Tran/s/gender

Assessing the effects of the social construction of gender on speech: A focus on transgender /s/ realisations

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Abstract

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The purpose of this study is to gauge how much one's speech is conditioned by their gender identity rather than by their sex. Many features of speech have been shown to vary depending on speaker sex and gender such as pitch, lexis, syntax and volume.

On a more fine-grained level, fricatives have been shown to index speaker sex and this was initially attributed to biological sex differences; 'larger' males would have a physically larger vocal tract and thus have lower peak frequencies. However, studies have indicated that gender identity also has an impact on peak frequency; speakers actively alter their /s/ production in order to index their gender and female speakers produce 'fronter' articulations of /s/ resulting in higher peak frequencies. Meanwhile, males have 'backer' articulations and actively lower peak frequencies. While these show /s/ to index speaker gender, it has also been found that /s/ varies depending on conversational context - females in same-sex conversations have been shown to raise peak frequencies.

Little sociophonetic study has been carried out on transgender voice, however, it has been found that peak frequencies of transmasculine speakers pattern based on their gender identity and the length of time they have identified as such, rather than the sex they were assigned at birth.

This study analysed data collected from six participants; four transmasculine and two non-binary speakers, across three conversational contexts; conversation with a cisgender male, cisgender female and transgender interlocutor. The peak frequencies of participants /s/ realisations were be measured and analysed across conversational context. This study found that most transmasculine participants' peak frequencies pattern with their gender identity while non-binary speakers behave differently in a unique way. Transmasculine and some non-binary speakers also vary their peaks across conversational contexts but non-binary speakers are not systematic in this variation.

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Chapter 1

Introduction

This study explores the acoustic, articulatory and sociophonetic properties of /s/ realisations (as in slow, ice) in transgender speakers in order to assess the effect the social construction of gender has on speech. This study will test whether speakers' self-identified gender influences their speech and if so, to what degree it does so by comparing the speech of transgender and cisgender speakers. Because transgender individuals' "physiology, socialization experiences, and current identity do not align in normative ways" (**?**)we are presented with an opportunity to gain a unique insight into how these factors interact. The realisation of /s/ is an ideal feature to focus this study on due to the wealth of previous study on it in both phonetic and sociophonetic contexts (Shadle, 1986; Flipsen et al., 1999; Fuchs et al., 2010), however little research has been carried out on the speech of transgender people especially in regard to /s/ realisations.

Many features of speech have been shown to vary by genders such as pitch, lexis, syntax, volume and also the peak frequency of /s/ realisation. Acoustic studies have shown high frequency /s/ realisations are associated with females while lower frequencies are associated with male speakers (Podesva and Kajino, 2014). It has been suggested that by altering physical size and larynx hight, speaker sex influences peak frequency. However, speakers' gender identity also has an impact whereby speakers actively alter their /s/ production in order to index gender. The purpose of this study is to gauge how much of this frequency difference is conditioned by one's gender identity as opposed to one's sex (and the factors this influences such as body mass and size) by focussing especially on transgender speakers i.e. those whose gender identity does not align with the sex they were assigned at birth

1.1 Aim and Research Strategy

This study aims to fill a gap in linguistic literature on transgender speech in general, and specifically in Standard Scottish English. This is an underexplored field but is of increasing interest to phoneticians, sociolinguists and the transgender community alike as academia and society in general begin to acknowledge and understand transgender and other non-cisgender people. In this study, data was collected by recording speech in two contexts, a word list which was read aloud following which participants engaged in three short informal conversations. These recordings were analysed, realisations of /s/ were extracted and peak frequencies, reflecting shifts in articulation, were measured. The above analyses were carried out using phonetic software (PRAAT) which allowed for the parsing of speech as well as allowing for the determining of peak frequencies. This study seeks to begin assessing the extent to which the social construction of gender influences speech and also to encourage academic research to include non-cisgender demographics within studies in the future.

1.2 Research Questions

The research questions which will be addressed are:

1. What are the acoustic characteristics of /s/ in Scottish trans speakers?
2. Do transgender speakers' /s/ pattern with cisgender speakers?
3. Do trans speakers style shift depending on interlocutor like cisgender /s/?

1.3 Structure of thesis

The thesis will begin with a summary of the background to this study in two sections; the first providing a social background with an overview of gender in society, gender theory and transgender identity and issues, and the second providing a linguistic and sociolinguistic background to gendered speech including a section on the specifics of /s/ realisations in cisgender and transgender people and finally the constructionist ideas of 'doing' your gender as opposed to being it.

These sections will be followed by a chapter describing the methods used for data collection and analysis in the study, after which the results will be presented. The discussion chapter will then summarise and critically evaluate

the results in relation to the research questions. We will see that gender identity does have an effect on speech sounds, with transmasculine speakers patterning with their cisgender counterparts and non-binary speakers behaving in uniquely interesting ways. The conclusion will summarise the main findings of the study and point towards future work.

Chapter 2

Background

"One is not born a woman, but rather becomes one"

Simone de Beauvoir

2.1 Introduction

This chapter will provide social and linguistic context for this study, beginning with a brief overview of sex and gender in society, gender theory and transgender identity. Following this, I provide a synopsis of sex and gender in linguistic research and previous research on transgender speech. In order to do this I refer to Eckert's perspective of 'waves' of variationist sociolinguistic research (2012), beginning with first wave Labovian studies, then second wave studies with a summary of the work of Milroy & Milroy and Network Theory, and finally third wave studies with a focus on the work of Penelope Eckert, Constructionism and community of practise theory followed by a short summary of previous studies of transgender speech.

For further context on the speech of participants, I briefly discuss the linguistic factor of this study, /s/ outlining the relevant previous research before describing Scottish English and it's unique vowel space before summarising the linguistic background of this study. Finally, I will review both the linguistic and social background covered in this chapter.

2.2 Social background

Gender in society

Sex and gender are ubiquitous parts of our society defined by the World Health Organisation as "the biological and physiological characteristics that define men and women" and "the socially constructed characteristics of women and men" respectively (W.H.O.). Gender and sex are thought of as separate categories but are treated practically as synonymous terms with somewhat cyclical definitions. The social construct of gender is built upon the dichotomy of sex and gender roles and norms are based on this dichotomy.

The impact of gender is not always visible but it is felt on every level of society from the clothes we wear and the careers we choose, to how much we earn once we are in them. Our society is littered with gender stereotypes; "men are better drivers", "women are better multi-taskers", "women talk more" and "men are better navigators". Whether or not there is validity to any of these claims, gender is undeniably a fundamental part of the society we live in. Gender roles are constantly being presented to us in everyday life - on television, in advertisements. Iconic television programs like 'I Love Lucy', 'Married With Children' and 'The Simpsons' present us with men who are 'breadwinners' while their wives are caregivers; cooking, cleaning and looking after children.

Though gender differences are ubiquitous many have challenged them as we will see in the coming section. More recently, Western societies have begun to see gender differently though while some changes have come about (e.g. the number of men who are the primary caregivers in their family increased by 54,000 between 2000-2010 (Poulter, 2010)), many effects of gender difference are still prevalent today. Men still dominate in science subjects (Bryner, 2007), women still earn less and are less likely to have high ranking professions (Denholm, 2017), men still do not wear dresses and women must still remove their body hair. Our society is moving toward gender equality but evidently, at a slow pace.

Gender theory

There is an extensive literature on gender theory, however, for the purpose of this research, I will focus on the writing of Judith Butler, the American gender theorist and philosopher. Butler's work has had an influence on a number of fields including feminism, queer theory, gender theory, social studies, philosophy, film and visual arts. It has been argued that "in the decade since the publication of Gender Trouble... few, if any, feminist theorists have been as influential

or as controversial as Judith Butler." (Margaret Sonser Breen, 2011) Butler states that "gender is neither the casual result of sex nor as seemingly fixed as sex" (Butler (1990), pg. 9-10) meaning the link between gender and sex is sociologically constructed and gender is not a static, "fixed" category - that is to say, identity is free-floating and not connected to an essence, but instead to a performance. She continues to say “Gender is the repeated stylization of the body, a set of repeated acts within a highly rigid regulatory frame that congeal over time to produce the appearance of substance, of a natural sort of being.” (Butler, 1990) Gender is an act which is constructed through the repeated performative enactment of social norms. She goes on to criticise these norms, traditional gender roles, the conceptualisation of gender as a reflection of the binary category of sex and also the idea that sex can be considered a stable category.

> "The gender/sex distinction suggests a radical discontinuity between sexed bodies and culturally constructed genders. Assuming for the moment the stability of binary sex, it does not follow that the construction of "men" will occur exclusively to the bodies of men or that "women" will interpret only female bodies. Further, even if the sexes appear to be unproblematically binary in their morphology and constitution... there is no reason to assume that genders ought also to remain as two...The presumption of a binary gender system implicitly retains the belief in a mimetic relation of gender to sex, whereby gender mirrors sex or is otherwise restricted by it" (Butler (1990), pg. 10)

Regarding sex, she asks "is it natural, anatomical, chromosomal or hormonal?" (Butler, 1990) Butler theorises "if the immutable character of sex is contested, perhaps this construct called ‘sex’ is as culturally constructed as gender." (Butler (1990), pg. 10) The idea that both sex and gender are socially constructed and this sentiment is supported by many other gender theorists such as Nicholson(1994), Delphy(2001) and Margaret Nash when she states "the categories of female/male and man/woman are political and not natural." (Nash (1990), pg. 172) Nash uses the terms male/female (sex) and man/woman (gender), stating neither is certain but again that both gender and sex are constructs. In reference to ‘Gender Trouble’, Nash states "Butler wants us to understand gender as a performance and one way to handle this circumstance is to encourage us to be aware of... how we act out our gender identity." (Nash (1990), pg. 172) The idea of performing gender is central to this project and if gender is not inherently linked to sex as Butler and Nash suggest then we are free to identify in any way we choose and to perform this identity in myriad ways, including how we speak.

LGBTQ+, trans and gender identity

Above I present a critique of the gender binary and the social norms and roles that come with it, but most people live within this binary and adhere to these norms. However, a large proportion of people do not subscribe to this binary and do not identify with the gender they were assigned at birth or in fact, reject the idea of gender or the idea of a set gender identity entirely (see Stryker (2008), Meyerowitz (2002)). The 'T'(for trans) in LGBTQ+ refers to such people, though some may use other terms such as 'queer', 'gender queer' etc. There are many variations on acronyms which refer to the LGBT community, (variations upon LGBTTQQIAAP - lesbian, gay, bisexual, transgender, transsexual, queer, questioning, intersex, asexual, ally, pansexual, though this acronym is not exhaustive) however I will use the acronym LGBTQ+ which stands for Lesbian, Gay, Bisexual, Transgender and Queer with the '+' representing a spectrum of gender and sexuality. The LGBTQ+ community has long been considered to be on the fringe of society as is evidenced by the attached timeline of LGBTQ+ history (see appendix). This timeline shows how recently homosexuality was decriminalised in the United Kingdom as well as how recently laws which prevented transgender individuals having their birth certificates reflect their gender identity were in place in the USA. Though homosexuality is no longer a criminal offence in the UK, many countries around the world, such as Iran, Saudi Arabia, Sudan, still consider being gay a criminal act and punish it with the death penalty. As people become more comfortable and free to express their gender identity, a unique community of individuals whose gender identity does not match the gender they were assigned at birth emerge, and this provides us with an opportunity to tease apart biology from identity in linguistics.

Bing and Bergvall are also critical of the category of binary sex (Bergvall, 2014) and draw attention to cultures where sex is not considered a binary category and more than two sex categories are given explicit social recognition e.g. those born intersex. Intersex has been defined as anyone "born with sex characteristics (including genitals, gonads and chromosome patterns) that do not fit typical binary notions of male or female bodies" (Report United Nations for LGBT Equality (2014)). In the western world, it is commonplace for intersex babies to undergo medical procedures in order to fit them neatly into our binary concept of sex. This shows the extent to which the gender binary is a fundamental part of society. Intersex activism has recently become more prevalent with many intersex groups and organisations fighting for the recognition of intersex people. With these sociological changes taking place, it is becoming more common for people to exist outside the strict binary of sex whether they are intersex, transgender, non-binary or another non-traditional

gender.

The term ‘trans’ is frequently used as an umbrella term to "describe people whose lives appear to conflict with the gender norms of society" (Office for National Statistics, 2009) i.e. a person whose gender identity does not correspond with the gender they were assigned at birth. This does not necessarily mean that all transgender people identify as ‘the other gender’ or binary-transgender and many people within the ’trans’ umbrella use different terminologies to express their gender identity and bodies. (Zimman (2014a,b), forthcoming)

There are many terms which transgender people use to categorise their gender identity, however, the terms used in this study are as follows;

- transmasculine; someone who was assigned female at birth but identifies with masculinity.
- transfeminine; someone who was assigned male but identifies with femininity.
- Non-binary; someone who exists outside of the gender binary.
- Cisgender; someone who identifies as the gender they were assigned at birth.

It is important to note that there is a large amount of terminology to refer to those who have differing gender identities which has not been covered in this study (e.g. multigender, gender fluid, demigender etc.) however as these do not relate to the participants of this study they will not be discussed here.

Despite this community being thought of as on the fringes of society, in 2004 an estimated 5 % of the UK population considered themselves gay (Warner et al., 2004) and by the next year, this figure had risen to 6% (Campbell, 2005). Currently there is no official estimate of the transgender population of the UK as neither the England/Wales nor the Scottish census provide an option for trans identification, however in 2010 the Gender Identity Research & Education Society estimated the number of people "who experience some degree of gender variance" in the UK to be between 300,000 - 500,000. (Reed et al., 2009) Mainstream media is also beginning to represent more trans people such as actress Laverne Cox, writer Janet Mock, screenwriters and directors Lilly and Lana Wachowski, and activist Chaz Bono who have recently become household names. (Peterson, 2014) Further, until November 7th, 2013 transgender Americans were not protected by America’s Employment Non-Discrimination Act. From the above, it is clear that trans issues have not always been at the forefront of society and are only recently coming to be represented, discussed and addressed.

Summary

In the above sections, we have seen that both sex and gender are fundamental parts of Western society which affect our lives in innumerable ways. Though sex and gender are defined as physiological and social categories respectively, gender is regularly conceptualised as a reflection of sex, something which gender theorists like Butler are critical of. In recent years people who live outside of these binaries have become a larger part of mainstream society. As this occurs, there is a slowly growing understanding of 'non-traditional' gender identities, some of which has been defined above, however, there is still a great deal to be achieved in the LGBTQ+ social movement before LGBTQ+ people achieve equality.

2.3 Sociolinguistic background

Sex and gender in sociolinguistics

Although there is a large amount of literature showing how men and women speak the same, there is also a wealth of literature demonstrating that men and women speak differently and not necessarily in a uniform way (Chambers et al., 2008; Cheshire, 2002; Cheshire and Trudgill, 1997; Coates, 2004; **?**; Holmes and Meyerhoff, 2008; Meyerhoff, 2014; Romaine, 2003). Though these differences have been observed, it is difficult to determine whether these are socially or biologically motivated at the level of some speech sounds. The differentiation between these terms has been defined by many linguists -

- “Sex is a biological category and gender is a social and cultural category" (Meyerhoff (2015), pg. 213)
- “Sex is nature, gender is culture" (Coulmas (2013), pg. 38)
- “Sex refers to a biological distinction while ‘gender’ is the term used to describe socially constructed categories" (Coates (2004), pg. 3)
- “Gender as a term differs from sex in being about socially expected characteristics rather than biology" (Goddard and Patterson (2000), pg. 1)
- “Gender is the socially constructed counterpart of biological sex" (Cheshire (2002), pg. 427)
- “Sex refers to the physiological distinction between males and females. Gender, on the other hand, refers to the social and cultural roles that individuals appropriate depending on their opportunities, expectations and life experiences." (Tagliamonte (2011), pg. 64)
- “The distinction between ‘sex’ and ‘gender’ essentially recognises biological and sociocultural differences." (Chambers (2009), pg. 116)

The common theme in each of these definitions is that sex is a biological factor while gender is a cultural one, that is to say, it is a social construct and what it defines is linked heavily to the culture and society in which one is situated.

The aforementioned need for people to fit neatly into ‘male’ and ‘female’ categories carries over into linguistics where many linguists still treat gender as a reflection of sex despite acknowledging the separation of these terms. Eckert is critical of this, stating “sociolinguists generally treat sex in terms of oppositional categories (male/female), and the effects of sex on variation are

generally sought in linguistic differences between male and female speakers" (Eckert, 1989b) however, she continues to state "the correlations of sex with linguistic variables are only a reflection of the effects on linguistic behavior of gender ?the complex social construction of sex" and "that the significance of gender in variation cannot be reduced to notions of male or female speech as "more or less conservative." (Eckert, 1989b) Cheshire echoes this, noting that "both sex and gender have been treated as binary categories" in the vast majority of sociolinguistic studies and that "gender differences need not map directly onto the physiological sex difference" (Cheshire (2002), pg.424) that is to say, while sex and gender are related they need not be reflections of one another.

As mentioned, we have seen a huge increase in representation for those who do not adhere to a binary gender system in recent years and a survey of 1,000 18 to 34 year-olds across America indicated that people are seeing gender more as a spectrum than as a binary system (Beneson Strategy Group, 2015). If we are to conflate the ideas of 'gender' and 'binary sex' in a society where the spectrum of gender is only beginning to diversify, this could disguise variation on the basis of identity. In this project, I will illustrate this by investigating non-traditional gender identities with the aim of demonstrating the effect of gender identity on speech.

The previous section shows that there has been a great deal of research into the ways males and females speak. However, for the purpose of this study, I will focus on variation and sex and gender in sociolinguistics which, as we will see could be said to be based on the belief that "women [have] another language than men." (Jespersen (2008), pg. 237)

Dialectology is sometimes considered the beginnings of what we now know as sociolinguistics and in 1665, Rocherfort carried out one of the first studies of language variation. This study took place in the Caribbean and stemmed from Rocherfort's observation that "it often seems as if women [have] another language than men" (Jespersen (2008), pg. 237). He studied how females' language differed from males' and found a difference of 10% in the core vocabulary of those studied. This attitude that 'women speak differently to men' became the norm for dialectologists who studied regional variation of speech and saw men's speech as indicative of pure forms of an area while women's speech was seen as deviant, or as straying from 'correct' forms. This is still visible in modern sociolinguistics where the speech of females is seen as different and is measured against an unspoken standard which is the speech of males.

