Listener Expectations and the Perception of Scottish English /ʉ/: A Sociophonetic Investigation

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Abstract

A sociophonetic speech perception experiment was conducted using Edinburgh listeners. The participants listened to recorded speech followed by a synthesized /ʉ/ vowel and were asked to decide whether the synthesized vowel matched the one produced by the speaker in a target word contained in each sentence. Half of the listeners were told that the speaker was from Edinburgh and half were told he was from Glasgow; the speaker was actually from Edinburgh. The response patterns of the two groups were analyzed to see if there were any significant differences in vowel choices based on the social information given about the speaker. The results are inconclusive, but insight has been gained on the methodology needed for future studies.

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Declaration

I have read and understood the University of Edinburgh guidelines on plagiarism and declare that this dissertation is all my own work except where indicated otherwise with proper use of quotes and references.

Kristina Barnes

To my grandmother, JoEva Benardis (1929-2005), whose bravery and strength will always be an inspiration to me

Table of Contents

List of Figures

List of Tables

Chapter 1

Introduction

The following study was an attempt at finding a relationship between social stereotypes and speech perception in native speakers of Scottish English. Participants (who were native to Edinburgh and the surrounding area) were asked to listen to recorded sentences followed by a synthesized vowel chosen at random from a six-point continuum; their task was to judge whether the vowel matched the one heard in the sentence. Half of the listeners were told that the speaker was from Edinburgh, and half were told he was from Glasgow. The same speaker, who was native to Edinburgh, was used in both conditions. The responses of the listeners were analyzed to investigate whether any significant differences existed between the groups based solely on the social information given about the speaker.

1.1 Vowel Perception

The amount of information that is contained in a single speech sound has yet to be determined. Current research strategies involve focusing on very specific features of human speech to find their phonetic function within the larger framework of language processing. The perception of vowels is a complex process that cannot be entirely explained by acoustic principles; the auditory system is merely the beginning link in a chain reaction.

The sounds of consonants are perceived categorically (Liberman *et al*, 1957); fine phonetic details cannot be easily distinguished between consonant sounds that are very similar, such as sounds that lie (acoustically) between /b/ and /d/. Phoneme boundaries for consonants (as labeled by listeners) shift very abruptly. For example, a continuum of sounds will be acceptable as /b/ until they approach the category boundary, where they will suddenly be

perceived as /d/ (as was shown by Liberman *et al*). Vowels, on the other hand, are perceived continuously (Fry *et al*, 1962); a great deal of phonetic detail can be differentiated between vowel sounds that are nearly identical acoustically, that is, vowel sounds that are in the same category. According to a study by Pisoni (1973), the auditory short-term memory works differently when discriminating within-category phonemes. His experimental results showed that listener performance for within-category vowel discrimination was well above chance, while their performance for within-category consonants was not. Clearly, vowels and consonants are perceived in different ways, and it appears that vowels contain much more complex information for a listener to analyze.

Synthetic vowels are often used in studies investigating speech perception because researchers can exert much more control over the desired aspects of the signal than they can with natural speech, and thus they can focus on the way a particular feature is perceived. An issue that has been raised about the use of such stimuli is whether listeners can perceive synthesized vowels in *exactly* the same way as they do natural speech sounds. While the naturalness of the sound has been shown to play a part in some aspects of perception (Wissig *et al*, 2004), it does not appear that vowels lacking "natural" qualities are more difficult to identify. This concept has been investigated by Klatt (1982), who found that listener's judgments of phonetic distance depend largely on differences in the formant frequencies of vowels and very little on such things as spectral tilt and formant amplitudes (which contribute to the "natural" sound of a given vowel).

If the formants are the most important acoustic cue in vowel identification, what other information can the formant frequencies contain? A classic study by Ladefoged and Broadbent (1957) showed that synthesized vowels with varied formant frequencies contained three different types of information: personal, linguistic and sociolinguistic. The relative positions of

the formant frequencies are responsible for the latter two types. How much sociolinguistic information is contained in the formants alone? Is it possible to manipulate this process? The following study will investigate the perception of formant frequencies in the context of social information about the speaker.

1.2 Accent Perception

The first time we hear people speak, we begin to analyze their vowel spaces (among other features of their speech, such as consonant realization and intonation), placing them into accent categories (Clopper and Pisoni, 2005). Once the general vowel spaces of speakers have been mapped in our brains, we may be able locate their geographic origins, assume things about their personalities, upbringing, and sometimes even socioeconomic status (Wells, 1982; Lambert *et al* 1960; Ladefoged, 2001a). How do we identify these social markers in the speech of others?

Laver and Trudgill (1979) examined some of the ways in which any two accents may differ. Phonologically, there can be different phonemic systems; lexically, there can be different selections of phonemes for pronunciation of words; and phonetically, there can be a difference in the actual pronunciation, or realization, of a phoneme. Speakers can adjust their accents to accommodate particular social situations and ambitions, and listeners have been known to misinterpret linguistic markers. Bernard Shaw's play, *Pygmalion,* illustrates this phenomenon nicely: when Eliza Doolittle, a young Cockney woman, is trained by phonetician Henry Higgins to speak with an upper class British accent (as well as dress and behave like an upper class lady), she is mistaken by another phonetician to be a Hungarian princess in disguise because she speaks English "too perfectly" (p. 97). The central question of the present study follows from this scene: can people be *led* to misinterpret an accent?

Speech perception clearly involves much more than speech itself; countless outside influences can alter the way a speech signal is interpreted. For example, visual stimuli showing articulatory gestures can disrupt the perception of simple one-syllable phonemes, known as the McGurk Effect (McGurk and MacDonald, 1976). While showing a film of a person's face producing one-syllable utterances, like "ba" and "ga," the dubbed soundtrack was deliberately mismatched to what, on the film, was actually produced; this resulted in misperception of the utterances. The same principles can be extended to accent perception. Social stereotypes, rather than actual accent features, can also have an effect on the way a person's speech is perceived; by manipulating listener expectations, these stereotypes can be made more apparent. Rubin (1992) conducted a study where visual information induced these expectations. The experiment involved matching recorded speech to faces of different nationalities; American listeners found the same recording of a Standard American English speaker (from Ohio) less intelligible when it was paired with an Asian-looking face than with a Caucasian one. In addition, the American speaker's accent was perceived as "foreign" when paired with the image of an Asian person.

The strongest influences on accent perception are cultural ones. On a small scale, the stereotypes and attitudes that exist in a given speech community can have a great impact on the interactions a person from outside that community has with its members. The term "speech community" is difficult to define, but for the purposes of this study, it shall entail social membership paired with shared linguistic practices (for an explanation of this definition and a discussion on the definition of a speech community, see Patrick, 2002). Kerswill and Williams (1999) investigated dialect recognition in British English speech communities, focusing on dialect leveling, or the "reduction in regionally marked forms and the adoption of regionally more widespread features" (p. 176). They found that the demographic history of

towns and the social networks within have an influence on the level to which its residents can recognize both their own dialects and others'. For example, some communities are close-knit or "focused" (p. 177), meaning the residents do not often interact with people from other communities, and therefore the dialect is relatively stable (these are often in rural areas), while others are open, or "diffuse" (p. 177) and have contact with many people from other locations, making the dialects subject to change over time (these tend to be in urban areas). The differences between these two types of communities contribute to the level of accuracy that listeners display in dialect recognition.

When dialects come in contact with one another, a power struggle ensues; which features will be retained and which will fade away is difficult to predict (Labov, 1972; Trudgill, 1986). Dyer (2002) studied the process of dialect leveling that is occurring in the English town of Corby, which has been under the influence of Scots dialects (particularly the Glaswegian varieties) due to migration of workers since the mid-twentieth century. Many of the small children in this town, who have presumably never been to Scotland, speak with a distinctive Scottish accent, according to interviews conducted by Dyer. A Glasgow native commented on the Corby dialect: "'I know lots of people who've been born in Corby and they've got a stronger Scottish accent than I have'" (p. 101). While it may be argued that Scottish English dialects are under the influence of Anglo-English ones (Jones, 2002), Dyer's study shows that Scottish dialects can exert a strong influence on English ones.

The speech communities within the urban centers of Scotland are complex and it is difficult to pinpoint where influences are strongest, where (or when) they originated, and in which direction they occur (see Macafee, 1994); speech community will be a factor in the analysis of the participants' responses in the present study, because the sociolinguistic environment each person grew up in will most likely have an influence on their language attitudes and ability to recognize dialects.

Clopper and Pisoni (2004) investigated the process of dialect categorization of American English by American listeners. They found that listeners use their phonological knowledge of differences to categorize different talkers. Perceptual learning, such as personal experience with and exposure to other dialects, appears to play a role in the individual differentiation abilities of the listeners. The speech community where any given individual grew up will certainly have an impact on the amount of perceptual learning that will have taken place in terms of dialect recognition.

Dialect perception has also been examined in detail on a larger cultural scale, for entire languages and countries. Inoue (1999) discusses the concept of "dialect image," or the "socio-psychological image of a (geographical or social) dialect" (p. 148), and compares the data from two studies that he conducted in England and Japan where subjects were asked to separate dialects geographically on a map. Two mechanisms appeared to be at work in both studies: linguistic distance from the "standard" language and social prestige of the residents in a given area. The most interesting findings of these two studies were that listener opinions appear to be much stronger in England than in Japan, and the English listeners also showed greater precision in geographical placement of dialects. According to Inoue, it is likely that this is due to a difference in the cultural importance placed on the accent with which one speaks: "standardness" of dialect is socially determined in England, while it is geographically determined in Japan; urban dialects are evaluated differently in the two cultures, Japan holding them in higher esteem; also, the differences in social class structure seem to play a role as well.

The English language has a rich cultural history and is sociolinguistically complex. On the surface, North America and Britain have relatively similar cultures; upon closer inspection, the degree of dialect awareness and differentiation divide these two cultures. Milroy (1999)

explains these differences in terms of language ideology. On the issue of "standardness," the U.S. defines Standard English as the mainstream, "colourless" variety, or as having "no accent" (p. 174). In Britain, Standard English, otherwise known as Received Pronunciation (RP), is a marker of upper class membership, an accent of the elite, which has never been mainstream. The definition of "standard" is only the beginning of the differences between these cultures' language ideologies. According to Milroy, accent perception in Britain is a reaction to social class and any corresponding stereotypes; in the U.S., accent is a marker of race and ethnicity, also entailing stereotypes.

