction is progressing slowly across several generations and so the change is not as salient as th-fronting in this community.

One further piece of evidence that suggests that we may be dealing with a change in progress in variation in BIT before /r/ comes from lexical frequency. As stated previously (section 5.2.2.1.2), in cases of phonetic change, particularly phonetic reduction, high frequency words tend to show more evidence of change

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<sup>98</sup> The discussion in Giegerich (1992) goes on to suggest that the collapse of the distinction between /ɪ/ and /ʌ/ is the first stage in another change in progress, a merger between /ɪ/, /ʌ/ and /ɛ/ to /ɜ/ before rhyme /r/. Giegerich (pc.) has since suggested that these may be different changes as the merger to /ʌ/ seems to be associated more with working class speakers (and with Scots) whereas the merger to /ɜ/ is more heavily associated with middle class speakers. Only two speakers in the WFHPB corpus can clearly be classified as middle class (*the Valley Lassies*) and, interestingly, both appear to have a merger to /ɜ/ in this environment, in at least some lexical items. However, without more data from a wider social spectrum, I am unable to pursue this suggestion at present.

(and so change more quickly) than low frequency words. In the case of BIT before /r/, there is a clear correlation between the lexical frequency of the word and the realisation of the vowel in the expected direction – high frequency words are more likely to be realised with a retracted vowel than low frequency words in this phonetic context (Pearson's correlation = -.325  $p = 0.000 < 0.01^{**}$ ). Notice that when all of the BIT data are considered in the same analysis, there is no significant correlation with lexical frequency in the F2 dimension. This correlation only becomes apparent when those lexical items in which the vowel is followed by /r/ are analysed separately.

The literature on vowel mergers before liquids in English is extensive and there are many examples of this phenomenon in pre-liquid position. In Philadelphia, for instance, there is a merger between /e/, /ɛ/, /æ/ and /ʌ/ before /r/ and in Texas and the South, /i/ and /ɪ/ both merge before /l/, as do /e/ and /ɛ/. Wolfram and Schilling-Estes state that “in American English, vowels followed by nasal sounds such as [m] and [n] and liquid sounds such as [r] and [l] are more likely to undergo changes and be subjected to mergers than vowels in others phonetic environments” (1998: 71).

Harris (2006) proposes a possible explanation for the apparent generalisation that vowel mergers occur more frequently before liquid consonants. He suggests that this may be a result of the dual nature of articulation of liquid consonants. According to Harris (2006: 13), liquids are produced with gestures which involve both the tip and dorsum of the tongue. Research suggests that while these two gestures are closely synchronised and stricture is tight in prevocalic articulation of liquids, post-vocalically, stricture tends to be looser and the dual gestures are out of sync. Post-vocalically, the tendency is for the dorsal gesture to precede the apical gesture. This leads Harris to propose that anticipation of the early dorsal articulation of the following liquid consonant affects the dorsal articulation of the preceding vowel.

To summarise, there is evidence to suggest that not all lexical items are behaving in the same way with regards the variation in the BIT vowel and it is therefore unwise to treat all instances of variation together in the same analysis. Specifically, the data here suggests that before liquids, the BIT vowel may be in the

process of retracting, a process not uncommon of vowels before liquids in English. There is historical evidence to suggest that this has been a feature of the dialect before /l/ for some time and real time evidence to suggest that this is a more recent phenomenon in the context of a following /r/ in this dialect. In other words, the BIT vowel before liquids must be considered separately, as a different context of variation.

#### **5.4.2 Returning to lexical frequency**

The problem identified at the beginning of section 5.4 was that the analysis of variation across all instances of the BIT vowel appeared to suggest contradictory evidence on the capability of a usage-based model to handle this variation. On the one hand, only a usage-based approach can account for the word-specific effects apparent in the variation in BIT; on the other hand, usage-based models place a large emphasis on lexical frequency effects and yet no predictions are made on the role of lexical frequency in cases of stable variation. Furthermore, the frequency effects in these data on BIT show the opposite pattern from that which might be predicted of vocalic variation in a short high vowel towards lower and/or more centralised variants. The frequency effects here correlate high frequency lexical items with high front vowels; the literature predicts that cases of phonetic reduction should correlate in the opposite direction. However, it is now apparent that variation in some lexical items (specifically in the contexts of a following liquid consonant) may be behaving differently than other instances of the BIT vowel. Does the relationship between lexical frequency and variation in BIT become any more transparent when items of BIT before liquids are removed from the analysis of variation?

The results of the analysis in which all instances of BIT were included, showed that in the F2 dimension, there was no significant correlation between lexical frequency and vowel backing ( $\beta = -0.42$ ;  $p > 0.05$  (1.00)). Lexical frequency was not a significant predictor of variation in the F2 plane of the BIT vowel across the whole of the WFHPB. In the rerun of this analysis, excluding all cases of BIT followed by a liquid consonant, the results of the F2 analysis are as follows:  $\beta = -0.063$ ;  $p > 0.05$  (0.059). Removing instances in which BIT is (possibly) undergoing change still does

not produce a significant result. Lexical frequency is still not a significant predictor of variation in the F2 dimension of the BIT vowel (although, as we saw above, it does correlate highly with F2 variation in the BIT vowel before liquids).

In the previous analysis of the F1 dimension, however, the correlation between variation in BIT and lexical frequency was not only significant, it was in the opposite direction from that which might be expected. In the rerun of this analysis, excluding all cases of BIT followed by a liquid consonant, the F1 correlation is  $\beta = -0.093$ ;  $p < 0.05^*$  (0.015). The correlation is again significant and so the problem of explaining why a significant correlation exists between lexical frequency and stable variation in the height dimension of this vowel remains. This is further confounded with explaining why the correlation appears to run in the opposite direction from that which we would perhaps expect given the results of previous research on the relationship between lexical frequency and processes of phonetic reduction.

At present, I can only offer some speculative suggestions that may help to further explain this variation. The correlation between lexical frequency and variation in the height dimension is very small and while statistically significant, does not provide overwhelming evidence for the importance of lexical frequency. Indeed, a significant proportion of the variation in BIT seems to be predictable from phonetic context and articulatory effects, exactly as we might expect for a short vowel displaying stable variation. It is possible that if the linguistic factors that have not been coded in this regression (see chapter 4, section 4.2.2.5) were to be included, these may account for the apparent frequency effects. In other words, it may be the case that the frequency effects that appear to exist in the F1 dimension are actually an artefact of some other variable not included in the analysis.

Another possibility is that there are other cases of ‘word-specific phonetics’ that have not yet been recognised in the corpus, particularly at either the high or low ends of the frequency range. As discussed in section 5.2.2.1.3 of this chapter, Bybee provides evidence that very highly frequent words or constructions can become autonomous from similar or etymologically related forms and so may not be affected in the same way as other lexical items in a particular change because as a particular word or construction is used more frequently, it begins to be processed as a whole

unit rather than by its individual parts. It is possible that perhaps some of the very high frequency lexical items of BIT have undergone such a process. Indeed, two of the most highly-frequent lexical items with respect to the BIT vowel are ‘*hing*’ and ‘*hink*’, both of which have already been analysed as possible exceptions to sound change (as a result of their very high frequency) in the discussion of th-fronting.

Another possible interpretation is that variation in the height dimension of the BIT vowel does not constitute a case of phonetic reduction. The underlying assumption of my approach has been to consider variation in BIT as variation away from a high front vowel. However, as discussed in chapter 4 (section 4.1), the BIT vowel is often phonetically lower in varieties of Scots than other varieties of English. In this case, perhaps variation in BIT is therefore not always a reduction in vowel height. If the vowel is historically closer to a mid vowel then it is possible that variation in BIT is actually taking place in two different directions and the vowel is showing signs of both raising and lowering (this was also the pattern found in the KIT vowel in Mendoza-Denton 1997).

Finally, it seems that there is a mismatch between the fundamental assumptions of the usage-based approach and the current methodological practices in which these assumptions are tested, which may or may not be affecting the result here but which should nonetheless be noted. I have argued in this chapter that in order to be able to account for the frequency effects that have been so widely reported to exist in language change, it is necessary to adopt certain assumptions of the usage-based approach; specifically the claim that there is a direct relationship between entrenchment and language use since entrenchment in the mind of the speaker results directly from frequency of successful use. However, much of the research on the relationship between language change and lexical frequency has been conducted on data extracted from large corpora and does not deal directly with issues relating to entrenchment in the mind of the individual speaker. This has been made possible by the assumption that there is a more or less direct link between frequency and cognition that has become known as that “Corpus-to-Cognition Principle” i.e. that “frequency in text instantiates entrenchment in the linguistic system” (Schmid 2000: 39). This assumption is based on Halliday’s original suggestion that “frequency in text instantiate[s] probability in the system” (Halliday and James

1999:3) and stems from the idea that observed frequencies in the use of language correlate with degrees of preference or tendencies in the linguistic system. The core assumption of a usage-based model is that the linguistic system is abstracted largely from a speaker's previous experience and hence predicts (albeit not explicitly) that frequency effects may be different for each speaker as no two speakers will share exactly the same grammatical system. The theoretical focus in a usage-based model is therefore on explaining *the grammar of the individual speaker* but the methods used to test these claims have dealt with abstractions over data collected from a vast number of speakers, genres and speech styles. Furthermore, the assumption that 'frequency in text instantiates entrenchment in the linguistic system' has recently been placed in doubt by the very author who proposed the principle (Schmid forthcoming), suggesting that the relationship between entrenchment and lexical frequency is perhaps more complicated than originally suspected.

#### **5.4.3 Summary of findings from BIT vowel**

The discussion of variation in the BIT vowel in WFHPB has highlighted several issues. There is evidence of word-specific phonetics affecting this variation, a phenomenon that can only be accounted for within a usage-based model of grammar and so represents an argument in favour of an approach to variation that considers usage-based principles. The heavy emphasis that is placed on lexical frequency in the usage-based approach suggests that it would be unwise to ignore some treatment of lexical frequency in this variable. This proved problematic for two reasons:

1. the usage-based model is heavily geared towards accounting for language change and seems to make no predictions about the relationship between lexical frequency and stable variation
2. correlations with lexical frequency (even with items showing 'word-specific' patterns removed from the analysis) were difficult to interpret within the predictions made by certain usage-based theorists.

The question that was posed at the beginning of the discussion of lexical frequency and stable variation (section 5.5) was "how can a situation of variability exist [in a

usage based model] without the more frequently used variants becoming more entrenched?” There has been a very heavy emphasis placed on the relationship between entrenchment and lexical frequency in the usage-based approach which has allowed it to account for certain features of word specific phonetics (i.e. frequency related features) and to account for cases of language change. Effects of frequency are quantifiable and so have provided an obvious testing ground for such models. The relationship between entrenchment and frequency is summarised by Israel and Kemmer below:

“Entrenchment is a cognitive consequence of experience: the more frequently a given form or pattern is experienced...the more entrenched it becomes. The more entrenched a form is, the more likely it is to be activated in actual usage events. Entrenchment and productivity are thus intimately linked: the more a form is used, the more likely it is to be used again” (Israel and Kemmer 1994: 166).

However, it is precisely this heavy emphasis on lexical frequency and entrenchment in a dynamic linguistic system that limits the capability of the model to deal with cases of stable variation. The system is dynamic and so it is inherently suited to accounting for language change but there are no ‘brakes’ in the theoretical framework, no system in place to stop or reverse process of change or to explain why cases of variability can exist without leading inevitably to language change.

In sections 5.2-5.4 above, I proposed that by invoking both a quantitative analysis of lexical frequency and, more importantly, some of the basic assumptions of the usage-based approach (such as a relationship between lexical frequency and cognitive entrenchment), the relationship that exists between lexical frequency and variation can begin to be explained. In order to clarify the place of stable variability in such a framework, it is necessary to re-visit this claim. Exactly what can be *explained* by incorporating an analysis of lexical frequency? The assumption in the quotation from Israel and Kemmer (1994) seems to be that the motivations for language change can be explained – high frequency words change faster (where the change is phonetically motivated) *because* they are highly frequent. This is exactly the reasoning that causes problems for situations of stable variation but it also leaves no place for the numerous other social, structural and cognitive motivations



for language change. For instance, it leaves no place for speaker agency or innovation in the system. Lexical frequency cannot be the underlying cause of language change or else all high frequency words would undergo phonetic reduction all of the time. However, an understanding of the relationship between lexical frequency and language change allows the possibility to better predict the *direction* in which change may take place. In other words, the explanatory aspect of including lexical frequency in an analysis of variation is not to account for the cause of change but the direction of change. If we accept this position then there is no longer a problem in accounting for stable variation in a usage-based framework because there is no reason to suggest that high frequency lexical items will necessarily change, only that when change does begin (by some other mechanism) it may be possible to predict how that change will spread throughout the lexicon.

## **5.5 Conclusion**

This chapter has shown that lexical frequency is only one of a number of factors influencing language variation and change in the variables (th) and (BIT). These results serve as a reminder of the limitations of an approach that puts lexical frequency squarely at the front of model building and suggests that while lexical frequency is an important aspect to consider when dealing with language variation and change, it is only one of many. I propose therefore that if the usage-based approach to variation is to be fully developed, it is vital not simply to consider the role of lexical frequency but to consider this alongside other social, structural and cognitive motivations for variation and change that may be equally well suited to interpretation within a usage-based framework. This idea is further developed in the following chapter.

## Chapter 6: Social and Linguistic Categorization

### 6.1. Introduction

A large proportion of the existing literature on usage-based approaches in linguistics is concerned with demonstrating the effects of lexical frequency on the rate and direction of language change as this is one way to exhibit the existence of a relationship between language structure and language use. Research on lexical frequency has in fact played such a prominent role in usage-based models of language structure (with a particular emphasis on Exemplar Theory – see below) that, in some circles, it seems as though the term ‘usage-based’ has become synonymous with Exemplar Theory. As discussed in chapter 5, an analysis of variation or change that *only* deals with lexical frequency as a motivating factor often paints an incomplete picture of the variation. The predicted relationship between language structure and language use that is thought to be visible through the existence of frequency effects is only one element of usage-based approaches. This type of analysis, therefore, does not exploit the full potential of usage-based linguistic theories.

This chapter moves away from discussing lexical frequency and explores other aspects of usage-based linguistic theories that may be of interest to sociolinguists. Cognitive psychologists often single out the act of categorization as perhaps the most basic or most fundamental act of the human mind (e.g. see Schneider 1991). Linguistic theory has also been heavily concerned with categorization; indeed, Labov has suggested that “if linguistics can be said to be any one thing it is the study of categories” (Labov 1973:342). It seems then that categorization is an obvious theoretical junction at which to further explore the potential for synthesis between sociolinguistics and (usage-based) linguistic theories.

This chapter begins with a brief review of two different approaches to categorization adopted by usage-based theorists: prototype/schema categorization and exemplar categorization. The purpose of this review is not to conclude which

method is ‘correct’ (thirty years of research in cognitive psychology has not achieved this); I aim simply to show that both methods adopt usage-based principles and that both can be successfully applied to linguistic categorization (and given the focus on phonology previously in the thesis, this review also concentrates on phonological categorisation). I also review a selection of literature from social psychology which has adopted both of these approaches to social categorization and so suggest that a single theory of categorization can equally account for both social and linguistic categorization (although perhaps the ‘hybrid’ models discussed in section 6.1.3, which includes both exemplar and schematic structures, are preferable).

At regular points throughout this chapter, I return to WFHPB to test whether the types of categorization processes discussed here can be applied to these data and these speakers. I also return to the discussion of social meaning (initially presented in chapter 3) and suggest that by applying usage-based principles of categorization to this topic, it may be possible to reach a more psychologically realistic understanding of the relationship that exists between th-fronting and social meaning in WFHPB.

### **6.1.1 Prototype and Schema categorization**

Prototype models of categorization have been employed in various linguistic theories within the Cognitive Linguistics movement following the pioneering work of Eleanor Rosch in the 1970s. The “classical” or “Aristotelian” model of categorization had dominated much of twentieth century linguistic theory up to this point (and is still dominant among generative theories of language structure). The four basic assumptions of the classical model are that categories are defined in terms of a conjunction of necessary and sufficient features; these features are binary; categories have very clear boundaries and all members of a category have equal status – there are no ‘better’ instances of a category than others (Taylor 1995: 23). Rosch found that when these assumptions were tested against the intuitions of real speakers, there was little or no evidence of their existence. Instead, she suggested that categories have an internal structure; that categories typically lack clear, definable boundaries; that the features (or attributes) which characterize categories

are neither necessary nor sufficient and that some members of a category are more representative or prototypical than others<sup>99</sup>.

Taylor (1995:59) suggests two working definitions of the term ‘prototype’: either it refers to a central member or cluster of central members of a category or it can be understood as a ‘schematic representation of the conceptual core of a category’. In the first definition, it is possible to refer to an actual real-world item as a prototype but with the second definition, it is only possible to suggest that a particular real-world entity instantiates the prototype. Estes (1994) adds a further two possible definitions for the term ‘prototype’, based on its use in cognitive psychology: it can be used as a cover term for the ‘prototype effects’ described by Eleanor Rosch and others<sup>100</sup>; or it can be used to refer to the central tendency of a group (or category) of exemplars, without necessarily implying the existence of a further prototype structure in the mind.