One of the accepted principals of linguistic change sets this as the precedent, stating "women show a lower rate of stigmatised variants and a higher rate of prestige forms than men." (Labov (2011), pg. 261 - 293) Alongside this statement, the 'gender paradox' exists in linguistics whereby females have

been shown to lead linguistic change, picking up innovative forms more quickly than males until these forms become stigmatised. Once this variation becomes salient and stigmatised, women reduce their rates of use leaving males in the leading position and females' exhibiting lower rates of non-standard variables. Regarding this, Labov states "Women conform more closely than men to sociolinguistic norms that are overtly prescribed, but conform less than men when they are not." (Labov, 2011) pg. 261-293

The three waves of variationist linguistics

Penelope Eckert conceptualises the history of variationist research into three 'waves' (Eckert, 2012). I use these three waves as a framework to investigate the treatment of sex and gender throughout sociolinguistic research.

First wave studies

First wave studies view sex as a macro category which has a direct influence on speech - i.e. men and women speak differently **because they are** men or women. William Labov is often considered the father of variationist sociolinguistics and can be considered the beginning point for the first wave. Indeed, Chambers states "variationist sociolinguistics had it's effective beginnings only in 1963, the year in which William Labov presented the first sociolinguistic report" (Chambers et al. (2008), pg. 5). It took place on the island of Martha's Vineyard with sixty-nine participants, looking at the increasingly centralised diphthongs of the island's residents. (Labov, 1963) Labov found that residents who wished to establish themselves as members of the traditional Martha's Vineyard community used higher rates of local forms while residents who aligned more closely with a mainland way of life used lower rates.

Later, in 1966, Labov carried out his second study which Eckert credits with beginning the first wave of variationist study (Eckert, 2012), this time in Harlem, New York (Labov, 1966). This study was on a much larger scale than the previous Martha's Vineyard study with over 200 speakers and "sought to illuminate the relationship between language and social structure" (Romaine, 2003) and more specifically between language and class. One of the variables studied was rhoticity (i.e. the active realisation of [ɹ/], the difference between the [kaɹ] and [kah]), more specifically the realisation of postvocalic /r/. In total, 264 interviews were carried out across three department stores; Saks, Macy's and Kleins, representing upper, middle and working class respectively. Labov found rhoticity to be closely linked to speaker class with those of higher social class realising their [ɹ] while those of lower social class were generally

non-rhotic. This finding was especially true for the female sales clerks who were more likely to realise their /r/ the higher their social class.

Following Labov's studies, Trudgill carried out sociolinguistic research in a similar Labovian framework in 1974 in Norwich. (Trudgill, 1974) One of many variables studies was the dropping of final velar /ng/ in gerunds (e.g. walking), polysyllabic monomorphemes (ceiling) and words like 'anything, everything, nothing' etc. Trudgill aimed to assess variation of [ng] dropping across the broad demographics of social class. Trudgill found that this variation was mediated by social, and other, factors. There was also a clear difference in variable usage between formal and informal speech and between categories of social class and sex. It became clear that lower-middle-class groups had the lowest rates of non-standard usage while the upper working class group had much higher rates. Trudgill found males using higher rates of the non-standard form (dropped [ng]) with male speakers in all social classes using the non-standard form more than females.

Though second wave studies began taking place in the 1980's, the waves of study exist in tandem over time with first wave studies taking place more recently. For example, Sali Tagliamonte's 2004 study of the 'be like' quotative in Toronto, Canada which focussed on the quotative *"be like"* as in "She's sitting there and she's like, 'Oh my god!" (Tagliamonte and D'Arcy, 2004) Tagliamonte used the half-million-word corpus of Toronto Youth English (TYE) which consists of informal interviews with people aged between ten and nineteen to gauge usage of the quotative across speakers differing in age and sex. She found that females used the variable at much higher rates than males. (Tagliamonte and D'Arcy, 2004). The data also showed a large increase in sex differentiation in variable usage when compared to data of Canadian-English from 1995, finding "a four-and-a-half time increase in the use of be like." (Tagliamonte and D'Arcy, 2004) Tagliamonte concludes, stating that this study is evidence that "be like is clearly a 'female' feature."

The first wave studies treated sex as a macro-category, one which was a binary difference of male or female without a more subtle 'micro' understanding of the nuances of gender, and according to first wave studies, it is the being a male or female which motivates variable usage. First wave studies also established that social class had an influence on speech with those at the lower end of the socio-economic scale showing greater regional, ethnic differentiation and more frequent use of the non-standard as characterised by Eckert. (Eckert, 2012)

Second wave study and network theory

The second wave of study began as a move away from the 'traditional' framework of the first wave and began research which had a "focus on the vernacular as an expression of local or class identity." (Eckert, 2012).

Unlike the aforementioned first wave studies which focused on large static macro-categories, second wave studies began to focus on small dynamic micro-categories. Milroy's 1983 study in working-class Belfast is typical of second wave research and was arguably the first to incorporate an analysis of network structure into the study of language change ((Chambers, 2003; Milroy et al., 1983)). According to Milroy & Milroy, a social network can be seen as a "web of ties" (Milroy et al.) which connect people to one another across all of society. These webs can be vast and so, studies generally focus on first order network ties - by 'anchoring' a social network to an individual we can limit this web to persons with whom the anchor interacts with directly and regularly. By having an anchor, we limit this web to roughly 30 - 50 people "although it is assumed that second-order ties to whom ego is linked through others are also influential" (Milroy and Milroy (1992), pg. 5). These networks fall into two categories; structural and interactional. Structural networks refer to the shape and pattern of the network and are generally analysed for their structural properties e.g. density. Interactional networks, on the other hand, detail the content of the web and are analysed in terms of their interactional features such as their multiplexity, history, durability, frequency, and intensity of ties (Mitchell, 1986).

Milroy's study looked at a-backing in working two class communities in inner-city Belfast; Clonard, a predominantly Catholic area and Ballymacarrett, a predominantly Protestant area. This variable showed unusual gender patterning which Milroy explained using network theory. She found gender differences in both communities but noticed that Catholic females were leading males in a-backing which was unusual given the fact a-backing is a characteristic of Protestant, working-class males. While on paper this could be attributed to sex differences, Milroy (Milroy, 1980) applied network theory and examined the network structure in which her participants lived. She noticed that the Catholic women were more socially mobile outwith the Catholic area of Clonard, and more likely to be employed than Christian males who showed higher rates of unemployment. Many of these females worked in shops which served customers from both Clonard and Ballymacarrett meaning these females had looser multi-tie networks with a range of different speakers. Milroy believed these Catholic women were bringing a-backing from their professional lives to their personal, spreading the variable to the less multi-networked Catholic males. To fully understand the patterning of this variable it was necessary

for Milroy and Milroy to contextualise the behaviour of their participants and consider how gender functioned in these communities. This variation was not simply the result of male v. female or Clonard v. Ballymacarrett variation, but instead motivated by participation in dense social networks.

This study shows that “participation in dense, multiplex networks preserved dialect features against the effects of dialect levelling, while weak ties to those outside the network promoted levelling effects (Labov (2011),187) and that looking at these networks can help illuminate the reasons behind variation. That is to say, macro-categories of male and female do not necessarily describe variation. It is the connections that males and females have - what they do and how they participate in their local communities rather than their being male or female that motivates variation. It is worth noting, however, that these properties of one’s social network can themselves be linked to ’gendered patterns’ and gender roles more widely.

Milroy shows two groups of female speakers exhibiting different patterns which relate to their network ties and social mobility. This concept of gender is closer to the idea of gender being a performance or something one ‘does’ which we will see in the coming sections.

Communities of Pactice and indexicality, The third wave and Constructionism

While the first wave considered the cause and meaning of variation to be “incidental fallout from social space" the third wave views these as “essential feature[s] of language." (Eckert, 2012) The third wave sees Silverstein’s idea of indexicality being brought to the field of linguistics in his 1976 paper ‘Meaning in Anthropology’ (Silvertein, 1976). While Silverstein introduced indexicality to linguistic anthropology, Ochs’ 1992 paper Ochs (1992) had a larger impact on language and gender research. Ochs states that “sociolinguistic studies tend to relate particular structures to particular situational conditions... The meanings so indexed are referred to as social meanings, in contrast to purely referential or logical meanings... Hence two or more phonological variants of the same word may share the identical reference but convey different social meanings, e.g. differences in social class or ethnicity of speakers, differences in social distances between speaker and addressee, differences in affect.” (Ochs, 1992) In other words, indexicality refers to the concept of something acting as a sign which indicates or indexes an object in the context in which it occurs.

This is similar to the idea of ‘enregisterment’ which relies on indexicality to operate (though they are separate ideas). Agha defines enregisterment as the “processes through which a linguistic repertoire becomes differentiable within a language as a socially recognized register of forms." (Agha (2003), pg. 231)

Agha gives the example of RP which, in the UK, register has come to count as a status emblem in British society, has become ‘an emblem of speaker status linked to a specific scheme of cultural values" and goes on the explain that RP is “indexical of speaker’s class and level of education ." (Agha (2003), pg. 231)

In 1982 Jenny Cheshire carried out a large-scale sociolinguistic research project on adolescents in Reading (Cheshire, 1982). Like some first wave studies this again focussed on social class and gender, but unlike previous studies instead of studying variation itself, it sought to explain the motivation for sound change. The young people studied were separated into two distinct categories; Group A and Group B. For Group B violence, skill in fighting, the habitual carrying of weapons, participation in certain crimes, certain job preferences, and a propensity to swearing were part of the norm and their choice of clothing and hairstyle also reflected their group membership. Cheshire found that those who conformed to the social conventions of their group also conformed to its linguistic conventions. This was the case in both groups for both male and female members, however, it was the males who showed the highest rates of non-standard usage. This indicates that one’s social conformity has more influence on their speech than any biological factors

While Penelope Eckert initially worked within the Network Theory framework, she was introduced to the perspective of communities of practice by Etienne Wenger and the perspective became central to her work. A community of practice can be defined as “an aggregate of people who come together around mutual engagement in an endeavour." (Eckert and McConnell-Ginet, 1992) The most in-depth study of language change in communities of practice was carried out by Eckert in her 1989a Belten High study which demonstrates the importance of considering variation patterns within local contexts in order to fully understand the motivation behind variable usage. This project focussed on the Northern Cities Shift (a chain shift in the sounds of some regional American English vowels), specifically on two vowel sounds - “(uh) as in fun, cuff, but" which was shifting to a backer realisations so that it began to sound like the vowel in fawn, cough, bought, and “the nucleus [a] of the diphthong (ay) as in file, line, heist raises to [U] or [O], so that the diphthong may sound more like the diphthong in foil, loin, hoist." (Eckert and McConnell-Ginet (1995), pg. 32)

The fieldwork and ethnographic work for this study were carried out between 1980-1982 in Belten High with an additional one to two months in four other suburban schools in the Detroit area. Eckert found the students of Belten High formed two opposing groups - the Jocks and the Burnouts. Even students who were neither a jock nor a burnout identified themselves in respect to these groups as “in-betweens" (Eckert, 1989a)

The Jocks were “a school-oriented community of practice, embodying middle-class

culture." (Eckert, 1989a) The Jocks functioned within the framework provided by the school and their socialising and extra-curricular activities took place within this framework. The Burnouts, on the other hand, were “a locally-oriented community of practice, embodying working-class culture" and they rejected the framework put in place by the school, instead operating in more urban environments.

The Jocks were students with status in Belten High and the idea of ‘jock’ meaning ‘a student with status who is involved in school activities’ spread to other aspects of the school. In an interview with two choir members, they identified another student as a ‘choir jock.’ Eckert defines a choir jock as “a choir member who gets involved in more than just the singing" (Eckert and McConnell-Ginet, 1995) as supported by excerpts from student interviews. We can see that the term Jock is seen as a positive and has favourable connotations. The Burnouts, on the other hand, are seen as the opposite of this, by rejecting “this community [they] are seen as deviant." (Eckert and McConnell-Ginet, 1995) For Jock boys, their status was achieved through their own achievements through sports or other endeavours but for Jock girl’s status was achieved through physical attributes such as clothing, appearance or the status of their boyfriend. A similar imbalance was present in the Burnouts where the males placed value and status on fighting ability however female Burnouts were generally expected to have a male chaperone in the urban areas which the burnouts socialised in for safety.

Eckert found that the backing of (uh) could be tied to group membership with Burnouts leading in usage, while the raising of (ay) correlated with sex, with females leading. Here is where we see the difference in Eckert’s work when compared to the studies which came before her - her findings could indicate that (uh) backing indexes group membership and (ay) raising indexes speaker sex, but she states “when we dig deeper, we will see that these data reflect a great complexity of social practice" (Eckert and McConnell-Ginet, 1995) . In regards to (uh) backing, Eckert found that while usage indicated group membership, it was the females who showed the most extreme values - more specifically, the Burnout females showed the most backing while the Jock females showed the least (with their respective group’s males following), that is to say the females in these groups bracketed the entire range of variation. According to Eckert female speakers rely more heavily on symbolic capital to claim membership of specific communities of practice than males do (Eckert and McConnell-Ginet, 1992). This can be seen in action in the speech habits of the Jocks and Burnouts - (uh) backing was seen as a burnout feature and so the burnout females used it more while the Jock females avoided using it to indicate or validate their group membership.

This is evidence that to fully understand variable patterning in linguistic

research we should not only examine how social categories behave but also how they interact. It also shows that studying variables at macro levels is valid, but using macro-level studies in tandem with micro-level gives us a fuller understanding of linguistic practices. Eckert shows that gender is relational, it is not about a distinction between male and female, but rather about the kind of male or female one is. This shows us that language is not attached to assigned sex as was assumed in first wave studies. This is important given that this study focusses on participants who do not identify as the gender they were assigned at birth, aligning with the understanding of gender construction of third wave variation.

Style Shifting

Much like style in reference to one's choice of clothing, linguistic style is an individual bricolage which speakers use as a way of expressing different social ideas when saying the same thing. Within linguistics, Labov refers to style as 'different ways of saying the same thing.' (Labov, 1972a) while Tagliamonte suggests that style refers to 'the linguistic repertoire of an individual speaker. For example, certain variants have informal connotations, e.g. the [n] variant of variable (ing) as in *workin'* and individuals will exhibit use of this feature in a way that demonstrates style." (Tagliamonte, 2011) With the above example in mind, 'style shifting' is a form of intraspeaker variation which refers to one's varying of linguistic features depending on context, for example in a formal interview setting one may avoid using the aforementioned *workin'* while in a casual context this variable would be perfectly natural. Style shifting occurs on many levels of speech from lexical variation to phonological variation. As to why this style shifting occurs, there are several models which attempt to explain this such as the 'Attention to speech' model. Labov proposes that speaker style is dependent on how much attention one is paying to their own speech and as such, how formal the context of the speech is. (Labov (1972b),97-120,Labov (1972a)) The implications of this model are that a speaker has one natural style and one formal style which are used dependent on how much attention is being paid to their speech which led to criticism due to the difficulty of measuring attention paid to speech (Kiesling, 1998) and the implication that speakers have only one style for a given level of formality. (Hindle, 1979) Another more common explanation for style shifting is 'Communication accommodation theory' which centres around two ideas; convergence and divergence. Convergence refers to a speaker's attempt to shift their speech to match that of their interlocutor while divergence refers to a speaker's attempt to shift their speech in order to distance themselves from their interlocutor. (Kiesling and Schilling-Estes, 1998) Much like 'attention to speech', this model is also open to criticism

as it does not account for instances where speech converges without social approval as a motivator such as in arguments. (Mosher et al., 1968) This idea of using speech in order to sound more or less like an interlocutor is something which will be revisited later in 5.0.1. Style shifting may also be an attempt to associate or disassociate oneself from a specific group (Le Page et al., 1985)- similar to Eckert's observations that speakers use variables to claim membership within communities of practice as discussed in section 2.3

Transgender linguistic research

While the field of transgender linguistics is a growing one, there is not a great deal written on the subject to date. There is an increasing demand for transgender voice therapy and this has lead to a number of publications on the process (Blagnys, 2006; Hancock and Helenius, 2012). In 1999, Kulick reviewed the major research which had been carried out on this topic prior to more modern studies. Kulick states that trans identities "affirm the permeability of gendered boundaries. By doing so, it highlights the contrived, contingent and contextualised nature of "male" and "female" (Kulick, 1999) In a similar manner to Eckert and Podesva, Kulick states that language is an integral part of constructing a gendered identity, proposing that "'men's' and 'women's' language constitutes a resource that is available to be invoked manipulated by anybody to convey and construct gendered positions and identities." (Kulick, 1999) This idea that one employs their speech and linguistic variables in order to create their own gendered identity is central to this study.

This concept is echoed again by Lal Zimman. Since 2010 Lal Zimman has been contributing to the field of transgender linguistics and has created a space within sociolinguistics for transgender study. He states "a field like language and gender... has rarely taken advantage of the potential insights to be gained from the study of how gender is produced and managed discursively by English-speaking transgender people." (Zimman (2009), 75) Zimman's 2013 perceptual study investigated the perception of the speech of transgender men with a focus on /s/ and creaky voice features. In general, Zimman found that in listening tests, participants grouped transgender men with cisgender gay men as "trans men who make use of testosterone typically experience a specific drop in vocal pitch yet may maintain stylistic traits acquired when living in a female social role." (Zimman, 2013) Zimman's forthcoming article focussing on /s/ in transmasculine (forthcoming) found that individuals' personal construction of gender has a measurable impact on their speech. Zimman's research provides a key springboard for this small-scale study of /s/ in Scottish transgender speakers. Zimman's research will be discussed in more detail in section 2.4.2.

In regards to non-binary identity, little research has been carried out on this topic, however, Gratton 2016 studied how two non-binary speakers varied their use of (ing) across conversational contexts. Gratton recorded speakers in 'queer spaces' and in 'non-queer spaces' and found that in queer spaces, speakers used a relatively even distribution of the variable while in non-queer spaces their use of the variable differed. Gratton proposes this is due to participants using this variable to index their gender identity - in queer spaces, they are not at risk of being misgendered and did not feel a need to index their gender while in non-queer spaces these speakers did feel at risk of being misgendered and as such they shifted their use of the variable in order to distance themselves from what would be expected of their gender-assigned-at-birth as a means to avoid the possibility of being misgendered. Gratton suggests "gender identity is not something that exists pre-discursively but rather something that individuals construct" (Gratton (2016), 52) She further states that "the situations that call for more conscious identity work are those in which they are around people with whom they feel uncomfortable" (Gratton (2016), 55) as the primary concern is to avoid being misgendered.