Milroy compares the historical reasons for certain dialects becoming stigmatized: in Britain, the areas that are consistently found to have the least prestigious dialects are London (Cockney), Birmingham, Liverpool (Scouse) and Glasgow; historically, these varieties are stigmatized because of an ongoing bitter class conflict in urban and industrialized areas. According to Milroy, while the U.S. does not show a consistent pattern of stigmatization of dialect by class, a racial dialect stigmatization exists for speakers of African American Vernacular English (AAVE)—particularly in the South—stemming from racial tension following the end of the Civil War (for further discussion of the perception of AAVE, see Purnell *et al*, 1999). The U.S. has shown a great deal of resistance to foreign languages in the past (immigration from other countries en masse gave rise to an "English Only philosophy," Milroy, 1999, p. 195), while Britain has shown strong resistance to non-standard dialects. How deep do the differences in language attitudes between these cultures reach? The speech perception experiment in the present study will attempt to answer this question.

Sociolinguistic studies show vast differences in the degree to which residents of these two cultures can differentiate and localize any given dialect. Preston (1999) looked at language attitudes and mental maps of regional

varieties in the United States. Despite the lack of a listening task, subjects clearly had stereotypical speech samples in their memories from which they derived their evaluations of speaker accents and personalities by region, as was shown by their ratings of regional accents on the map. However, their ability to label accents *within* regions was very poor.

Fought (1999) studied the dialectal attitudes of undergraduate students in California using a blank map of the U.S. (containing only state boundaries); the students were asked to label and draw lines between the areas where they thought people spoke differently. She found that there was little agreement on specific regional divisions beyond the very broad definitions of West, Midwest (the boundaries were very inconsistent for this region), South, and East; even those definitions carried a large amount of variability. Many states were labeled as "unknown" in terms of dialect. Though this was not assigned as part of the task, some respondents used the words "proper" or "good" English to describe some regions. "Proper" was used most often in relation to the Northeastern states, while "good" was used in relation to the Western states (pp. 125-6). Fought concludes that this distinction lies in what is aesthetically pleasing to the respondents ("good") as opposed to the stereotypical correctness of pronunciation ("proper"). Some of the stereotypical comments made by the respondents are worth noting here: when labeling the Southern dialects, the terms "hillbilly" and "redneck" were used often; Northeastern dialects were referred to as "harsh," "rough," "rude," and even "violent" (p. 128-9). The dialects of these two areas are clearly stigmatized, at least in the mental representations of many California residents, who perceive California speech as "relaxed," "hippie," and "surfer" (p. 131). There were positive and negative labels for each region, which indicates conflicting language attitudes in these respondents. Though not addressed by Fought, this high amount of variability could be linked to linguistic experience; some of these respondents may actually have family or

acquaintances in (or from) these regions and would therefore not only have a more positive attitude towards the dialects through association, but might also be reluctant to express a negative opinion of them.

The linguistic attitudes of Britons have been found to be much more specific and consistent than those of North Americans, especially when it comes to the labeling of "correctness" and "pleasantness." Preston (2002) found that "correct" to North Americans (from Michigan) simply referred to whatever regional dialect the respondent spoke, while "pleasant" was more loosely defined, and Northern respondents were reluctant to label their own dialect as the most "pleasant." Some interesting differences were found between Northern (Michigan) and Southern (Alabama) respondents, both on the "correct" and "pleasant" ratings. While the South received the worst ratings on both "correctness" and "pleasantness" from Northern respondents, Southern respondents found their own dialect more "pleasant" than "correct." Preston attributes this to the differences in importance placed on these qualities by the two regions.

Approximately 20 years earlier in Britain, Trudgill (1983) examined these concepts in depth, so it should be noted that some things have possibly changed culturally in Britain since then. It appeared that the most "pleasant" and "correct" accent was Standard British English (RP), which is not a regional variety at all, but a learned accent used by the BBC (until late in the twentieth century, when regional accents became increasingly acceptable [Milroy, 1999]) and individuals of the highest social and political status. The further away a speaker's accent was from this established standard, the more "incorrect" and "unpleasant" it became to British listeners. It appears that the terms "correct" and "pleasant" are synonymous to British listeners, while there is a degree of difference between them for North American listeners.

Trudgill (1983) asserted that the educational system was responsible for this sociolinguistic attitude (Edwards & Giles, 1978, also pursued this idea,

calling education "an institution of the middle class", p. 119). Small children were encouraged by teachers to use RP and were rewarded for doing so; use of any regional variety was frowned upon and those students who continued to use them did not advance as quickly. The higher one's education was, the closer one's accent became to RP. In this way, RP had become a type of idiolect to identify someone as a member of an elite community. Children in British schools today are still encouraged to use Standard British English instead of their own regional varieties (Carter, 1999).

Another study (Trudgill 1983) involved listeners from America, Canada, Scotland, Ireland and England who were asked to rank British accents in terms of aesthetic value based on recordings of different speakers reading the same prose passage. English subjects found Glasgow, Liverpool, the West Midlands and London to possess the "ugliest" accents, and Scottish subjects showed similar preferences (the only difference, interestingly, is that they preferred the South Wales accent to RP). All other regions showed markedly different preferences with very little agreement; this result shows that an inherent aesthetic value does not exist for English accents. Therefore, it must be socially determined. The similarity between the attitude judgments of Scottish and English listeners suggests that English language attitudes have influenced Scottish ones. It is interesting at this point to note that the same British varieties that were stigmatized in Trudgill's study two decades ago are still stigmatized today (as reported by Milroy, 1999).

Scotland has a dialectal diversity all its own, mostly because it did not undergo the same sound change as the rest of Britain (see Wells, 1986 for a historical account). Corbett *et al* (2003) describe the term "Scots" as a continuum of languages with "Broad Scots" at one end and "Scottish Standard English" (henceforth SSE) at the other, though they note that Scots more often refers to Broad Scots than other varieties. It is also noted that the continuum itself is problematic because there does not exist a straight line

between SSE and Broad Scots; the two labels themselves encompass a wide range of social and geographical variants, many of which are undergoing changes in every generation. The Scots-SSE continuum was also studied by Aitken (1979) in terms of social class, age and education.

Stuart-Smith (2003) analyzes the phonological details of modern urban Scots, focusing on Glasgow dialects: "Urban Scots of Glasgow continues a form of West Central Scots, which has changed and is continuing to change mainly through processes of dialect contact and levelling with Scottish Standard English" (p. 110). By collecting both middle class and working class speech, she was able to describe working class speech more accurately, because of "patterns that are characteristic and, sometimes the exclusive domain, of Scots" (p. 113). Her analysis of the Scottish English vowels reveals the patterns that are present in Glasgow Scots, Scottish Standard English, and RP. There is also a middle category, between Glasgow Scots and SSE, which represents alternating forms, and Stuart-Smith refers to this as "Urban Scots." She attributes the presence of alternation in these speakers to dialect contact.

According to Jane Stuart-Smith (personal communication), there is a socially determined scale for the accents of Edinburgh and Glasgow, from the working class variety of Glasgow to the upper class variety of Edinburgh. The Scots dialect of working class Glaswegians, otherwise known as Glasgow Vernacular, is thought to be the least desirable, followed by the middle class (Glasgow) Scots dialect. The working class Edinburgh dialect is held in higher esteem than middle class Glaswegian Scots, and middle class Edinburgh dialects trend towards Scottish Standard English (SSE), spoken by upper class Edinburgh residents.

An interesting pilot study on the relationship between the Scots language, identity and nationalism by Hardie (1995) revealed that perception of Glaswegian accents can be problematic. Scottish listeners living in Edinburgh were asked to identify four varieties of Scottish speech on a

continuum from Scottish English to Scots. The group identified Scottish English, Fife (Lowland Scots), and Doric (Aberdeenshire) consistently, but were undecided on Glasgow speech; the responses were spread across the continuum. It appears that Glaswegian accents, at least in this study, were difficult to classify. The present study shall pursue this idea further by investigating which vowels listeners will find acceptable as "Glaswegian" in contrast to vowels acceptable as "Edinburgh."

There has been a lot of interest since the 1970's in urban Scots dialects, particularly in the Glaswegian varieties. Macaulay (1977) studied the language of Glasgow in the context of social class, education, and religion, making recordings of various Glaswegian speakers and playing them back to Glaswegian listeners. He compared the linguistic variation within Glasgow to the range of idiolects found in New York City by Labov (1966). Listeners were asked to evaluate the occupation rank of the speaker that they heard, and Macaulay concluded "…the informants share a set of values by which they can evaluate their fellow citizens on the basis of very short stretches of speech" (p.82), though he could not determine what phonetic cues the listeners used to draw these conclusions. One of the main goals of the present study is to investigate what one of these cues might be.

A more recent Glasgow study was done by Macafee (1994), who investigated the use of the vernacular in working class residents of the East End of the city. She discusses the influences that Glasgow's urban dialects have been under and the influence that they have on other areas; London and Edinburgh have a great deal of influence on Glasgow, but Glasgow also has influence on Edinburgh and Dundee dialects. Another interesting sociolinguistic topic covered my Macafee is linguistic insecurity. Working-class Glaswegians are reportedly self-conscious of their accents, due to the mutual hostility between social classes within Glasgow; the interviewees in

the study, who were otherwise articulate, would become tongue-tied if they were asked to talk about social class, education, or Standard English.

Looking more closely at language attitudes, Macafee found that the working class Glaswegians she interviewed expressed negative views toward Edinburgh residents, referring to them as "snobs" or "toffs" (pp. 175-6). She notes that "urban middle-class Scots are perceived by the working-class as anglicized, and if their speech is quite standard, they are in fact very much closer to an English speaker of the same class than to a fellow Scot who speaks the dialect" (p. 176). What the present study will attempt to determine is whether there are corresponding attitudes towards Glaswegian varieties held by middle class Edinburgh natives.