The usage-based models which apply prototype categorization are all within the sub-field of Cognitive Linguistics (see Croft & Cruse, 2004; Geeraerts, 1997; Langacker 1987, 1991). The object of employing a theory of categorization in these models is to better understand the ways in which speakers abstract linguistic structure from their experience of language and organize this knowledge once it has been abstracted. A prototype is therefore typically considered to be an abstract conceptual core in the usage-based approaches which adopt this method of categorization. It is an abstraction from the most common, most frequently encountered, most salient or most representative members of a category.

Newly encountered instances are assimilated to a particular category depending on the extent to which they are perceived as similar to the prototype; closely related instances acquire more central membership within the category. Similarity is measured depending on the number and weight of shared attributes or features. As Taylor (forthcoming) explains, the prototype of a category is the category member that has the greatest number of attributes which are (a) also shared

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<sup>99</sup> Rosch published these findings in a series of papers that appeared between 1971 and 1978. See Taylor (1995) for an extensive overview of this research.

<sup>100</sup> In her own work, Rosch (1978) is concerned only with effects of prototypicality, and does not attempt to embed her findings within a wider model of possible category structure. She also warns that to posit a single fixed prototype is equally as problematic as the classical approach to categorization and simply raises the same problems regarding the placement of category boundaries.

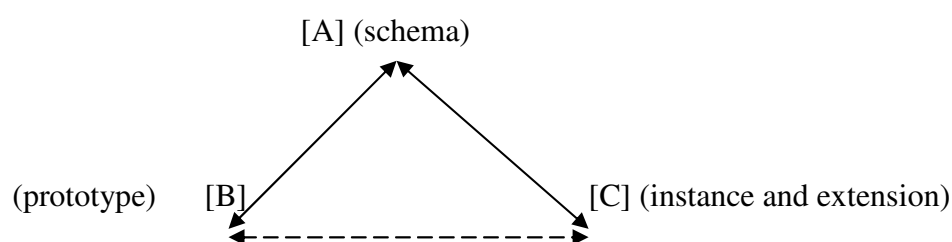
by other members of the category and (b) not shared by members of contrasting categories. For Taylor (forthcoming), the category itself is defined by a set of attributes. However, unlike the features of the classical approach to categorization, these attributes do not have equal status; rather they are weighted according to their importance in establishing category membership. A newly encountered instance achieves category membership if the attributes it shares with the prototype reach a certain ‘threshold level’. Naturally, different speakers may have different ‘threshold levels’ and attributes may also be weighted differently for each individual. This means that not only is category membership a matter of degree but that the degree to which an entity achieves category status depends, to a large extent, on the previous experiences of the individual speaker<sup>101</sup>.

In some usage-based models (see, for example, Langacker 1987; 1991), prototype categorization is supplemented with a second principle of categorization: the schema. This allows for different types of abstraction to occur and for categorization to assume a hierarchical structure. For Langacker, “a schema...is an abstract characterization that is fully compatible with all the members of the category it defines...it is an integrated structure that embodies the commonality of its members” (1987: 371). The schema abstracts all that is similar between instances of category membership and so relationship to the schema is not a matter of degree. By proposing the existence of categorization by schema, Langacker is not suggesting this as an alternative to categorization by prototype; the two are not mutually exclusive. The same method of abstraction applies in the construction of both, the only difference is that all instances of a schema are fully compatible with (or are fully sanctioned by) the abstract representation. Langacker represents this phenomenon graphically as a ‘categorization triangle’ (1987: 373).

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<sup>101</sup> The assumption that entities are assigned to categories on the basis of ‘similarity’ has been heavily criticised. ‘Similarity’, as a criterion, is not well defined; it is unconstrained and speaker-specific. It is therefore difficult to disprove and could also simply be a by-product of the conscious awareness of category structure: “it is not at all clear whether some members belong to the same category because they are similar or whether they are similar because they are in the same category” (Mompeán-González 2004: 433).

**Figure 6.1: The categorization triangle** - adapted from Taylor (2002:125).



[A] is schematic for [B] and [C], [B] and [C] elaborate [A]. The solid lines indicate a relationship of instantiation and the broken line illustrates a relationship of similarity or extension.

Taylor (1990) is more concerned with categorization by prototype than categorization by schema because, he suggests, prototype categorization is developmentally the more basic of the two processes and can occur before categorization by schema. There is little doubt that all naturally occurring categories show prototype effects (Chandler 2002: 56) but for Taylor, it is impossible to conceive of a schema which can encompass commonality between all instances of a category, at least not while remaining restrictive enough to be ‘cognitively useful’ (Taylor 1995: 67)<sup>102</sup>. And yet there is evidence that some speakers can and do abstract commonalities between instances of a category and therefore do structure categories by schemas. Taylor suggests that perhaps the evidence for both types of categorization process is due to variation in categorization methods by different individuals: “different speakers of a language might well operate with different mental representations, some seeing the commonality between diverse members of a category, others associating diverse entities on the basis of similarity to a prototype” (1990: 530).

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<sup>102</sup> Langacker (1987: 382) would suggest that in order for a category to exist, an abstract schematic structure must exist but that problems Taylor identifies are applicable to ‘superschemas’, particularly when applying this model of categorisation to phonological structure.

### 6.1.1.1 Prototype and schema categorization in phonology

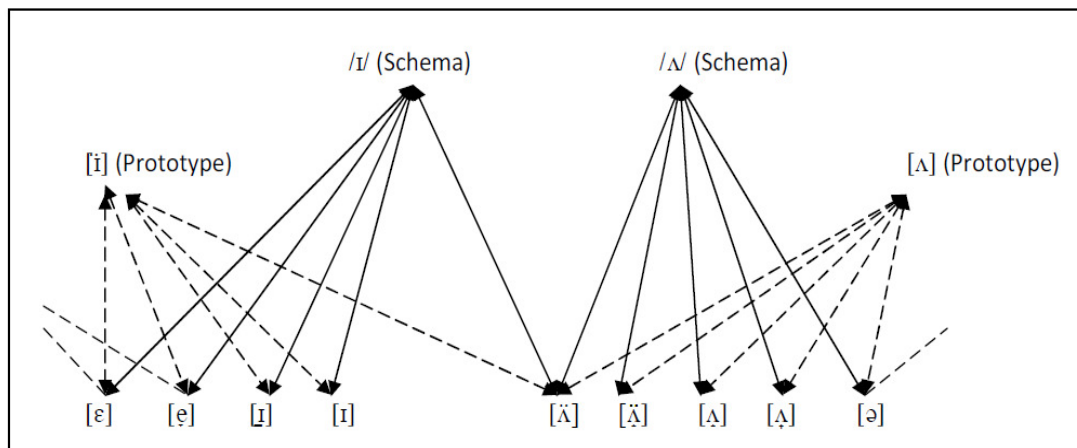
Prototype models of categorization have been suggested in phonology (as in other areas of linguistics) as a counter-argument to the explanations of categorization suggested by traditional classical models such as the Prague School of phonology and classical generative phonology. The large majority of this work has been in relation to the concept of the phoneme. For a detailed review of this work, see Mompeán-González (2004).

Several versions of a prototype/schema approach to the phoneme that draws on a network metaphor have stemmed from the method of categorization adopted in Cognitive Grammar (Langacker 1987; 1991) e.g. Bybee (1999; 2001) and Taylor (1995). In a network approach to categorization, the phoneme is not regarded as a single, abstract unit but as a complex network of instances and relations between instances (where an ‘instance’ is a low-level unit, specified in greater detail than the prototype or schema). One instance is the category prototype and all other instances are extensions from the prototype. As discussed in section 6.1.1, newly encountered instances are assimilated to the category on the basis of perceived similarity to the prototype. Speakers who are able to perceive further commonality between members of a category, may also abstract schemas.

Figure 6.2 shows a simplified approximation of the network for BIT in WFHPB based on typical variants that were found to exist among these speakers. This figure is a modified version of the network representation presented in Mompeán-González (2004) to describe the phoneme /t/. It is necessary to point out that this is a schematic diagram based on a range of data found in the WFHPB corpus and does not represent the network structure of the category BIT for any one particular speaker in WFHPB. The figure contains the prototype which is a lower and more retracted variant than that typically found in varieties of British English. The instances (or allophones) in figure 6.2 do not represent an exhaustive list but show a range of variants that appear in the corpus. The schema for BIT in figure 6.2 is represented with the IPA phoneme /t/. It represents an abstraction over the

commonalities shared between all of the instances and the prototype. As a number of instances of BIT in WFHPB occurred with lower, more retracted variants, this figure also charts a possible schematic network for the CUT vowel in order to highlight the category overlap that may exist between these networks. This is discussed further below.

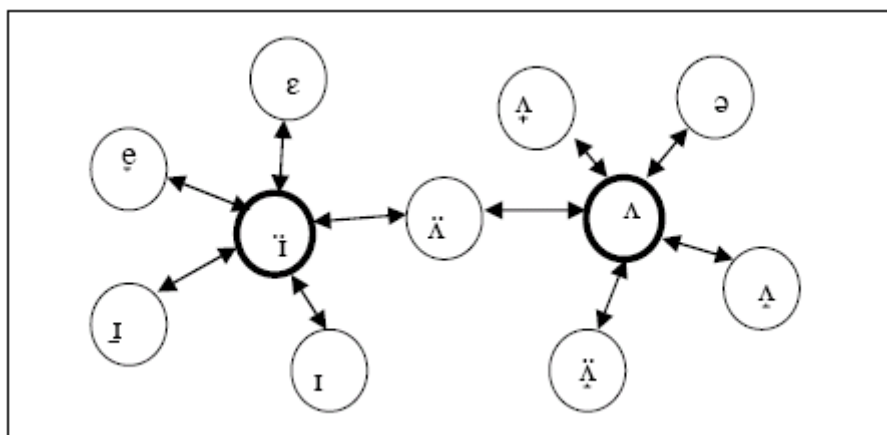
**Figure 6.2: Variation in BIT in WFHPB represented as a network of prototypes, schemas and instances**



Another version of a prototype-based approach to the phoneme is based on Lakoff's (1987) radial approach to categorization. The radial category is applied by Lakoff (1897) to explain examples of category extension. In much the same way, Nathan (1986, 1996) suggests that the phoneme can be conceived of as a radial category. The prototype acts as a central member in this category structure and other instances are organized around the prototype "in a relationship which is similar to an image of the spokes of a wheel" (Mompeán-González 2004: 436).



**Figure 6.3: Variation in BIT in WFHPB represented as a radial category with prototypes and stances**



Notice that because neither of these approaches suggests that categories have clear boundaries (unlike classical models of the phoneme), both can easily incorporate category extension and category overlap i.e. both models can account for the phenomena in which two phonemic categories are instantiated by identical phonetic instances. In this case, both the /i/ and /ʌ/ networks contain, as one of their instances, a short low back vocalic variant which can be categorized by speakers as an instance of different schemas/phonemes on different occasions. Classical models of categorization in phonology assume that, because categories have clear boundaries and because membership is defined on the basis of necessary and sufficient features, it is theoretically impossible for the same instance to belong to more than one category. This is articulated in phonology as the “bi-uniqueness condition”. It expresses the idea that a given sound should always belong to one and only one phoneme category - “it is to be taken as axiomatic that one sound cannot belong to two phonemes of a language” (Jones 1950: 11).

Although speakers are still faced with the task of deciding which category the variant belongs to on any given occasion, both the radial model and the network models can easily explain the fact that this variant may be categorized, during perception at least, as instances of different phoneme categories on different occasions by the same speaker.

One potential problem with the radial model is that there is no suggested link of similarity between instances of the category. In other words, the suggestion is only that speakers perceive similarity relations between instances and the prototype and to do this must follow “a trail along the spokes of an imaginary wheel back to the centre” (Mompeán-González 2004: 437). The network model discussed briefly above overcomes this intuitively unsatisfying aspect of the radial model by recognizing relationships of similarity between members/instances of a category. Furthermore, the network approach offers the option of accounting for abstract schemas, similarities that some speakers at least are able to capture between members of a category.

The aim of this section has simply been to highlight one of the ways in which usage-based principles of categorization (in this case, prototype and schema extraction) have been applied to categories in phonology. However, one of the main tenets of the usage-based approach to language structure is that language is not modular and so it is regarded as an instance of general cognitive abilities. If this is the case, it should be possible to apply the same types of categorization models to other areas of cognition and so, for the purposes of this thesis, it is necessary to investigate to what extent prototype/schema categorization can account for patterns of social categorization.

### **6.1.1.2 Prototype and schema categorization in social psychology**

Until the 1970s, the mainstream approach to social categorization was that it was considered to involve a different cognitive process than other types of categorization; in other words the assumption was that “people perceive and think about their social world differently from what would be expected based solely on the stimulus information and principles of formal logic” (Higgins and Bargh 1987:370)<sup>103</sup>. Martin and Halverson (1981) suggest that because the categorization of people or personality traits (i.e. stereotyping) often resulted in prejudice, it was thought to be the result of ‘inferior judgmental processes’ (Edwards 1940) or ‘a kind of

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<sup>103</sup> An alternative argument which proposes that categorization processes are similar regardless of the type of stimulus was suggested as early as Allport (1954) but this was not considered mainstream.

pathological thinking' (McCauley, Stitt and Segal 1980). However, as researchers in social cognition developed a deeper understanding of how stereotypes are acquired and used by individuals, it became clear that the evaluative aspect of stereotyping did not necessarily imply a different type of cognitive process (Martin and Halverson 1981). The focus then shifted from one which accentuated the differences between categorization processes in society and the rest of cognition to one which recognized the great many similarities between stereotyping and other acts of categorization: "what is wrong with stereotyping is no more and no less than what is wrong with human conceptual behaviour generally" (McCauley *et al.* 1980: 195)<sup>104</sup>.

Evidence for the existence of prototype categorization effects in general cognition have been well documented since the early work of Eleanor Rosch. In social cognition, a number of studies carried out in experimental settings also suggest the existence of prototype effects, or stereotyping (see, for example, Hamilton and Sherman 1994). A number of different models, employing research paradigms borrowed from cognitive psychology, have since been proposed in social psychology to describe and explain this categorization process.

Prototype models often assume that the individual perceiver/cognizer<sup>105</sup> stores a single prototype representation for any given social type and this prototype also contains various attributes. For example, the prototype of the group "Novice Tenor Section WILD!!" in WFHPB may contain reference to attributes such as 'bitchy', 'daring', 'tough', 'drinks alcohol'; and the prototype of the group "They act hard all the time/fancy tune folk" may contain attributes related to the way this group dresses: 'spiky hair', 'football top', '[brand name] trainers', '[brand name] track suit', and to their personality e.g. 'loud', 'smart', 'hard'. The prototype is an abstraction over all instances of the social type and so does not correspond to any single category member. Some models (see, for instance, the discussion in Smith 1996) also invoke the schema as an organizing structure where the schema again

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<sup>104</sup> Krueger and Clement (1994) suggest that the only differences between studies of general categorization and social categorization are methodological rather than theoretical e.g. the two research areas of cognitive psychology and social psychology use different terminologies and different methodologies and so, ironically, the perceived difference is one of categorization as "categorical labels are superimposed on the graded theoretical and procedural differences" (1994: 46).

<sup>105</sup> The term 'perceiver' is used predominantly in social cognition and 'cognizer' is used in cognitive psychology to mean exactly the same thing; this is another example of the terminological differences between the two research areas.

represents commonality between instances and the prototype represents the idealized category core. Importantly, these knowledge structures are abstracted from context and so are usage-based and specific to the individual perceiver.

According to Carver *et al.* (1984), the first stage in the formation of a social category or stereotype is when some specific individual or group of people is recognized, for whatever reason, as being different from 'people in general'. When this happens once, the newly encountered information is stored as an exception to the schematic category 'people in general'. However, if this happens more than once and, crucially, if the perceiver recognizes a degree of similarity between more than one exceptional instances, a separate knowledge structure is then created in the mind of the perceiver which represents both the perceived distinction between the original 'people in general' schema and the new 'exceptions' category as well as the relationship of similarity between these new instances.

When another individual is encountered with perceived similarities to the prototype of the new category, the category becomes 'active'. Again, different models employ different means of representing this activation metaphorically. Typically in social psychology, the assumption is that there is a given set of schemas that can be used to characterize a newly encountered person or trait and the task of the perceiver is simply to find the best 'fit'. For example, in Wyer and Srull's (1989) model, the perceiver is said to search through schemas that are stored as memory representations in a 'storage bin' until a schema is found that adequately fits the representation. Other models suggest a metaphorical 'storage battery' containing various amounts of charge attached to each representation (see Higgins 1996). Categorization is therefore based on the level of similarity between the abstract cognitive representation and the attributes of the newly encountered individual. 'Accessibility' (as it was termed by Higgins 1996) to these abstract knowledge structures also depends to an extent on the recency and frequency of use of these structures. For instance, in the case of the 'storage bin' metaphor, the 'bin' contains multiple separate schematic structures that can be searched from the 'top down' on the assumption that more frequently and recently activated structures are stored near the top of the storage bin. Once activated, the schema may influence behaviours in

various ways and so often judgments are based on schematic knowledge rather than on the stimulus information itself (Smith 1996).