Summary

The above sections have provided an overview of how sex and gender are defined and treated within linguistics and sociolinguistics. We have seen how the first wave of studies conceptualised sex as a binary category which influenced speech simply due to one's being a male or female. The second wave of studies began to look more closely at gender to view how people performed their gender in their social networks, moving closer to the third wave view of gender as something which is 'done' and not something one has. By the end of the third wave, we can see that gender is not so much a category which explains variation but rather one which can give insight into how other social factors such as power may be influencing variability, that is that gender is a performative act and not a biological state. This is key to this piece of research as we will see this performance of gender later in sections 4 and 5. A brief summary of style shifting and transgender linguistic research has also been provided.

2.4 The Linguistic Feature - [s]

Introduction

The following section will introduce the variable /s/ on which this study is focussed as well as key phonetic and sociophonetic works which underpin this study.

2.4.1 Phonetic background

Ladefoged describes the process of fricative production as close proximity “of two articulators so that the air stream is partially obstructed and turbulent airflow is produced" (Ladefoged (1993), pg 14).

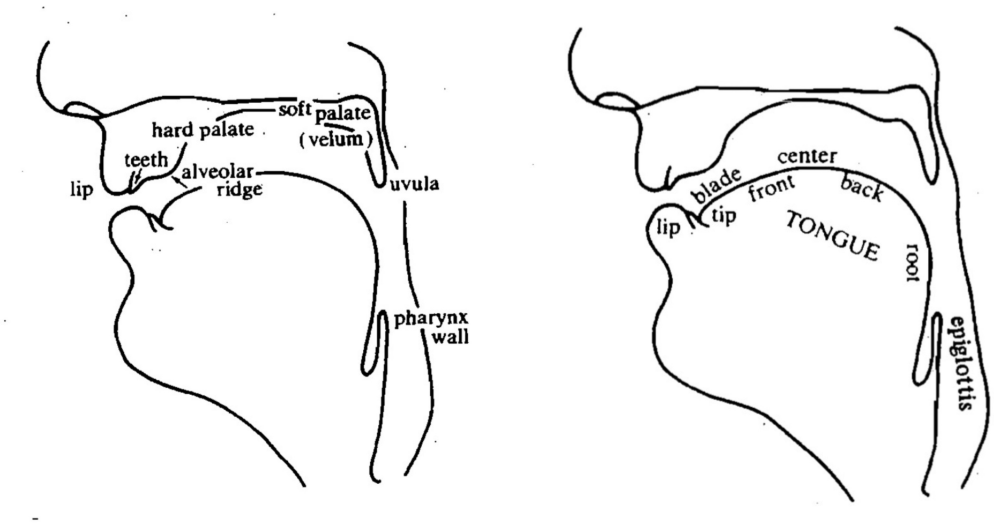


Figure 2.1: The principle parts of the upper surface of the vocal tract (Ladefoged, 1993)

Further, Ogden notes that there are two kinds of fricative, one which Ladefoged details above, and another which occurs when a speaker directs “a channel of air at another surface, such as the back of the teeth or the alveolar ridge, and when the moving air hits the surface it becomes turbulent" (Ogden and Books (2009), pg. 118). In the case of alveolar [s] and post-alveolar [ʃ] we have the tongue acting as the active articulator while the alveolar ridge/post-alveolar region (in [s] and [ʃ] respectively) act as the passive articulator.

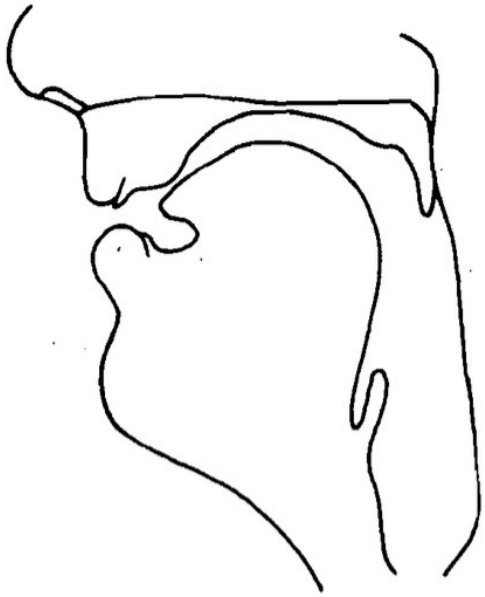


Figure 2.2: The positions of the vocal organs in the palato-alveolar fricative in shy (Ladefoged, 1993)

The space forward of the maximal constriction is known as the front cavity and in the case of /s/ is the space in front of the point of constriction consisting of part of the palate, the teeth and the lips. /s/ can be produced with a fronter, more dental or backer, more /ʃ/ like sound. (Catford, 1988) Therefore, one of the constraints of /s/ variation is the place of articulation which can vary in 'frontness' or 'backness' along the alveolar ridge. This variation can be examined by assessing peak spectral frequency, which will be used in this study, as a higher Herz value frequency is indicative of shorter front cavity and of a fronter articulation. (Stevens, 1998; Jongman et al., 2000) See figures 2.3 and 2.4 for examples of a 'standard' [s] spectrum and spectrogram.

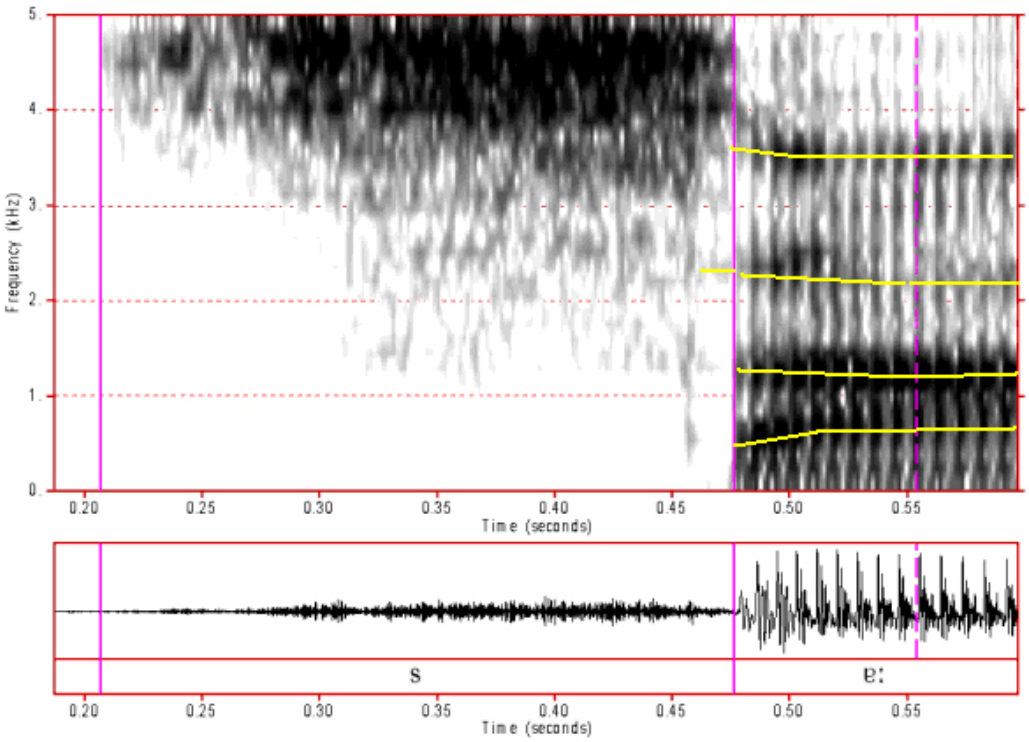


Figure 2.3: FFT/LPC spectrum of /s/ (Mannell, 2008)

Another characteristic of /s/ is 'centre of gravity' which denotes how high the frequencies in a spectrum of /s/ are on average, and can index gender in a similar manner to peak frequency with lower values being attributed to males and higher values to females.

2.4.2 Sociophonetic background

Studies have shown females generally to have smaller vocal tracts than males and therefore, should also have a smaller front cavity. (Stevens, 1998; Daniloff et al., 1980) Due to this, it could be assumed that females naturally produce a higher frequency /s/ than males and some studies have shown they do (Schwartz, 1968; Flipsen et al., 1999; Johnson, 1991; Jongman et al., 2000) However, there is little evidence to support the differences between male and female /s/ peak frequencies being accounted for solely by physiological size differences. Strand 1999 has noted that the main difference in size between the male and female vocal tract is actually in the back cavity and not the front cavity i.e. the cavity mainly responsible for resonance in [s].

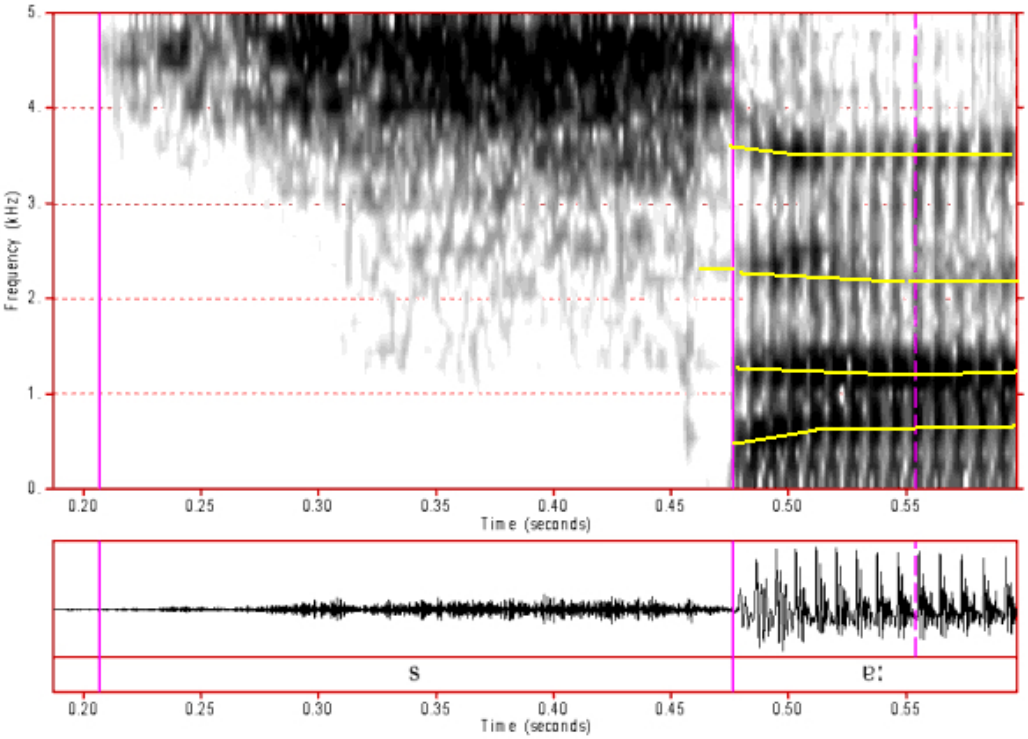


Figure 2.4: Spectrogram of /s/ (Mannell, 2008)

As is the case with the pitch of the voice, the difference between female and male /s/ realisations cannot be explained by anatomical differences alone. The difference in peak frequency is influenced by physiological difference but also by social factors, "in other words, /s/ appear[s] to be doing something in terms of gender" (Levon and Holmes-Elliott, 2013) and this 'something' has been shown to be the result of gender conditioning in our society.

While studies have shown that males and females have different /s/ realisations, many since have shown that this difference is not simply a by-product of anatomical differences. Citing unpublished evidence from two speech perception experiments and by drawing togetherfindings from the fields of speech perception, gender studies, and social psychology, Strand indicates that American men actively produce backer /s/ realisations which, by creating a larger front cavity, results in a lower peak frequency. Strand cites this as evidence of "the development and salience of socially influenced fricative productions" (Strand, 1999). Furthermore, Strand notes that front realisations were considered 'more female', as females with front realisations were deemed to be more feminine. In an auditory analysis of sibilant production, Flipsen et al. (Flipsen et al., 1999) found higher rates of dentalised /s/ realisations in female participants in comparison to males. Stuart-Smith's 2007 study of /s/ in Glaswegian English focused on class and gender, and the interaction of these. The sample in this study was divided by age, class and sex. By measuring the peak and slope (the gradient (slope) of the line connecting spectral peaks) characteristics of speakers' sibilants, she found that all males shared "similar socially constructed norms for /s/-production as they all patterned the same regardless of their age and class." (Stuart-Smith, 2007) Similarly, most of the females studied also patterned together, that is except the young working-class females. This group of young working-class females surprisingly patterned in line with the working-class males. Stuart-Smith argues this is evidence of identity indexing and that these young females were speaking like males, not in order to affiliate with them or claim membership in their community of practice but instead to distance themselves from middle-class females. Later Fuchs and Toda found in an acoustic study that English speaking female participants "actively produce a more front place of articulation and shorter front cavity than men." (Fuchs et al., 2010)

Munson's study of the link between speech perception and gender studied participant's perceptions of /s/ realisations. This study found that a fronter realisation of /s/ was closely tied to perceptions of 'gay speech' making it inherently associated with femininity and further linking back to the idea of this being a feminine trait as homosexual men are often perceived as less masculine and often more feminine than their heterosexual counterparts. (Munson, 2007)

Levon and Holmes-Elliott (2013) carried out a study with a focus on the

effect of gender and class on variation of /s/ realisations in South-east England. They compared tokens from males and females from both working and middle/upper-class backgrounds using a corpus of speech from the television programs Made in Chelsea and The Only Way is Essex. They found that their middle/upper-class speakers "/s/ peak frequency is governed by two independent effects of speaker sex, with men consistently producing lower /s/ peak frequencies than women, and speech context, with lower peak frequencies for all speakers in single-sex, as opposed to mixed-sex, talk." This difference was found to be present in the working class speakers too where in mixed-sex interactions WC females /s/ peak frequencies average was 2200 Hz higher than their male counterparts. In single-sex interactions, however, the same women's average peak increased by over 1000 Hz while the WC men's did not exhibit a comparable change. Levon & Holmes-Elliott argue the variation of peak frequencies across speaker context in their WC speakers to be further evidence of what Stuart-Smith found in 2007, stating that this "linguistic exaggeration is part of the construction and presentation of a locally-defined gendered self." (Levon and Holmes-Elliott, 2013)

Lal Zimman's forthcoming paper studies the changes in /s/ realisations in participants as they undergo their gender transition process (Zimman, forthcoming). Zimman's study consisted of fifteen trans participants all of whom had been assigned female at birth but did not identify as cisgender. Zimman measured the centre of gravity (as mentioned in section 2.4.1) using instances of /s/ recorded as participants read The Rainbow Passage. This resulted in Zimman finding that the centre of gravity (COG) of his speakers' realisations varied depending on gender identity. Upon analysing the data, three groups emerged. The first, a group of who "were comfortable being identified as men and who self-identify as straight men" (Zimman, forthcoming). This group had mean COG's below 6000 Hz - within the norms for cisgender men's mean centre of gravity of 4-7000 Hz. The second group self-identified as trans men and as queer. This group's mean COG fell into the range where cisgender males and cisgender female's mean COG overlap i.e 6400-7000. The final group consisted of people who "do not identify as men and instead use labels like *boy* and *genderqueer* [while] others avoid labels altogether." This group exhibited mean COG's significantly higher than the previous two groups, indeed some of the people in this group have a mean COG higher than the upper range of what is generally expected for English speaking cisgender women (8500 Hz). Zimman's research indicates the strong possibility that internal socialisation i.e. one's own concept of themselves and their own gender, has as much, if not greater an effect on speech than external socialisation.

Summary

The above section clearly indicates that high Herz values for /s/ peak frequencies are associated with females while lower values are associated with males. This association goes beyond sex and continues to social ideas of masculinity and femininity with listeners perceiving fronted /s/ sounds, and by proxy high peaks, as feminine. With this in mind, I predicted that transmasculine speakers would produce lower peak frequencies than cisgender females and transfeminine speakers would produce higher peaks than cisgender males.

2.5 Scottish English

This study was carried out in Glasgow for numerous reasons. Scotland is known for it's being a progressive country and has a thriving LGBTQ+ scene which made this an ideal location to study transgender voice. Further, with Stuart-Smith's study on /s/ realisations in Glasgow allowed a like for like comparison of /s/ peaks of speakers from a similar location, minimizing possible variation amongst speakers.

As this study will be carried out in Glasgow, Scotland, it will focus on speakers of Scottish English, more specifically the Central Belt variety. Aitken 1979; 1984 describes Scottish English as a bipolar linguistic continuum with Scottish Standard English (SSE) at one end and Scots on the other. It is worth noting that while these may sound similar to English, they also have marked differences lexically, phonologically, syntactically etc. As noted by Stuart-Smith Scots is generally spoken by the working class while SSE is more generally spoken by "the educated middle classes". Having said that, many speakers of Scottish English could be considered bi-dialectal in their ability to style-shift between Scots and SSE while others "drift up and down the continuum - dialect drifting" ((Stuart-Smith, 2004) see also Macafee (1992)). With this in mind, it is unlikely that participants in this project will be speakers of true Scots due to their status as university students and as such are more likely to be speakers of SSE though it would be naive not to assume that some participants will use some features of Scots as well as features of SSE in their everyday vernacular due to the continual nature of Scottish English. The vowels of Scottish English are as follows; /i, ɪ, e, ɛ, a, o, ɔ, u, ʉ, ʌ, əi, ae, oe, ʌʉ/, however as this covers both Scots and SSE (and the area's between them) it is difficult to fully describe these vowels. This difficulty is furthered by the regional variation in Scottish English which is can be separated into Central Belt Scots, Northern Scots, Borders Scots and Insular Scots. Stuart-Smith addresses this issue by creating tables which depict the vowel systems of each regional dialect, however as this study will be carried out in Glasgow I have attached only an example of the relevant table.

The difference in Scottish English vowels may cause /s/ realisations to differ from those found in American or Southern English. 'Backed' vowels may result in more lip rounding, causing a longer front cavity and lower peak frequencies. In Southern English, /a/ has spread lips in citation form, however, in SSE this vowel often becomes /ɔ/ which has rounded lips, for example, /hand/ often becomes /hɔnd/. ((Stuart-Smith, 2004)). This differing vowel system and the effects it may have on peak frequencies has been accounted for and will be considered during analysis. As noted above, Stuart-Smith has carried out research in Glasgow specifically pertaining to /s/ realisations and

Figure 2.5: Table 1 -The vowels of Scottish English (example from Glasgow) - (Stuart-Smith, 2004)

	Urban Scots	Urban Scots (in practice)	ScStE
OFF	a̱	a̱ ↔ ɔ	ɒ
CAT	a̱	a̱	a
(LONG)	a̱	a̱ ↔ ɔ	ɒ
(WASH)	a̱	a̱ ↔ ɔ	ɒ
HAND	ɔ	ɔ ↔ a̱	a
START	ɐ	ɐ ↔ a̱	a
CAUGHT	ɔ	ɔ	ɒ
(SNOW)	ɔ	ɔ ↔ o	o
CUT	ʌ̈	ʌ̈	ʌ
(PULL)	ʌ̈	ʌ̈ ↔ ʉ	ʉ̱
NEW/DEW	ju	ju	ju̱
BITE	əi	əi	əi
TRY	ae	ae	ae
EYE	i	i ↔ ae	ae
LOIN	əi	əi ↔ oe	oe
VOICE	oe	oe	oe
LOUP 'jump'	ʌu	ʌu	(ʌu)

previous work (e.g. Macaulay (1977)) has indicated that gender differences are apparent in SSE. With this in mind, SSE is an excellent form of English to focus this study on.