Another study conducted in the 1970's provides support for the idea that English linguistic attitudes have had an influence on those of Scotland. Reid (1978) interviewed 11 year-old boys in Edinburgh and found that they are highly aware of the stylistic changes that occur in different social situations. The way their female classmates talk to teachers is described as "posh," while the way they talk with their friends is "normal" (p. 169). There also appeared to be a particular speech style that children were expected (by their parents) to use when they were guests in someone's home. There was a code-switching behaviour occurring in children (at least during this study) such that they could have been simultaneously rewarded by teachers and parents while also being accepted by their peers. It is interesting to note that the 11 year-old children in Reid's Edinburgh study would now be 38 years old, which is near the age group of the Edinburgh listeners in the present study; perhaps these linguistic attitudes and practices have persisted over the past 27 years.

One thing that has certainly persisted throughout Britain is the use of the slang term "posh" to describe an accent. When this term is used in relation to a person's behaviour or speech, it usually means that the person is

wealthy, sophisticated and (thinks he or she is) socially superior (definitions found at www.urbandictionary.com and www.peevish.co.uk). "Posh" will make another appearance in Chapter 3, when it is used by an experimental participant to describe the speaker's accent.

1.3 Sociophonetics

Over the last 15 years, sociolinguistics and phonetics have been merging to form a single discipline. Clopper and Pisoni (2005) review these developments and comment on new techniques and strategies that are being utilized in the current research. Some of the methodologies they summarize are map-drawing tasks, attitude judgments, the matched-guise technique (where the same speaker uses different accents), speech caricatures (dialect imitation), and vowel matching. Their comments on attitude judgments and vowel matching are most relevant to the present study, and will be described in greater detail below.

In Britain, sociophonetics is a growing, thriving field of study. New theories are emerging about the social nature of English speech production and perception in the British Isles (see Foulkes, 2002 for a review). The dialects in the Newcastle area have been a popular topic in British sociophonetic studies. Docherty and Foulkes (1999) presented evidence from an acoustic study of glottals, finding further support for the possibility that consonant production has a sociophonetic dimension. Watt (2002) presents evidence for leveling of the Tyneside dialect to a more "putative regional standard" (p. 44), based on an apparent decline in the use of traditional variants by certain social groups. The Tyneside accent has long been stigmatized as a "backward" (p. 55) or undesirable variety, causing (especially middle class) young people to use variants that are closer to the more general Northeastern dialect; interestingly, RP is viewed negatively by many Tyneside residents (Beal, 1999, as cited by Watt), so leveling toward this

variety is highly unlikely. This region has been more influenced by dialect contact with Scotland's Central Belt varieties.

Foulkes, Docherty and Watt (1999) conducted a study on 2-4 year-old children in Newcastle, focusing on the production of /t/. They found that these children already displayed sophisticated adult accent patterns, including variants that changed with phonological context. It also appears that the acquired accent of children in this area is directly related to the accent of the primary caregiver, including any features undergoing sound change. Hewlett et al (1999) also found that parental accents had an influence on production patterns in Scottish English speaking 6-9 year-olds; the Scottish Vowel Length Rule (SVLR) was more robust in children with at least one Scottish parent than in those with non-Scottish parents. In the present study, listeners will be asked to provide information about their parents' geographical backgrounds; this will help to assess each individual's linguistic experience during accent acquisition, which will certainly play a role in their perceptual responses to accents.

A perceptual study by Evans and Iverson (2004) investigated vowel normalization (in the broad sense of accommodating for differences between speakers) for Sheffield and Southern Standard British English accents; the researchers examined the ratings of synthesized vowels (which were embedded in carrier sentences) by listeners, determining where the best exemplars were located for the two accents. The synthesized continuum was large enough to represent the entire vowel space of the speaker, who produced both accents. The listeners judged the vowels embedded in words on a continuous scale ranging from "close" to "far away" in terms of the accent they heard. The results suggest that the linguistic experience of listeners predicts the extent to which they will normalize vowels for different accents of British English. There also appeared to be sociolinguistic mechanisms at work; listeners living in multidialectal environments tend to

adjust their accents to fit in socially with other members of particular communities, and so their perception of accents is altered as well. This idea will be pursued in the present study by collecting biographical information from the listeners.

Scottish dialects have also received a lot of sociophonetic attention in the past several years. Stuart-Smith *et al* (2003) studied sex and gender differences in the production of /s/ in Glasgow, finding age and social class to also be factors in the acoustic differences. While some of the difference can be attributed to physical differences, there seems to be evidence for group identity as a determinant of how /s/ is produced. Eremeeva and Stuart-Smith (2003) analyzed the read and spontaneous speech of Glaswegian males from two different age groups and two different social classes, focusing on the vowels of the words "out" and "bit." They found that the realization of these vowels is socially stratified, corresponding to the level of frontness or retraction. There is also evidence presented for a socially-driven sound change in progress. The frontness and retraction of /ʉ/ in Scottish English will be investigated in the present study to see if there are any socially marked variants of this particular vowel.

Stuart-Smith (1999) has also investigated voice quality in the Glaswegian accent, which turns out to be a very important aspect of this variety of Scots, especially in terms of social class. If variation in production can be linked to sociolinguistic factors, to what extent are they linked to the perception of these same variants? Acoustically, what is the phonetic trigger that must be pulled in order for a social marker to be acknowledged in an individual's speech? What about the intentions of the speaker and the preconceptions of the listener? These present study will attempt to answer these questions.

While Glasgow has received a lot of the recent interest in Scottish dialects, Edinburgh varieties have also been studied in terms of gender, age

and social class. Using recordings of formal interviews and informal observation, Chirrey (1999) identified and characterized the accent of Edinburgh and its surrounding area according to education and employment, which helped to determine the social class of speakers. She comments on the distribution of social classes between Edinburgh and Glasgow, stating that Edinburgh has a larger middle class than Glasgow, and thus Edinburgh speakers "are on the whole more oriented towards standard varieties than their Glasgow counterparts" (p. 224). What will be investigated in the present study is if Edinburgh listeners will continue to hear a "standard" Scottish dialect (presumably similar to their own) when they have been told that the speaker's dialect is of a "nonstandard" type—that is, a Glaswegian dialect.

Comparing Edinburgh and Glasgow accents, Scobbie et al (1999) re-examine the Scottish Vowel Length Rule (SVLR), finding that it only applies to the vowels /i/, /u/, and /ai/ in middle class and working class Scottish Standard English, which contradicts previous research on the topic. There also appears to be an influence of Anglo-English speech, particularly on middle-class Edinburgh residents. In another comparison of these two urban dialects, Stuart-Smith (2003) describes and outlines the phonological system of modern Urban Scots, noting a key difference between the Edinburgh and Glasgow accents: intonation of the former tends to terminate in a mid- to low-fall while the latter shows a high rising pattern (for more comprehensive phonological descriptions of these varieties, see Robinson and Crawford, 2001; and Jones, 2002).

A lot of data has been gathered and analyzed on the production of Scottish phonemes; more investigation is needed on the *perception* of them, with particular interest in sociolinguistic factors similar to the ones reviewed above. This study will attempt to determine if Edinburgh native listeners have a set of stereotypical Glaswegian vowels in their memories that will

influence their choices of synthesised vowels to match a speaker's natural production of them.

1.4 Michigan or Canada?

Niedzielski (1999) has investigated the effects of social information on speech perception in North America. Her hypothesis was that a) listeners use social information to the same extent as any other non-auditory cues (e.g. visual) to "create or calibrate the phonological space of speakers" (63); b) language stereotypes have an effect on the ways a listener will calibrate the phonological space of a particular speaker; and c) people have stereotypes about their *own* dialect, which may be inaccurate, and this in turn affects the calibration of the phonological space of fellow speakers of that dialect.

Niedzielski had found in her previous research that Detroit residents have a stereotype of Canadian English speech, particularly in regard to Canadian Raising (CR), where a diphthong is produced with the tongue raised and forward in the mouth. The best example is /aw/ as in "house." What she also found is that white, middle-class Detroiters actually produce this raised diphthong, but are unaware of it. In addition, Detroiters believe their dialect to be Standard American English, when it has actually been under the influence of the Northern Cities Chain Shift (NCCS).

The experiment involved Detroit-area residents; they were asked to choose a synthesized vowel from a six-point continuum that matched the vowels produced by the speaker they heard in a recording; they were told that the purpose of their participation was to assist a computer company (for which Niedzielski supposedly worked) in assessing the quality of computerized vowels. One synthesized vowel, corresponding to the vowel heard in a particular word from each recorded sentence, was presented to the listeners. Half of the listeners were told that the speaker was from Detroit (which she was), and half were told that she was from Windsor, Ontario,

Canada, which is very near Detroit (just across the Detroit River). The same speaker was used for both conditions, so any differences in the choices of the listeners could be attributed to their expectations based on the information given about the speaker. Clopper and Pisoni (2005) comment on Niedzielski's task design, questioning her decision to tell the listeners they were matching vowels for the purpose of improving synthetic speech; the listeners may have chosen particular vowels to "help" Niedzielski in selecting the "best" vowels, not the best *match* to the speaker's actual production of them (p. 319).

The synthesized vowels were created based on the differences between F1 and F2 produced by the speaker. Adjustments were made to F1 and F2 during synthesis to represent "actual onset" (closest to the speaker's actual production, p. 65), "canonical" (based on standard production, p.65) "ultralow" (where the onset is lower than the canonical variant, p. 65), and "hyperstandard" (where F2 is lower than standard production, p. 70) variants of the vowels.

The results showed that social information given about the speaker had a statistically significant effect on the vowels chosen by the listeners. Detroit speakers, who do not hear CR in their own speech or that of fellow Detroiters, will notice it if they are told that the speaker is Canadian. Because they expected CR, they heard CR.

Only one listener in Niedzielski's study refused to believe that the speaker was Canadian, and his response pattern was similar to listeners given the Detroit label. Because this listener had actual knowledge of Canadian speech, as opposed to a stereotype, he rejected the label completely.