Prototype and schematic categorization processes have been extensively documented and researched in social cognition, linguistics and cognitive psychology. The theoretical assumptions of these models are all highly similar – they all adopt the basic principles of usage-based approaches to knowledge learning, storage and organization - yet they have typically been applied separately in different research paradigms. One of the major strengths of usage-based research, however, is that it offers a possible route towards a more integrated approach to the study of linguistic and social structure. Exemplar approaches to categorization have similarly developed in quite different disciplines despite sharing a great deal of common ground and so also offer this advantage.

### **6.1.2 Exemplar categorization**

As discussed in section 6.1, categorization is generally considered to be one of the cornerstones of linguistics, yet accounts of this process vary depending, primarily, on what is assumed to be stored for those categories. A prototype model creates categories by extracting similarities from instances but often does not then propose that these instances are further stored in cognition. Exemplar based models of categorization, on the other hand, suggest that large amounts of information are stored in episodic memory. These models have been gradually imported into linguistic theory over the last 10 years or so and have become a popular alternative to both classical and prototype models of categorization. According to Chandler (2002: 64), the starting point for this shift in focus was work carried out by Medin and Schaffer (1978) in *Cognitive Psychology*. This work suggested that a model which proposes that categorization takes place by means of direct comparison with stored memories (and not with any abstract representations in cognition) is not only able to account for many of the same types of phenomena as prototype models (such as significant correlations between similarity to an implied prototype and speed of

recall, recognition and categorization) but can also account for other types of experimental data which prototype models have difficulty explaining without incorporating stored memories into the model, such as the learning of linear versus non-linear separability (see Chandler 2002 for a detailed review of this literature).

Exemplar and prototype-based models of categorization are, in most respects, actually very similar. For instance, both approaches adopt usage-based principles and reject the defining characteristics of an Aristotelian model of categorization. Both take a ‘bottom-up’ view of learning because they suggest that categories are learned through experience and are not inherently available; neither assumes the existence of necessary and sufficient conditions for defining category membership and both allow marginal and simultaneous category membership. However, as with prototype categorization, there are various different versions of exemplar theory and the degree to which prototype and exemplar categorization differs depends on the strength of commitment that is adopted to the exemplar metaphor.

‘Strong’ models of exemplar theory (such as Nosofsky 1986)<sup>106</sup> assume that categorization takes place when the speaker compares some newly encountered instance (or probe) to similar exemplars of such instances which have been stored in memory from previous experience. If the newly encountered instance is considered sufficiently similar to an existing exemplar, the new instance will be ‘mapped’ onto the existing exemplar, strengthening (or entrenching) its representation further in memory<sup>107</sup>. If, however, the instance in question is a novel experience and there are no previously stored exemplars, the new instance will be evaluated for its degree of similarity to other exemplars and then stored as a new exemplar. The (metaphorical) distance between the new instance and previous exemplars will depend on the degree of similarity to other exemplars (Bybee and Eddington 2006: 325). Categories are therefore defined as collections of exemplar ‘clouds’ i.e. remembered instances of exemplars, between which the individual has recognized dimensions of similarity. In this respect, exemplar clouds are similar to the network metaphor discussed previously. With each experience, exemplars are either formed or strengthened and

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<sup>106</sup> See Barras *et al.* (2007) for a review of ‘strong’ and ‘weak’ approaches to Exemplar Theory in phonology.

<sup>107</sup> Pierrehumbert (2001) suggests that so long as there are no ‘just noticeable differences’ between new instances and remembered exemplars, this process of mapping will take place.

so “each experience alters the entire category system slightly by changing the range and/or activation of component exemplars” (Wedel 2006: 252). ‘Strong’ models of exemplar theory therefore suggest that exemplars alone are responsible for category behaviour and do not posit the existence of schematized category representations which have been abstracted from memories of experience. In this case, newly encountered instances are directly compared to one or more ‘episodes of past experiences’ (Chandler 2002: 65) or exemplars which are evoked into working memory by similarities between the new instances and remembered exemplars.

### **6.1.2.1 Exemplar categorization in phonology**

Seminal contributions of research on Exemplar Theory in phonology have come from Goldinger (1997), Johnson (1997), Pisoni (1997), Pierrehumbert (2001, 2003), and Hawkins (2003), among others. As in the cognitive psychology literature, linguistic research in exemplar theory suggests that actual tokens of linguistic experience (or exemplars) are stored in memory. Pierrehumbert (2002) proposes that a useful way of discussing exemplar storage in phonetic space is in terms of a multidimensional map, similar in form to the two dimensional F1-F2 vowel plots used in phonetics. Exemplars are simply stored locations on that map and phonological categories are nothing more than clusters of similar phonetic experience or ‘exemplar clouds’.

Lexical representations are therefore not stored in such models as abstract strings, built up from phonological and morphosyntactic segments; instead “lexical representations consist of all exemplars of that word the individual has heard uttered” (Docherty 2008)<sup>108</sup>. Phonemes in this model are also sets of phonetically similar variants that are clustered together in groups (Bybee 2001: 53).

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<sup>108</sup> The assumption that exemplar storage in linguistics takes place (primarily) at the lexical level has been heavily criticised by opponents of ET e.g. Labov (2006: 512) suggests that the “word is not the most useful member of this vocabulary for linguistic analysis, as opposed to morpheme, root, and stem. None of the discussions of exemplar theory presented here [Journal of Phonetics 2006 (34)], discuss the problem of whether we remember and store phonological words, words with clitics attached or inflected words”. This may, however, simply be the result of an unfortunate use of terminology (Paul Foulkes, pc). In fact, although there is no doubt that the term ‘word’ has been used

The identification of new exemplars in this approach results from a process of ‘mapping’ new exemplars onto those which are already stored and present in cognition; if no identical exemplars are available, the incoming stimulus is evaluated according to its degree of similarity to other exemplars and will be stored on the multidimensional map as (metaphorically) close to or distant from existing exemplars. Density distributions on the map are built up over use, time and exposure and so sections of an exemplar cloud may gain weight with repeated exposure to utterances similar to exemplars from that section of the cloud (Pierrehumbert 2001).

### **6.1.2.2 Exemplar categorization in social psychology**

As in other areas of categorization research, exemplar approaches to social categorization have become a popular alternative to the more abstract representation of knowledge proposed by prototype and schematic models of categorization. The motivation for this approach in social cognition comes from research which suggests that not only is the human memory strikingly specific, it is also capable of capturing and retaining an incredible amount of low-level detail. Research on prototype categorization often suggests that the existence of prototype effects is simply a natural and intrinsic process of the human mind, a necessary by-product of our need to categorize in order to avoid ‘cognitive overload’ (Hamilton and Trolier 1986). In other words, the theoretical claim is that the human mind abstracts generalizations from experiences in an effort to make sense of the overwhelming amount of information present in the world around us and, in so doing, discards non-relevant detail. Recently, the argument of ‘cognitive overload’ has become increasingly tenuous as studies have shown that people have the ability to remember and recall memories for specific instances of people, places and things such as the typeface in

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synonymously with ‘exemplar’ in the application of ET in phonological theory, proponents of ET have more recently spelled out that exemplars are much more than simply ‘words’. Exemplars are abstractions over experiences. The problem that this account raises in linguistic research is that it is then possible that exemplar frequency may be quite at odds with lexical frequency because “clusters of exemplars do not reflect undifferentiated raw experience, but rather experience as it has been encoded and stored...exemplar models are not sensitive to frequencies of ambient events per se, but rather to frequencies of memories” (Pierrehumbert 2006: 525).



which a word was read or where it appeared on the page (Alba & Hasher 1983) and the specific voice in which a word was spoken (Johnson 1997).

Experimental evidence also suggests that the memory representations that we store of specific individual people can actually influence our social judgment. For instance, in a study carried out by Lewicki (1986), subjects encountered a rude experimenter with distinctive long hair who was insulting to them as they filled out a questionnaire. Later in the task subjects were asked to take their form to an assistant who was not busy in the next room. When they arrived in the room, neither of the assistants were busy and so the subjects were forced to choose. Interestingly, subjects who had been insulted earlier in the day tended to avoid the assistant with a similar hairstyle to the rude experimenter. This study suggests that not only do people store information (and their evaluations linked to this information) in the form of individual exemplars but that these exemplars are also capable of influencing social judgment. In other words, people can learn the idiosyncratic characteristics of a specific individual and they can use this knowledge (often unconsciously) to make inferences about the likely traits of a newly encountered individual who may resemble the known exemplar(s) in some way. Other models of social categorization and social judgment have difficulty explaining results such as these:

“One could argue that a single encounter with a hostile long-haired individual could alter one’s schematic knowledge about long-haired people, but that hardly seems plausible. And if it is argued that a single experience can have a major impact on schematic knowledge, even for a short time, then any clear conceptual distinction between general, abstract schematic knowledge and memory traces of specific experiences or episodes is lost – the very meaning of the term schema is destroyed” (Smith and Zárate 1992: 6).

Rather than proposing that individuals organize knowledge around prototypes and abstract hierarchical structures, proponents of exemplar theory in social psychology suggest that individuals store representations of instances or exemplars. In social psychology, exemplars are most often cognitive representations of people. Stored with these exemplars are the perceiver’s attitudes and reactions to individual people and these exemplars are used to categorize newly encountered instances.

Smith and Zárate (1992) employ Nosofsky’s (1987) General Context Model (GCM) which has been widely used in accounting for exemplar categorization effects in non-social contexts. The suggestion from this model is that exemplars are

stored with strength values (which can represent the fact that memories decay in time) and when categorizing new information, perceivers form a ‘weighted average’ of the known values of all exemplars. Exemplars that are highly similar to the target are those with the most weight (Smith and Zárate 1992: 9). A category, in this approach, is represented by an accumulation of information about known exemplars. As new instances are encountered and old instances are re-encountered, the weight and activation levels associated with the exemplars changes. Categories are therefore not static ‘stored’ structures that are retrieved by a search process; they are created by the flow of activation along nodes and links in a cognitive network of stored exemplars.

One of the main means of testing the viability of prototype and exemplar approaches to categorization has been with computational models. Typically, exemplar-based models have been more successful at replicating some important psychological processes than prototype models (see e.g. Estes 1994, Shanks & St. John 1994, Shanks 1995) which has led to the conclusion that exemplar theory is better supported empirically by the experimental data – “better supported but not unequivocally supported by the data” (Chandler 2002: 54)<sup>109</sup>. The challenge for proponents of exemplar theory therefore remains in being able to account for the entire set of relevant prototype effects only by comparing the input stimulus directly to memory representations and so obviating any structured system of schematized knowledge. While it is indeed possible to model categorization behaviour in this way, the theoretical leap that must be taken in order to then apply this model in linguistics is immense. The suggestion in such an approach is that categories arise spontaneously when some ‘probe’ or newly encountered experience arises and evokes into memory a series of previously stored experiences. The implication for linguistics, therefore, is that “if categories do not exist as real structures in the brain, then there are no substantive universals such as noun or verb or clause except as those categories arise on demand during language comprehension” (Chandler 2002: 96). This represents a considerable departure from mainstream accounts of linguistic structure that most linguists find difficult to tolerate.

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<sup>109</sup> See Matsuka *et al.* (2006) for a modified prototype model of category learning that is able to replicate empirical studies and model human learning.

### 6.1.3 “The future lies with hybrid models” (Pierrehumbert 2006: 524)

In both linguistics and social psychology, prototype and exemplar models have often been presented as mutually exclusive. Even when researchers take a less dogmatic approach to the division between these theoretical stances, there is often little effort to reconcile them in a single framework. For instance, while the exemplar approach of Smith and Zárate (1992) “in no way requires the assumption that schematic knowledge structures and information integration processes do not exist or have a role in social judgment” (1992: 4), they do not suggest a way in which these schematic knowledge structures could be integrated into their model, despite at one stage even endorsing them by stating that “it is impossible to support a general claim that categories will always be represented by exemplars rather than prototypes” (1992: 6). A model which is based on episodic memory traces is not incompatible with an approach which allows for the possibility of abstract generalisations which are, albeit, usage-based and so continually created and changed by experience. Such a ‘hybrid model’ is not only more in keeping with developments in linguistic theory but, according to Pierrehumbert (2006), is essential because “the simplest exemplar models appear to be seriously deficient in handling classic findings in linguistics and psycholinguistics” (p523)<sup>110</sup>.

One of the first attempts to incorporate both exemplars and abstract categories into the same model in cognitive psychology came from Fried and Holyoak (1984). They present a framework for category learning that suggests that learners abstract over instances of exemplars to infer the density of a category. Their Category Density Model (CDM, Fried 1979) makes the central claim that the goal of the categorization process is to develop a schematic description of the distribution of category exemplars. In this model, individual exemplars are used to construct a ‘density function’ or perceived central tendency from the variance of category members. This aspect of the CDM is similar to prototype models of categorization

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<sup>110</sup> Although the introduction of hybrid models in phonology is a fairly recent development, in Cognitive Linguistics, the assumption that grammar includes both specific items and more general patterns has been apparent for quite some time. This is the assumption behind Langacker’s rule/list fallacy (see Langacker 1987:29 ); the rule/list fallacy is also discussed in chapter 1 of this thesis

as this is the stage at which abstraction takes place and the learner infers category level information. These density functions are then stored in memory but are continually updated in response to each newly encountered instance. Individual instances may also be stored in memory which is the assumption made by exemplar models of categorization. An individual's representation of a particular category therefore consists of both the central tendency abstracted from perceived variance among category members (or the prototype) and the stored instances. Both the abstract central tendency and the individual instances can be used when making new categorization decisions.

The CDM was simulated using a FORTRAN program and then tested on various categorization tasks (see Fried and Holyoak 1984 for details). Their results from the simulation suggest that learners are capable of 'dual processing'. Their findings suggest that learners abstract away from exemplars to arrive at the density distribution of categories and then classify novel instances based on the relative probability of category membership as a function of the induced category density. Evidence for the continued storage of exemplars comes, for instance, from situations in which stored instances provide the only possible representation of a category distribution such as with categories that are highly irregular or ad hoc e.g. the category of 'things stored in my attic' (Fried and Holyoak 1984) or the category of 'people I know who wear glasses' (Park and Hastie 1987). Members of these categories have so little in common that stored exemplars provide the only possible means of representation.

In linguistics (and, again, the focus here is particularly on phonology), there has also been an (albeit more recent) shift towards incorporating both exemplars and abstract knowledge structures into the same theoretical framework. Evidence from a number of sources on lexical structure, historical change and psycholinguistics reviewed in Pierrehumbert (2006) suggests that there is, to some extent, a need to incorporate abstract phonological structure into the theoretical framework. In other words, it is necessary to incorporate both segmental phonological categories (like the phoneme) and episodic representations of sounds. Hybrid models in which a phonological coding level intervenes between the lexicon and phonetic instances are suggested in Goldinger (1998) and Pierrehumbert (2002). Pierrehumbert (2006)

describes the levels of representation in Pierrehumbert (2002) as similar to the levels of structure suggested in generative models of phonology but levels of representation are an equally important aspect of any schema-based model of categorization. In generative grammar, the levels of representation are thought to be inherent to the language module and operate on a 'feed-forward' mechanism i.e. there is no relationship between the use of a particular segment and its phonological (or lexical) encoding in the grammar; in usage-based models of grammar, 'levels' in a schematic hierarchy are abstracted from instances of use and with each further instance of use, the schematic structure is changed slightly because it operates a 'feed-back' mechanism. As Pierrehumbert (2002) includes a feed-back mechanism in the model, it seems that the levels of representation suggested in this approach are not unlike the levels of representation that could be proposed in a schema-based model of phonological structure.

While evidence from this research is convincing, it is (like most research in cognitive psychology) based on computational models that are designed to simulate a neural network. Even the most recent and advanced neural network modelling should only be viewed at best as 'neurally inspired' rather than 'neurally plausible' (Read *et al.* 1997: 28). None of this neural network modelling actually suggests that nodes in the model correspond to neurons in the human brain. This therefore causes problems when attempting to generalize these conclusions to acts of real categorization by humans. For instance, in the study by Fried and Holyoak (1984), one problem is that the experiments are carried out using instances from normally distributed categories which, as the authors note, is too restrictive to account for the human capacity to learn categories and their distributions (p 254). There is therefore "a real need for the development of assessment techniques that can reveal what exemplars or other knowledge structures are accessed when a real person is the cue" (Smith and Zárate 1992: 17).