Summary

The above sections provide linguistic context for this study. /s/ has been shown be used by speakers to index gender by tapping into the indexical 'femininity' of a fronted /s/ or the 'masculinity' of a backed /s/. This has been shown by Stuart-Smith; Zimman whose research shows speakers using /s/ to construct complex genders strongly linked to class and identity. It is important to provide an overview of the dialect in order to understand what makes it different to standard southern British English, in this case, the differing vowel set due to the participants of this study being speakers of Scottish English. These differences may affect /s/ realisations making them important to be aware of.

2.6 Summary of literature review

To summarise, gender and gender roles are entrenched parts of our western society and they affect our lives in countless ways, one of which is their influence on our speech. I have detailed what it means to be transgender as well as the social history of the LGBTQ+ community which shows the treatment of members of this community throughout history. This indicates why representation of the LGBTQ+ community is still an issue, especially for transgender individuals. Someone who identifies as transgender may not necessarily identify as any binary gender instead, they may self-identify using labels such as transmasculine, trans-man, trans-boy etc. as can be seen in the work of Lal Zimman (forthcoming).

I have shown that in sociolinguistic research gender emerged as a factor which influences variation over time and so it gradually became the focus of many studies. Despite many linguists agreeing that sex (a biological category) and gender (a social construct) are not synonymous, I have observed that many still use the terms to refer to a binary distinction of male and female. By looking at the work of Milroy & Milroy and Eckert & McConnell-Ginet, we can see that gender is a complex social construction which should be studied in its social context and in relation to other social categories in order to fully understand its effect on variable patterning.

Finally, I have provided an overview of the linguistic variable /s/ in terms of both phonetic and sociophonetic research as well as an overview of Scots Standard English which is important to understand due to the speaker's of this study being speakers of SSE. In order to fully understand variation in the realisation of /s/, it is important to understand the mechanisms of production and how they may vary or be manipulated by speakers. Similarly, it is necessary to understand the differences in Scottish English which may influence /s/ peak frequencies, such as rounding of vowels which are commonly spread in other dialects such as Southern English, thus increasing the size of the front cavity.

Zimman's work sheds further light on the way in which transgender identity affects speech showing us that internal socialisation is possibly more powerful than external socialisation i.e. self-identity has more influence on our speech than how we are perceived by society. (forthcoming)

Chapter 3

Methodology

"Gender is a construct, tear it apart"

Sasha Velour / Alexander Steinberg

The following chapter provides an account of the data collection, data processing and data analysis methods used in this study. I will begin with a brief outline of the recruitment strategy and a description of the participant sample, continuing with a description of the recording equipment which was used and the recording procedure. This is followed by a section on the process of designing and building a word list and a discussion of ethical considerations and requirements of this project. Finally, the chapter will outline the types of data processing and analysis and a brief summary of the statistical modelling carried out.

3.1 Participants

This section outlines the recruitment strategy by which participants were contacted for the study and provides a brief synopsis of demographic information which was gathered during the interview process.

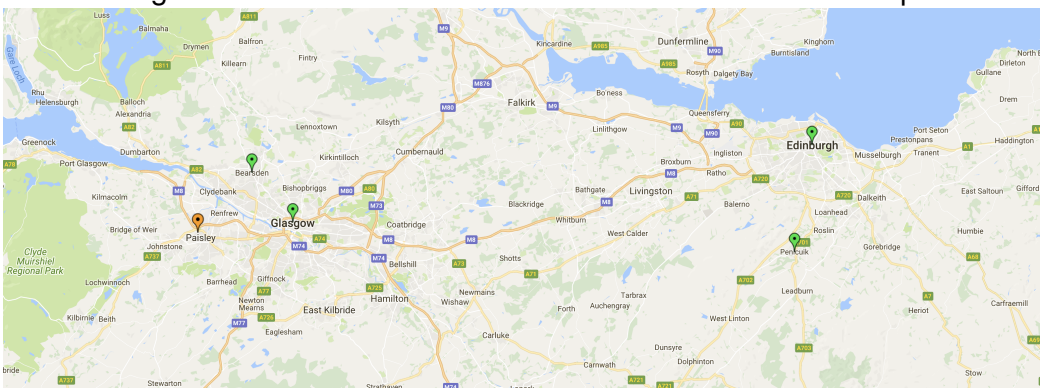
3.1.1 Recruitment strategy

To study the phonetic and social properties of transgender /s/ in Glasgow, a recruitment strategy was required to gather speakers from Glasgow and its surrounding areas without making them aware that /s/ was the phoneme

being studied as an awareness of the sound being focussed on may prime participants, causing them to alter their linguistic behaviour. After a lengthy ethical review, the process of recruiting participants began in April 2017 with the criteria that participants should be over 18, identify as transgender and be from Glasgow, however, this was later broadened to anyone from the Central Belt area of Scotland, illustrated in figure 3.1 below. Anyone who met these criteria was invited to take part in the project. Due to /s/ being a frequent part of speech no screening was required other than ensuring participants did not have any speech impediments which may affect /s/ realisation. Recruitment was carried out both online and in person using various LGBTQ+ networks. Emails were sent to several LGBTQ+ organisations around Scotland, several independent organisations were contacted over the phone and the project was also spread by word of mouth due to the relatively small size of the LGBTQ+ community in Glasgow.

A full list of the organisations contacted requesting the passing of information on the project along to their members is as follows; the relevant LGBTQ+ societies at the University of Glasgow, Strathclyde University, Glasgow Caledonian University, Napier University, the University of Edinburgh, Stirling University and Glasgow School of Art as well as the Student Association at the University of Edinburgh. Further independent and government LGBTQ+ groups were contacted; Seahorses Swimming (a swimming group for trans identifying people in Glasgow), 'Lock Up Your Daughters' LGBT filmmaking group, the Trans.Edu project at Strathclyde University (a project researching the experience of trans applicants, student and staff in college and university), Glasgow's branches of LGBT Health, Action for Trans Health and Trans Youth Scotland. Permission to access Glasgow University's psychology department subject pool was sought, though this was unsuccessful. A request for participants was posted on Glasgow University's student forum 'StudentVoice', an email was sent to the students of the English Language & Linguistics department, all Postgraduate students in the College of Arts and later to every student at Glasgow University having received approval to do so from the head of each college. Finally, this request was circulated on social media. Any interested parties who got in touch regarding taking part were sent an information sheet which outlined the purpose of the study and the conditions of taking part (available in appendixes). They were not informed of the exact focus of the project i.e. the focus on /s/ but were told it would concern the effect of gender as a construct on speech and that the aim of the project was to improve representation for non-cis people in academia. Those who chose to participate were then scheduled for recording.

Figure 3.1: Central Belt area of Scotland as seen on a map



3.1.2 Participant sample

After two months of recruitment in June, thirteen people had expressed interest in participating in the study, however, only eight were suitable due to the remaining five of these people not being from Scotland. Of these eight, two were unable to attend their recording sessions. The remaining six participants were made up of four transmasculine and two non-binary people. Of these, two were originally from and living in Glasgow, one was from Edinburgh but living in Glasgow, one was from Glasgow but living in Edinburgh, one was from Penicuik but now lived in Glasgow and one was from Paisley, a suburb of Glasgow. Five of the six participants were students, while the remaining participant had joined the workforce. Due to the nature of the recruitment strategy, the resulting group formed a relatively homogeneous group in terms of age, trans identity and socio-economic group. In keeping with ethical requirements, all participants were over 18 years of age but were still considered young with the oldest being twenty-six. Most of the speakers were from a moderate, middle-class socio-economic background though participant class was not restricted.

Demographic information of participants					
Name	Gender identity	Assigned at Birth	Age	City of birth	City of residence
Euan	Transmasculine	Female	20	Penicuik	Glasgow
Oscar	Transmasculine	Female	Unknown	Glasgow	Glasgow
Jack	Transmasculine	Female	Unknown	Edinburgh	Glasgow
Alfie	Transmasculine	Female	18	Glasgow	Glasgow
Eli	Non-Binary	Male	Unknown	Glasgow	Paisley
Harvey	Non-Binary	Female	26	Edinburgh	Glasgow

Table 3.1: Demographic information of Participants; gender identity's as self reported by participants

Due to the small size of the sample, the conclusions drawn from the speech data are tentative, however, the data is still valid for an exploratory analysis and the results statistically significant which indicates the possibility for larger scale studies in the future.

3.2 Materials

This section will describe the word list and interview process used to elicit /s/ (as in **s**low, pa**ss**age, ma**ss**) realisations in this study as well as explain the reason for their design. The word list itself can be found in the appendix.

3.2.1 Design

It was decided to include a word list and three conversational contexts. The word list was included due to the ease of analysis and in order to illicit stylistically neutral speech. Participants would be recorded in a conversation with a cis-male, cis-female and transgender interlocutor in order to assess style shifting as observed by Levon and Holmes-Elliott (Levon and Holmes-Elliott, 2013) and to allow participants to construct their gender in relation to those around them, which Eckert suggests is what takes place. It was decided not to include a control group due to the short time frame for completion of the study and it was deemed that if a control were necessary, the data could be collected from the cis-male and cis-female interviewers.

Position of [s]	Vowels	Example from word list
Initial	followed by spread vowel	Sea
Initial	followed by rounded vowel	Soup
Medial	preceded and followed by spread vowel	Fleecy
Medial	preceded by spread, followed by rounded vowel	Lesson
Medial	preceded by rounded, followed by spread vowel	Mossy
Medial	preceded and followed by rounded vowel	Twosome
Final	preceded by spread vowel	Fleece
Final	preceded by rounded vowel	Moss

Table 3.2: Table illustrating the variation of /s/ position and vowel types in varying preceding and following positions. Note some vowels which may be expected to be 'spread' are categorised as 'not spread' due to differences in Scots vowel set.

3.2.2 Word list and Interview Preparation

The decision to have participants read a word list was made in order to illicit citation forms of /s/. While citation forms have been shown to be a site of dialect display amongst other kinds of linguistic propositioning (Gafter, 2016), these forms are useful when comparing style shifting in response to an interlocutor and also for ease of analysis of word list data. This can then be used for comparison with frequencies observed in spontaneous conversational speech influenced by interlocutors. The word list consisted of fifty-seven words in total including distractors with /s/ presented in word-initial, word-medial and word-final conditions eg. 'sea', 'moose', 'pass', avoiding consonant clusters in order to maintain a consonant-vowel-consonant pattern. Alongside the varying position, the preceding or succeeding vowel sound varied between rounded and neutral e.g. /o, ɔ, u, ʉ, ə/ or spread vowels e.g. //i, ɪ, e, ɛ, a/, as these affect frequencies as mentioned previously. This is illustrated in table 3.2.

Once selected, the words were semantically grouped in order to disguise the phoneme being studied. Words were grouped into everyday semantic categories e.g foods, feelings, words associated with nature or university. Distractors were also chosen with the intent of allowing for possible further study on other phonetic items such as vowel quality, vowel length, vowel onset time, plosive sounds or investigation of clear/dark /l/.

The word list was presented in orthographic form in a Powerpoint slide show which allowed participants to scroll through the list at their own speed and participants were instructed to repeat each word twice with a short gap between each elicitation. The full word list can be found in the appendix.

3.3 Interview

Participants were be recorded in three informal conversations in differing conversational contexts by varying the interlocutor's gender; a cis-gender male (the researcher), cis-gender female and a transgender individual. As mentioned previously the changing of the interlocutor was to allow participants to construct their gender in response to different stimuli and to gauge the style shifting which had been observed previously. (Levon and Holmes-Elliott, 2013) The transgender conversation was only possible to record with two participants as others were recorded individually due to timetabling conflicts.

The setting of the interviews was considered and in order to ensure the comfort and ease of the participants, it was decided not to use a sound booth and instead the recordings took place on the campus of the University of Glasgow, using committee rooms in the Queen Margaret Union as well as the Glasgow University Laboratory of Phonetics. The committee room used was a medium sized room with a large table and plastic chairs which the participants sat around during the recording. The Laboratory of Phonetics had a similar set up with a table around which plastic chairs were arranged allowing participants to be seated and converse with all present comfortably. In order to create a relaxed and informal atmosphere, participants were provided with snacks and hot drinks. Recording sessions began either with the transgender or the cis-female conversation, followed by the cis-male conversation and finally the word list. To further promote informal, conversational speech, interviews were carried out in a semi-structured interview style whereby participants were allowed to guide the conversation in any direction they chose and to allow for new ideas to be brought up during the interview as a result of what the interviewee says. During the conversations, participants spoke about their day, families, plans for their summer break as well as previous holidays, societies which they are members of and workplace interactions. In order to allow participants to freely construct their gender, few direct questions were asked however participants were asked where their parents were from and whether they had worn orthodontics though neither of these factors had an outcome on the data. Participants were also asked which gender pronouns they use and how they would describe their gender identity. Some participants spoke more about their gender identity than others, though all participants shared their preferred pronouns and a small amount about themselves and their identity. Participants were able to answer these questions in as much detail as they wished. The recordings were all at least ten minutes with none exceeding fifteen minutes in length and the topics of conversation were similar across conversations though the cis-female did not ask any demographic questions which the cis-male did as the primary researcher.

3.4 Equipment and recording procedure

3.4.1 Recording equipment

The data collection method in this study was audio recordings which were created using a model H4n Zoom Handy Recorder and Beyerdynamic Opus 55 Mk II neck-worn microphone. The microphone was attached to a headband which was worn around the back of the neck and allowed the microphone to be positioned at a stable distance of roughly 5cm from the mouth. The microphone was connected to the Zoom recorder using an XLR cable paired with XLR to mini XLR converter. The microphones were fitted with foam covers to minimize 'popping' etc. from plosives and other noise interference.

3.4.2 Recording procedure

Before recording began, participants were provided with an information sheet (see Appendix) and asked to sign a consent form (see Appendix). Participants were asked to silence mobile phones and to avoid bringing any noise making objects into the recording session with them. They were then fitted with the Beyerdynamic microphone, connected to the zoom recorder and recording began. The informal interviews were recorded before the word list in order to encourage more naturalistic production, based on Di Paolo & Yaeger-Dror (2011):

> "Given the importance of the vernacular to sociolinguistic analysis, the tasks which focus on pronunciation should always be placed as late in the session as possible so that the conversation itself will be as untrammelled with self-conscious speech as possible." Di Paolo & Yaeger-Dror 2011: 16

The spontaneous speech was followed by the word list task, which was carried out with the researcher in the room. The participant was given instructions in person and once they were comfortable, the researcher began the recording. The word list appeared on the screen in front of them and the participant was in control of changing slides. Once this was finished, the session was ended and the headset removed and participants were debriefed on the study and told which sound was being studied and why. No participants reported being aware that /s/ was the focus of the study. Many of those who participated were interested in the study and wished to be kept updated on findings. These participants were offered a copy of the thesis once complete. The only participants who knew each other came as a pair of pre-existing friends and it was decided

that the chance of word regarding the study spreading was slim due to the other four participants not being acquainted.

3.5 Ethics

Ethical approval was obtained from the University of Glasgow's College Research Ethics Committee before recruitment began. This was done to ensure the study met ethical requirements in relation to the following criteria; data collection and handling, anonymity and confidentiality, acquisition of informed consent and compensation, each of which will be discussed briefly below.

3.5.1 Data collection

Only a small amount of demographic data was collected from participants in order to identify the nationality of their parents, any orthodontic alterations to the vocal tract and information regarding their gender identity. Participants were not obliged to answer any questions in the interview and were free to provide as much or as little detail as they liked. While it would hypothetically be possible for a participant to be identified by someone who knows them intimately from their or audio recordings, this is unlikely and if it were to occur it is unlikely that it would affect the participant in any negative way. Those who took part did so actively, with interest in the study and the field. They made this clear by expressing their wish to be updated regarding the status of the project and the findings.

3.5.2 Informed consent

Before any recording took place, all participants provided informed written consent. After first being given information about the purpose and procedure of data collection including information about the method, data handling, anonymity and conditions for taking part. Participants were given the researcher's contact details as well as those of the project supervisor and it was made clear that either party could be contacted with any further questions of issues pertaining to the study. Finally, participants were reminded that their participation in the study was voluntary and that they were free to withdraw at any time without having to state a reason.

3.5.3 Data processing

Once the data was recorded, manually orthographically transcribed and coded each participant was assigned a pseudonym and all transcripts were anonymised in order preserve the anonymity of the participants as requested on their consent forms. The data was stored securely on password-protected university drives. Other than those who already knew each other, no participants came in contact with each other in order to protect participants and respect their anonymity. All participants contact details were deleted once the project was complete.

3.5.4 Compensation

Recording sessions were between thirty minutes and one hour and for this reason, as well as to encourage participants to come forward, they were offered compensation in the form of being entered into a raffle for a £30 Amazon.com gift voucher to thank them for their time. This raffle was carried out blindly and the winning participant was contacted and awarded the voucher.

3.6 Data preparation and analysis

The data used for this project consisted of nineteen recordings; six interviews with a cis-female, six with a cis-male, six read word lists and two with transgender interlocutors as shown below in Table 3.3. In total, the recordings were three hours, nineteen minutes and thirty seconds long with two hours, seventeen minutes and twenty-nine seconds of this being made up of participant speech i.e. not the interviewer. This section will describe the methods used to prepare and analyse the data for this project.

	Cisfemale recording	Cismale recording	Transgender recording	Wordlist
Alfie	✓	✓	✗	✓
Jack	✓	✓	✗	✓
Euan	✓	✓	✓	✓
Oscar	✓	✓	✓	✓
Harvey	✓	✓	✗	✓
Eli	✓	✓	✗	✓

Table 3.3: Table demonstrating which recordings in which each participant had engaged.

3.6.1 Acoustic data

Recordings were loaded into Transcriber and manually transcribed according to a set of guidelines as used on the Sounds of the City project as provided by Professor Jane Stuart-Smith. A sample of this can be seen below.