Niedzielski failed to find significant differences in the responses based on gender, which conflicts with data from her previous language-attitudes study. Men in Niedzielski's previous study reported that there is no difference between the English spoken by Michiganders and Canadians, yet men in her perceptual study chose different tokens based on the label

attached to the speaker. She speculates that men in her language-attitudes study may have been reluctant to share their stereotypes with her because, as a woman, she would be considered an "out-group" member (p. 79). Women tended to give much more detail and personal narrative, while men gave short, one-sentence answers. Niedzielski concluded that men and women from Detroit share the same stereotypes of Canadian speech (at least on a perceptual level), but a male interviewer may be needed to (possibly) reveal their opinions, because, presumably, they will be more willing to share their attitudes with a man.

Overall, the findings in Niedzielski's study support her hypotheses: a) Detroit listeners use social information to calibrate the phonological space of a speaker; b) stereotypes affect the calibration of the phonological space of speakers of particular language varieties; and c) people have inaccurate stereotypes of their own speech, and this affects the calibration of the phonological space for members of their own speech community.

The results of this study are compelling: apparently, a simple label can cause marked differences in vowel perception. If North Americans can be led to believe they are listening to an accent which is different from theirs (even if it is not), will Britons be so easily influenced? If Edinburgh listeners expect to hear a Glaswegian accent, will they mistake an Edinburgh accent for a Glaswegian one? If so, what are the implications? One possible implication is that social cues actually *alter* the way a person's speech is processed in the brain, or that these cues direct the attention of the listener to particular stereotyped phonemes which may otherwise go unnoticed if they are in fact present acoustically. An important question to be addressed herein is how well-defined stereotypes of accent are in Britain; are they fairly consistent between individuals, or do different levels of accent familiarity produce different perceptual responses? The present study will attempt to replicate the results of Niedzielski's study. If similar results are found, the likelihood

of the phenomenon being region- and/or culture-specific will be lessened. If similar results are not found, then this phenomenon may very well be linked to North American language attitudes, or even Detroit-specific language attitudes.

1.5 Aims and Goals

Based on Niedzielski's experimental design, I conducted a similar study using Glasgow and Edinburgh accents. I aimed to find comparable results using Edinburgh listeners. Recorded sentences, read by an Edinburgh native speaker, were presented, followed by a synthesized /ʉ/vowel chosen at random from a six-point continuum. The listeners were asked to give their opinion on whether or not the vowel matched the target word in the preceding sentence; it was a forced-choice task, so they had to answer either "yes" or "no." They were not given information on the purpose of the study (as in Niedzielski's experiment). Half of the subjects were told that the speaker was native to Edinburgh (Group 1), half that he was native to Glasgow (Group 2). The investigation attempted to determine whether the differences in the vowels chosen by the two groups could be attributed to social information about the speaker. Questionnaires completed by the listeners also helped to assess other possible factors (e.g. dialect exposure) in the response patterns.

The purpose of this study was to investigate whether or not native Scottish English speakers could be influenced to perceive an accent inaccurately (as in Niedzielski, 1999), that is, to perceive an Edinburgh accent as if it were a Glaswegian one. Edinburgh and Glasgow were chosen because of their geographical proximity, their status as the major urban centers of Scotland, and most importantly, their social differences and the attitudes (as discussed above) that often follow.

If the responses of Group 1 and Group 2 differ significantly, it may be theorized that the same principles of influence apply in Edinburgh as they appear to in Detroit—that social information elicits expectations which subsequently influence perception. If the responses of the two groups do not differ significantly, it can be speculated that Edinburgh listeners are familiar enough with Glaswegian accents to question or disregard the given label, or that the experimental conditions were such that significant differences could not be found, and the methodology will need to be adjusted for future experiments. Either outcome will provide insight for future studies on this topic, be they in North America or Britain.

Chapter 2

Methods

Thomas (2002) reviews some of the experimental methods that are important to sociophonetic investigations of speech perception, expanding on the theoretical issues already mentioned above. He notes that speakers of different languages rely on different linguistic features to determine dialect, such as prosody or segmental information. Thomas gives guidelines for future experiments in speech perception, calling his considerations a "cookbook approach" (p. 130). The parameters he discusses are choice of speakers; recording equipment and signal modification; synthesis and synthesizers; listening equipment and environment for its use; hearing impairment screening; experimental task; stimuli presentation; and response forms. Many of these guidelines will be discussed below with regard to the present study.

2.1 Recordings

Thomas stresses the importance of optimizing the recording environment, especially if the study requires speech synthesis based on the recordings. Recordings were made in the Theoretical and Applied Linguistics recording studio at the University of Edinburgh using the *SONAR 4* studio edition computer program with a *MOTU 828* audio interface (48 kHz, 16 bit sampling rate), and an *AKG SE 300B* microphone. Each speaker was seated approximately 30 cm from the microphone at a table in a sound-controlled booth, where he read sentences from cards that were placed on the table. The sound files were in WAVE format, and the sampling frequency of the recordings was later converted to 22.050 kHz.

2.2 Speakers

An issue in speaker selection that Thomas discusses is the intensity of the speaker's dialect; is it easily recognizable as a specific regional dialect? Another potential problem is the contextual variability of a speaker's dialect; a different accent and speaking style will result when reading sentences on cards in a recording studio as opposed to conversing on the street with a friend. While a person may fall into a particular dialect category, that person's upbringing and parentage could also have an effect on the resulting speech patterns (as seen in Foulkes *et al*, 1999 and Hewlett *et al*, 1999), and that person's dialect may be ambiguous or misleading to a listener. For example, Labov (1981) found that a particular vowel shift in a dialect of Philadelphia was dependent not on being born in the area, but on both parents being born there as well.

With these considerations in mind, two male speakers were chosen: one native to Glasgow and one native to Edinburgh. Both speakers' parents were also native to their respective cities of origin. The speakers completed a questionnaire that assessed their socioeconomic backgrounds; the Glaswegian comes from a middle class family, the Edinburgh native from a working class family. In terms of Edinburgh and Glasgow accents, neither of these speakers represents the extreme ends of the spectrum (i.e, neither Scottish Standard English nor Glasgow Vernacular, as discussed in the introduction); according to Macafee (1994) it may be difficult to tell the accents of these two social classes apart: "…there is a general downward shift of one sociolinguistic class in Glasgow, thus e.g. a lower middle-class Glaswegian sounds rather like an upper working-class Edinburgh speaker" (p. 176).

2.3 Sentences

Six sentences containing a word with the short /ʉ/ vowel were composed for the speakers to read aloud during the recording session (for

discussion of this vowel's usage in Scots, see Stuart-Smith, 2003 and Wells, 1982). Thomas discusses the advantages and disadvantages of using read speech as opposed to conversational speech. While conversational speech is more naturalistic, it is difficult to control the content and sound quality, especially if the researcher wishes to use particular phonemes, as in the present study. The target words were: suit, foot, book, astute, took, and boots. Both speakers read each of the 6 sentences 10-20 times in different sequences to avoid a list effect. The sentences are shown in Table 2.1.

The tailored ***suit*** was cleaned and pressed.
He broke his ***foot*** yesterday.
She closed the ***book*** and went to sleep.
The ***astute*** observation amazed her friends.
She ***took*** the cheque gratefully and left.
The old sailor's ***boots*** were torn and unlaced.

Table 2.1 Sentences

2.4 Analysis

Analysis of the formants was carried out with the *Praat* phonetics computer program (version 4.2.24). Examining each target word separately, the formants were isolated and the average frequency was estimated for each individual formant within the vowel's duration (between 80-100 ms); the formant frequencies were then averaged across word and speaker. The words "took" and "astute" yielded slightly higher f0 and f2 measurements than the other words for both speakers; this is likely due to the higher onset of the formants following the unvoiced plosive, /t/ (Ladefoged, 2001b). The final averages for both speakers are presented in Table 2.2. The F2 measurements of these speakers only show a 60 Hz difference, but the F1/F2 ratios show a difference of 120 Hz.

Speaker	F0	F1	F2	F3	F4
Glasgow	70	410	1600	2550	3100
Edinburgh	70	350	1660	2180	3290

Table 2.2. Speaker formant measurements, values in Hz.

2.5 Synthesis

Thomas discusses the advantages and disadvantages of the various speech synthesizers that are available to researchers today, namely the LPC and Klatt types. Klatt synthesizers (Klatt, 1980) are well-suited to the type of vowel synthesis used in the present study because of their capabilities to vary and modify acoustic signals in fine detail.

Based on the average formant measurements of both speakers, a six-vowel continuum was created using the *SenSyn* KLSYN88 cascade-parallel formant synthesizer computer program (Sensimetrics corp). The duration of each steady-state vowel was set at 500 ms. When a highly natural synthesized vowel is presented, duration is not particularly important for identification (Sawusch, 1996; Hillenbrand *et al*, 2002); the synthesized vowels used in this study were not particularly natural-sounding, so their duration was extended. The formant frequencies (F0, F1, F3, F4 and F5) of each synthesized vowel were set at the same corresponding levels except for F2, which ranged from 1250 to 1750 Hz with a difference of 100 Hz between each point on the continuum (Table 2.3). By varying only F2, it will become clear whether the listeners are using this acoustic cue alone to match the synthesized vowels to the speaker they hear. If too many parameters are varied, it may be unclear which cue is actually being used by the listeners in making decisions. If the results suggest that F2 is not the only cue that listeners use, subsequent experiments can explore other cues to vary (possibly in addition to F2) that will yield more conclusive results.

Thomas comments that there are advantages to using synthesis in sociophonetic experiments, particularly those examining dialectal variation; the researcher has fine control over the acoustic cues that are being presented, eliminating or minimizing other possible cues that the listeners may be using. He also mentions a number of hazards to using these types of stimuli, mainly that the content forces the listener to focus more closely on a perceptual cue than they would under normal circumstances, which could have an effect on their responses.