Some experiments have been conducted using real subjects in social psychology which appear to support the findings of Fried and Holyoak (1984) and their call for a hybrid model of categorization. Results from experiments in Park and Hastie (1987) suggest that subjects appear to build an accumulation of information about category membership, abstracting both a central tendency (or prototype) and

information on perceived variability within the category. Subjects also seemed to store *some*<sup>111</sup> information about individual instances. Their conclusion from this research is that “it does not seem reasonable to think that one or the other type of model will provide an account of category acquisition and use in all cases. Instead it seems likely that both can operate” (Park and Hastie 1987: 634). However, even these results which have come from experiments using real people are difficult to generalize to real world situations because in experimental conditions, subjects are faced with the task of learning a single category from a set number of instances in a controlled environment; this is clearly very different to the task of learning an infinite number of categories in the real world. Furthermore, as Smith and Zárate (1992: 17) explain, the task of categorizing is a very subjective one and depends, to a large extent, on factors that are unique to each individual such as the past experiences that they bring to the categorization task, their own sense of self-categorization or group membership, the social context in which the categorization takes place and the attention given to the stimulus dimensions. None of this information can yet be incorporated into a computational model or controlled for in an experimental setting and so it is still difficult to fully understand the mechanisms involved in “one of the major cognitive tasks humans face...that of placing things, events, and people into categories” (Schneider 1991: 533).

One criticism that has been waged against usage-based approaches in linguistics is that “the theoretical cart preceded the empirical horse” (Docherty 2008); the encouraging message from the empirical research reviewed here is one of support for the ‘theoretical cart’ of usage-based approaches to categorization. Specifically, there seems to be support for both of the fundamental assumptions that are believed necessary for the inception of usage-based model (see Kemmer and Barlow 2000; also discussed in chapter 1): (a) the ability for the human mind to register frequency effects and (b) the ability for the mind to form networks of knowledge. Both prototype/schema and exemplar models of categorization employ

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<sup>111</sup> One misconception about exemplar theory is that absolutely *all* of the information we process is thought to be stored as exemplars. This, however, has never been suggested. Exemplars are not mini ‘video-clips’ of raw memories, they are themselves one level of abstraction away from raw experiences and so only some of the information in the stimulus will ever be stored as an exemplar. Which information is stored and which is ‘forgotten’ depends on what the individual perceives as important at the time.

some form of network based structure; both also recognize that this structure is dynamic and sensitive to frequency of exposure to stimuli (linguistic and social). All of this research points to the fact that there is a definite relationship between category structure and category use and that the use/activation of a particular category (whether in prototype/schema categorization or exemplar theory of any sort) plays a role in further shaping the category structure in the mind of the individual speaker/hearer/perceiver/cognizer. The encouraging aspect of this research is therefore the support it provides for the theoretical claims made in usage-based literature, particularly as similar conclusions are being drawn independently by researchers in linguistics, cognitive psychology and social psychology. The task now, it seems, is to show that this cross-disciplinary research can be usefully synthesized in a way that is applicable and beneficial to all concerned.

As stated in the introduction to this chapter, the aim here was not to set these models against each other as competing theories and conclude which is 'best'; rather my aim was simply to show that all of the models reviewed here (a) adopt usage-based principles of categorization and knowledge organization and (b) have strong research paradigms associated with them in social psychology (in relation to social categorization) and linguistics (in relation to phonological categorization). All of the models reviewed in this section have been employed separately in linguistics and social cognition and all of them also advocate that neither linguistic nor social categorization is unique. The next logical step therefore is to see how well these models can be synthesized under a common theoretical umbrella. Hay and Bresnan (2006) suggest that research on this synthesis between social and linguistic approaches to categorization "may provide a way forward for understanding the complex ways in which social meaning emerges from and is created by phonetic variants" (2006: 326).

## ***6.2 Linking linguistic and social knowledge in a usage-based model of categorization***

Evidence from sociophonetics increasingly suggests that hearers perceive phonetic variation in the speech signal but that this is also tightly interwoven with social knowledge to the extent that perceived social information can often ‘override’ linguistic information that is also present in the stimulus. For example, Niedzielski (1991) gave Detroit residents a selection of re-synthesized vowels to categorize. All of the vowels displayed the feature ‘Canadian Raising’ (i.e. a feature typical of Canadian English in which the nucleus of diphthongs are ‘raised’ or articulated higher in the vowel space when the vowel appears before a voiceless consonant). One half of the sample were told that the vowels they were hearing were produced by a Canadian speaker and the other half were told that the vowels were produced by someone from Michigan (where Canadian Raising is also common but below the level of conscious awareness). Informants who were told that the speaker was Canadian thought that they heard the stereotypical ‘raised’ variants but subjects who were told that the speaker was American generally did not. The perceived national identity of the speaker was the only variable that was manipulated in this study and so the only conclusion that can be drawn from this research is that listeners activate social information when they perceive speech.

Strand (1999) found a similar pattern, this time with gender stereotypes. Subjects in her study were presented with a word list which contained words with the phoneme [ʃ] or [s] but the realization of this phoneme had been manipulated to create a continuum of variants between the most prototypical [ʃ] or [s] variants to more ambiguous cases that display characteristics of both. Subjects in this study were reported to have categorized the re-synthesized ambiguous variants as [s] more than [ʃ] when the speaker was perceived to be male, despite the fact that the re-synthesized tokens that were presented as coming from male and female speakers were identical. This is because listeners expect fricatives produced by men to have



lower spectral centres of gravity than those produced by women and so they ‘hear’ this when listening to a male voice. This again is further evidence of the role of social factors in speech perception.

Finally, Hay *et al.* (2006) report that the perception of variant forms that people are exposed to, this time in relation to the current NURSE/SQUARE merger taking place in New Zealand English, is affected by the perceived age, gender and social class of the speaker. All of this evidence points to the fact that social and linguistic knowledge is intricately connected in the mind of the speaker; indeed Foulkes and Docherty (2006: 419) suggest that “the interweaving of sociophonetic and linguistic information in speech is so complex that no natural human utterance can offer linguistic information without simultaneously indexing one or more social factor”<sup>112</sup>. Despite the strength of their conviction, Foulkes and Docherty (2006) also admit that there is, at present, very little understanding of the ways in which this process takes place. How do social and linguistic knowledge come to be stored together? What is represented cognitively? How much of this information is re-activated during production? Sections 6.2.1 and 6.2.2 explore the tools that are currently available to investigate these questions from the theories discussed in section 6.1. Section 6.3 attempts to apply some of these tools to help our understanding of the ways in which knowledge of linguistic variation and social meaning might be stored and structured in the minds of those speakers from WFHPB.

### **6.2.1 Making the link between linguistic and social knowledge with Exemplar Theory**

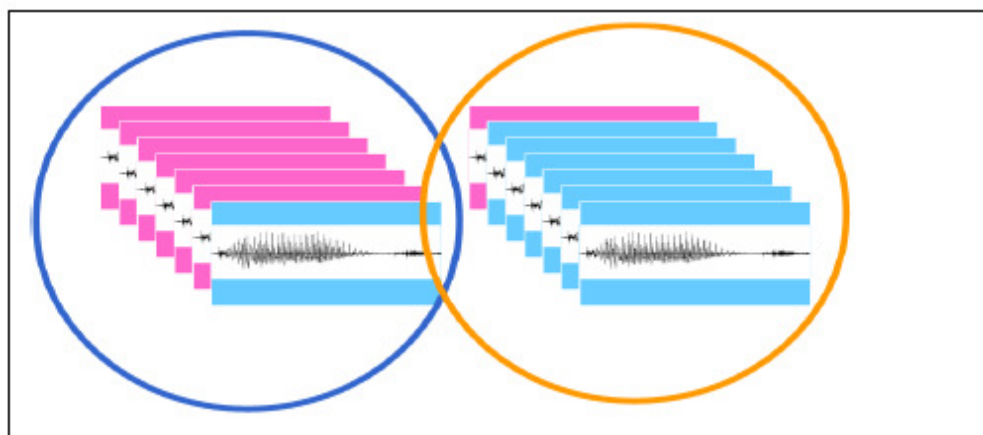
Foulkes and Docherty (2006) go some way towards redressing the problematic lack of discussion on how social and linguistic variants are linked in the mind of the speaker by attempting to show that Exemplar Theory can account for the social indexical properties of phonological patterning. They assume firstly that knowledge

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<sup>112</sup> Labov (2006: 507-8) suggests that, although this may be so (even if only in the trivial sense that everything said is spoken by someone), it does not follow automatically that the job of the sociolinguists is to describe all of this social indexing. If this had to be done, sociolinguistics would be at risk of being “plunged into an endless pursuit of detail” (2006: 508).

of the social dimensions of variation are carried by the speech signal and are perceived and acquired at an early age (e.g. they provide evidence of a developing gender split in the use of variants of /t/ in speakers from the age of 3 in Tyneside). Following the proposition in Exemplar Theory that exemplars cluster according to degrees of similarity, they suggest that speakers cluster exemplars not only according to their phonetic similarity but, as detailed speaker information is also stored with each exemplar, exemplars may also cluster along the dimension of perceived similarity between speakers. Figure 6.4 is a schematic representation of how this clustering might take place. The variation shown in the spectrogram represents variation between the glottal and released variants of /t/ in Tyneside and the pink and blue of each spectrogram represents the sex of the speaker who uttered these instances.

**Figure 6.4. Schematic representation of clusters of exemplars in cognition grouped according to sex of the speaker** (reproduced with thank to Paul Foulkes in Docherty 2008).



Foulkes and Docherty (2006) assume that three basic social categories emerge in the first instance during language acquisition: adult male, adult female and child (which may originate simply as mother, father and sibling). They suggest that initially “the child may not be aware of the source of the clustering or the indexical meaning of the differences between phonetic variants within the cluster, but it is the very presence of such clusters that permits indexical awareness to emerge” (2006: 428), although they concede that the extent to which awareness of the acquisition of social indexicality is

explicit or implicit has not been investigated enough to be clear on the details of this stage. As the child then acquires more exemplars and experiences, they begin to build up more of an understanding of the relationship between exemplars and their social correlations which leads to the development of more abstract social categories, perhaps at first ones that are still to some extent grounded in biological criteria such as gender and age. Eventually, even more arbitrary associations between variants and social dimension such as ethnicity, geography and style will be learned but this will happen at a later age because these social categories are less transparent and require a greater range of experiences to acquire.

In the case of th-fronting in WFHPB, there is a statically significant correlation between the use of (th): [f] and age in the group (younger speakers use (th): [f] more than older speakers) but this correlation is overshadowed by the role of the community of practice/friendship group membership in this community. The suggestion from Foulkes and Docherty (2006), when applied to these data, implies that younger speakers (or perhaps speakers who are less socially aware) may begin by recognizing a link between the use of th-fronting and more 'basic' social categories (that are grounded in biological differences) like age and so the first step in the acquisition of social meaning here is in recognizing (or co-activating) exemplars of th-fronting and younger members of WFHPB simultaneously. Then, as the speaker's social knowledge becomes more developed, perhaps through time, gaining maturity and experience, they can begin to make the more subtle associations between (th): [f] and more arbitrary group membership. This suggestion may, in fact, serve as an explanation for the high proportion of th-fronting found among the 'tiny wee pipers' and 'the new folk'. The 'tiny wee pipers' are the youngest members of WFHPB and the 'new folk', although slightly older, have spent very little time in this community. Therefore, it may be the case that members of both of these group have only been in WFHPB long enough to have acquired the first level of social meaning i.e. they may be aware that younger speakers tend to use the labiodental variant more than older speakers but they have not yet acquired the more

subtle or abstract social meanings of ‘tough’ or ‘rough’ that are also indexed by this variant<sup>113</sup>.

There is also evidence to suggest that as the association between th-fronting and social meanings of ‘rough’ or ‘tough’ is achieved, speakers may change (albeit perhaps unconsciously) their production levels of this variant. In 2005, Kate was a recent addition to the band and so was part of the ‘New Folk’ group at the time. By 2007, her position in the band had changed significantly. She had played for 1 year in the winning Juvenile band and was then moved to the adult band when the juvenile band split. Although on the periphery of this group socially (and so part of the ‘on the fringe’ friendship group), she is now recognized much more as a member of WFHPB than when these data were first collected in 2005. Kate displays an increase in confidence over this time:

Extract 29

Kate: Em me an Lucy were sortae like the quiet wans cos we didnae ken naebdy, naebdy kent us

Rob: /that’s fucking changed noo anywiy

Kate: fucking right it has. An afore it’d be like ken if Ted ever shouted at us, me an Lucy are sort eh like ‘mmmmm’ sortae, noo we dinnae take nae shit fae him we just gie him it back ken

LC: so you’re mair sort eh out goin noo than ye were?

Kate: oh aye, cos I ken a’bdy noo

Although Kate doesn’t discuss a similar change in her use of language, her frequency of th-fronting changed from 0% in 2005 to 36% in 2007. One possible reason for this change is that as Kate began to make the association between exemplars of th-fronting and some of the central, ‘tough’ members of the group, her frequency of the variant increased as she attempted to model her own speech closer to these exemplars<sup>114</sup>.

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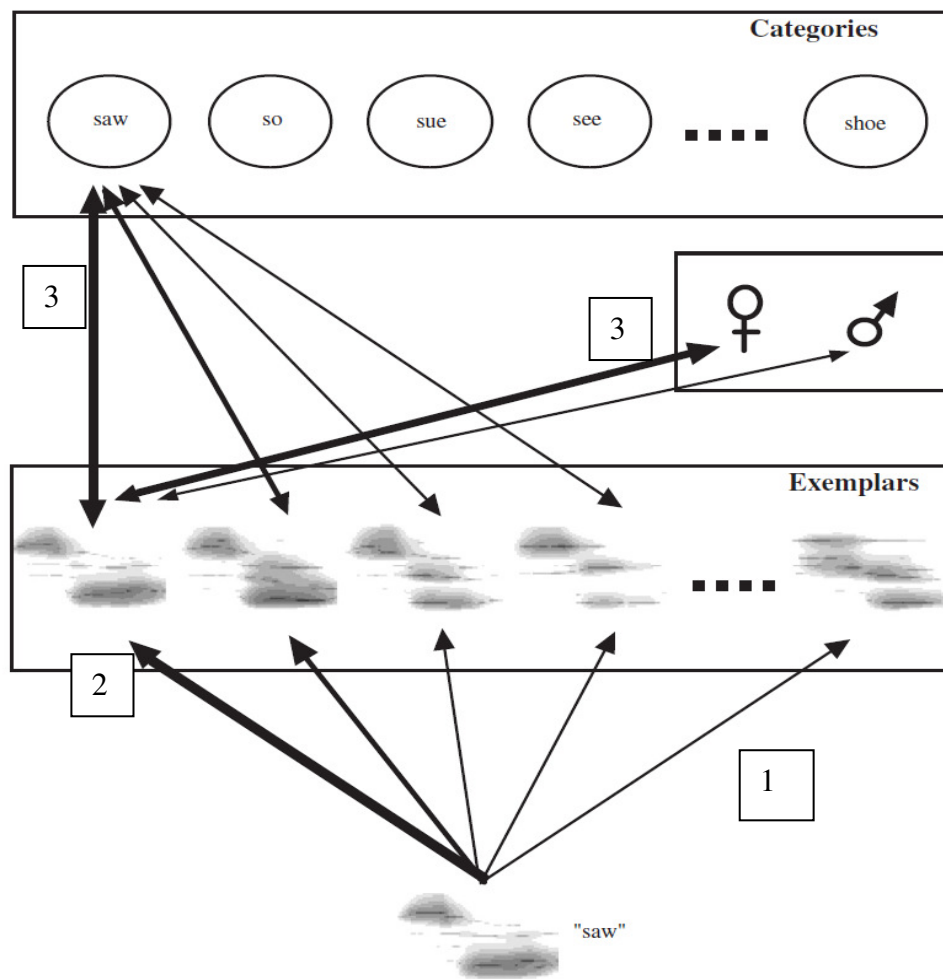
<sup>113</sup> Of course, speakers do not arrive at WFHPB in their early teens as ‘blank slates’ – they may already have some sense of the meaning of th-fronting in the wider community which may then be refined or embellished in the context of WFHPB.

<sup>114</sup> Kate also uses a great deal more expletives in the 2007 data. Although I have not quantified this difference, it is anecdotal evidence in support of the claim that Kate is increasingly attempting to sound ‘tough’.

This proposition deals with both perception and production but Foulkes and Docherty (2006) explain that there is very little research available on how exemplar representations relate to speech production. In their approach to the correlation of social information with linguistic factors, they follow Pierrehumbert (2003) who suggests that in producing a target instance, speakers create a production goal by finding an averaged neighbourhood around a randomly-sampled set of relevant exemplars but that this sampling is susceptible to ‘bias’ depending on other influencing factors such as choices of speech style. This ‘bias’ is therefore assumed to be the mechanism which allows speakers to generate a target which is sociolinguistically appropriate for a given context.