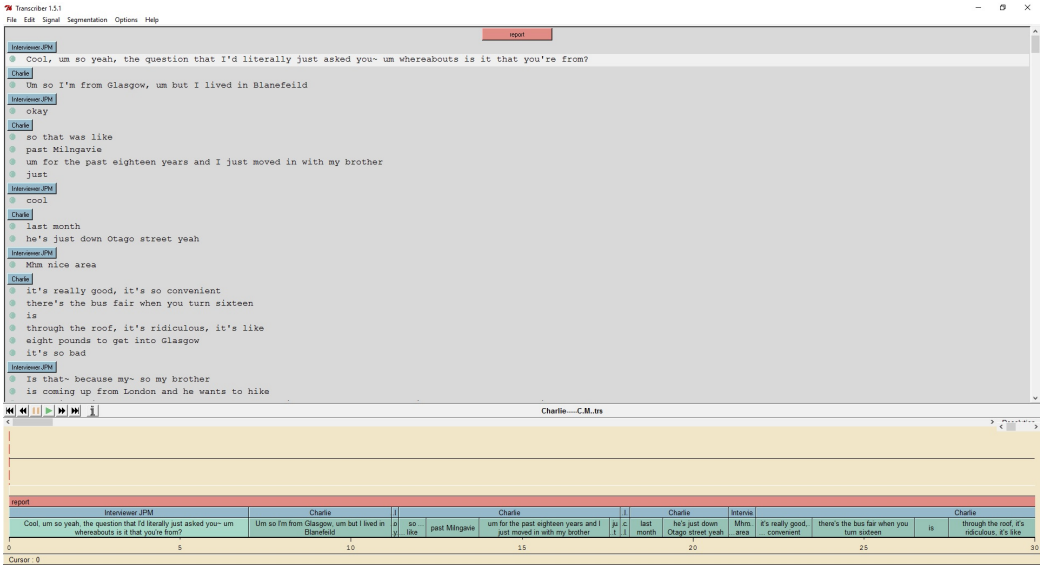


Figure 3.2: Screen-shot of Transcriber showing program and example of transcript

Once complete these files were checked for typos and incomprehensible sounds were rechecked.

Once checked, the transcriber files were uploaded up LaBB-CAT (Version 20170726.1333) (Fromont, R, Hay, J.). LaBB-CAT automatically force aligned the audio recordings to the orthographic transcript. Using LaBB-CAT, these interviews were searched for phonemic instances of /s/ - see figure below.

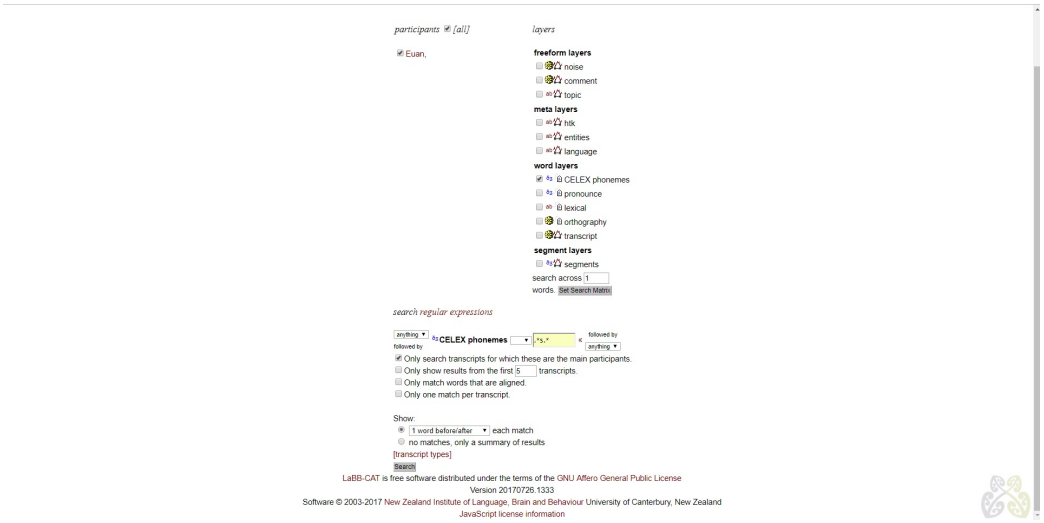


Figure 3.3: Screen-shot of LaBB-CAT illustrating search function

Once located, these instances were screened for any which were not part of a consonant cluster. These were then selected and exported in audio and TextGrid file formats.

3.6.2 Coding

After exporting and downloading, these files were manually inspected and each item was coded using Praat (version 6.0.33) and a short labelling script in order to speed up the process. (see appendix) This script was designed to add 6 tiers for coding; presence of /s/, position, preceding sound, following sound, topic and word.

- Position - the position of the word was coded as either ‘i’, ‘m’ or ‘f’ for initial, medial or final. This was to asses the effect of word position on peak frequencies.

- Preceding Sound - preceding sound was coded using phonemic transcription. This was done as the lip shape required to make some vowel sounds may influence /s/ peaks i.e. Ice /ais/ has a spread preceding vowel which will result in a raised peak, moose has a rounded preceding vowel which will result in a lowered peak.

- Following sound - The same method for preceding vowel sounds was used for following sound and for the same reasons. Rounding of the

lips following an /s/ may result in co-articulation resulting in a lowered /s/ peak e.g soup /sup/ or seek /sik/.

- Topic - the topic of the speech was considered and speech act was coded for. Tokens were coded as either a narrative, response, question of hedging.
- Word - word was coded for using the word which was uttered.

An example of this can be seen below.

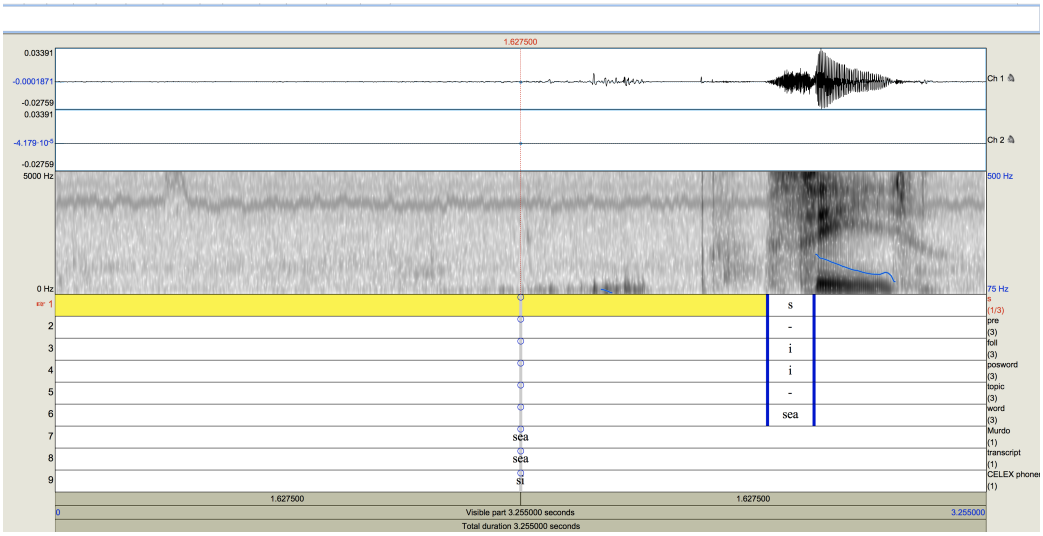


Figure 3.4: Screen-shot of Praat illustrating coding practice

Any instances which were not deemed appropriate due to misalignment, unusual levels of voicing or unclear boundaries were removed from the dataset leaving a remaining 1418 tokens of /s/ realisations. Once coding had been completed, sound files were manually segmented by ear - boundaries were added at the beginning and end of /s/ realisations as judged by ear. Once segmentation was complete, a second Praat script (see appendix) was used to extract values of peak frequency (highest Hz frequency in the realisation of a sound), centre of gravity (how high the frequencies in a spectrum are on average) and duration (number of milliseconds a sound lasts) from each token. This information was output as a 'comma separated value' or .csv file.

3.7 Statistical analysis

Once this .csv file had been generated by Praat it was loaded into R (version 3.3.3) for further analysis. The xtabs function was used in order to ensure there was enough tokens in each category for analysis, see table 3.4 for example. Using the factor function and the original coding as a basis, further factors were created for analysis.

GenID	CisFeInterview	CisMaInterview	Word List
NB	160	143	119
TM	377	285	239

Table 3.4: Example of xtabs showing number of /s/ tokens for transmasculine (TM) and non-binary (NB) speakers in each conversational context ('Style2').

Factors were added for;

- Following Lip shape - sounds were condensed from spread, neutral and rounded into spread or not spread
- Gender Identity - Gender identity was added as either Transmasculine, Non-Binary assigned female (NBF) or Non-Binary assigned male (NBM)
- 'Style1' - Style was separated into Style1 and Style2. Style2 coded tokens as either spontaneous or citation form speech.
- 'Style2' - Style2 was added and coded for conversational context; either cis-female, cis-male, or transgender conversations, or citation forms

Statistical analysis was carried out using a linear mixed effects regression model in R. This model used 'peak' as a dependent variable, 'following lip shape', 'word position' and 'speaker' as fixed factors and 'word' was set as a random factor. Due to the smaller number of participants and both non-binary speakers being so different, 'Speaker' was used to imply gender identity as it was felt that gender identity is an immutable aspect of the speakers. Due to only some speakers having engaged in conversation with a transgender interlocutor analysis of the data was carried on a subset of data which did not include the results for these conversations.

The initial lmer model used is as follows;

m1 = lmer(Peak FolLips1 + Position + GenID + Style2 + (GenID + Style2) + (1|Speaker) + (1|Word), data=data1)

however this returned no statistical significance with GenID (gender identity) as a factor due to the difference in /s/ production between the two non binary speakers. Instead the following lmer model was used;

m3 = lmer(Peak FolLips1 + Position + Speaker + Style2 + (1|Word), data=data1)

In m3 (model 3) gender identity is inferred by speaker instead. This returned Each factor (Following lip shape, position, speaker and style) with p values of <.05.

Chapter 4

Results

This chapter will present the results of this study, beginning with a summary of the results before continuing to explore the results in more detail with reference to linguistic and social factors. A summary will be presented at the end of each section and a chapter summary will be provided at the end.

4.0.1 Linguistic factors on /s/

Certain linguistic factors influenced /s/ realisation as was expected. Word position and lip shape of the following sound both influenced peak frequencies as they have been shown to do previously.

Word position

Figure 4.1 shows peak frequency of /s/ by position in the word. The position of /s/ in a word was a significant factor for peak frequency (F = 5.6462 , df = 148.30, p = 0.0043) such that /s/ in word-final position e.g. moose, had the lowest peak (p <.001) and medial the highest (p <.001). The differences between initial and final and between initial and medial position realisations were significant (p = <.001) however, the differences between medial and final were not significant.

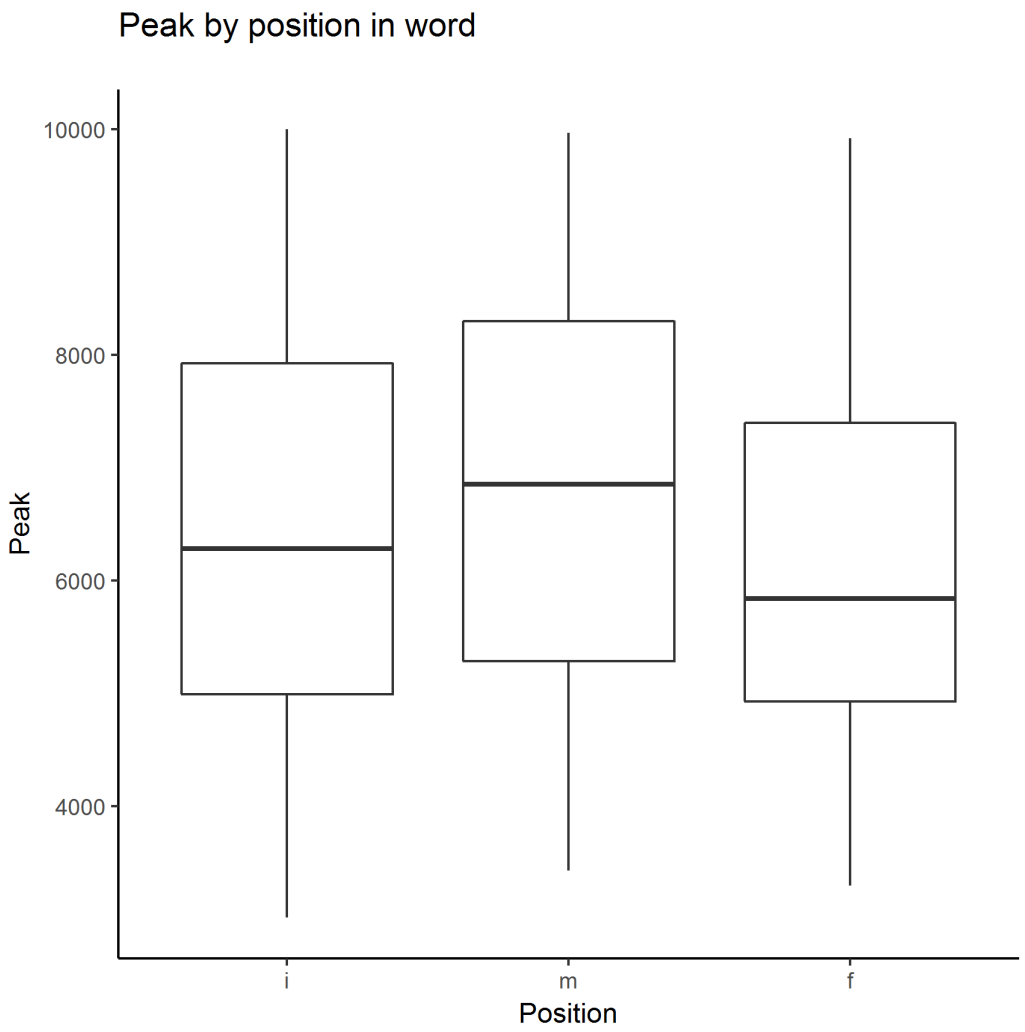


Figure 4.1: Peak frequency (Herz) for all speakers by position in word, i = initial, m = medial and f = final.

Following lip shape

Following lip shape is a statistically significant factor in regards to /s/ peak frequencies (F value = 11.4179, df = 237.80, $p < 0.0008$). Sounds following /s/ with rounded lips e.g. /sup/ have lower peak frequencies due to co-articulation i.e lengthening the front cavity. Similarly, if a following sound has spread lip shape e.g. /si/, the shorter front cavity results in higher frequencies as has been observed in previous research (Shadle, 1986)]. This can be seen below in figure 4.2 showing /s/ as influenced by following lip shape.

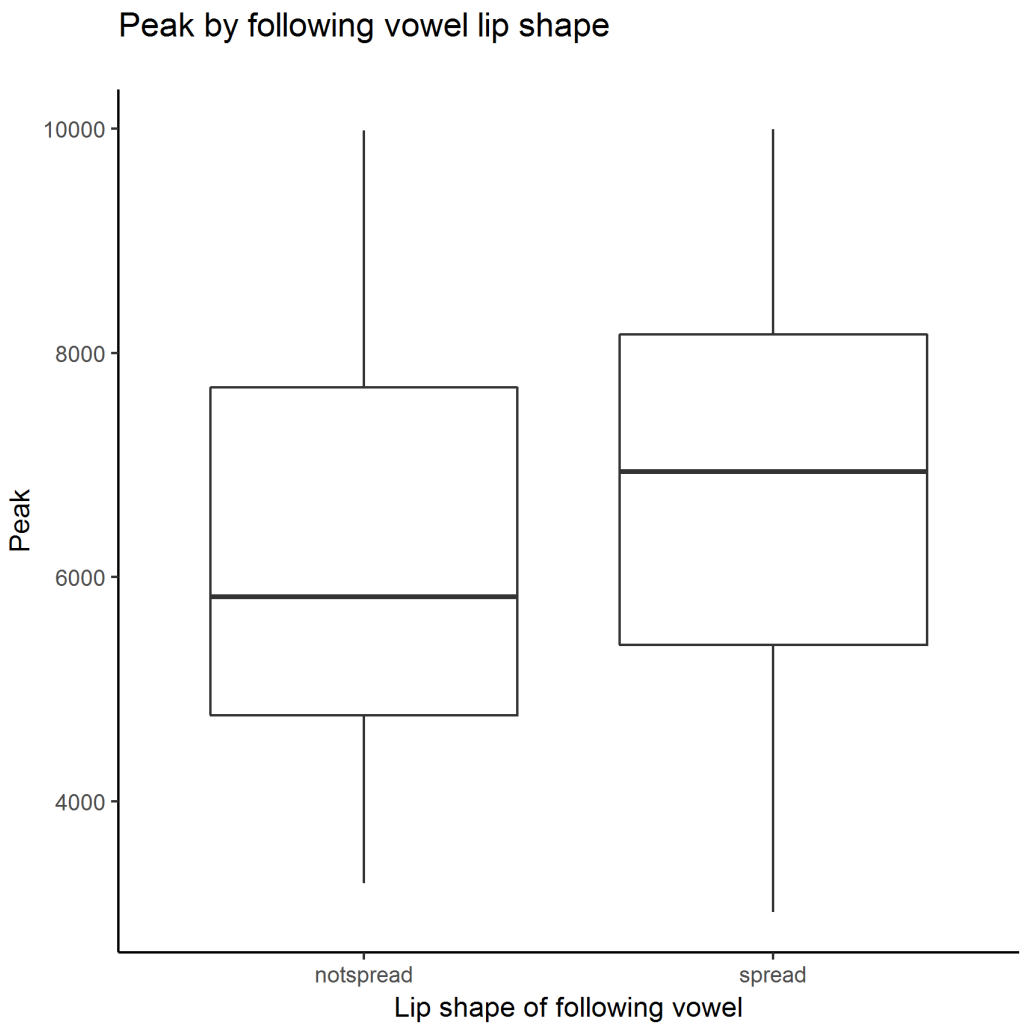


Figure 4.2: Peak frequency (Herz) for all speakers by following lip shape, notspread = neutral and rounded following vowels.

The empirical results shown in Fig 4.2 show a clear difference in frequency of peak of /s/ with /s/ followed by vowels with spread lips (e.g. sea, sail) showing significantly higher frequencies than other vowels ($p < .001$)

Summary

Both of these linguistic factors can be seen to be behaving as they have in previous research. (Shadle, 1986) This illustrates that linguistic factors are influence participants /s/ as they should, therefore the differences in participants'

realisations may be caused by social factors.