Since F1 was not varied, the position of F2 in relation to a constant F1 position corresponds to the degree of fronting or retraction that would be present in articulation of /ʉ/ with either a Glaswegian or Edinburgh accent. During the preliminary synthesis process, which was based on the formant measurements of the natural productions of the speakers, the vowel representing the Edinburgh speaker was vowel 3, and the vowel representing the Glasgow speaker was vowel 4; these vowels were the midpoints of the continuum. When adjustments were made for there to be a consistent 100 Hz difference between each vowel, the synthesized vowels that best represented the production of the speakers shifted to vowel 2 (Edinburgh) and vowel 3 (Glasgow).

Since the production of /ʉ/ by these particular speakers was so similar, it would have been problematic to synthesize four vowels that lie between them acoustically; this may have caused the listeners difficulty in differentiating each of the vowels (e.g. if no difference is perceived between, say, vowel 4 and vowel 5) between trials, which would affect their responses. If it is perceived as the same variant of the vowel, the response is likely to be the same, where it may change given a more noticeable difference. For a continuum of this size, there needed to be a substantial amount of difference between the points on it to determine the points at which listeners draw perceptual boundaries according to accent. With these concerns in mind, the

continuum simply corresponds to the changes in F2 which represent the degrees of fronting or retraction that are characteristic of Glasgow Vernacular (at one end) and Scottish Standard English (at the other end) accents (Stuart-Smith, 2003). Other varied parameters were spectral tilt (20 percent) and flutter (25 percent); these changes made the vowels sound slightly more natural. The amplitude of voicing was reduced gradually to 0 dB in the last 100 ms of each vowel to eliminate the popping sound of an abrupt offset.

VOWEL	F0	F1	F2	F3	F4	F5
1	70	380	1750	2500	3250	3700
2	70	380	1650	2500	3250	3700
3	70	380	1550	2500	3250	3700
4	70	380	1450	2500	3250	3700
5	70	380	1350	2500	3250	3700
6	70	380	1250	2500	3250	3700

Table 2.3. Synthesised Vowel Continuum, values in Hz.

2.6 Listeners

17 listeners participated in the experiment, all of whom were native Scottish English speakers between the ages of 19 and 33; there were 8 females and 9 males. Most were native to Edinburgh and the surrounding area, though some were from Perthshire. One listener was native to Tain (Easter Ross), which is in Northeastern Scotland. However, she had lived in Edinburgh for 4 years, and had friends from Glasgow which she visited frequently. Therefore, her exposure to Edinburgh and Glasgow accents was considered sufficient for inclusion of her data in the study. One listener's data was excluded due to his failure to follow the instructions given at the start of the experiment; he chose to judge the naturalness of the vowels (as he admitted during an informal conversation following the experiment), so his responses were drastically different from the rest of the listeners.

2.8 Experimental Procedure

The participants in the experiment were asked to listen to recorded sentences and decide whether or not the synthesized vowel following each sentence matched the vowel (in a target word) produced by the speaker. The listeners were divided into two groups: Group 1 was told that the speaker was from Edinburgh, Group 2 was told he was from Glasgow. Both groups actually heard the same speaker, who was native to Edinburgh.

Before beginning the listening session, each listener was given a questionnaire with either "Glasgow" or "Edinburgh" written on it, and they were told that the speaker they would hear is native to that city. The experiment was run using *E-prime* (Psychology Software Tools) on PCs located in sound-controlled booths. Each listener completed an informed consent form (which also verified that the individual had no history of speech or hearing difficulties). The computer screen displayed instructions and prompts, explaining the procedure to listeners and collecting responses. The screen welcomed the listener to the experiment, and then explained that it was a speech perception study on Glasgow and Edinburgh accents. The instructions on the screen repeated the information given by the experimenter about the city name written on the questionnaire. After the procedure was explained, the listeners were asked to listen to examples of the synthesised vowels so that they would know what type of stimuli to expect from the experiment; it was then explained that they were not judging the naturalness of the synthesised vowels, but whether the vowels sounded reasonably similar to the natural speech they heard in each sentence. Auditory stimuli were heard through Sennheiser HD headphones; the listeners were informed that they could adjust the volume (with the volume knob on the speaker) if necessary. Thomas, while acknowledging the usefulness of headphones for sociophonetic experiments, also reminds us that this equipment "creates a sociolinguistically unnatural environment" (p.134). However, the

environment used for the present experiment required the use of headphones, since the experiment took place in a room which is often shared with other researchers who are conducting separate experiments; outside noise, therefore, needed to be minimized. There were then a few practice trials to habituate the listeners to the procedure. A spoken sentence was heard through the headphones while the target word appeared on the screen. This was followed by one of the six synthesised vowels. A prompt then appeared on the screen asking "Did the synthesised vowel match?" The responses were given using the keyboard; the options were "1" for YES and "2" for NO. After three practice trials, the listeners were prompted to begin the experiment.

Thomas emphasizes the importance of detailed descriptions regarding the experimental procedure; length of pauses between stimuli, number of stimuli per set, and how subjects are cued when a set of stimuli end are the main concerns of the experimenter. During the experiment, each sentence was paired with each vowel from the continuum 4 times, for a total of 144 trials. The sentence vowel-pairs were chosen randomly by the computer for presentation to the listeners. There was an interval of 500 milliseconds between the termination of the sentence and onset of the vowel. The screen prompting the listener to respond would remain until a response was made. There were two opportunities during the experiment for the listeners to take a short break (at the end of 48 trials and again at 96 trials), cued by a message on the computer screen. Again, this screen would remain until the listener responded, thus continuing the experiment. At the end of all trials, the computer screen displayed a message stating that the experiment was over.

Following the listening task, the participants completed a short questionnaire to determine the following information: where they grew up, their age, where their parents grew up, their parents' socioeconomic status, the level of similarity/difference of the speaker's accent to their own, and their

level of social/familial contact with Glaswegians. Upon completion of the questionnaire, each participant was paid £5.

Chapter 3

Results

3.1 Data Analysis

Using *E-prime* software (E-Data Aid), the total number of "yes" responses were tallied for each listener according to vowel. The mean number of total "yes" responses by the groups are presented in Figures 3.1 and 3.2.

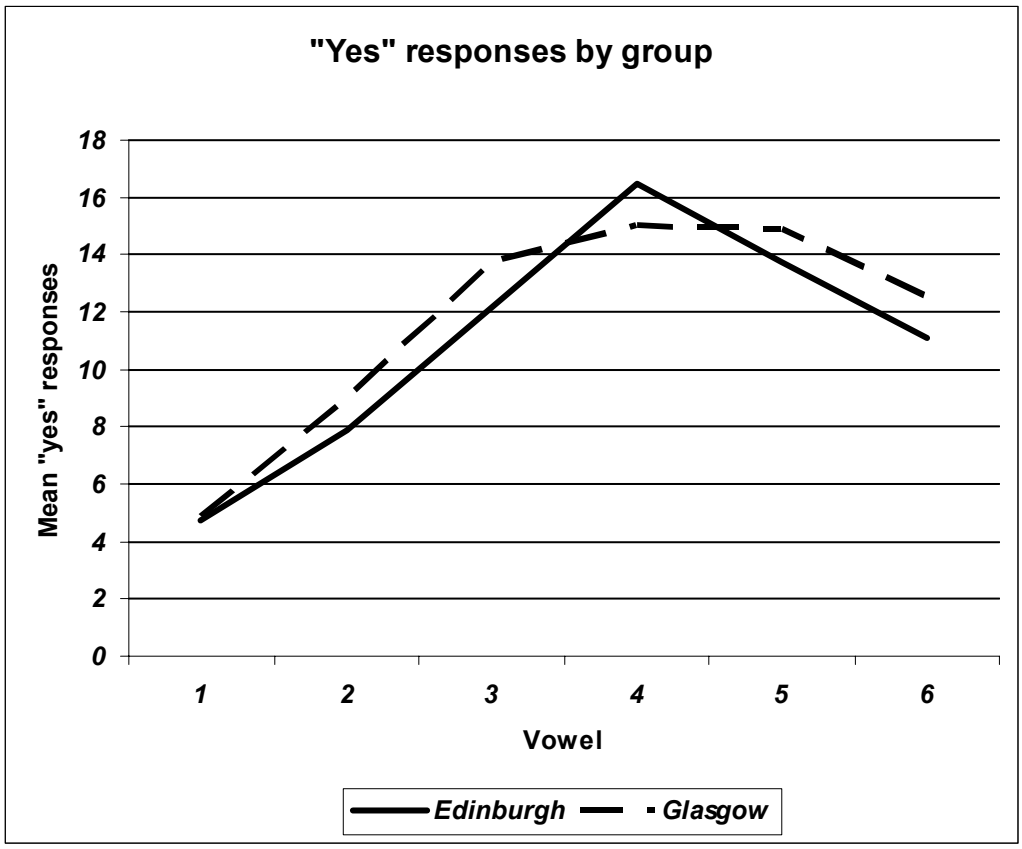

Figure 3.1. Mean "yes" responses by group.