Johnson (2006) provides a slightly more formal apparatus for discussing the link between social meaning and linguistic structure in his ‘resonance exemplar’ model. As with all exemplar models, Johnson assumes that the phonetic properties of a ‘linguistic episode’ are retained in memory in such a way that records relevant aspects of the interaction such as, for example, the sex of the talker. This whole process is diagrammed in figure 6.5.

**Figure 6.5 Schematic illustration of an exemplar resonance model of speech perception** (modified from Johnson 2006: 494)



The computer simulation of this process discussed in Johnson (2006) takes an input speech sound and encodes it as an auditory spectrogram which is then stored in an exemplar cloud (see numbers 1 and 2 on figure 6.5) in much the same way as this is expected to happen in the human mind. Perceived similarity between the input signal and the exemplars previously stored in memory determines the level of activation of each of the exemplars. The level of activation is represented here with different degrees of bold arrows – arrows with the darkest, most extreme bold (number 2) represent the strongest connection between the new exemplar and previously stored exemplars. Once a new instance has been categorized as belonging to a particular exemplar cloud, activation spreads along connection weights to category information related to each lexical item (number 3 on figure 6.5). Although

category information appears to be rather abstract and homogeneous from this diagram, this is simply a short-hand way of representing all of the non-linguistic information that a speaker knows about a particular lexical item. This could include, for instance, a memory of seeing the word written on a page at some point or the observation of someone's face as they uttered the word. The schematic way of representing this information does not necessarily imply that some level of abstraction has taken place across the knowledge store (indeed, in 'strong' versions of exemplar theory, this is explicitly not the case). Also, this schematic representation suggests that the activation of an audio exemplar spreads to activate other general knowledge that appears to be stored in another part of the system, and, in this case, knowledge associated with the sex of the speaker seems to be stored somewhere different from other types of more general knowledge. Again this is simply a by-product of the method of representation in this diagram; in reality "the correlations/generalizations do not need to be, and perhaps cannot be, abstracted and stored separately from the episodic memory" (Johnson 2006: 494). Notice, finally, that the link between perception and production is made explicit with the use of double-headed arrows in figure 6.5. The suggestion here is that there is a 'feedback loop' at work and exemplars that are frequently activated in perception will have higher levels of resting activation and so are more likely to be activated during production.

How can Johnston's model be applied to the relationship between th-fronting and social meaning in WFHPB? In the case of Kate from WFHPB, when she became a member of the band in 2005, the frequency with which she was exposed to th-fronting increased (this is likely to be the case since th-fronting is not a traditional feature of this local dialect) which meant not only that the number of exemplars in her memory store increased but so too did the social information that was stored relating to these exemplars. This social information may have become more detailed and specific, relating to individual people that Kate has grown to know. As activation levels during perception increase, so too does the likelihood of activation during production and so Johnson's (2006) model suggests that Kate would have begun to use th-fronting over time simply as a result of this increase in activation.

Again, however, the problem with this approach, as with any model that places a heavy emphasis on frequency effects (discussed in chapter 5), is that it leaves no room for speaker agency. Was there a point at which Kate *chose* to use a labiodental variant of (th) in order to exploit the link in her mind between the variant and the social characteristics of ‘toughness’? Was this a conscious choice and, if not, can we still call it a ‘choice’? Even if we accept that Kate did not choose to modify her linguistic behaviour (and so increase her frequency of th-fronting) in order to sound ‘tougher’ and more typical of a member of WFHPB, it is difficult to explain within Exemplar Theory why Lucy’s production of th-fronting significantly dropped between 2005 and 2007. Presumably, as Lucy spent more time in WFHPB, the number of exemplars she encountered of lexical items with th-fronting would also have increased (particularly as she and Kate spent a lot of time together in the band and so would have experienced similar linguistic episodes). If this is the case, Exemplar Theory would predict that her resting activation levels of this form would rise over time, making it *more* likely that she would produce lexical items with a labiodental variant. Despite this, Lucy’s frequency of th-fronting significantly dropped from 58% in 2005 to 15% in 2007. As in Kate’s case, this shift in frequency of production also accompanied a shift in attitude. For instance, at the time that the 2007 data was collected, Lucy was feeling estranged from WFHPB. She was studying for exams and so the band was no longer a top priority for her. Although an exemplar model can perhaps account for the shift in Kate’s production as a consequence in the change of activation levels of th-fronting while attending WFHPB, it cannot account adequately for the change in Lucy’s levels of th-fronting as she was receiving similar levels of activation while at WFHPB. It therefore seems that the exemplar approach would be better equipped to deal with the relationship between linguistic variation and social meaning if it incorporated some mechanism for speaker agency. Pierrehumbert’s suggestion of introducing a ‘bias’ in the model is one way forward but it would be interesting to see, for example, how this bias is thought to be activated and to what extent the speaker can control this process.

Foulkes and Docherty (2006) point out that the application of exemplar theory in sociophonetics is still evolving and is in need of much more empirical investigation, and, as such, it should be seen as an enhancement of existing accounts



rather than one which is antagonistic to them. Despite this, they suggest that an exemplar-based model is the most promising theoretical framework for offering a unified account of how social and linguistic knowledge might be connected in the mind, even suggesting that it is “currently, the only theoretical framework that embeds [social] indexicality centrally within phonological knowledge” (2006: 426). This, however, is not the case. Even within the usage-based approach, there have been attempts to explain the cognitive relationship between social and phonetic knowledge without the use of exemplars. This has taken place within those theoretical frameworks that instead advocate prototype/schema categorization and many of these approaches can be found in the Cognitive Linguistics movement.

### **6.2.2 Making the link between linguistic and social knowledge with prototype/schema models of categorization**

Kristiansen (2001, 2003, forthcoming) has presented a series of articles that explore links between social identity, stereotyping and language. Kristiansen’s research assumes that there is an unquestionable relationship between linguistic variation and social categorization but recognizes that the nature of this relationship is not well understood: “Nowhere...do we find a technical description of the steps involved in processes of stereotyping, nor is the language-society link examined in detail. As in many other sociolinguistic accounts it is simply taken for granted that linguistic variants can mark social identities and evoke attitudes” (2001: 130). Kristiansen attempts to rectify this problem by examining processes of social categorization, linguistic categorization and style shifting within a Cognitive Linguistics framework.

The main proposition in Kristiansen’s work is that both social and ‘lectal’ categories (i.e. dialects, accents, sociolects, acrolects, basilects, registers, codes, speech styles etc.) are organized around schema/prototype structures and so both types of categories display evidence of prototype effects such as gradience between and within category boundaries. In other words, the suggestion is that knowledge of variation (variation in language and variation in society) is stored and organized in

cognition in the same way, around schemas, prototypes and frames/domains<sup>115</sup>. This claim, however, only goes part of the way towards examining the language-society link for while it is clear that humans have the ability to categorize varieties of speech and varieties of people, it also seems to be the case that activating certain forms of linguistic knowledge can trigger (perhaps unconsciously) certain types of social knowledge. How does this happen? “How exactly does a linguistic stereotype lead to a social stereotype?” (Kristiansen forthcoming). Kristiansen draws on the cognitive model of metonymy (Lakoff 1987) and reference point construction (Langacker 1987) in order to answer this question, suggesting that a combination of both processes can help the speaker and the hearer to establish links between social and linguistic knowledge structures and for linguistic information to then acquire social meaning.

Lakoff (1987) first suggested that a major source of prototype effects is metonymy, which he defines as “a situation in which some subcategory or member or submodel is used...to comprehend the category as a whole” (1987: 71). As a similar process occurs during stereotyping i.e. where the characteristics of the most typical member of the category are often applied wholesale across all members of the category, Lakoff suggested that “social stereotypes are cases of metonymy – where a subcategory has a socially recognized status as standing for the category as a whole, usually for the purpose of making quick judgments about people” (Lakoff 1987: 71).

The process of prototype formation, when applied to social categories, results in the creation of an image that is an abstraction from reality; it is an idealized category core and so does not correspond to the same attributes or characteristics of any single other member of the group. According to Kristiansen (forthcoming) exactly the same process applies with prototype formation over varieties of language or ‘lects’. It is in this sense that Kristiansen employs the term ‘linguistic stereotype’. Kristiansen suggests that speakers and hearers use linguistic stereotypes (or ‘folk

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<sup>115</sup> The concept ‘domain’ was introduced by Langacker (1987:63) to explain the fact that meaning does not occur as isolated semantic units in the mind. All linguistic expressions *profile* or designate a concept but these concepts can only be understood against a more general *domain* of background knowledge, some of which is often intrinsic to the concept and so will constitute the *base*. Fillmore’s concept of ‘frames’ (1982) and Lakoff’s concept of Idealised Cognitive Models or ICM’s (1987) are similar to the notion of domains

perceptions' of the distinctive features of a variety) as 'cognitive reference points' which allows this metonymic link to take place:

“We may say that a linguistic stereotype leads us efficiently, directly and rapidly to the corresponding social stereotype with all its value-laden components because a producer-product or cause-effect source-in-target-metonymic schema is at work: the speech pattern associated with a particular group leads hearer to the wider frame of the social group itself, to the social stereotype associated with it...and all the encyclopaedic knowledge hearer has about the group in question” (Kristiansen: forthcoming).

Both social and linguistic categories work metonymically with respect to the category whole and as these different types of knowledge are linked in cognition, then the perception/use of a particular linguistic structure may lead to the activation of the whole of a social category through a process of metonymy.

Kristiansen (forthcoming) suggests that this categorization process takes place in three separate stages when categorizing the speech and social characteristics of a particular individual:

1. Hearer locates Speaker socially and regionally on the basis of his/her speech pattern in a general way
2. Hearer locates Speaker socially and regionally in more specific ways
3. Hearer locates Speaker relative to him/herself.

First, the Hearer categorizes the speech pattern of the Speaker and this evokes a metonymic schema containing the speech (style/register/variety) and the social characterization with the central tendency or prototype of these two categories operating as cognitive reference points. Next, once the Hearer has successfully categorized the Speaker as having a particular type of accent/variety (and, hence, a particular set of social characteristics), the categorization process becomes more fine-tuned, the Hearer can begin to identify the relative position of the speaker from the central prototype. In step 3, the categorization process again changes and this time involves a stage of self categorization so that the Hearer can find his/her own relative position with respect to the Speaker. Kristiansen (forthcoming) draws parallels between this type of 'viewing something with respect to another entity' and the notions of Figure, and Ground in Cognitive Linguistics. In Cognitive Grammar, the figure of a scene is the substructure that is perceived as 'standing out' above the

ground (see Langacker 1987: 120). In the case of this process of categorization, Kristiansen suggests that the relative awareness of the fact that both the Hearer and the Speaker are onstage (figured) in the same speech event (ground) at the same time is related to this basic cognitive ability to perceive figure/ground relations.

Can this model help us to understand the processes of categorisation that apply in WFHPB? Again, the example of Kate as a new member of WFHPB in 2005 is applicable. In applying Johnston's model, it was necessary to explain the increase in Kate's production levels of th-fronting simply as a result of the increase in perception levels that Kate experienced. In Kristiansen's approach, the focus is on the categorisation processes that take place, rather than on the frequency with which these processes occur. Stage 1 of Kristiansen's approach focuses on the type of cognitive processes that are assumed to take place in Cognitive Linguistic models of categorisation. In Kate's case, her first encounters with members of WFHPB in 2005 would have begun by Kate categorising her new interlocutors (based on their speech) in a very general way e.g. she may have begun by categorising them as 'from west Fife'. At this point, Kate's prototype of the social type 'people from west Fife' would have been activated. This categorisation process would then have become more specific as Kate began to focus in on the detail of her interlocutors' speech and she may have begun to invoke more specific categories (and prototypes) such as 'from town X' or 'member of social group Y'. In stage 3, this model suggests that Kate would have then begun to categorise herself in these specific term (e.g. 'from town X' etc.) and so would have been able to perceive a sense of (cognitive) distance between herself and her newly-categorised interlocutors.

Kristiansen believes that speakers, as agents, can choose to signal their affiliation with a particular social type by selecting the linguistic variants that they associate with that social type. In other words, speakers can use linguistic variation as an '*act of identity*' (Le Page and Tabouret-Keller 1985); speech is not just a reflection of category identity, but a projection of it (Le Page 1980). Kristiansen (forthcoming), therefore, introduces another three stages that can take place during the point at which social and linguistic knowledge are co-activated in cognition:

4. Hearer changes his/her relative position with respect to Speaker
5. Hearer changes his/her speech style towards an existing pattern

6. Hearer develops a new style, exploiting existing speech patterns.

In stage number 4, the Hearer can try to adopt the actual linguistic features of the typical speech pattern of the speaker although (depending on the level of familiarity the Hearer has with the Speaker's variety) this is not likely to result in a form of speech that is identical to Speaker, given the previously discussed features of a linguistic stereotype. In stages 5 and 6, the Hearer may choose to draw on other existing resources such as 'wide scale socio-regional styles' and perhaps even create new local identities in the process. Returning to Kate's experiences of WFHPB, she may have, at stage 4, been motivated (for any number of reasons) to reposition her self-categorisation closer to that of the other members of WFHPB and to do this, she may have attempted to adopt the actual features of their speech. One of the ways Kate could do this is by increasing her frequency of th-fronting and so in this model, Kate's rise in th-fronting during 2005-2007 is characterised as an active rather than a passive process. By stage 5, Kate may also have been drawing on other resources in order to change her speech style e.g. she may have increased the amount and type of expletives in her repertoire (in fact, this is indeed what happened). Finally, stage 6 is the stage during which new social meanings can come to be imbued to previously existing variation. The example Kristiansen provides of such a process is the ways in which t-release has come to be associated with a number of different social meanings in various communities of practice in America. I have discussed the similarity between this example and the ways in which the social meanings of th-fronting have developed in WFHPB (chapter 3) and so the suggestion is that stage 6 in this process is also the stage at which speakers exploit existing linguistic variants, such as th-fronting, and use them in novel ways which, in turn, creates new social meanings for these variants in the community.

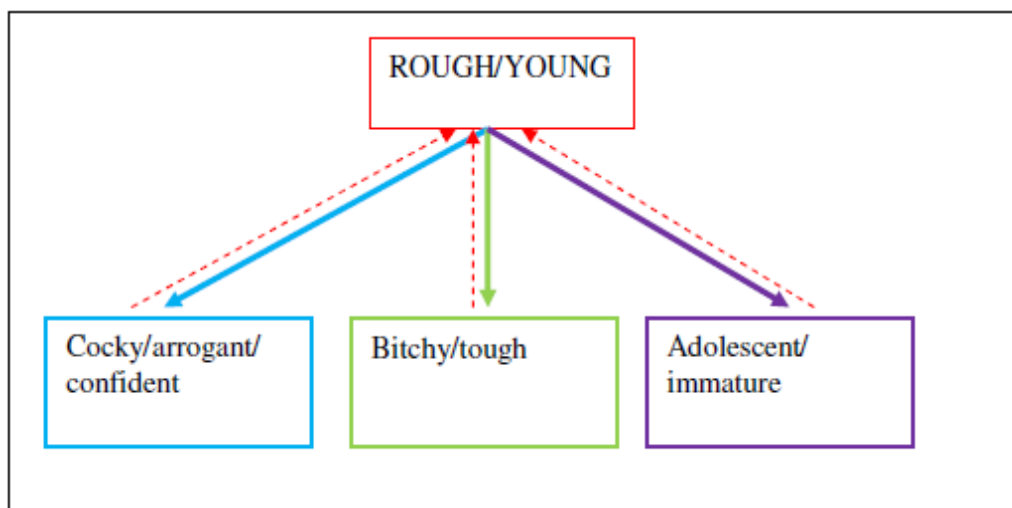
There are of course some problems with this account, for example no evidence is provided for assuming that the categorization process takes place in 6 separate stages (rather than in a single step), nor is there any indication of whether these steps always occur in the same order. Furthermore, it is not clear from work in either the exemplar or schema approach to social and linguistic categorisation whether there should be a distinction made between new and given category information. For instance, do we always go through the same categorization process

with every individual talker (even when we know them very well) or is this 6-stage categorization task only used when people are new to us? Nonetheless, Kristiansen's account provides an alternative to the exemplar-based approach to linking social and linguistic knowledge in category structure, one which also allows more scope for the inclusion of speaker agency in the model.

### ***6.3 Returning to social meaning***

Recall from the discussion in section 3.7 (chapter 3) that 'third wave' approaches to the relationship between linguistic variation and social meaning suggest that 'salient' variants often have abstract or core social meanings that exists across a community which then become more specific as they are used by particular individuals and groups of speakers. In this way, certain parts of the core meaning can be indirectly indexed and used to create new meanings in new contexts. This process is cyclical because as new meanings develop, this feeds back to the original core meanings which may, in turn, cause changes to the macro-level meanings (a process which Inoue (2004) calls 'indexical inversion'). In section 3.7 (chapter 3), I applied this method of interpretation in an attempt to uncover the core social meanings of th-fronting in WFHPB. This meaning-making process is diagrammed schematically in figure 6. 6 and represents how the social meaning of th-fronting could have arisen in WFHPB.