4.0.2 Social Factors

This section will show the effect social factors have on /s/ peak frequencies, specifically the effect of gender identity and gender of interlocutor as both of these have been shown to influence /s/ in previous research. (Zimman (forthcoming), Levon and Holmes-Elliott (2013))

Gender Identity

Gender identity also had a statistically significant effect on /s/ peak frequencies. (F value = 131.3065 , df = 1448.75, p <.001) Speakers' exact mean peak frequencies are shown below table 4.1 as rounded to the nearest full number.

Speakers' Mean Peak Frequencies						
Speaker	Alfie	Jack	Euan	Oscar	Eli	Harvey
Mean Peak Hz	7637	5490	5668	5670	7990	7490

Table 4.1: Peak frequency (Herz) for all speakers for full data set.

Figure 4.3 shows the mean peak frequency of each speaker as differentiated by gender identity. The two dashed lines represent the average peak's of middle-class (red) and working-class (blue) adult males in Glasgow (Stuart-Smith, 2007). Three of four transmasculine speakers pattern below the average for working-class males in Glasgow. The fourth transmasculine speaker (Alfie) has much higher means patterning than the other transmasculine speakers - this will be addressed in the next chapter. Furthermore, there is no clear pattern amongst the non-binary speakers who are different both to each other and to the transmasculine speakers.

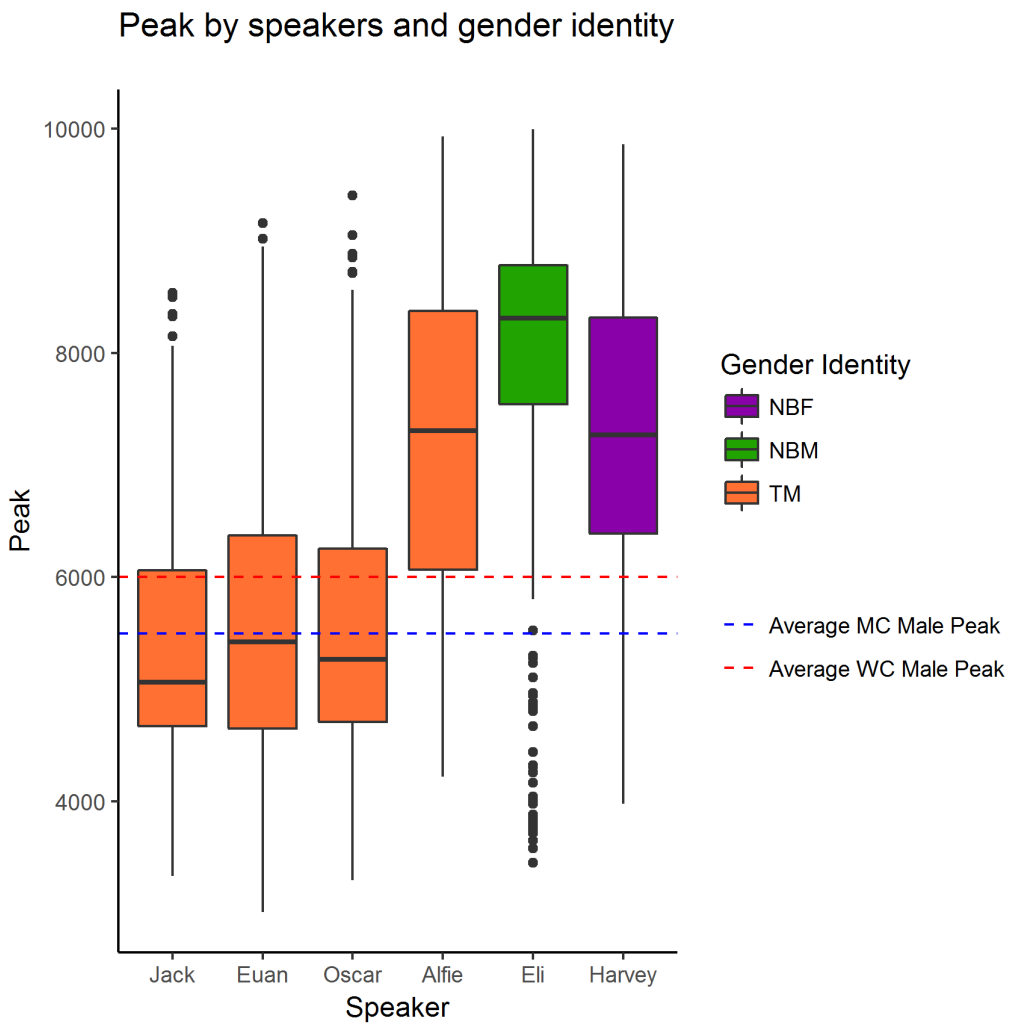


Figure 4.3: Peak frequency (Herz) for all speakers by gender identity, TM = transmasculine, NBF = Non-binary assigned female at birth, NBM = non-binary assigned male at birth.

The initial model provided above did not find gender identity to be significant due to the large disparity between non binary speakers and Alfie and the other transmasculine speakers, however 'speaker' is a sign of gender identity (F = 131.3065„ df = 448.75, p = <.001) and the comparisons between speakers show this. The transmasculine speakers are all statistically similar (p = <.001) though Alife does appear to be very different to the other transmasculine speakers, while Eli is significantly different from all other speakers (p = <.001).

Style shifting

The final statistically significant factor which affect /s/ peak frequencies was ‘Style2" or the gender of the interlocutor (F value = 3.3546, df = 199.53, $p < 0.0369$). Figure 4.4 shows the main effect of /s/ peaks as influenced by the gender of interlocutor. Levon and Holmes-Elliott found that females in some same-sex conversations raise their /s/ peaks as an enactment of gendered style. With this in mind, I expected to find my transmasculine participants lowering their /s/ peaks in a similar manner, in order to distance themselves from their female interlocutor and this phenomenon is illustrated in figure 4.4. This illustrates that trans people style shift in conversation with cis-females by lowering their /s/ peak frequencies when speaking to a cisgender female (<.001). There is no similar effect with a cis-male conversation or in citation forms as peaks observed in these interviews are similar to those observed in citation forms.

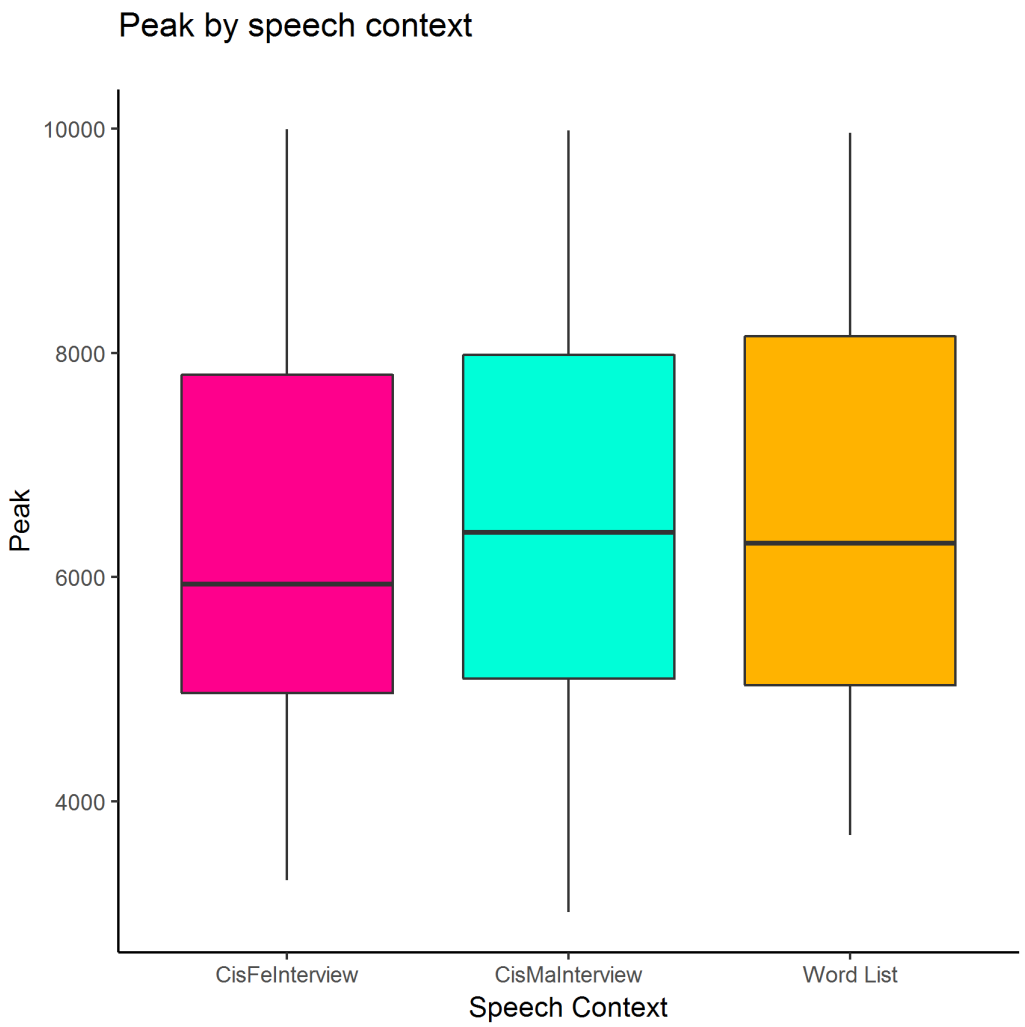


Figure 4.4: Peak frequency (Herz) for all speakers by interlocutor, CisFeInterview = Cisgender Female, CisMaInterview = Cisgender male.

Figure 4.5 illustrates the interaction between speech context and gender identity. It shows this style shift again but shows how this shifting is affected by the speakers' gender identity. The effect is not uniform across all trans participants, rather it is consistent for the transmasculine speakers and for non-binary Harvey (NBF) i.e. lowering peaks in cis-female conversation, remaining stable in other contexts. Eli does not pattern with other speakers instead, showing highest peaks in citation form, raised peaks in cis-female conversation and lowered peaks in cis-male conversation. This will be discussed further in the next chapter.

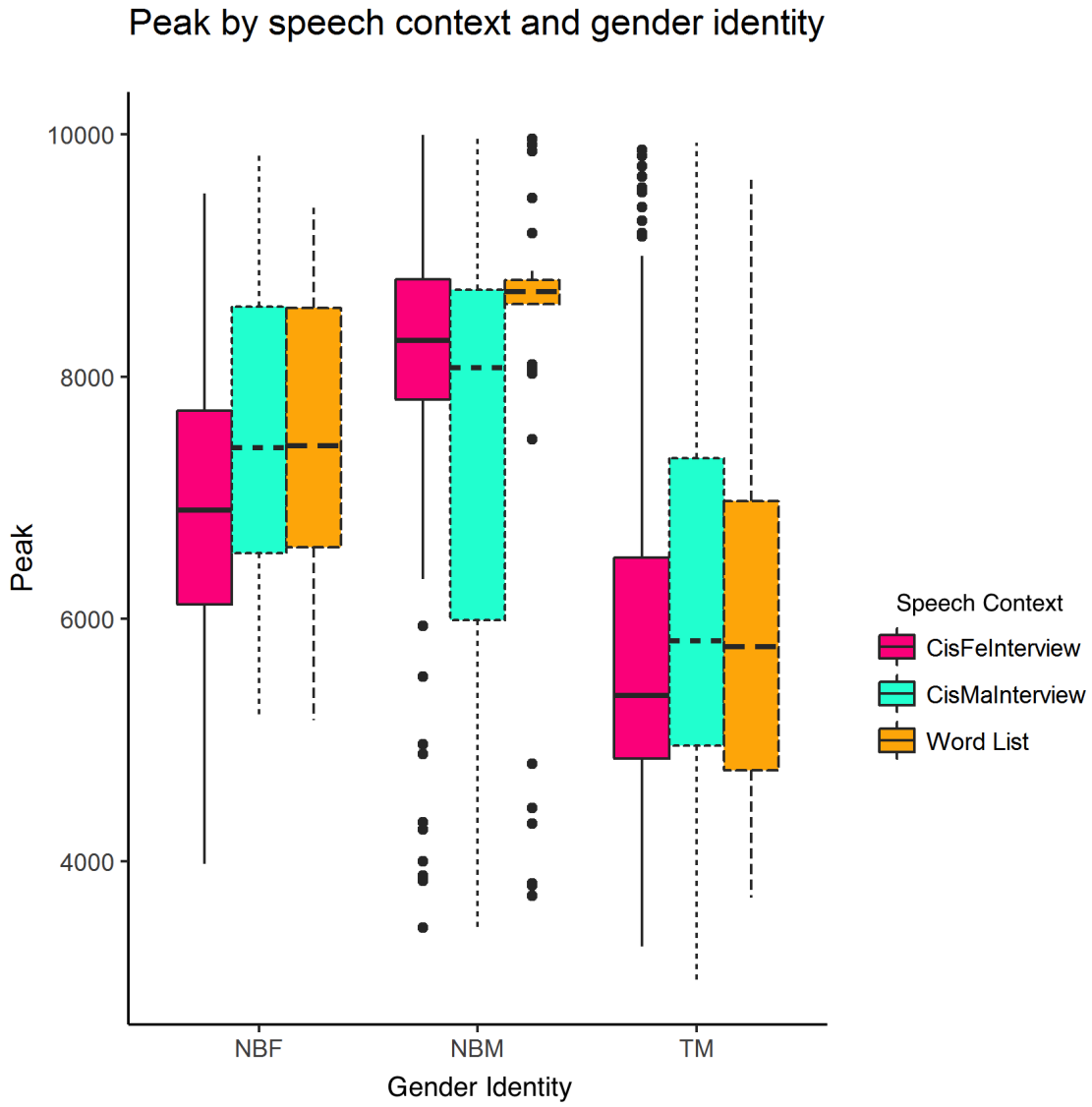


Figure 4.5: Peak frequency (Herz) for all speakers by gender identity separated by style of recording. Gender identity is as above in Fig 4.3

Summary of results

The results in this section can be separated into two categories - linguistic and social factors. The linguistic factors consist of word position and following lip shape. Word position has a significant effect on /s/ peaks with word-final utterances exhibiting lower peaks while medial position shows the highest

peaks. Following lip shape also has a significant effect on /s/ peaks with /s/ followed by spread vowels resulting in higher peaks than those following by rounded and neutral lips. In regards to social factors, gender identity and interlocutor gender also affect /s/ peaks. Participants who identified as transmasculine generally had lower peaks in line with working-class adult Glaswegian males, while speakers who identified as non-binary showed much higher peaks. In conversations with cisgender females, transmasculine speakers and Harvey (non-binary assigned female at birth) shifted their /s/ peaks down while Eli (non-binary assigned male) shifted their /s/ peaks up. While tentative, these empirical results show gender identity affecting speakers' /s/ realisations.

Chapter 5

Discussion

This chapter will begin by revisiting the research questions presented in the introduction and summarising the results presented in the previous chapter in relation to these questions. It will then discuss the findings in relation to the existing literature, reflect on how successfully the research questions were answered and discuss possible directions for further research on this topic. Finally, any potential issues raised by the results, or the design of the study will also be discussed.

The following questions will now be addressed in turn;

1. What are the acoustic characteristics of /s/ in Scottish trans speakers?
2. Do transgender speakers' /s/ pattern with cisgender speakers?
3. Does transgender /s/ style shift depending on interlocutor like cisgender /s/?

To answer these questions I will initially focus on the transmasculine speakers before moving on to discuss the non-binary speakers.

What are the acoustic characteristics of /s/ in Scottish trans speakers?

The results of this study give us the beginnings of an idea of what Scottish transmasculine /s/ looks like. Of the four participants, three patterned together while one did not. Zimman found that speakers who identified using similar/the same labels for their gender identity also patterned together as is the case here. Zimman also found that speakers' /s/ peaks lowered as the length of time they outwardly expressed their gender identity increased. This may explain why Alfie does not pattern in line with the other transmasculine speakers as he has lived as male for the shortest period. It is possible that as Alfie lives his

everyday life as a male, he will begin to pattern with the other transmasculine speakers though it is possible that other factors are at play in causing his high peaks.

Regarding non-binary /s/ it is difficult to state what a typical non-binary realisation looks like due to the small number of non-binary participants. Though non-binary /s/ peaks are significantly higher than transmasculine peaks, falling into the boundaries of cisgender females there does not seem to be a clear patterning of non-binary /s/ further than this given Eli exhibiting significantly higher peaks than Harvey. I suggest this is a similar effect to that observed by Gratton whereby non-binary speakers who have been assigned different genders at birth will not pattern together as each is diverging from their assigned gender rather than converging to any established non-binary speech patterns.

Do transgender speakers' /s/ pattern with cisgender speakers?

In order to determine whether transgender speakers pattern with cisgender speakers we first need to discuss how Glaswegian cisgender males realise /s/. Stuart-Smith found that males produce peak frequencies of 6,000 Hz or lower with working-class males producing lower peaks (> 5,500) than middle-class males. Further Stuart-Smith found much less variability amongst male speakers than female speakers which suggests that men are overcoming their physiology to maintain low frequencies. The transmasculine speakers in this study do pattern with cisgender speakers with three of the four speakers exhibiting peaks lower than the average for working-class males. As mentioned above, the fourth speaker may not pattern with the other three due to the length of time he has lived as male.

Eckert and McConnell-Ginet presented the idea of communities of practice and claiming membership of a community using linguistic variables and I suggest this as an explanation as to why speakers' gender identity impacts their /s/ realisations. Though /s/ is not a salient feature, it has been shown to be actively manipulated in order to index gender and sexuality in cisgender speakers (Fuchs et al., 2010; Munson, 2007; Podesva and Kajino, 2014; Fuchs et al., 2010) and as such I suggest these speakers are altering their /s/ realisation in order to index masculinity and maleness, claiming membership of a 'male' community of practice. This is further evidence for the performance of gender or "how we act out our gender identity" (Butler, 1990) showing that by using elements of our speech we can construct or index gender.

Due to non-binary speakers rejection of a gender binary, it would be inappropriate to say whether they pattern with cis-gender speakers.

Note the aim of this research is not state or imply that a trans speaker patterning with a cis speaker is a 'validation' or 'confirmation' of their gender

identity but rather a confirmation that /s/ is a socially marked variable which is used by speakers of all gender identities to index their gender identity and claim membership of a relevant community of practice.

Do trans speakers style shift depending on interlocutor like cisgender /s/?

Levon and Holmes-Elliott found that some female cisgender speakers raise their /s/ realisations in same-sex conversations as something social was taking place with /s/. As such, I expected the transmasculine participants in this study to lower their /s/ peaks in the same conversational setting.