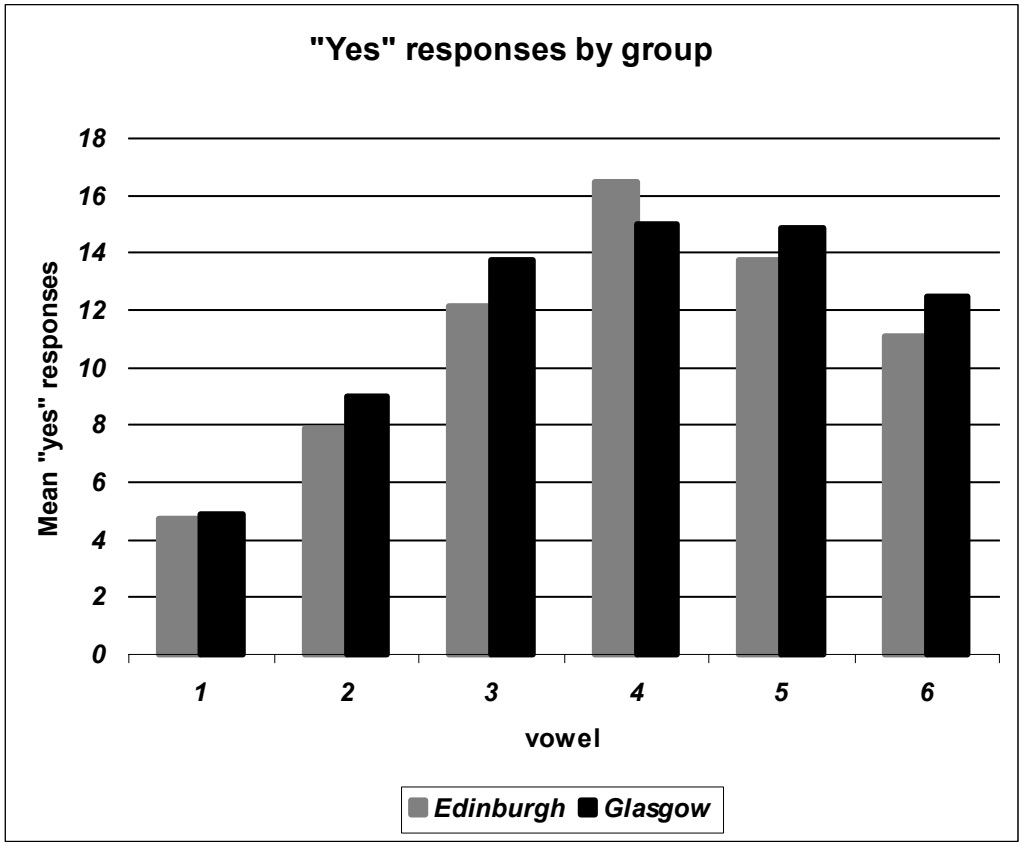

Figure 3.2. Mean "Yes" responses by group.

The Edinburgh group has a definite peak of "yes" responses for vowel 4, while the Glasgow group has a plateau of frequent "yes" responses from vowel 3 to vowel 5. It is interesting to note that the vowel which best represents the Edinburgh speaker's natural production of /ʉ/ (vowel 2) was not chosen very frequently by either group.

A non-parametric statistical test, the Mann-Whitney U test, was run on the data to investigate whether group assignment was a factor in the vowels that were chosen. The Edinburgh group (Mdn = 3.76) did not differ from the Glasgow group (Mdn = 3.95) according to which vowel was chosen most frequently, U = 26, ns, r = -0.16.

There is a great deal of individual variability in the responses patterns of the participants which may not be apparent by comparing the means of the two groups as a whole. The two most extreme (i.e. most different by

comparison) response patterns in the Edinburgh group are shown in figures 3.3 and 3.4. As can be seen in the figures, subject 3 chose vowels 2 and 3 the least, while subject 7 chose vowel 3 the most. Vowel 1 was chosen the most by subject 3, the least by subject 7.

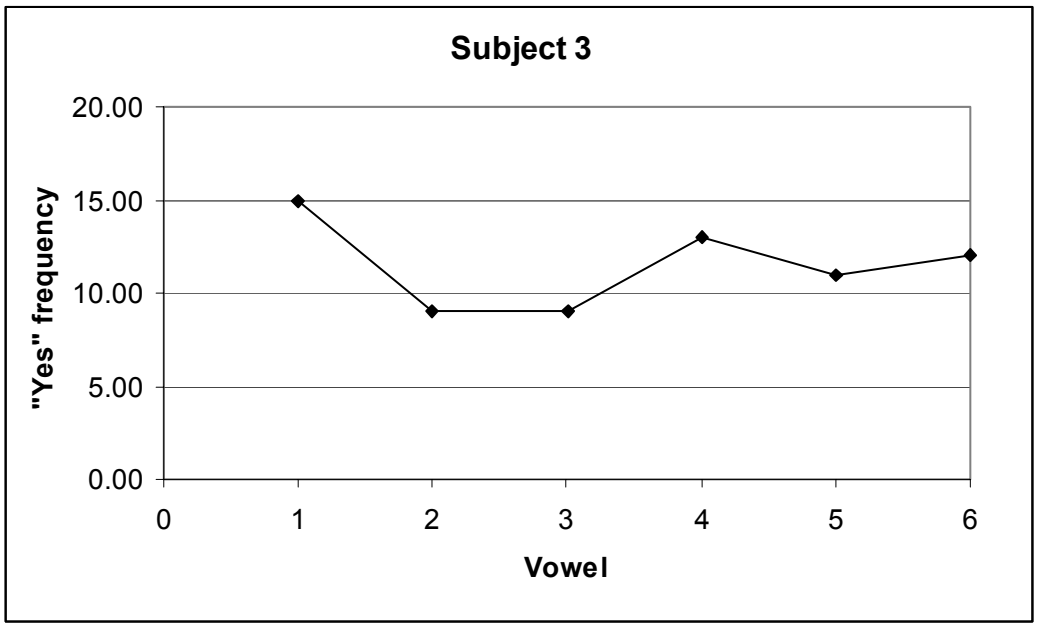

Figure 3.3. Subject 3 response pattern, Edinburgh Group (1).

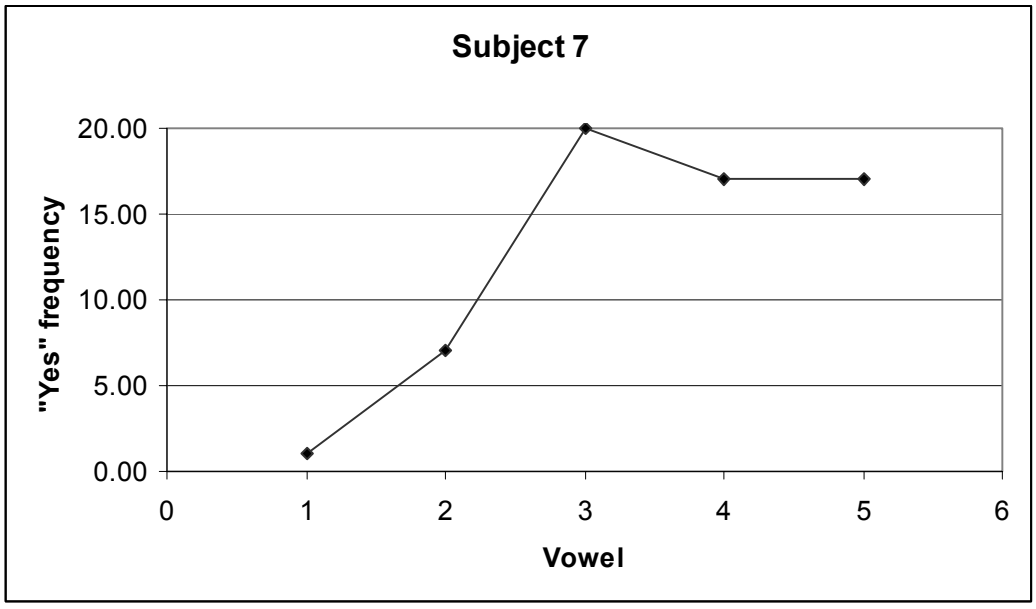

Figure 3.4. Subject 7 response pattern, Edinburgh Group (1).

The two most extreme response patterns of the Glasgow group are shown in figures 3.5 and 3.6. As can be seen, subject 2 chose vowel 1 the least while subject 14 chose vowel 1 the most. Subject 2 chose vowel 5 the most while subject 14 did not choose vowel 4 or vowel 5 *at all*.

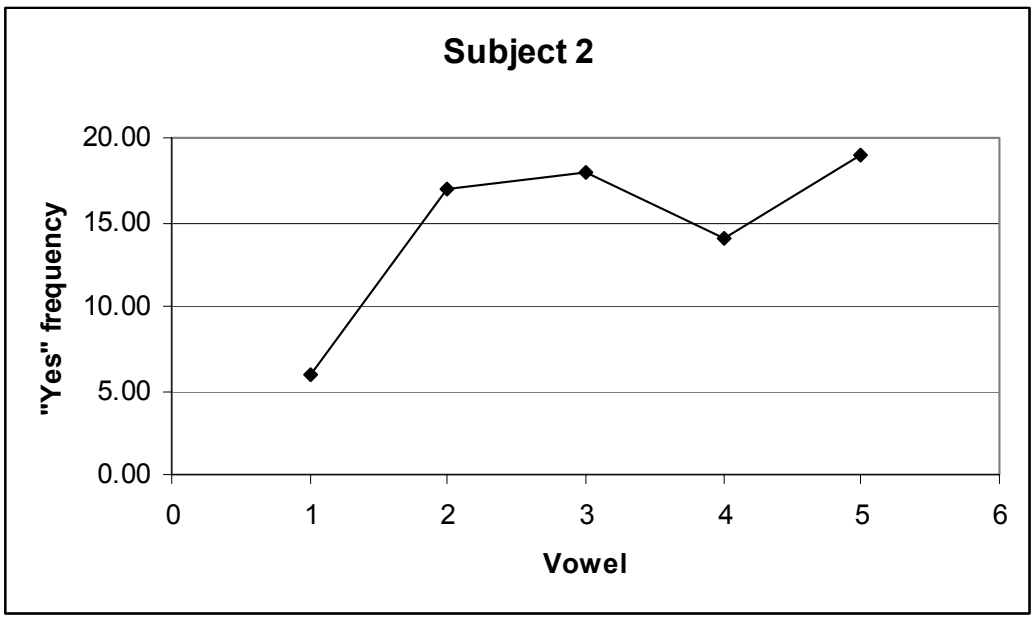

Figure 3.5. Subject 2 response pattern, Glasgow Group (2).