**Figure 6.6: Schematic representation of the social meaning of th-fronting in WFHPB within a third-wave sociolinguistics framework**



I suggested that examining the social meaning of variation within such a framework provided a coherent ‘story’ of the process by which th-fronting could have come to mean a number of different things to different speakers within the same community but I also pointed out some of the limitations of this approach. My main concern was with the assumption that a shared core social meaning was a reality among these speakers. This entire approach to the acquisition of social meaning is grounded on the assumption that speakers have a shared sense of the social meaning of variation at a community-wide level<sup>116</sup> but this is a very difficult notion to prove, especially without using psycholinguistic techniques of investigation.

Third-wave approaches to sociolinguistics typical employ long-term ethnographic research in an effort to reduce the level of abstraction in the analysis of variation, often focusing on individual speakers rather than larger macro-level structures that are difficult to define such as the speech community. In some respects, the proposition that speakers should all have access to an abstract knowledge structure that represents the core social meaning of a particular variant,

<sup>116</sup> There is very little discussion in this literature on how this abstract social meaning is acquired. For instance, there is no indication whether it is assumed to be innate or learned from experience.

particularly before any localized social meaning develops, seems a little at odds with the more grounded investigative techniques of the third-wave. This idea is also fundamentally at odds with the usage-based models of learning and categorization for which a large amount of evidence has been presented in this chapter. One of the main tenets of a usage-based model of language structure is the suggestion of non-modularity. Language is regarded as an instance of other general cognitive abilities and so it should be possible to apply usage-based principles to other areas of cognition. For the purposes of this discussion, it should be possible to apply usage-based principles of the acquisition of social meaning. How can this be done? What are the consequences for our understanding of social meaning in WFHPB?

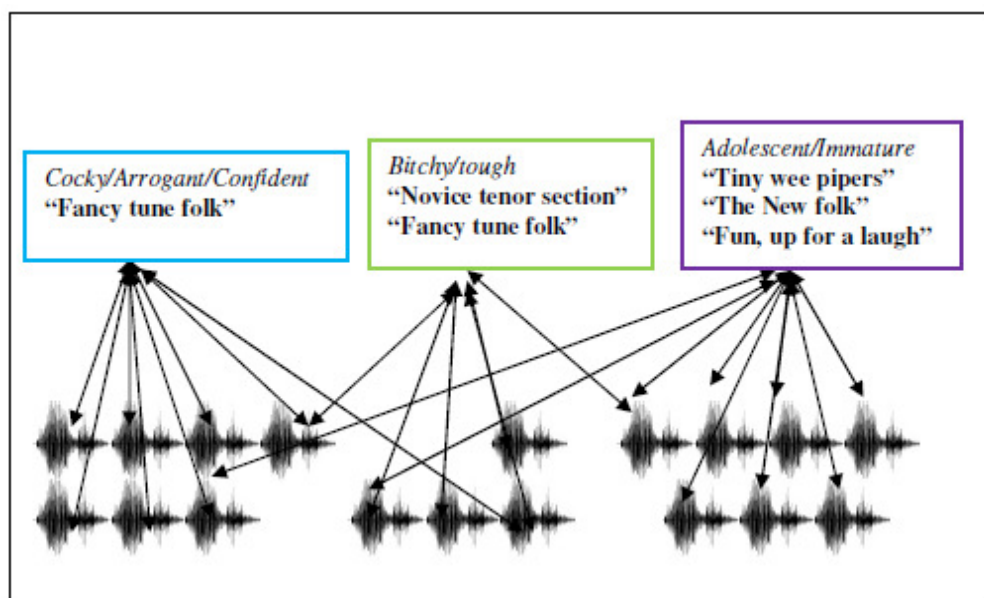
In a usage-based model, meaning (including social meaning) is determined by a speaker's previous experience. One consequence of this is that each speaker will acquire a (minimally) different knowledge structure. This is also true of social meaning. The precise social meaning of *th*-fronting for each speaker in WFHPB is dependent on a variety of factors including the type of speaker that each individual has had experience with using the variant and the context in which it was used.

In exemplar theory, as we experience a number of different speech events in which *th*-fronting occurs, we store memory traces of these events which include linguistic *and* social information that we perceive to be relevant and if we spend a large amount of time with the same people (e.g. in the case of a tight social network) who are all, as a result of this, experiencing the same stimuli, we are likely to store similar (but not identical) exemplars of this experience. A hybrid model would further propose that as we begin to recognize dimensions of similarity between these exemplars, we may retain these exemplars in memory but also abstract the commonality that we recognize in salient displays of style (such as dress, behaviour *and* speech) to form low-level schemas which, again, contain both linguistic and social knowledge. A usage-based approach which employs a network in its description (such as Hudson 2007c) would reach the same conclusion: the repeated co-activation and entrenchment of particular (social and linguistic) nodes and links in the cognitive network enables each speaker to associate social knowledge with particular linguistic variants. This process is schematically diagrammed in figure 6.7. I have only represented the linguistic exemplars in this diagram (with a mini



‘sound wave’) but it should be implied that social information is also contained in these exemplars. Similarly, it should be taken as given that linguistic knowledge is represented in the schematic category (which is here described mainly by social characteristics)<sup>117</sup>.

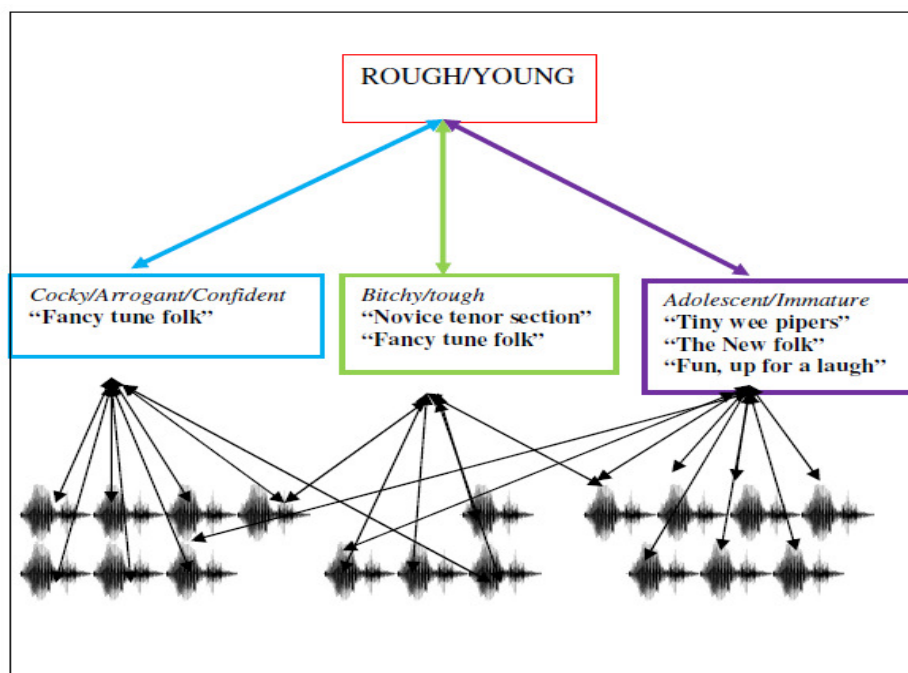
**Figure 6.7: Schematic representation of the social meaning of th-fronting in WFHPB in Exemplar Theory**



Even more abstract commonalities may be reached and so abstract knowledge structures may still exist in the usage-based approach to social meaning but they are not there as the first stage in the meaning-making process, they emerge over time from an accumulation of experiences.

<sup>117</sup> Hudson (pc.) suggests mapping linguistic exemplars onto linguistic categories and social exemplars onto social categories (and then linking them at some higher level of schematicity). I have avoided this, however, because the aim in this chapter has been to highlight the *similarities* that exist between social and linguistic categorisation.

**Figure 6.8 Schematic representation of the social meaning of th-fronting in WFHPB: a hybrid exemplar/schema model**



In this approach, it may therefore be possible to abstract fairly vague meanings of ‘rough’ or ‘young’ in the acquisition of the social meaning of th-fronting (see figure 6.8) but this would not be the first stage in the process; this could only happen over time and experience with a number of different speakers who use this variant in a number of different contexts. Speakers can then choose to signal their affiliation with a particular social type by activating the linguistic variants that they associate with a given type. For instance, speakers in groups “Pipe band geeks/Ex-Dream Valley”, “Fun/up for a laugh, not very serious” and “senior drummers/pipe band geeks” (see Table 3.1, chapter 3.3 for details) may have, in their mind, an association with the realization of (th): [f] and younger speakers. Speakers in the group “Fun/up for a laugh, not very serious” can therefore project their youthful image by using a higher frequency of the labiodental variant while speakers in the group “Pipe band geeks/Ex-Dream Valley” and “senior drummers/pipe band geeks” can avoid using this variant for the same reasons i.e. to project a more ‘grown-up’, responsible image. The crucial difference between this approach to the acquisition of social meaning and that which is proposed by third-wavers is that in this case (and in keeping with

findings from a range of literature on the acquisition and organisation of knowledge structures in the usage-based literature reviewed here), social meaning is not inherently available in an underspecified form; social meaning (as with other types of meaning) is *emergent*.

#### **6.4. Limitations and conclusions**

The motivation for this chapter was to attempt to move away from the type of account of the relationship between language structure and language use that is so often presented in the usage-based literature – one that is heavily centred on frequency effects in language change – to explore other aspects of the usage-based thesis and its possible application to areas of knowledge that are less exclusively concerned with language structure. Since categorisation is considered to be a key element of both sociolinguistics and cognitive linguistics, this seemed like an obvious place to start the discussion. The aim of this chapter, therefore, was to test whether usage-based accounts of categorisation could be applied to both social and linguistic categories. This was indeed found to be the case and so the argument presented here was that a more unified approach to categorisation that could incorporate both social and linguistic categories into the same model at the same time would surely be a beneficial addition to any (socio)linguistic model.

I have also tried, wherever possible, to apply the approaches to categorisation that are presented in this chapter to an interpretation of the social and linguistic categories that may exist in the minds of the speakers in WFHPB. While this task has indeed been possible, I am aware that the application of theory to variable data presented in this chapter is much more programmatic and speculative than in previous chapters. This is partly the result of a lack of agreement between competing models of categorisation within the usage-based approach but mainly, this level of speculation is simply the result of a lack of psycholinguistic data from WFHPB. The sociolinguistic methods used in this thesis were chosen in order to test the extent to which it was possible to synthesise sociolinguistic and usage-based models of grammar. However, these sociolinguistic methods placed imitations on what I could legitimately infer about the existence of linguistic and social categories in the minds

of speakers in WFHPB and so my discussion in this chapter is necessarily more speculative. Without adopting a combination of sociolinguistic and psycholinguistic methods in the data collection process, it is difficult to move beyond these inferences and so difficult to expand the application of the usage-based thesis to sociolinguistics in ways which involve more than simply a discussion of frequency effects in language change. This problem is discussed further in section 7.2

### ***Part III: Conclusion***

The two main research questions that I embarked upon in chapter 1 and have returned to in part III of this thesis are:

1. To what extent is it possible to synthesize sociolinguistic methods of data collection and analysis with usage-based methods of interpretation?
2. Is such a synthesis beneficial?

From the discussion of the usage-based approach to language structure presented in part III, it should now be apparent that the usage-based approach is particularly well suited to interpreting the relationship between linguistic variation and social meaning, not only because it is compatible with an account of social meaning but because when we adopt a usage-based model of language structure, an understanding of the relationship between social and linguistic knowledge falls out naturally from the theoretical framework; it is to be expected. I will now review the results which have led me to this conclusion in the final chapter of the thesis before exploring some of the more problematic aspects of the analysis and possible ways in which the synthesis between sociolinguistic variation and usage-based linguistic theory could be taken forward.

## **Chapter 7: Conclusions, limitations and extensions**

### ***7.1 Overview of results***

In cases where reference has been made to a possible unified approach to sociolinguistics and linguistic theory, the aim has typically not been to account for both ‘social’ and ‘linguistic’ phenomena in the same theoretical framework. As stated in chapter 1, this is because many of the theories on which attempts to address this issue were modelled are both asocial and modular in their design. Part I of the thesis explained that in usage-based theories of language, this cross-over is implied in the theoretical framework and so by adopting this framework as a basis on which to investigate the potential crossover, it is possible to illustrate patterns and links between social and linguistic knowledge that more modular theories of cognition do not allow. However, the synthesis is still largely unexplored in the usage-based literature and in the emerging cases in which it has been investigated, the emphasis has been primarily on the theoretical capability of the usage-based approach to handle variation rather than on detailing exactly how this could work in practice. My analysis has therefore focused on addressing this problem by testing (a) how far a typical (variationist) sociolinguistic approach to data can take us (part II) and (b) how much more of an insight into the variation we gain by incorporating ‘usage-based’ principles in the interpretation of variable data (part III).

This thesis also addressed two other secondary issues. The first of these was to expand the range of methods used in studies of variation and change in Modern Scots and Scottish English. The description of the methods used in collecting this corpus and of the social structure of WFHPB presented in chapter 2 went some way towards addressing this. I used a combination of long-term participant observation, as well as tools from social network analysis and insights from community of practice research in my data collection. Triangulating these methods helped me to move away from any preconceived ideas about the social structure of the group and begin instead to understand the local categories and groups that were important to the local community i.e. to move towards an understanding of the community structure

from an 'emic' perspective. The results from the varbrul analysis in chapter 3 (i.e. the significance of the social factor group Community of practice/friendship group membership above all else) lends support to the appropriateness of the methodology adopted in the data collection process.

Chapters 3 and 4 were designed to provide a solid quantitative analysis of variation of two phonological variables using widely accepted techniques. This helped to answer how far a typical (variationist) sociolinguistic approach to variable data could take us and also provided a stable platform on which further exploration of the data could be built. Chapter 3 discussed the pattern of variation in 'th-fronting' in West Fife High Pipe Band, a phonological change in progress currently underway in many varieties of British English, and chapter 4 examined variation in the BIT vowel which is a vocalic variable that is reported to show stable sociolinguistic variation in Scottish English (but which was found to be less stable than expected from previous accounts of the variation).

The results of the varbrul analysis of th-fronting suggest that a number of linguistic factors are significantly correlated with th-fronting in this community and so are responsible for a portion of the variation. Th-fronting is more likely to occur in words which have a preceding [f] somewhere in the word and in words where the variable (th) is in coda position; th-fronting is less likely to occur in place names, proper names and ordinals than in all other lexical items. This is interesting in itself as no other account of th-fronting in British English has recognised such correlations. Furthermore, in WFHPB there is evidence to suggest that th-fronting is a socially meaningful variant in this community because community of practice/friendship group membership substantially outranks all other factors influencing the variation in this community (including the macro factor groups of speaker age and sex).

The results of the multiple regression analysis of BIT in chapter 4 also showed that a variety of social and linguistic factors were motivating this variation although linguistic factors account for a greater proportion of the variation in this variable. In particular, the place and manner of articulation of the preceding and following consonant greatly affect both the vowel height and the position of the vowel on the front/back dimension. Social factors such as the age of the speaker or their membership in one particular community of practice/friendship group (the

Valley Lassies) were also found to be influential factors which motivate variation in the F1 dimension but not the F2 dimension of the BIT vowel.

The discussion of methods used in data collection and the mainstream analysis of variation presented in chapters 3 and 4 constitute part II of the thesis. These results therefore answered the question: “how far can a typical (variationist) sociolinguistic approach to data take us?” These analyses of variation also formed a useful platform on which further extensions to the interpretation of these data were built in part III.

Part III of the thesis is where the synthesis between usage-based models of language structure and sociolinguistics was tested on data from WFHPB. This was done in two ways.

First, chapter 5 expanded the analysis of variation presented in part II beyond that which has previously been considered mainstream in variationist sociolinguistics. This was done by incorporating into the analyses of variation, for both (th) and (BIT), a factor group testing for one of the most widely recognized and debated topics in usage-based research – the effect of lexical frequency on language variation and change. The methods used in this chapter were largely quantitative. In both the (th) and (BIT) analyses, lexical frequency was found to play some role in influencing the variation/change, although the effect was not particularly large in either case. Chapter 5 also showed that simply including the factor group which coded for lexical frequency into the statistical analysis was not enough – these results had to be interpreted and in order to do this, it was necessary to adopt certain theoretical assumptions of the usage-based approach. For instance, it is impossible to explain the frequency effects found in these data without employing the notions of cognitive entrenchment and word-specific phonetics. Finally, chapter 5 also showed that it is important to not only consider the role of lexical frequency as an motivating factor in the spread of sound change but to consider this alongside other social and linguistic motivations for variation and change.