The results of this project show that trans speakers do style shift their /s/ realisations but where cisgender females raise /s/ peaks in same-sex conversations, trans speakers actively lower /s/ peaks in cis-female conversation. In conversation with a cisgender male, /s/ peaks remained in line with those recorded during the word list task showing a consistency between cis male conversation and citation forms. Though the shift found in this study is in opposing direction to that found by Levon and Holmes-Elliott, it is likely that the motivation is the same.

This may be best explained as divergence - both the transmasculine and Harvey (NBF) speakers recognise that their interlocutor is part of a different community of practice (a 'female' one) and in a move to distance themselves from this, they actively lower their /s/ peaks. The remaining speaker, Eli (NBM) does the opposite of this, raising /s/ peaks in conversation with a cis female and lowering them dramatically in conversation with a cis male in comparison with those recorded during the word list. Eli's peaks are lower in conversation with a cisgender male interlocutor which initially suggests convergence - shifting peaks down to meet male interlocutor, however, Eli's peaks are far above those generally found for cisgender males. I suggest that Eli's is similar to the results provided by Gratton whereby non-binary speakers style shifted their speech in order to construct their own non-binary gender identity in response to their interlocutor. As such, assigned gender is a factor, but only as it need be recognised by a speaker in order to diverge from it.

5.0.1 Issues encountered

The largest issue encountered during this study was that of accessing participants though receiving ethical approval was also challenging. The transgender community is difficult to access and this became apparent due to the lack of responses to initial calls for participants. With more time, it would have been possible

to join relevant groups and create links within the community but due to time constraints, this was not possible.

Regarding ethical approval, due to the sensitivity of gender identity and gender transition, this project required a high level of sensitivity and respect from an ethical perspective. Time was spent ensuring that the study was appropriately sensitive before applying for ethical approval. While this took time it was beneficial for the study and ensured participants felt comfortable taking part.

In regards to data collection and comparison, it may have been useful to include a control group had time allowed. If a control group had been included it may have provided a more concrete basis for like-for-like comparison of style-shifting data between trans and cisgender speakers, however, due to the short time frame during which the project was carried out it would have created difficulties in processing a larger quantity of data.

Chapter 6

Conclusions

This study has provided an exploratory description of the acoustic and sociophonetic properties of /s/ in Scottish transgender speakers, contributing to the small amount of literature which currently exists on transgender /s/ realisations.

Data provided by this study has shown that gender identity effects /s/ realisations in Scottish transgender speakers. In general, transmasculine speakers index their gender by producing low /s/ peaks in line with working-class males while non-binary speakers produce higher peaks in line with cisgender females. This patterning will act as a point of interest for future work as speakers vary their speech depending on their gender identity rather than their assigned gender.

Speakers also systematically vary their /s/ realisations depending on the gender of their interlocutor. Participants who were assigned female at birth (Transmasculine speakers and Harvey) showed lower peaks in conversation with a cis-gender female, diverging from their interlocutor's 'femaleness'. Eli, who was assigned male at birth, however, exhibited higher peaks in conversation with a cis-female and lower peaks with a cis-male showing a divergence from the cis-male speaker and his 'maleness'. This divergence is evidence of speakers using /s/ to construct their gender identity in response to their interlocutor and for participants acting as members of a community of practice, constructing themselves in according with their own community and in response to other communities around them.

The effect of conversation with a transgender interlocutor could not be investigated due to a lack of data, however this may be of interest for further study. It is important to note that while these differences may be influenced by socially constructed gender, they may also reflect other factors such as vocal tract size or indeed a combination of vocal tract size and the influence of gender identity. Also, while preceding and following context were studies in this analysis other factors could play a role in variation such as frequency,

position in prosodic structure etc. in creating different distributions of /s/ peak frequency across the interlocutor conditions. It would be worth studying these factors in future studies with an extended time frame. Further, in future study it would be worth focusing on other linguistic or phonetic variables in order to asses whether this effect is present in other parts of speech on both salient and sub-salient levels.

A study with a larger participant pool may provide more insight into the effect of identity on speech patterns as may a participant pool made up of people of other gender identities e.g. gender fluid speakers. A study carried out over a longer period of time may also provide further insight into these effects.

Appendices

Appendix A

Timelines of LGBTQ+ history in the US and UK

Timeline of LGBT History in the UK

- 12th Century: Council of London went about making the general public aware of the sin of homosexuality
- 1533: The 'Buggery Act' is passed making buggery/sodomy a criminal act punishable by death
- 1553: The Buggery Act was repealed by Mary Tudor
- 1558: The Buggery Act reinstated by Elizabeth I
- 1724: Margaret Clap opens coffee house which becomes a haven for the gay community
- 1726: 3 men arrested after a raid at Clap's coffee house, all three are hanged.
- 1772: First public debates on homosexuality during the trial of Captain Robert Jones.
- 1785: Jeremy Bentham becomes one of the first people to argue for the decriminalisation of homosexuality
- 1812: James Miranda Barry, a transgender man, graduates medical school and goes on to serve in the armed forces.
- 1828: The Buggery Act is replaced by the Offences Against the Person act under which homosexuality is still punishable by death

- 1861: Buggery is longer punishable by death - 56 men had been executed and 404 had been sentenced to death.
- 1866: marriage is officially defined as 'between one man and one woman.'
- 1885: the Criminal Law Amendment Act is introduced - criminalising all homosexual activity.
- 1895: The trial of poet Oscar Wilde begins.
- 1897: George Cecil Ives founds the Order of Chaeronea - the first gay rights group.

  Havelock Ellis, sexologist, publishes *Studies in Psychology of Sex* stating homosexuality is not a sin but a normal anomaly. This book was banned in the UK until 1936.
- 1912: London's first gay bar, as we now know them, the Cave of the Golden Calf opens
- 1912: The British Society for the Study of Sex Psychology is founded
- 1921: The Criminal Law Amendment Act is expanded to include lesbian activity also.
- 1936: Mark Weston became one of the first people to openly transition gender, from female to male, with the News of the World publishing a sensitive and accurate article about Mark's transition.
- 1945: Michael Dillon undergoes one of the first phalloplasty procedures as part of female to male confirmation surgery.
- 1951: Roberta Cowell becomes the first Briton to undergo Male to female confirmation surgery.
- 1950's saw a witch hunt instigated by John Nott-Bower who sought to 'weed homosexuals out' of the British Government
- 1954: Alan Turing commits suicide after being given a course of female hormones (chemically castrated) as an alternative to being imprisoned for his homosexuality.
- 1957: The Wolfenden Report is published advising the decriminalisation of homosexuality.

- 1958: The publishing of the Wolfenden report lead to the formation of the Homosexual Law Reform Society which campaigned for the legalisation of homosexuality.
- 1963: The Minorities Research Group becomes the first lesbian social and political organisation in the UK.
- 1964: the Homosexual Law Reform Committee is founded calling for the legalisation of homosexuality.
- 1967: The Sexual Offences Bill is passed, decriminalising homosexual acts in private between two men aged over 21 in England and Wales. Courts decide that transgender people cannot marry as this would violate the previous definition or marriage being between one man and one woman.
- 1969: Campaign for Homosexual Equality becomes the first gay activist group
- 1970: The Gay Liberation Front (GLF) founded off the back of the Stonewall Riots in New York The Marriage of April Ashley and Arthur Cameron Corbet was annulled by law as Ashley was a transgender woman and by British law a man - therefore they had entered a same-sex marriage which was not legal. This set a precedence meaning transgender people's birth certificates could not be changed to match their self-identified gender.
- 1971: Nullity of Marriage Act passed making same-sex marriage illegal. This was to prevent transsexual people entering a (legally) same-sex marriage as opposed to stopping homosexual couples from marrying (though it obviously also had this effect.)
- 1972: The first Pride parade was held in the UK and Gay News was founded.
- 1974: TV/TS, a group for transsexual people who cross-dress, founded in Manchester. The first TV/TS conference is held in Leeds.
- 1977: LGBT workplace rights are discussed by trade unions for the first time.
- 1978: The International Lesbian and Gay Association is founded as the *International Gay Association.*
- 1979: As of 1979 there is still no official legislation for the rights or the protection of transgender people.

- 1980: Scotland decriminalises homosexuality - legalising homosexual acts between two men over the age of 21 in private. Self Help Association for Transsexuals (SHAFT) founded with the intent of providing information and support for transsexual people.
- 1981: Homosexuality decriminalised in Northern Ireland
- 1984: Chris Smith becomes the first openly gay MP
- 1988: Section 28 becomes legislation outlawing the 'promotion of homosexuality.' In response to this, actor Ian McKellen publicly comes out as gay.
- 1989: Stonewall UK set-up up in response to Section 28.
- 1990: Following the murder of three gay men, marches and an overnight vigil took place in Ealing. This lead to the setting up of OutRage; a group which called for police protection for the LGBT community.
  The first Manchester pride took place
  Jersey decriminalises homosexuality.
- 1992: The first Brighton Pride parade takes place
- 1994: The legal age of consent is lowered for same-sex intercourse from 21 to 18, however, this only applies to men as there is no formal legislation regarding same sex intercourse for women.
- 1997: Angela Eagle becomes the first openly lesbian MP
  Same-sex partners are granted immigration rights in the UK.
- 1999: The Admiral Duncan, a gay bar, is bombed in London by an ex-BNP member killing 3 and wounding over 70.
- 2000: Homosexuals are permitted to openly serve in the armed forces
  The Labour party attempt to repeal section 28 but are defeated by the Conservatives, however, Section 29 is repealed in Scotland.
- 2001: All intercourse relating laws are equalised for hereto and homosexual couples.
  Previously it had been illegal for more than two gay men to engage in intercourse, however, this law is abolished
- 2002: Same-sex couples can now adopt.
- 2003: Section 28 is repealed in England and Wales.
  Employment Equality is legislated and discrimination of LGBT people is outlawed in the workplace.

- 2004: The Civil Partnership Act becomes law.
  The Gender Recognition Act now allows transgender people to have their birth certificate reflect their gender.
- 2006: It becomes illegal to discriminate against gay people in the provision of goods or services.
- 2007: Engendered Penalties Transsexual & Transgender People's Experience of Inequality and Discrimination is published and lead to the inclusion of transgender people in Commission for Human Rights and Inequalities.
- 2008: changes to the Criminal Justice and Immigration Act now prohibit the inciting of homophobia.
- 2009: The government formally apologise for the treatment of Alan Turing and for Section 28.
- 2014: Same-sex marriage is legalised.
- 2016: In 2016 we now have 40 LGBT MP's.

Timeline of LGBT History in the US

- 1924: The *Society For Human Rights* becomes the first gay rights organisation in the US. It published *Friendship and Freedom*, the first publication specifically for homosexuals. However, the group was soon disbanded after founding due to political pressure
- 1948: Alfred Kinsey publishes *Sexual Behaviour in the Human Male* saying that at least 37% of men have enjoyed homosexual behaviour at least once.
- 1950: The Mattachine Society, the first sustained gay rights organisation, is founded by Harry Hay in order to raise awareness of homosexuality and to assimilate it into mainstream culture.
  The Lavender Scare takes place - *Employment of Homosexuals and Other Sex Perverts* is published by the Senate stating that homosexuality is a symptom of mental illness which renders all homosexuals unfit for government work. This saw 4,380 men and women lose their jobs.
- 1952: Homosexuality is listed as a sociopathic personality disturbance in the *Diagnostic and Statistical Manual of Mental Disorders* by the American Psychiatric Association This decision was heavily criticised by experts due to the lack of empirical evidence.
- 1953: The Executive Order is signed, banning homosexuals from government jobs.
- 1955: The Daughters of Brilitis founded in San Francisco becoming the first lesbian rights organisation
- 1956: Evelyn Hooker publishes *The Adjustment of the Male Overt Homosexual* concluding there to be no significant difference between hereto and homosexual men.
- 1958: The Supreme Court rules in favour of *One: The Homosexual Magazine* under the first amendment after a case was brought against them by the FBI and the Postal Service.
- 1962: Illinois becomes the first state in the US to repeal it's sodomy laws, therefore becoming the first state to decriminalise homosexuality.
- 1965: The first of five national Reminder Day's takes place, held in order to draw attention to LGBT rights.

- 1966: Members of the Mattachine Society stage a sip-in - protesting laws outlawing the serving of gay patrons in bars due to the idea they were 'disorderly'. The New York City Commission for Human Rights rules in favour of the protesters, legalising the serving of homosexuals in bars.
  Riots take place after the police are called in response to transgender customers being 'raucous' in a canteen in San Francisco. The police 'manhandled' some patrons which lead to the rioting which in turn lead to the setting up of the first peer-run support and advocacy group for transgender people in the world; *The National Transsexual Counselling Unit*.

- June 28 1969: Stonewall riots take place. Patrons of the Stonewall Inn riot after a police riot on the bar.

- 1970: A memorial march for the Stonewall Riots becomes the first annual Pride parade.

- 1973: The board of the American Psychiatric Association removes homosexuality from its list of mental illnesses.

- 1974: Kathy Kozochenko becomes the first openly gay American to be elected to public office in Michigan.

- 1977: Anita Bryant successfully lead the *Save Our Children* campaign to repeal gay rights in Florida. They were not reinstated until 1998.
  Harvey Milk wins a seat on the San Francisco Board of Supervisors. Milk was responsible for the legal protection of gay and lesbian people in the workplace and prevented to passing of Proposition 6.

- 1978: Harvey Milk is assassinated by Dan White.

- 1979: The lenient charge for Dan White leads to riots and on what would have been Milk's 49th birthday 10,000 people gather in a peaceful demonstration.
  75,000 people take part in the National March on Washington for equal civil rights and protective legislature for gay and lesbian people.

- 1980: The Democratic Rules Committee declares it will not discriminate against homosexual people.

- 1981: The beginning of the AIDS crisis. Originally named Gay Related Immune Deficiency Disorder (GRID), 41 gay men were diagnosed with AIDS.

- 1982: Wisconsin becomes the first state to outlaw discrimination on the basis of sexual orientation.
- 1987: ACT UP is formed in response to the effects of AIDS and HIV on the LGBT community in New York as well as protesting pharmaceutical companies profiting greatly from the high cost of AIDS medication.
  The National March on Washington takes place to force Ronald Regan to address the AIDS crisis.
- 1988: The CDC mails a pamphlet, *Understanding AIDS*, to every home in America. An estimated 107 million are mailed.
  The WHO hold the first annual World AIDS day.
- 1990: President Bush signs *Ryan White Care Act*, a federally funded program to help people living with AIDS.
- 1993: *Don't Ask, Don't Tell* is enforced in the armed services - allowing lesbian and gay people to serve in the military but not openly.
- 1996: The Supreme Court rule that LGBT protection laws are 'unconstitutional' as they afford come citizens 'special rights.'
  President Clinton signs the *Defence of Marriage Act* into law making marriage a legal institution between one man and one woman.
- 2000: Vermont becomes the first state to permit civil unions and registered partnerships.
- 2003: Supreme Court rules that sodomy laws to be unlawful.
- 2004: Massachusetts becomes the first state to legalise same-sex marriage. Over the next 6 years New Hampshire, Vermont, Connecticut, Iowa and Washington will follow suit.
- 2008: California votes for Proposition 8; to legalise same-sex marriage.
- 2009: Obama signs *Presidential Memorandum* allowing same-sex partners of federal employees some of their professional benefits.
  Matthew Shepard is murdered in a homophobic attack. His death leads Congress to pass the *Matthew Shepard Act* expanding Hate Crime laws to cover perceived and actual gender, orientation and gender identity.
- 2010: San Francisco judge finds Proposition 8 to be unlawful.

- 2011: The Obama Administration states it will no longer defend the *Defence of Marriage Act*.
  New York State legalises same-sex marriage.
- 2012: Tammy Baldwin becomes the first openly gay politician elected to US Senate.
- 2015: Caitlyn Jenner comes out publicly as a transgender woman.
  The Supreme Court rules that states can no longer ban same-sex marriages.
- 2016: Obama announces the Stonewall Monument which becomes the first LGBT monument.
  The Armed Forces removed the ban on transgender members.

Appendix B

Word list

- beach
- sea
- sail
- boat
- vessel
- field
- far
- moss
- trunk
- moose
- mossy
- fruit
- juicy
- pulp
- soup
- leek
- lesson

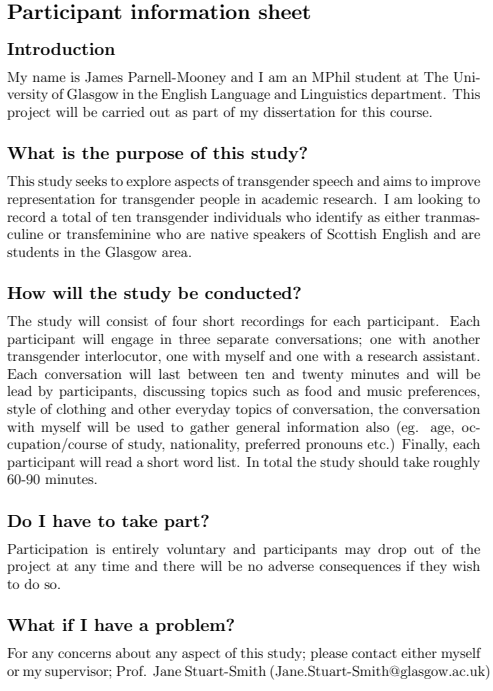
- lecture
- thesis
- degree
- soap
- fairy
- mess
- mop
- tidy
- messy
- braw
- piece
- soup
- lassie
- woolly
- fleecy
- bubbly
- gassy
- lucky
- sad
- awesome
- perfect
- decent
- awful
- dosage
- doctor

- drip
- dose
- twosome
- duo
- pair
- sit
- pass
- kick
- kiss
- ran
- pace
- roar
- said
- lost
- sought

Appendix C

Participant information sheet

Figure C.1: Information sheet which was sent to anyone interested in taking part in the study.



Participant information sheet

Introduction

My name is James Parnell-Mooney and I am an MPhil student at The University of Glasgow in the English Language and Linguistics department. This project will be carried out as part of my dissertation for this course.

What is the purpose of this study?

This study seeks to explore aspects of transgender speech and aims to improve representation for transgender people in academic research. I am looking to record a total of ten transgender individuals who identify as either tranmasculine or transfeminine who are native speakers of Scottish English and are students in the Glasgow area.

How will the study be conducted?