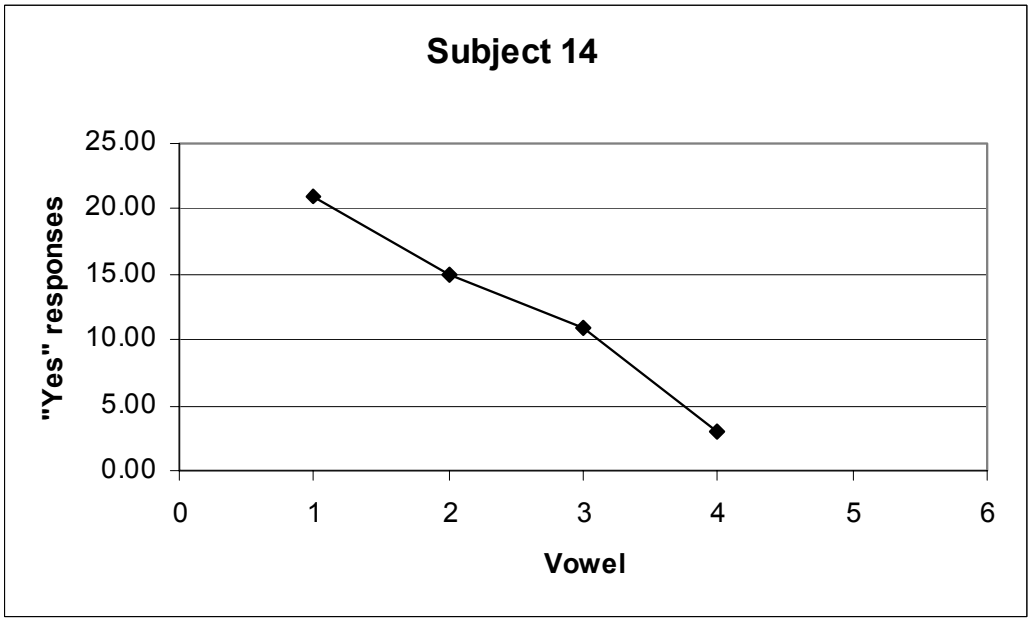

Figure 3.6. Subject 14 response pattern, Glasgow Group (2).

What these response patterns suggest is that the way each individual listener perceived the synthesised stimuli in this experiment is different, which makes the data very difficult to interpret.

3.2 The Questionnaires

The responses on the questionnaires revealed a wide range of backgrounds. Eight listeners were native to Edinburgh, though many were native to the surrounding area (Fife [1] , Linlithgow [1], Dunbar [2], and Dunfermline [1]). The remaining three were from Perthshire (2) and Easter Ross (1), and have lived in Edinburgh for an average of 5 years. In terms of dialect, 15 of the 16 listeners fall into the Mid Scots dialect group, as described by Johnston (1997). The listener from Easter Ross would be considered a Northern-Scots speaker. The parentage of the listeners is diverse. Table 3.1 represents the range of responses: (E = Edinburgh and surrounding area; G = Glasgow and surrounding area).

Entire Group

Both parents E: **3**	One E, One G : **5**
One E, one Elsewhere (Scotland): **0**	One G, one Elsewhere (Scotland): **2**
One E, 1 Elsewhere (not Scotland): **1**	One G, 1 Elsewhere (not Scotland): **1**
Both Scotland (not E or G): **3**	Neither Scotland: **1**

Table 3.1. Parentage report.

A majority of the listeners had one parent from Edinburgh and one from Glasgow, which indicates that they have had substantial exposure to both dialects. This could partially explain the subtlety of difference between the groups' responses on the listening task. Using the same method of separation by parentage, the distribution of the two groups is shown in Tables 3.2 and 3.3.

Group 1 (Edinburgh)

Both parents E: **2**	One E, One G : **2**
One E, one Elsewhere (Scotland): **0**	One G, one Elsewhere (Scotland): **1**
One E, 1 Elsewhere (not Scotland): **1**	One G, 1 Elsewhere (not Scotland): **0**
Both Scotland (not E or G): **1**	Neither Scotland: **1**

Table 3.2. Group 1 Parentage Report.

Group 2 (Glasgow)

Both parents E: **1**	One E, One G : **3**
One E, one Elsewhere (Scotland): **0**	One G, one Elsewhere (Scotland): **1**
One E, 1 Elsewhere (not Scotland): **1**	One G, 1 Elsewhere (not Scotland): **0**
Both Scotland (not E or G): **1**	One Elsewhere (Scotland), one Elsewhere (not Scotland): **1**

Table 3.3. Group 2 Parentage Report.

Group 1 appears to be more balanced with regard to Edinburgh parentage; two listeners have Edinburgh-native parents, two have one Edinburgh and one Glasgow native (one listener from Group 1 was contacted by e-mail after the experiment to further specify his parentage; his written response on the questionnaire was "Scotland."). Group 2 shows that a majority of listeners have one of each. There were no consistent patterns found when comparing parentage and vowel choice in the individual listeners of either group.

The third question determined the social class of each listener's parents. Overall, middle class was chosen twelve times (six times in each group), working class three times (twice in Group 1, once in Group 2), and upper class once (Group 2). Thus, 75% of the listeners came from middle class backgrounds.

The fourth question asked the listener to choose an option from a range of statements regarding the speaker's accent in comparison to the listener's. The choices were: 1) very similar to my accent, 2) somewhat similar to my accent, 3) slightly different from my accent, and 4) very different from

my accent. Group 1 responded "somewhat similar" 6 times, "very similar" once and "very different" once. Group 2 responded "slightly different" five times, "very different" twice, and "somewhat similar" once. It appears that the level of similarity chosen could be connected to group assignment: a majority (75%) of Group 1 (Edinburgh) chose "somewhat similar," while a majority (62.5%) of Group 2 (Glasgow) chose "slightly different." This could be attributed to language attitudes and self-perception of accent, since the given label "Glasgow" yielded more "slightly different" responses than the label "Edinburgh." Even though the actual vowel choices do not differ significantly between the groups, the language attitudes measure in the questionnaire reveals a difference worth noting and pursuing in future studies.

The parentage of the listeners who chose accent opinions outside the majority should be noted here. In Group 1 (Edinburgh), the listener who chose "very different" has parents from Ayrshire, on the West coast of Scotland. The listener who chose "very similar" has parents from Glasgow and North Wales. In Group 2 (Glasgow), one of the listeners who chose "very different" had one parent from Edinburgh, one from Glasgow, and noted that both parents lived in Edinburgh for over 30 years. The second listener to choose "very different" is from Tain (Northeastern Scotland), with parents from Perthshire and Cardiff. The listener who chose "somewhat similar" has one parent from Edinburgh and one from Germany. So again, the diverse parentage of the listeners seems to make interpretation of the response patterns difficult. In the case of comparing one's accent to another person's, it appears that individuals use different scales of differentiation to determine similarity or difference; the boundaries between "similar" and "different" could fall at different points for each individual listener.

Interestingly, during informal conversation following the experiment sessions (I always asked an open-ended question, such as "What did you

think of the experiment?"), only two listeners made a comment about the speaker's accent and how it "didn't sound very Glaswegian." Both were from Perthshire: one described his accent as "educated Scots," the other as "posh Glasgow." These two listeners did not display similar response patterns, so it cannot be concluded that their reaction to the speaker's accent had an effect on their vowel choices. None of the other participants made comments on the authenticity of the speaker's accent; most of the comments made by the participants were regarding the "strangeness" or difficulty of the task. It is interesting to note that the alternative labels given to the speaker by these listeners are very class-specific. They did not question where he was from, but placed him in a higher social class instead. This raises an interesting question: how similar are middle- to upper class Glaswegian accents to working-class Edinburgh ones? Can they be easily mistaken for one another (as suggested by Macafee, 1994)?

Question five determined the level of social contact that each listener has with Glaswegians. Obviously, many listeners have one Glaswegian parent, so their contact level is relatively high (every day, once a month, once a week). Only one listener without a Glaswegian parent reported contact with family in Glasgow (her parents are from Ayrshire, on the West coast of Scotland, so it is likely that she would have family in the Glasgow area as well). Those who reported having friends in (or from) Glasgow indicated contact occurring anywhere from every day to a few times per year. Two reported having Glaswegian classmates and three had Glaswegian co-workers. The choice of "other" was indicated three times: one specified "shopping," one indicated that she spends half of her time in Edinburgh and half in Glasgow, and one indicated that he had lived in Glasgow for 2 years and occasionally meets Glaswegians and visits the city. One listener in Group 2, who had one Edinburgh parent and one Glasgow parent, was very insistent that his mother was Glaswegian, but "doesn't have a strong accent," as he

both said to me and wrote in his questionnaire. His response pattern rose steeply to peak at vowel 5. His emphasis on the strength (or weakness, rather) of his mother's accent indicates that he knows what a "strong" Glaswegian accent sounds like. Based on this information, it would not have been surprising if he had rejected the label or chosen vowels that were closer to the Edinburgh speaker's natural production, but the opposite seems to have occurred; he chose vowels that represent Glaswegian /ʉ/, and made no comment on the authenticity of the speaker's accent.

The questionnaires indicate a very wide range of dialect contact with Glaswegian varieties through parents/family and social situations. The chosen degree of difference between the listener's accent and their perception of the speaker's does show some compelling evidence for group assignment as a factor. However, the listeners' accents were not analyzed, so it is difficult to say exactly how different their accents are on a purely acoustic level, let alone any perceptual ones.

Chapter 4

Discussion and Future Research

4.1 Discussion

The most important possible reason for the puzzling results of this study is that Edinburgh listeners simply perceive accents differently than Detroit listeners, at least when it comes to phonetic matching tasks involving social information. Niedzielski's study revealed a very strong relationship between listener expectations and speech perception. There may be a cultural difference in the amount of influence a label (and its social significance) can have on a listener's perception; the "dialect image" (as defined by Inoue, 1999) that Edinburgh listeners have of Glaswegians may not carry the same stereotypes that are apparent in Detroit listeners' image of Canadians. Also, British listeners may use different acoustic cues in a more complicated manner to determine dialect than do North Americans. It is possible that the perceptual vowel space which defines "Glaswegian" to Edinburgh natives is simply more loosely defined than their knowledge of their own vowel space, which would partially explain the overall response patterns of the two groups (i.e., the sharp peak of Group 1 compared to the plateau of Group 2). Maybe a stereotypical Glaswegian /ʉ/ does not exist for Edinburgh listeners as a stereotypical Canadian raised /aw/ exists for Detroit listeners.