Chapter 6 employed more qualitative methods and dealt with another of the main issues of concern for usage-based models of language – how knowledge (linguistic and otherwise) is stored, accessed and categorized in the human mind. Chapters 5 and 6 therefore also addressed the remaining secondary issue that I set out



to discuss which was to further understand aspects of the structure and organization of phonological knowledge within the mind of the speaker. The first part of chapter 6 attempted to reduce the perceived differences between various usage-based models of categorization in social and linguistic theory by highlighting the similarities that exist between them and showing that there is a great deal of evidence in favour of all of these approaches (or, indeed, in a single 'hybrid' approach that includes aspect of each) in social psychology, cognitive psychology and linguistics. The remainder of this chapter outlined a selection of ways in which work on categorization in linguistics and social psychology could be synthesized in an effort to work towards a better understanding of the relationship between linguistic variation and social knowledge in the mind of the speaker. Finally, I returned to the discussion of the acquisition of the social meaning of th-fronting that was originally presented as adequate but, in many ways, unsatisfying in chapter 3 and attempted to model this using usage-based principles of categorization. This resulted in a more psychologically plausible description of the ways in which social meaning comes to be associated with linguistic variation at the local level.

## ***7.2 Limitations and directions for future research***

This study has been concerned with the synthesis between sociolinguistic and usage-based accounts of linguistic variation and change. In focusing on the positive aspects of such a synthesis, my analysis has not always been clear on the limitations that continue to exist with the present approach. It seems that there are two main types of limitation arising from this research: (a) limitations that are the result of the methods adopted in this study and (b) limitations that stem from the theoretical framework. The latter raises more cause for concern for future research in this area.

The motivation for this study was to move beyond some of the more programmatic accounts of synthesis between sociolinguistics and linguistic theory that have appeared in the literature but the resulting discussion in this thesis is also, in many ways, programmatic because it has only been capable of scratching the surface of the topic it set out to investigate. For example, the 360,000 word corpus

that was collected in the course of this research contains an enormous amount of, as yet, unstudied variation. The analysis of 2 phonological variables presented here does not adequately represent the range of variation in WFHPB or, indeed, the richly detailed picture of social variation that was also compiled when collecting this corpus. One possibility for future research is therefore to dig deeper into the variation found in the WFHPB corpus, analysing a greater number and type of sociolinguistic variables in a similar way to the analysis of (th) and (BIT) presented here. For instance, work on variation and change in grammatical constructions in this corpus could help to bring together research on usage-based models in phonetics/phonology and syntax that appear to be developing independently, despite sharing many similar theoretical concerns (see Hay and Bresnan 2006).

The assumption in this thesis has been that social meaning exists at the level of allophonic variation but it may equally exist at other levels of grammar or phonology such as syllables, words or even suprasegmental aspects of the remembered exemplar (see Foulkes and Docherty 2006 for a similar concern). Very little research has been conducted on the social meaning of supra-segmental variation, for instance and so this is another possibility for future research.

As stated in chapters 2 and 6, the ethnographic approach to data collection in this thesis was adopted in order to test whether an analysis which synthesised sociolinguistic methods of data collection with usage-based methods of interpretation was a viable approach to variation. The results from chapter 5 suggest that an analysis which includes both ‘social’ factor groups (e.g. community of practice/friendship group membership) and ‘cognitive’ factor groups (e.g. lexical frequency) into the same analysis of variation can reach a more insightful understanding of the motivations for variation and change. However, chapter 6 attempted to move beyond the more easily quantifiable predictions of the usage-based approach and found that the synthesis between sociolinguistics and usage-based linguistic theory (this time with respect to categorisation) was much more tenuous. This was principally the result of a lack of information – using only the methods employed in this thesis meant that it was impossible to reach a clear and full account of the ways in which speakers in WFHPB acquire, store and access social and linguistic categories. Perhaps this is an unrealistic goal but by combining socio-

and psycholinguistic methods of data collection that can explicitly test for category structure, the goal is perhaps more achievable than by simply inferring the category structure that might exist from a corpus of variable data. The danger of combining socio-and psycholinguistic approaches to data collection is a possible loss of quality. For instance, if experimental psycholinguistic methods are employed initially before the ethnography proper begins, it may be difficult for the (same) researcher to ever achieve a position of participant-observer in the community (i.e. they may always be the 'observer'). If, on the other hand, the experimental part of the data collection happens much later in the ethnography, the researcher could damage well-established relations with community members. However these problems are to be resolved, they require greater communication between members of the sociolinguistic and psycholinguistic research communities.

Another potential problem with the methods adopted here is the social level at which the analysis takes place. First wave sociolinguistic accounts typically abstract away over individual speaker variation to form a 'broad brush' picture of variation at the community level. Even third wave accounts that are typically much more concerned with variation at the local level tend to abstract away from communities of practice and, again, present aggregate results. However, the models of grammar which adopt usage-based principles (at least within Cognitive Linguistics) do not model community grammar; they explicitly state that grammar does not exist at the level of the community, it exists at the level of the individual speaker. In this respect, there is a mismatch between the fundamental assumptions of the usage-based approach and the current methodological practices in which these assumptions are tested (as discussed in section 5.4.2). The mismatch is this: the theoretical focus in a usage-based model is on explaining the grammar of the individual speaker and as the assumption in usage-based models is that grammar is acquired from previous experience, no two speakers will have exactly the same grammar; but the data used to test these claims have not come from individual case studies but rather have dealt with abstractions over data collected from a number of speakers, genres and speech styles. This criticism applies not only to work in Cognitive Sociolinguistics but also to work in Cognitive Linguistics that is based on data extracted from large corpora (e.g. see the collection of papers in Gries &

Stefanowitsch 2006). While these methods allow access to large quantities of data, they often combine data from a number of different styles and dialects into the same analysis, forcing the researcher to model theories of language change on abstract language varieties such as ‘American English’. These methods pose particular problems for the usage-based approach which assumes that speakers’ linguistic systems are abstracted largely from their previous experience. The current climate in Cognitive Linguistics seem perfectly able to tolerate this mismatch but if we are to produce an accurate synthesis between sociolinguistics and usage-based theories that is true to the theoretical assumption of the framework on which it is based, it seems to me that it is necessary to pay much more attention to the individual speaker than is typical of sociolinguistics. Of course, an analysis which focuses on the individual speaker brings its own problems, e.g. an analysis which does not combine results from a number of speakers often results in low cell counts and so quantitative analysis can be difficult. Future research on the synthesis between sociolinguistics and usage-based theoretical linguistics must work towards solving these problems.

Throughout this thesis, I have consistently argued that usage-based models of linguistic theory are fundamentally compatible with sociolinguistic accounts of variation and change. The relationship between ‘linguistic’ and ‘social’ knowledge in the mind of the speaker is assumed to exist; it is inherent in the theoretical framework; it is to be expected. However, the details of this assumed relationship are often not made explicit and in my attempt to do so, I came across some problems with the theoretical approach.

One of the most unsatisfying aspects of the usage-based approach is the apparent lack of agency in the model. The heavy emphasis that is placed on lexical frequency as the driving force behind particular types of language change paints the speaker in a passive light. Although the model does not actually deny speaker agency, it also does not discuss the cognitive processes that are involved in such a choice, instead focusing primarily on the relationship between production and perception. This is completely at odds with the sociolinguistic methods that were adopted here; pioneers of the participant-observation approach are very much concerned with understanding speaker agency:

“A theory of variation as social practice sees speakers as constituting, rather than representing, broad social categories, and it sees speakers as constructing, as well as responding to, the social meaning of variation...The study aims to treat the speaker as a linguistic agent, to treat speech as a building of meaning, and to treat the community as mutually engaged in a meaning-making enterprise (Eckert 2000: 3-4).

Not all usage-based theories share the same commitment to the strict relationship between language structure and language use and so perhaps this problem is exacerbated in this thesis by my wish not to commit to one particular theoretical model within the usage-based approach. I was motivated to do this by a desire to highlight the great many similarities that exist between theories in quite different research paradigms, for example similarities between Cognitive Linguistic models and Exemplar Theory, but perhaps this approach to the topic has led to an overview that is, in practice, quite unconstrained and weak on theoretical detail. Researchers interested in this synthesis now need to work towards applying particular (usage-based) linguistic theories to sociolinguistic accounts of variation and change.

This chapter has shown that there are problems with the analysis presented here and challenges for future research in this area. However, I hope that the thesis as a whole has shown that by synthesising sociolinguistic methods of data collection and analysis with usage-based models of cognition, we have taken a step towards creating another viable and insightful approach to the study of language variation and change.



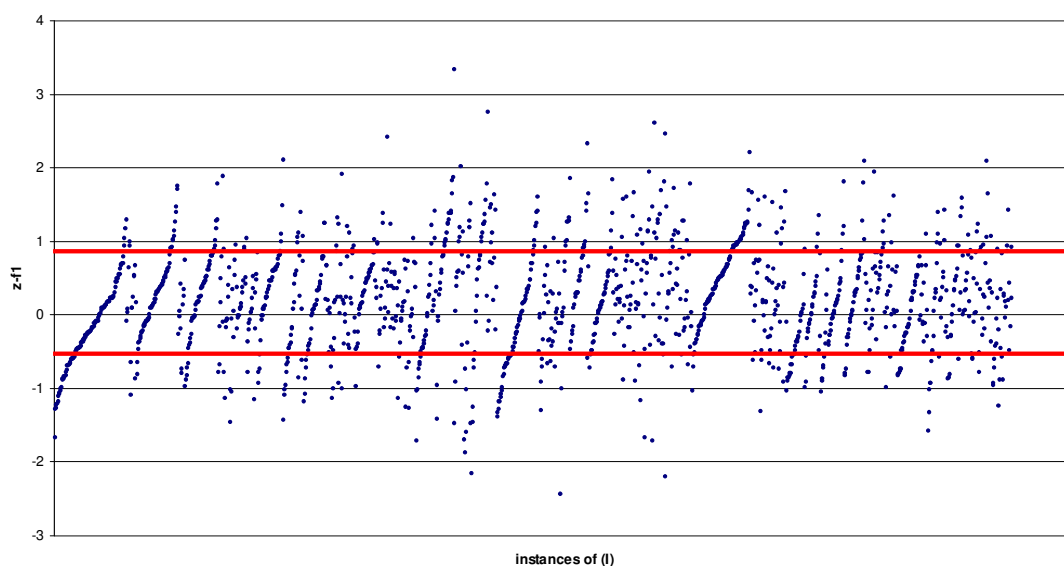
## **APPENDICES**

***APPENDIX 1: Using varbrul as an exploratory tool***



In order to run an analysis using varbrul, some recoding was also necessary, this time in the independent variable. As discussed in chapter 3, varbrul requires discrete variants for both the dependent and independent variables (or factor groups) and so the researcher must code each factor group (which contains a number of factors) in this way. In order to recode the BIT vowel into discrete variants, I first plotted all instances of the z-transformed F1 and F2 data onto a scatterplot and found the mean and standard deviation of variation across these data. I then made a cut point 1 standard deviation on either side of the mean (highlighted in red in figures 4.7 and 4.8 below) and recoded all instances within this band as ‘mid’ vowels<sup>118</sup>.

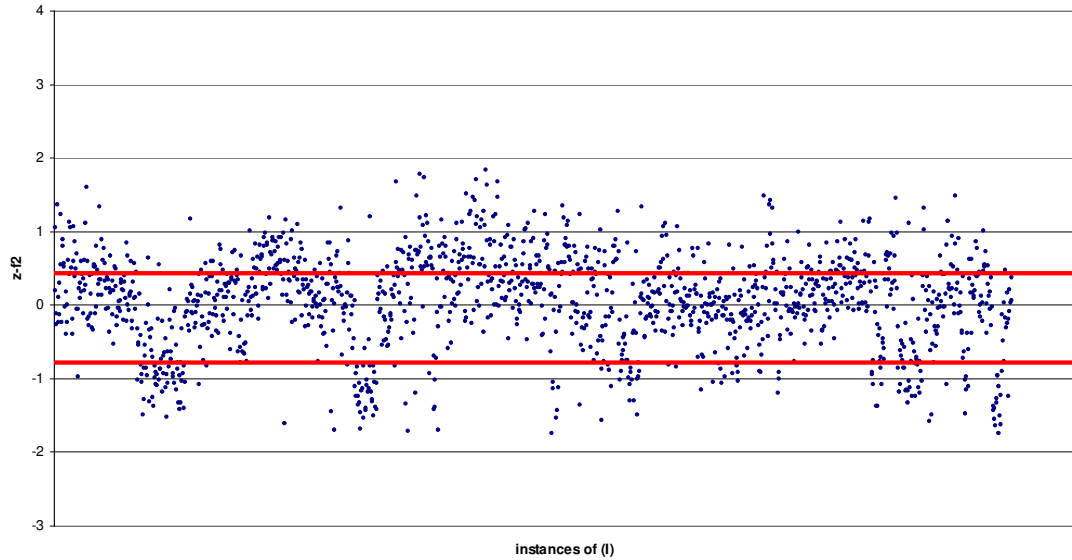
**Figure A: Normalised values of F1 plotted as individual instances**



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<sup>118</sup> Dividing the vowel space in this way into categories of high, mid and low vowels in order to make use of varbrul is not new; methods such as these have appeared in the sociolinguistics literature since Labov (1963).

**Figure B: Normalised values of F2 plotted as individual instances**



High, low, front and back vowels occur on either side of these cut points. The exact measurements of where these cutpoints have been made are as follows:

<b>F1 (zf1)</b>	<b>F2 (zf2)</b>
High: <-0.506	Front: >0.692
Mid: -0.506 to 0.906	Mid: 0.692 to -0.580
Low: > 0.906	Back: <-0.580

Next, following the procedures discussed in chapter 3, I ran 4 separate varbrul analyses testing the importance of the social and linguistic variables that were coded on the following dependent variables: High vs. non-High vowels; Low vs. non-Low vowels; Front vs. Non-front vowels and Back vs. non-Back vowels, the results of which are detailed in tabular form below.

F2

Table a: Multivariate analysis of the contribution of features selected as significant to the probability of (BIT): back vowel. Factor groups not selected as significant are not shown in this table.

Corrected mean			0.09
Log Likelihood			-410.039
Total N			1496
	Factor weight	% of (BIT): back	N
<b>Preceding phonological context</b>			
approximant	0.891	33.5	164
labial	0.594	18.4	450
dental	0.577	35.2	128
/h/	0.516	7.1	98
alveolar	0.363	11.5	364
glottal/velar	0.12	12.8	179
<i>Range</i>	77		
<b>Following phonological context</b>			
approximant (l, r, w)	0.969	55.4	316
labial (stop inc. m)	0.443	8.2	195
alveolar (inc. n)	0.282	7.9	229
glottal/velar	0.236	6.3	709
<i>Range</i>	69		
<b>Grammatical category</b>			
Ordinal	0.63	46.6	88
Adverb and Adjective	0.521	13.2	295
Verb	0.511	13.1	421
noun	0.45	14.3	350
Proper noun and pronoun	0.387	20.5	342
<i>Range</i>	24		
<b>Voicing [i.e. vowel duration]</b>			
Following voiceless consonant	0.569	8.6	639
Following voiced consonant	0.448	23.3	857
<i>Range</i>	12		

F2

Table b: Multivariate analysis of the contribution of features selected as significant to the probability of (BIT): front vowel.

Factor groups not selected as significant are not shown in this table.

<hr/>			
Corrected mean			0.12
Log Likelihood			-534.126
Total N			1496
	Factor weight	% of (BIT): front	N
<hr/>			
<b>Preceding phonological context</b>			
glottal/velar	0.836	29.6	179
/h/	0.711	37.8	98
alveolar	0.656	19.7	466
dental	0.436	9.5	137
labial	0.271	7.1	450
approximant	0.227	4.9	164
<i>Range</i>	62		
<hr/>			
<b>Following phonological context</b>			
glottal/velar	0.694	20.5	709
alveolar (inc. n)	0.458	15.6	243
labial (stop inc. m)	0.428	24.2	132
approximant (l, r, w)	0.135	7.1	269
<i>Range</i>	56		
<hr/>			
<b>Grammatical category</b>			
Proper noun and pronoun	0.575	20.2	342
Adverb and Adjective	0.542	16.6	295
noun	0.494	14.3	350
Verb	0.445	14.3	421
Ordinal	0.361	8	88
<i>Range</i>	21		
<hr/>			
<b>Voicing [i.e. vowel duration]</b>			
Following voiced consonant	0.573	18.2	857
Following voiceless consonant	0.403	12.4	639
<i>Range</i>	17		
<hr/>			

F1

Table c: Multivariate analysis of the contribution of features selected as significant to the probability of (BIT): high vowel.

Factor groups not selected as significant are not shown in this table.