The study will consist of four short recordings for each participant. Each participant will engage in three separate conversations; one with another transgender interlocutor, one with myself and one with a research assistant. Each conversation will last between ten and twenty minutes and will be lead by participants, discussing topics such as food and music preferences, style of clothing and other everyday topics of conversation, the conversation with myself will be used to gather general information also (eg. age, occupation/course of study, nationality, preferred pronouns etc.) Finally, each participant will read a short word list. In total the study should take roughly 60-90 minutes.

Do I have to take part?

Participation is entirely voluntary and participants may drop out of the project at any time and there will be no adverse consequences if they wish to do so.

What if I have a problem?

For any concerns about any aspect of this study; please contact either myself or my supervisor; Prof. Jane Stuart-Smith (Jane.Stuart-Smith@glasgow.ac.uk)

1

Appendix D

Consent form

Figure D.1: Form which was given to participants in order to gain their informed consent before recording.

CONSENT TO THE USE OF DATA

I understand that James Parnell-Mooney is making recordings for an experiment on gendered language as part of his MPhil for the department of English Language, University of Glasgow. I also understand that short excerpts of my anonymised speech recordings may be used in teaching and/or conference presentations.

I give my consent to the use of data for this purpose on the understanding that:

- All names and other material likely to identify individuals will be anonymised.
- The data will be treated as confidential and kept in secure storage at all times.
- Participation in this experiment is voluntary, so I may opt out at any stage.
- The information is processed by the University in accordance with the provisions of the Data Protection Act 1998.

Signed by the contributor:

_____ date: _____

Researcher's name: **James Parnell Mooney**

Researcher's email: **j.parnell-mooney.1@research.gla.ac.uk**

Supervisor's names: **Prof Jane Stuart-Smith**

Department address: **English Language**
12 University Gardens
Glasgow
G12 8QH

0141 330 6852 (Prof Stuart-Smith)

Appendix E

Praat script 1

```
#script: james_s.txt
#author: Jane Stuart-Smith
#date: 15 August 09; revised 9 September 10, revised 9 November
2011; revised 17 November 2011; revised 26 Jan 16; revised 7 June;
revised 20 June 17
#Praat version: 5.0.06; edited 5.0.32; edited 5.1.01; 5.3.53; 5.3.56

#How to use this script:

#put all your sound files and textgrids into the same folder (it
should be empty except for those files)
#be sure that your sound files d textgrids have exactly the same
names as each other, bar the extension (.wav, .TextGrid)
#copy the script file into the same folder

#open Praat
#close the picture window
#in Praat objects, go to Praat, open script...
#using the browse window, find the script file and click Open
#the script will appear in the window
#Go to Run, and click Run
#this will bring up a window summarizing what the script needs to
know to run on your data,
#you need to type in the output filename you want, being sure to end
it as a .csv file (this means comma separated, and can
#be opened in Excel)

#check that the tier numbers are correct for your tiers
#click OK

#the program will automatically run through your textgrid file,
pulling out all the entries, and putting them into the .csv
# file you have specified
#the script will finish by itself, and the Praat Info window will
have appeared, listing all the data which has been extracted

#Tip: you must have s, or something else (a letter) in the
slabel_tier intervals, otherwise the script will ignore them and
move
#on to the next filled interval. Basically it searches for intervals
that have a 'string' (letter(s)) in them, and then carries
#operations on the ones which are filled.
#Tip: IMPORTANT - You must have specified your spectrogram settings
to ensure the appropriate spectrum will be taken (e.g. 10ms Hamming
window)
#Tip: don't use IPA symbols, or spaces before text, in the intervals
that you want Praat to work with; the script will crash
#Tip: avoid spaces in filenames. Use _ instead


form James s script
        word sound_extension .wav
        word textGrid_extension .TextGrid
        comment output file will be created in same directory as
```

Figure E.1: Excerpt of praat script #1

Appendix F

Praat script 2

```
#script: james_s.txt
#author: Jane Stuart-Smith
#date: 15 August 09; revised 9 September 10, revised 9 November
2011; revised 17 November 2011; revised 26 Jan 16; revised 7 June;
revised 20 June 17
#Praat version: 5.0.06; edited 5.0.32; edited 5.1.01; 5.3.53; 5.3.56

#How to use this script:

#put all your sound files and textgrids into the same folder (it
should be empty except for those files)
#be sure that your sound files d textgrids have exactly the same
names as each other, bar the extension (.wav, .TextGrid)
#copy the script file into the same folder

#open Praat
#close the picture window
#in Praat objects, go to Praat, open script...
#using the browse window, find the script file and click Open
#the script will appear in the window
#Go to Run, and click Runå
#this will bring up a window summarizing what the script needs to
know to run on your data,
#you need to type in the output filename you want, being sure to end
it as a .csv file (this means comma separated, and can
#be opened in Excel)

#check that the tier numbers are correct for your tiers
#click OK

#the program will automatically run through your textgrid file,
pulling out all the entries, and putting them into the .csv
# file you have specified
#the script will finish by itself, and the Praat Info window will
have appeared, listing all the data which has been extracted

#Tip: you must have s, or something else (a letter) in the
slabel_tier intervals, otherwise the script will ignore them and
move
#on to the next filled interval. Basically it searches for intervals
that have a 'string' (letter(s)) in them, and then carries
#operations on the ones which are filled.
#Tip: IMPORTANT - You must have specified your spectrogram settings
to ensure the appropriate spectrum will be taken (e.g. 10ms Hamming
window)
#Tip: don't use IPA symbols, or spaces before text, in the intervals
that you want Praat to work with; the script will crash
#Tip: avoid spaces in filenames. Use _ instead


form James s script
        word sound_extension .wav
        word textGrid_extension .TextGrid
        comment output file will be created in same directory as
```

Figure F.1: Excerpt of Praat script #2

Bibliography

Agha, A. (2003). The social life of cultural value. *Language & communication*, 23(3):231–273.

Aitken, A. J. (1979). Scottish speech: A historical view with special reference to the Standard English of Scotland. *Languages of Scotland*, 4:85–120.

Aitken, A. J. (1984). *Language in the British Isles*, chapter Scots and English in Scotland, pages 517–532. Cambridge Univeristy Press.

Beneson Strategy Group (2015). *Report To Fusion.Net January 2015 Survey of Millennials*. Beneson Strategy Group.

Bergvall, V. (2014). *Rethinking language and gender research: Theory and practice*. Routledge.

Blagnys, B. L. (2006). Voice and communication therapy for the transgender/transsexual client. *The Journal of Laryngology & Otology*, 120(8):710–710.

Bryner, J. (2007). Why men dominate math and science fields. https://www.livescience.com/1927-men-dominate-math-science-fields.html.

Butler, J. (1990). *Gender trouble: Feminism and the Subversion of Identity*. Routledge, New York.

Campbell, D. (2005). 3.6m people in Britain are gay. https://www.theguardian.com/uk/2005/dec/11/gayrights.immigrationpolicy.

Catford, J. C. (1988). *A practical introduction to phonetics*. Clarendon Press Oxford.

Chambers, J., Trudgill, P., and Schilling-Estes, N. (2008). *The Handbook of Language Variation and Change*. Blackwell Publishing.

Chambers, J. K. (2003). Sociolinguistic theory: Linguistic variation and its social significance, 2nd ed. (orig. 1995). *Malden, MA: Blackwell*.

Chambers, J. K. (2009). *Sociolinguistic theory: linguistic variation and its social significance*, volume 37;37. Wiley-Blackwell, Malden, Mass; Oxford, rev. edition.

Cheshire, J. (1982). Variation in an English dialect: A sociolinguistic study. *Cambridge Studies in Linguistics London*, 37.

Cheshire, J. (2002). 17 sex and gender in variationist research. *The handbook of language variation and change*, page 423.

Cheshire, J. and Trudgill, P. (1997). *The Sociolinguistic Reader: Gender and Discourse*. Routledge, 2nd edition.

Coates, J. (2004). *Women, Men, and Language: A Sociolinguistic Account of Gender Differences in Language*. Sill Series. Pearson Longman.

Coulmas, F. (2013). *Sociolinguistics: The study of speakers' choices*. Cambridge University Press.

Daniloff, R., Schuckers, G., and Feth, L. (1980). *The physiology of speech and hearing: an introduction*. Prentice-Hall, Englewood Cliffs;London.

Delphy, C. (2001). Rethinking sex and gender. *Feminism in the Study of Religion: A Reader, London and New York: Continuum*, pages 411–423.

Denholm, A. (2017). Revealed: The gender imbalance at the heart of Scotland's universities.

Eckert, P. (1989a). *Jocks and Burnouts: Social Categories and Identity in the High School.* Teachers College Press.

Eckert, P. (1989b). The whole woman: Sex and gender differences in variation. *Language variation and change*, 1(3):245–267.

Eckert, P. (2012). Three waves of variation study: The emergence of meaning in the study of sociolinguistic variation. *Annual review of Anthropology*, 41:87–100.

Eckert, P. and McConnell-Ginet, S. (1992). Think practically and look locally: Language and gender as community-based practice. *Annual review of anthropology*, 21(1):461–488.

Eckert, P. and McConnell-Ginet, S. (1995). Constructing meaning, constructing selves. *Gender articulated: Language and the socially constructed self*, pages 469–507.

Flipsen, P., Shriberg, L., Weismer, G., Karlsson, H., and McSweeny, J. (1999). Acoustic characteristics of/s/in adolescents. *Journal of Speech, Language, and Hearing Research*, 42(3):663–677.

Fuchs, S., Toda, M., Fuchs, S., and Toda, M. (2010). Do differences in male versus female/s/reflect biological or sociophonetic factors. *Turbulent sounds: An interdisciplinary guide*, pages 281–302.

Gafter, R. J. (2016). What's a stigmatized variant doing in the word list? authenticity in reading styles and Hebrew pharyngeals. *Journal of Sociolinguistics*, 20(1):31–58.

Goddard, A. and Patterson, L. M. (2000). *Language and gender*. Psychology Press.

Gratton, C. (2016). Resisting the gender binary: e use of (ing) in the construction of non-binary transgender identities. *University of Pennsylvania Working Papers in Linguistics*, 22.2.

Hancock, A. and Helenius, L. (2012). Adolescent male-to-female transgender voice and communication therapy. *Journal of Communication Disorders*, 45(5):313–324.

Hindle, D. (1979). *The social and situational conditioning of phonetic variation*. University of Pennsylvania.

Holmes, J. and Meyerhoff, M. (2008). *The handbook of language and gender*, volume 25. John Wiley & Sons.

Jespersen, O. (2008). *Language; Its Nature, Development and Origin*. Read Books.

Johnson, K. (1991). Differential effects of speaker and vowel variability on fricative perception. *Language and speech*, 34(3):265–279.

Jongman, A., Wayland, R., and Wong, S. (2000). Acoustic characteristics of English fricatives. *The Journal of the Acoustical Society of America*, 108(3):1252–1263.

Kiesling, S. F. (1998). Men's identities and sociolinguistic variation: The case of fraternity men. *Journal of Sociolinguistics*, 2(1):69–99.

Kiesling, S. F. and Schilling-Estes, N. (1998). Language style as identity construction: A footing and framing approach.

Kulick, D. (1999). Transgender and language: A review of literature and suggestions for the future. *GLQ: A Journal of Lesbian and Gay Studies*, 5.4:605–622.

Labov, W. (1963). The social motivation of a sound change. *Sociolinguistic Patterns*, pages 1–42.

Labov, W. (1966). *The Social Stratification of English in New York City Second Edition*. Cambridge University Press.

Labov, W. (1972a). *Sociolinguistic patterns*. University of Pennsylvania Press.

Labov, W. (1972b). Some principles of linguistic methodology. *Language in society*, 1(1):97–120.

Labov, W. (2011). *Principles of linguistic change, cognitive and cultural factors*, volume 3. John Wiley & Sons.

Ladefoged, P. (1993). *A course in phonetics*. Harcourt Brace Jovanovich, New York; London, 3rd edition.

Le Page, R. B., Le Page, R. B., and Tabouret-Keller, A. (1985). *Acts of identity: Creole-based approaches to language and ethnicity*. CUP Archive.

Levon, E. and Holmes-Elliott, S. (2013). East end boys and west end girls:/s/-fronting in Southeast England. *University of Pennsylvania Working Papers in Linguistics*, 19(2):111–120.

Macafee, C. (1992). A short grammar of older scots. *Scottish Language*, 11(12):10–36.

Macaulay, R. (1977). *Language, Social Class and Education: A Glasgow Study*. Edinburgh University Press, Edinburgh.

Mannell, R. (2008). Speech Spectra and Spectrograms. `//http://clas.mq.edu.au/speech/acoustics/speech_spectra/fricatives.html`. [Online; accessed 01-July-2018].

Margaret Sonser Breen, W. J. B. (2011). Butler matters: Judith butler's impact on feminist and queer studies.

Meyerhoff, M. (2014). Variation and Gender. *The Handbook of Language, Gender, and Sexuality*, pages 87–102.

Meyerhoff, M. (2015). *Introducing sociolinguistics*. Taylor & Francis.

Meyerowitz, J. (2002). *How Sex Changed: A history of transsexuality in the United States*. Cambridge, MA: Harvard University Press.

Milroy, J., Milroy, A., Harris, J., Gunn, B., Pitts, A., and Policansky, L. (1983). *Sociolinguistic variation and linguistic change in Belfast*. J. Milroy.

Milroy, L. (1980). *Language and social networks*. Blackwell Oxford.

Milroy, L. and Milroy, J. (1992). Social network and social class: Toward an integrated sociolinguistic model. *Language in society*, 21(01):1–26.

Mitchell, J. C. (1986). Network procedures. *The quality of urban life. Ber*.

Mosher, D. L., Mortimer, R. L., and Grebel, M. (1968). Verbal aggressive behaviour in delinquent boys. *Journal of abnormal psychology*, 73(5):454.

Munson, B. (2007). The acoustic correlates of perceived masculinity, perceived femininity, and perceived sexual orientation. *Language and Speech*, 50(1):125–142.

Nash, M. (1990). Review: Gender trouble: Feminism and the subversion of identity by Judith Butler. *Hypatia*, 5(3):171–175.

Nicholson, L. (1994). Interpreting gender. *Signs*, 20(1):79–105.

Ochs, E. (1992). Ochs_Gender.Pdf.

Office for National Statistics (2009). Trans data position paper. `http://www.ons.gov.uk/ons/guide-method/measuring-equality/equality/equality-data-review/trans-data-position-paper.pdf`.

Ogden, Richard, D. P. and Books, D. (2009). *An introduction to English phonetics*. Edinburgh University Press, Edinburgh.

Peterson, W. (2014). The quickly shifting language of the transgender community. [Online; accessed 25-March-2017].

Podesva, R. J. and Kajino, S. (2014). Sociophonetics, Gender, and Sexuality. In Ehrlich, S., Meyerhoff, M., and Holmes, J., editors, *The Handbook of Language, Sexuality and Gender*, chapter 5, pages 103–122. John Wiley & Sons, 2nd edition.

Poulter, S. (2010). Aviva UK. https://www.aviva.com/media/news/item/uk-ten-times-more-stay-at-home-dads-than-10-years-ago-6344/.

Reed, B., Rhodes, S., Schofield, P., and Wylie, K. (2009). Gender variance in the UK: Prevalence, incidence, growth and geographic distribution. *Retrieved June*, 8:2011.

Romaine, S. (2003). Variation in Language and Gender. In Holmes, J. and Meyerhoff, M., editors, *The Handbook of Language and Gender*, chapter 4, pages 98–118. Blackwell Publishing Ltd, Oxford.

Schwartz, M. F. (1968). Identification of speaker sex from isolated, voiceless fricatives. *The Journal of the Acoustical Society of America*, 43(5):1178–1179.

Shadle, C. H. (1986). The acoustics of fricative consonants. *The Journal of the Acoustical Society of America*, 79(2):574.

Silverstein, M. (2003). Indexical order and the dialectics of sociolinguistic life. *Language and Communication*, 23(3):193–229.

Silvertein, M. (1976). *Meaning in Anthropology*, chapter Shifters, Linguistic Categories and Cultural Description, pages 11–55. University of New Mexico Press, Albuquerque.

Stevens, K. N. (1998). *Acoustic phonetics*, volume 30.;30. The MIT Press, Cambridge, Massachusetts.

Strand, E. A. (1999). Uncovering the role of gender stereotypes in speech perception. *Journal of language and social psychology*, 18(1):86–100.

Stryker, S. (2008). *Transgender history*. Seal Press.

Stuart-Smith, J. (2004). Scottish English: Phonology. *A Handbook of Varieties of English*, 1:47–67.

Stuart-Smith, J. (2007). Empirical evidence for gendered speech production:/s/in Glaswegian. *Laboratory phonology*, 9:65–86.

Tagliamonte, S. (2011). *Variationist sociolinguistics: Change, observation, interpretation*, volume 40. John Wiley & Sons.

Tagliamonte, S. and D'Arcy, A. (2004). He's like, she's like: The quotative system in Canadian youth. *Journal of Sociolinguistics*, 8(4):493–514.

Trudgill, P. (1974). *The Social Differentiation of English in Norwich.[Mit Skizz.]*, volume 13. Cambridge University Press, Cambridge, UK.

United Nations for LGBT Equality (2014). Fact sheet, intersex. https://unfe.org/system/unfe-65-Intersex_Factsheet_ENGLISH.pdf.

Warner, J., McKeown, E., Griffin, M., Johnson, K., Ramsay, A., Cort, C., and King, M. (2004). Rates and predictors of mental illness in gay men, lesbians and bisexual men and women. *The British Journal of Psychiatry*, 185(6):479–485.

W.H.O. (2017). Gender, equity and human rights: Gender. `http://www.who.int/gender-equity-rights/\penalty\z@{}understanding/gender-definition/en/`. Online; accessed 01 -October-2017.

Zimman, L. (2009). The other kind of coming out: Transgender people and the coming out narrative genre. *Gender and Language*, 3.1:53–80.

Zimman, L. (2013). Hegemonic masculinity and the variability of gay-sounding speech: The perceived sexuality of transgender men. *Journal of Language & Sexuality*, 2.1:1–39.

Zimman, L. (2014a). Boycunts and bonus holes: Discourse about transmasculine bodies and sexual productivity of genitals. *Journal of Homosexuality*, 61(5):673–690.

Zimman, L. (2014b). *Queer Excursions: Retheorising Binaries in Language, Gender and Sexuality*, chapter The Discursive Construction of Sex: Remaking and reclaiming the gendered body in talk about genitals among trans men, pages 13–34. Oxford University Press.

Zimman, L. (forthcoming). Variability in/s/among transgender speakers: Evidence for a socially-grounded account of gender and sibilants. *Linguistics*, 55.5:993–1019.