4.2 Experimental Factors

Since the results of the data analysis are inconclusive, there are a number of experimental factors which need to be addressed as possible causes. If these problems can be reduced or eliminated, future experiments of

this type may provide more robust evidence for the influence of social information on accent perception.

First, the choice of speakers used for the recordings could have caused confusion for the listeners. Since the speakers were from neither extreme of the Scots-SSE continuum of accents (as discussed above), their production of /ʉ/ was remarkably similar, making it difficult to base the best exemplars of the vowel continuum on natural speech. If more speakers were interviewed and recorded, a wider range of accents could have been accounted for and a more comprehensive acoustic analysis performed to determine the most salient differences (and the most appropriate acoustic cues) between Edinburgh and Glasgow varieties. It would also have been useful to record their conversational speech for purposes of analysis or use in experimental conditions. An interesting study could result from recording a conversation between a Glasgow native and an Edinburgh native, not only to see the contrast of the accents in a single environment, but also to investigate whether (and to what extent) the speakers level or intensify their accents in the presence of the "other" variety.

The speaker used for the experiment was of a different age group and social class than most of the listeners; he was 49 and he described his parents as upper working class. These factors may partially explain some of the responses of the participants, since speaker age and social class background can result in accent differences (Chirrey, 1999; Stuart-Smith, 1999, Stuart-Smith, 2003; Stuart-Smith *et al* 2003; Eremeeva & Stuart-Smith, 2003)

Next, the use of /ʉ/ as the acoustic cue under investigation may have been problematic. It is possible that the variants of this phoneme do not have strong enough stereotypes attached to them for listeners to identify them as "definitely Edinburgh" or "definitely Glasgow." The words chosen for the recordings may have contained /ʉ/ at too short a duration; words with longer

/ʉ/ duration (such as "booze" or open syllables like "two") may provide a better cue for listeners than ones with short /ʉ/.

The synthesis of the vowel continuum is likely to be a major source of the problems encountered with the data collected in this experiment. First, the manipulation of F2 alone, especially in a steady-state vowel, may not have provided enough sociolinguistic information for the listeners. Maybe the choice to use steady-state vowels as stimuli was erroneous; if a consistent rise-fall pattern had been found in the F2 measurements of the speakers, the synthesized vowels could have reflected this. However, the purpose of this study was not to see if listeners react to *changes* in F2, but only the resonant frequency of F2. It may still be possible to manipulate F2 alone so long as the other parameters are consistent for every point on the continuum. For instance, F0 could be time-varied to rise and fall at certain points, but it would need to be exactly the same for every vowel. Also, it may have been beneficial to manipulate both F1 and F2 to see if the relative distance between them was a stronger cue than the F2 position alone.

The lack of "naturalness" in the vowels may have caused problems as well. The listeners were instructed not to focus on the naturalness of the vowel, but making the vowel sound more natural may result in responses that are easier to interpret. If the listeners do not need to stretch their perceptual definition of a natural vowel to accommodate the task, they may be able to focus more closely on its similarity to the speaker's production of it. However, the parameters that are varied in synthesis would need to be chosen carefully to make sure the listeners are using the cues *intended* for their judgments.

Another possible problem could have been the presentation of the stimuli. The synthesized vowels were presented in isolation, 500 milliseconds after the sentence, which is not how vowels are normally heard. This interval may have been too long. Also, the responses would likely be different if the

stimuli were presented within the sentence by splicing, as in the study by Evans and Iverson (2004).

The size of the continuum may not have been appropriate for the experiment. A larger continuum could possibly have resulted in a more normal distribution of responses, since the individual differences between the vowels may not be as apparent to the listener. If this were so, the frequency of "yes" responses could be examined for a group of vowels (a continuum within a continuum) instead of a single vowel.

Exploration of different stimuli could be immensely useful to further sociophonetic investigations of Edinburgh and Glasgow accents. It is known that vowels are exceedingly important to dialect identification; intonation may be another acoustic cue worth pursuing, since these patterns in Glaswegian and Edinburgh varieties are noticeably different (as described by Stuart-Smith, 2003). If a continuum of intonation patterns can be synthetically manipulated and embedded in natural sentences, and then used with an experiment design similar to the present one, it may be found that intonation patterns carry social significance for Scottish listeners.

4.3 Participants

Moving on to the listeners used in this experiment, the questionnaires revealed that there is a great deal of variability in their dialect backgrounds. Of particular interest is the high number of listeners with one Glaswegian parent. There is, therefore, not only an influence on the acquired accent of the listener, but the listeners' parentage also indicates the level of perceptual experience with the accent. Perhaps more detailed biographical information needs to be collected, not to mention recordings of the listeners to determine how features of their own accents are actually being compared to the speaker. This would benefit the question of self-perception and the possible stereotypes people have about their own varieties, as was found by

Niedzielski. It may be found that British listeners have a more accurate perceptual representation of their own accents than do North Americans.

Being more selective may also be useful when choosing listeners for the study. The speakers were required to be native to Glasgow or Edinburgh with *both* parents native as well. If the same requirements had been set for the listeners, the results may have shown larger differences between the groups. However, seeking a completely homogenous group presents another set of potential problems: it may be exceedingly difficult to find enough people who meet the criteria and are interested in participating; and such a group would probably not represent the normal population distribution, which may cause the results to be misleading.

More listeners would greatly benefit the experimental design by allowing more conditions and larger groups may also lead to more normally distributed data; the extreme individual differences in the responses of this study make drawing any conclusions based on the data difficult. Other experimental conditions could include a question asking the listener to guess where the speaker is from instead of having that information provided at the start of the experiment. This condition would help to determine each listener's dialect recognition ability as well as the range of possible dialects that the speaker could be perceived as speaking. Listeners not given a label at all may show completely different response patterns to the vowel continuum, which would add strength to the argument that socially stereotyped expectations influence speech perception. Another measure related to this would be a task similar to what was used in Hardie's (1995) pilot study; the listeners could be given a continuum of Scots dialect labels, and they could be asked to indicate where the speaker belongs on it.

4.4 Language Attitudes

To gather more information on the language attitudes connected to social class, it would be useful to ask the listeners to place the speaker in a social class, even if they must guess. If a geographical label is given regarding the speaker at the start of the experiment, this may have an influence on the social class the listeners choose. The responses would also clarify the reasons behind the class labels ("educated Scots" and "posh Glasgow") given voluntarily by listeners in the present study; formally asking this question may reveal how strong social class stereotypes are in relation to speech, particularly in Scotland.

The language attitudes of the listeners clearly need to be investigated in more depth. Simply asking for a similarity statement did not effectively assess the listener's *opinion* of the speaker's accent. Accent similarity measures can be complicated, as discussed in Clopper and Pisoni (2005): "…perceptual similarity between dialects is based in part on the phonological similarity of the dialects, but it also might be influenced by the stereotyped uniqueness of a given variety" (p. 331). While the phonological differences between Edinburgh and Glasgow varieties are well-documented, it may be more difficult to assess where listeners draw the line between "like me" and "different from me" in terms of accent, especially if the scales of similarity and difference for each listener do not match. For instance, one listener may have interpreted the question in terms of Scottish accents, while another may have interpreted the question in terms of all British Isles accents, or further yet, all accents of the English language. The selection of, say "somewhat similar," could then take on any number of meanings in terms of accent; it could mean, "Yes, that's definitely a Scottish accent," or it could mean "It definitely *isn't* an American accent, and therefore it is similar to my accent."

It would be useful to have another question asking for the listener's aesthetic judgment of the accent, maybe with a similar scale, ranging from

"very pleasant" to "very unpleasant." Of course, it can be hard to make that kind of judgment on speech that was read from cards, one isolated sentence at a time, as opposed to a monologue or casual conversation.

With my informal open-ended questions following the experiment, I was hoping to extract the listeners' opinions of the speaker's accent. As was discussed above, only two listeners shared the opinion that the speaker "did not sound very Glaswegian," and these listeners were not from Edinburgh. This either means that opinions (and/or stereotypes) of Glaswegian accents are stronger in Perthshire, or it could be the same problem Niedzielski seems to have had with male participants: as an American, I may be considered an out-group member to Edinburgh natives, and the listeners may therefore have been reluctant to share their opinions on Scots/SSE accents with me. There is also the possibility that Edinburgh opinions towards Glaswegian varieties are not particularly strong; this may not be the case with Glaswegian opinions towards Edinburgh varieties (as was suggested by the opinions reported in Macafee, 1994) which will need to be explored.

4.5 Future Research

Having the listeners participate in only one experimental condition may have limited the range of responses. If the "yes" responses could be examined within subjects (for two conditions) as well as between, a clearer pattern may result. Using more listeners (with the above requirements) to accommodate more experimental conditions would also strengthen the patterns that emerge from the data. For instance, there could be four conditions: the first two could be exactly the same as the ones used in the present experiment; the third could then involve an Edinburgh listener who hears a Glasgow speaker; and the fourth, an Edinburgh listener hears a Glasgow speaker but is told he is from Edinburgh. With this design, the conditions of speaker AND label could be examined.

With all of the above considerations in mind, more experiments should be done to investigate what, in the present study, is so subtle. Clearly, a finer amount of control over the components of the experiment is needed to replicate the results found in Niedzielski's study, if they can be replicated.

Future studies should expand the methods used here to include: more speakers with a wider range of recordings; numerous acoustic cues which are known to separate Edinburgh and Glasgow dialects, as well as optimal variants of them; increasingly detailed synthesis to maximize naturalistic listening (and hence accuracy of responses); larger vowel continua for clarity of perceptual boundaries within a category; splicing of stimuli into natural carrier sentences to better mimic natural speech perception conditions; narrower screening of listeners and more detailed questionnaires; recordings and acoustic analyses of listeners' speech; multiple experimental conditions for individual listeners; larger groups; and more experimental conditions.

In addition to these suggested improvements, it will be vital to also conduct the same experiment on Glaswegian listeners (it would be interesting to see the results of a follow-up study by Niedzielski on Canadian listeners for comparison). The central question of this study, in light of its results, remains unanswered: To what extent can the speech perception of British listeners be reliably influenced by the mere suggestion, be it true or false, of a speaker's native city?

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