<hr/>			
Corrected mean			0.16
Log Likelihood			-598.930
Total N			1502
	Factor weight	% of (BIT): high	N
<b>Following phonological context</b>			
Labial stop	0.67	14.3	21
Alveolar	0.662	14.4	197
Nasals	0.565	22.9	327
Velar/glottal stop	0.53	12.8	569
Dental	0.527	12.1	58
Approximants (r, l, w)	0.274	8.8	317
<i>Range</i>	40		
<hr/>			
<b>Preceding phonological context</b>			
Alveolar	0.603	20.3	473
Velar/glottal stop	0.561	25.5	55
Approximants (r, l, w)	0.514	18.1	116
Labial stop	0.483	12.9	402
Nasals	0.469	14.3	56
/h/	0.393	16.3	98
Dental	0.25	5.5	12.8
<i>Range</i>	35		
<hr/>			
<b>CofP</b>			
Valley Lassies	0.762	36.8	57
The Rest	0.498	14.9	1445
<i>Range</i>	27		
<hr/>			
<b>Voicing [i.e. vowel duration]</b>			
Following voiced consonant	0.611	18.7	863
Following voiceless consonant	0.352	11.7	639
<i>Range</i>	26		
<hr/>			
<b>Age of speaker</b>			
20-24 years old	0.579	19.9	166
16-19 years old	0.577	18.3	349
30+ (30-42 years old)	0.474	14	150
25-29 years old	0.466	13.2	106
12-15 years old	0.458	14.2	731
<i>Range</i>	13		

F1

Table d: Multivariate analysis of the contribution of features selected as significant to the probability of (BIT): low vowel.

Factor groups not selected as significant are not shown in this table.

<hr/>			
Corrected mean			0.16
Log Likelihood			-659.853
Total N			1502
	Factor weight	% of (BIT): low	N
<b>CofP</b>			
The rest	0.514	16.4	1445
Valley Lassies	0.2	5.3	57
	31		
<hr/>			
<b>Preceding phonological context</b>			
/h/	0.82	42.9	98
Nasals	0.726	35.7	56
Dental	0.545	13.8	130
Approximants (r, l, w)	0.529	17.1	164
Labial stop	0.519	15.7	402
Velar/glottal stop	0.506	14	179
Alveolar	0.356	9.3	473
<i>Range</i>	46		
<hr/>			
<b>Grammatical category</b>			
Proper noun and pronoun	0.636	20.2	342
Verb	0.587	23	421
noun	0.438	13.4	350
Adverb and Adjective	0.342	6.4	295
Ordinal	0.335	6.8	88
<i>Range</i>	30		
<hr/>			
<b>Voicing [i.e. vowel duration]</b>			
Following voiceless consonant	0.573	17.7	693
Following voiced consonant	0.446	14.7	863
<i>Range</i>	12		
<hr/>			

The results of the F1 and F2 analyses of the BIT data in varbrul provide us with several potential independent variables for inclusion in the more fine-grained multiple regression.

### **Preceding and following phonological context**

As with the analysis of th-fronting, I began by coding phonological context in detail and labelled each individual segment as a separate factor in the factor group but, again, a number of cells were left empty or had very low cell counts and so it was necessary to collapse some of these factors together. In order to reach the factors presented in the tables above, I began by extracting the factor weights for each phonological segment in the first run of the analysis both for F1 and F2. I labelled these factor weights by their place and manner of articulation and then sorted these factor weights in ascending order. The patterns that emerged provided the codes for phonological context in the final varbrul run. Notice that the codes are different for the F1 and F2 analyses. This is because in the F1 run of the analysis, the nasals<sup>119</sup> and the approximants grouped with similar factor weights. Also, the phoneme /h/ did not group in the same way as either glottals or velars and so I have coded these separately in the F1 run of the analysis. In the F2 analysis, factor weights seemed to pattern much more closely with place of articulation than manner of articulation.

Previous accounts of variation in the BIT vowel in Scotland suggest that the phonetic environment in which the vowel occurs plays an important role in the realisation of the vowel. However, the exact nature of the role of phonetic environment is difficult to infer as the literature at times provides contradictory generalisations. For instance, Macaulay and Trevelyan (1977) suggest that following nasals correlate with higher, fronter realisations whereas McAllister (1963: 141) suggests instead that both preceding and following nasals have a lowering effect in the realisation of the vowel. In these data, preceding and following phonological context seem to have an effect on the likelihood that BIT will be realised as a high

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<sup>119</sup> The fact that nasals patterned in a similar way and could be grouped according to manner rather than place of articulation is unsurprising given the extensive literature on the effects of following nasals on (perceived) vowel duration, height and quality (see Hajek & Maeda (2000) and Whalen & Beddor (1989) for details of this literature).

vowel and preceding phonological context is also a significant predictor of the realisation of BIT as a low vowel. Specifically, these data suggest that high vowels are correlated most with following labials and alveolars and preceding alveolars. Low vowels, on the other hand, are correlated most with preceding /h/ and preceding nasals. Preceding and following phonological context are also important predictors in the front/back dimension according to this varbrul analysis. In this case, back vowels correlate strongly with both preceding approximants (/r/, /l/ and /w/) and following approximants (/r/ and /l/ ); front vowels correlate most with preceding and following velar and glottal consonants.

### **Community of practice/friendship group membership**

In the first run of the analysis, CofP/friendship group membership was not selected as a significant predictor. However, on closer inspection of these results, it became apparent that one CofP/friendship group in particular (the “Valley lassies”) were behaving quite differently from the rest of the speakers in this community with regard to variation in the height dimension of this vowel. Whereas the factor weight results for most CofP/friendship groups were between 0.4 and 0.6, the Valley lassies were achieving a factor weight of 0.20 for the variable (BIT): low vowel and 0.76 for the variable (BIT): high vowel. I felt that this was an important observation and so I recoded the original CofP/friendship group factor group to highlight the contrast that exists between the Valley Lassies and the rest of the WFHPB. There was no significant variation by CofP/friendship group in the front/back dimension of variation in BIT.

### **Voicing of Following Consonant**

The ‘target-undershoot’ model (see Lindblom 1990) predicts vowel reduction (i.e. more schwa-like formant values) in vowels which are durationally short. The explanation for this is that with a decrease in vowel duration there is less time for the vowel to be produced and so less time for the articulators to attain their target position, resulting in undershoot.

One method of obtaining data relating to vowel duration in the (BIT) vowel would be to segment each vowel precisely and measure the duration of the vowel in



milliseconds. However, lax vowels (as with unstressed vowels and schwa) are notoriously difficult to segment accurately (see Harrington and Cassidy 1999: 57), partly because they are shorter in duration and partly because they tend to be influenced more by phonetic context. This problem is confounded in vowel-approximant positions where the formant structure of certain lax and/or unstressed vowels is very similar to the formant structure of approximants. According to Harrington and Cassidy (1999:105), “it is difficult to justify on acoustic grounds where precisely segmentation boundaries should be placed (and some might argue that, because an approximant-vowel sequence has no clearly defined discontinuity, it should not be segmented at all)”.

In an attempt to extract vowel length data while avoiding problems with difficult segmentation, I have instead coded the following segment according to features of voicing since “in most English accents vowel length is approximately 50% greater before a voiced consonant than before its voiceless cognate” (Hewlett *et al.* 1999:2157)<sup>120</sup>. The correlation between voicing of the following consonant and vowel duration is known as the Voicing Effect (VE). Although in Scottish English, vowel length is also conditioned by the Scottish Vowel Length Rule (McMahon 1991) SVLR is not thought to operate on lax vowels. Hewlett *et al.* (1999) investigate to what extent the VE operates in Scottish English. The results of this paper indicate that on the high vowels /i, ʊ/ (which were the only ones tested in this case), following voiced consonant (VE) does induce vowel lengthening, although the vowel is lengthened further when the consonant is a voiced fricative (SVLR).

The factor group ‘voicing of following consonant’ is therefore coding for vowel length. The factor ‘voiced’ equates to ‘longer duration of vowel’ and the factor ‘voiceless’ equates to ‘shorter duration of vowel’. It would appear from this varbrul run that the length of the vowel segment may be an influential factor in the realisation of the BIT vowel in these data. Specifically, these data appear to indicate a relationship between lowering and laxing of the BIT vowel when the vowel is durationally shorter.

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<sup>120</sup> This was done on the advice of D.R. Ladd, personal communication

### **Grammatical Category**

Grammatical Category was included in the analysis given the findings for (th) that place names, proper names and ordinals behave differently than other lexical items with respect to th-fronting. Bearing in mind that th-fronting is a change in progress, the hypothesis in this case was that grammatical category would not have any effect on the realisation of the BIT vowel. However, it has been selected as a significant factor group in the analysis of low vowels, which are correlated most with proper names and place names. It is also significant in the front/back dimension. Front vowels are correlated most with pronouns and proper names and back vowels are correlated most with ordinals.

### **Age of Speaker**

Previous analyses of this vowel in Scottish English report that the age of the speaker is a significant predictor in the realisation of the BIT vowel and that younger speakers favour lower, centralised variants. Although the age of the speaker is selected as a significant factor group in the variable (BIT): high vowel, it is not selected as significant as a predictor of low vowels or in the front/back dimension in WFHPB. Furthermore, not only are the differences between the age groups minimal, they are also not showing a linear pattern. Instead, high vowels seem to be used most by 16-24 year old speakers, which may suggest some form of age grading. However, this is impossible to accurately infer because the age range of the speakers in this group is too limited.

***APPENDIX 2: Multivariate analysis of the contribution of features selected as significant in variation in the BIT vowel, including the factor group 'lexical item'.***

Table e: Multivariate analysis of the contribution of features selected as significant to the probability of (I): high vowel, including the factor group ‘lexical item’.

<hr/>			
Corrected mean			0.14
Log Likelihood			-565.503
Total N			1496
	Factor weight	% of (I): high	N
<b>lexical item</b>			
Girlfriend	0.877	50	4
Will	0.858	40	15
Birthday	0.831	33.3	6
Nickname	0.815	33.3	3
Sister	0.761	48.4	31
Big	0.751	27.1	129
Swinley	0.709	41.2	17
Skinny	0.699	40	5
Kill	0.662	16.7	6
Did	0.647	34.5	29
Guid	0.647	33.3	27
Middle	0.647	33.3	3
Jim	0.641	35.8	67
Sick	0.638	16.7	6
Ginger	0.635	33.3	3
Tin	0.635	33.3	6
Stick	0.616	15.4	13
Still	0.615	15.8	38
Jimmy	0.604	17.5	40
Different	0.596	15.4	39
Shit	0.595	14.3	7
Hing	0.594	29.6	27
Girl	0.588	15	20
Kilt	0.583	12.5	8
Rip	0.576	25	4
Similar	0.569	40	5
Pish	0.55	25	4
Bit	0.543	11.9	59
Kid	0.478	20	5
Drinking	0.465	20	5
Hink	0.465	20	30
Since	0.465	20	5
Sit	0.45	11.7	60
Think	0.442	20.8	24
Drink	0.436	18.2	11
Kirsty	0.434	8.1	37
Dick	0.432	10	40
Prick	0.404	7.1	14
Prick	0.397	8.3	12
King	0.332	12.5	16
Miss	0.328	11.8	17
Bitch	0.327	12.5	8
competition	0.316	12.5	16
Fit	0.313	5.6	18
Pit	0.272	4.2	96
Piss	0.25	8.3	12
Kirk	0.243	3.4	29

First	0.229	2.9	34
Billy	0.218	2.1	65
Him	0.157	7.1	28
Range	72		

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**WFHPB vs. Valley High Lassies**

Valley high lassies	0.782	36.8	57
WFHPB	0.487	14.9	1439
Range	30		

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**following phon. context**

Labial	0.659	14.3	21
Nasal	0.65	23.1	325
Alveolar	0.638	24.5	196
Dental	0.432	12.1	58
velar/glottal	0.422	12.9	567
approximant	0.397	8.8	317
Range	26		

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Table f: Multivariate analysis of the contribution of features selected as significant to the probability of (I): low vowel, including the factor group ‘lexical item’.

<hr/> <hr/>			
Corrected mean			0.14
Log Likelihood			-564.587
Total N			1496
	Factor weight	% of (I): low	N
<b>preceding phon. context</b>			
/h/	0.907	42.9	98
nasal	0.832	35.7	56
dental	0.709	14.3	126
approximant	0.703	18.3	115
Labial	0.469	15.7	402
Alveolar	0.306	9.3	473
velar/glottal	0.17	5.5	55
<i>range</i>	73		
<hr/>			
<b>lexical item</b>			
similar	0.952	40	5
since	0.918	40	5
king	0.852	50	16
pish	0.81	50	4
guid	0.742	7.4	27
did	0.735	13.8	29
stick	0.721	32.1	13
pick	0.704	35.7	14
drink	0.7	27.3	11
Kirk	0.697	27.6	29
Jim	0.674	10.4	67
girl	0.673	5	20
billy	0.66	18.5	65
pit	0.638	29.2	96
sick	0.633	16.7	6
drining	0.591	20	5
shit	0.589	14.3	7
him	0.573	57.1	28
kill	0.536	16.7	6
sit	0.532	10	60
Dick	0.517	10	40
Jimmy	0.512	10	40
piss	0.461	16.7	12
think	0.456	20.8	24
Kirsty	0.423	18.8	37
different	0.42	7.7	39
prick	0.405	16.7	12
Swinley	0.402	17.6	17
bit	0.36	11.9	59
miss	0.35	41.2	17
hink	0.306	16.7	30
big	0.281	4.7	129
nickname	0.277	33.3	3
fit	0.247	16.7	18
hing	0.243	29.6	27

first	0.084	2.9	34
range	87		
<hr/>			
<b>WFHPB vs. Valley High Lassies</b>			
WFHPB	0.515	16.4	1439
Valley High Lassies	0.178	5.3	57
range	34		
<hr/>			
<b>voicing of following segment</b>			
voiceless	0.595	17.6	636
voiced	0.429	14.8	860
range	17		

Table g: Multivariate analysis of the contribution of features selected as significant to the probability of (I): front vowel, including the factor group 'lexical item'

<hr/> <hr/>			
Corrected mean			0.11
Log Likelihood			-507.657
Total N			1496
	Factor weight	% of (I): front	N
<b>lexical item</b>			
listen	0.942	14.3	7
middle	0.929	33.3	3
shit	0.847	71.4	7
kick	0.843	80	5
shirt	0.835	20	5
sit	0.833	60	5
guid	0.806	55.6	27
girlfriend	0.804	25	4
girl	0.754	25	20
hit	0.747	50	4
competition	0.741	18.8	16
ginger	0.732	20	3
Kirk	0.726	17.2	29
Dick	0.69	50	40
circle	0.669	9.1	11
drinking	0.66	20	5
did	0.635	24.1	29
first	0.63	2.9	34
prick	0.607	8.3	12
Kirsty	0.598	10.8	37
stick	0.581	38.5	13
finger	0.577	33.3	3
drink	0.564	18.2	11
him	0.563	28.6	28
Jim	0.562	29.9	67
nickname	0.526	33.3	3
king	0.498	62.5	16
hing	0.493	48.1	27
hink	0.479	46.7	30
sister	0.461	6.5	31
big	0.456	14.7	129
kid	0.453	20	5
pick	0.449	7.1	14
think	0.422	20.8	24
pit	0.418	6.2	96
thing	0.415	18.2	11
bit	0.363	5.1	59
Jimmy	0.25	12.5	40
still	0.168	8.3	60
still	0.168	2.6	38
range	78		
<hr/>			
<b>preceding phon. context</b>			
glottal/velar	0.774	29.6	179
alveolar	0.675	19.7	466
/h/	0.659	37.8	98
dental	0.428	9.6	135
labial	0.304	7.1	450
approximant	0.208	5	160



range 57

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<b>grammatical category</b>			
adverbs/adjective	0.735	20.5	707
proper nouns/pronouns/ordinalr	0.474	24.2	132
verb	0.332	15.8	240
noun	0.118	7.1	269
range	62		

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<b>voicing of following segment</b>			
voiced	0.586	18.3	854
voiceless	0.385	12.4	636
range	20		

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Table h: Multivariate analysis of the contribution of features selected as significant to the probability if (I): back vowel, including the factor group ‘lexical item’

<hr/> <hr/>			
Corrected mean			0.058
Log Likelihood			-386.102
Total N			1496
	Factor weight	% of (I): back	N
<b>lexical item</b>			
still	0.98	73.7	38
did	0.923	3.4	29
sister	0.918	3.2	31
first	0.907	94.1	34
circle	0.829	54.5	11
pit	0.793	18.8	96
guid	0.698	3.7	27
listen	0.626	28.6	7
pick	0.574	7.1	14
bit	0.539	6.8	59
him	0.516	7.1	28
thing	0.421	9.1	11
drinking	0.333	20	5
prick	0.202	8.3	12
girlfriend	0.195	25	4
Kirsty	0.189	24.3	37
drink	0.182	9.1	11
bit	0.083	0.8	129
Kirk	0.05	6.9	29
girl	0.037	5	20
range	95		
<hr/>			
<b>preceding phon. context</b>			
approximant	0.938	33.8	160
labial	0.634	18.4	450
/h/	0.624	7.1	98
dental	0.557	33.3	135
glottal/velar	0.514	12.8	179
alveolar	0.16	9	466
range	77		
<hr/>			
<b>grammatical category</b>			
noun	0.955	51.7	269
pronoun/proper noun/ordinal	0.413	5.3	132
adjective/adverb	0.348	6.4	707
verb	0.203	6.2	240
range	75		
<hr/>			



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