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A SOCIOPHONETIC STUDY OF THE REALIZATION OF WORD-FINAL VELAR PLOSIVES BY FEMALE PUPILS IN A GLASGOW HIGH SCHOOL

By

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Abstract

This study analyses the realization of word-final /k/ in read and casual speech by female pupils in a Glasgow high school, specifically focusing on the realization of word final velar ejectives. The literature on ejectives in varieties of English is still at a very early stage and much of what we know of them is mainly anecdotal or comes from accepted, yet often unsubstantiated statements: they are more prominent word-finally, they usually do not follow voiceless sounds, they are found in varieties of Northern English. My research aims to identify the phonetic and linguistic factors that promote ejective use and to also gain a better understanding of who are using ejectives more and what social factors this depends on. In doing this I found that there is more going on than just independent factors at work. Instead the social factors of age and ethnicity seem to play crucial roles in ejective realization. Overall this study found some intriguing initial results showing that ejective realization of /k/ is now very common in these Glaswegian girls. It seems as if this represents a real-time change in Glasgow – though more data/study is needed to establish this.

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Chapter 1 Introduction

1.1 Background

Ejectives or 'glottalic egressive stops' are generally regarded (and regularly described by linguists) as being exotic and although they occur in about 18% of the world's languages, most are minority languages. They occur in many language families from Mayan to Chadic to Caucasian (Ladefoged, 1996). Given this, it is somewhat interesting that they occur in varieties of English. In English, however, they are not contrastive, but occur as possible realisations of stop consonants, for example, /k/ in *back* can be realised as [k] or [k'] (e.g. Ogden 2009).

Ejectives have been noted informally as possible emphatic realisations of stops in Scottish (Glaswegian) English (Macafee 1983: 33). Gordeeva and Scobbie (2006) carried out a study of pre-school children in Edinburgh and found systematic occurrence of word-final ejectives, but they note 'that there are occasional notes of ejectives in English in word-final positions but so far no systematic studies'. My own experience as a secondary school teacher in a Glasgow High School has allowed me also to observe that ejectives are regular and highly frequent amongst pupils in my classroom, in particular for the realisation of word final voiceless velar stops (e.g. final /k/ in *like*, *park, think* etc). Several other factors seem to correspond with the use of ejectives, socio-economic background, ethnic identity, and style of speech. These personal observations seem to fit with a more general – but as yet unsubstantiated – view that ejectives are becoming increasingly more likely, and may represent change in progress in Scottish English. This research consisted of a small-scale sociophonetic study on the use of ejectives word-finally in the speech of female pupils in a high school in Glasgow.

The study focuses on two groups of girls from S3 (13-14 years) and S5 (15-16 years), who vary according to socio-economic background and ethnicity, specifically focusing on their realization of word-final velar ejectives. High quality recordings were made using two tasks to vary speech style: a reading passage and a paired map task. The data was then subjected to a fine-grained phonetic analysis of the realisation of word-final /k/, and the realisations correlated with social, ethnic, and stylistic factors.

1.2 Research Questions

My research question fit into two categories: general and specific. The first set of general questions relate to the initial stages of my research and arose from observations in the classroom:

1. *How common are ejectives?*
2. *Do the pupils use more ejectives when reading or when speaking casually in an unmonitored, natural way in school?*

The next questions are more specific and are aimed to uncover the phonetic, linguistic and social factors that constrain or promote ejective use among Glasgow high school girls and also to better understand the way these two factors intersect and work together.

3. *What are the phonetic and linguistic factors that promote ejective use?*
4. *Who is using ejectives more and what social factors does this depend on? Ethnicity? Age? Social category?*
5. *Can the use of ejectives among speakers be regarded as language change in progress?*

1.3 Thesis outline

In Chapter 2 I outline the fundamentals of ejective production placing it in a context that allows one to understand its 'exotic' characteristics. I also define ejectives' impressionistic characteristics. I review the main literature on ejectives and then focus on ejectives within varieties of English. Finally I look at the main social factors that relate to language change.

In Chapter 3 I provide a background context for the Glasgow English variety and give a short background to the school where the study took place. I then outline the methods used in obtaining the data; including sampling and the organisation of tasks to vary speech style.

In Chapter 4 I present a detailed look at the results from the data, looking firstly at the overall main effects and then I provide a more detailed presentation of the phonetic, linguistic, and social factors.

In Chapter 5 I discuss the results within the context of my research questions.

In Chapter 6 I conclude my study and suggest future research.

Chapter 2

2.1 Fundamentals of sound articulation

To understand and to appreciate wholly the complex and unique phonetic nature of ejectives it is useful to first understand the fundamentals of speech articulation: how sounds are initially created and modified and how we classify them. Below, I briefly outline the five methods of describing speech sounds which I deem essential to be aware of in order to comprehend the remarkable features of ejectives not only within the context of the sounds of the world's languages but especially to fully comprehend the so-called 'exotic' quality of ejectives within the context of English and in particular Glaswegian English.

To effectively specify the articulation of speech sounds we can use five categories of classification.

1. The airstream mechanism
2. The state of the glottis
3. The position of the velum
4. The place of articulation
5. The manner of articulation

A fundamental of sound production is the need for air to be generated. In other words, air needs to originate somewhere in order for sounds to be made. The usual source of power for the production of the vast majority of sounds in languages is our lungs (Ladefoged 1993:129) from where air is forced outwards. This is why when we speak it is (usually) with an outward breath. This process of the outward movement of air from the lungs to initiate speech sounds is referred to as the *pulmonic airstream mechanism*. The articulation of all English phonemes is primarily initiated by a pulmonic egressive (outward flowing) airstream only (Pike 1943:89).

Although every human language uses this airstream mechanism, for a large number of these languages this is not the sole mechanism for initiating speech sounds and there also exists in these languages other places of initiation of the airflow and indeed the direction of the flow. The flow of air can also begin at the velum (*velaric airstream*) or the glottis (*glottalic*

airstream), and the air, rather than move egressively, can also move inwards or *ingressively*[1]. See Table 1 below for a summary of the principle airstream mechanisms use in the worlds languages.

Airstream	Direction	Brief description	Type of stop	Symbols
Pulmonic	Egressive	Lung air pushed out under the control of the respiratory muscles	Plosive	p t k
Glottalic	Egressive	Pharynx air compressed by the upward movement of the closed glottis	Ejective	pʼ tʼ kʼ
Glottalic	Ingressive	Downward movement of the vibrating glottis	Implosive	ɓ ɗ ɠ
Velaric	Ingressive	Mouth air rarefied by the backward and downward movement of the tongue	Click	ʇ ʗ ʃ

TABLE 1 THE PRINCIPLE AIRSTREAM MECHANISMS TAKEN FROM LADEFOGED, P (1971:23)

As can be seen from the above table, in the languages of the world there exist four different airstream mechanisms: pulmonic egressive which is used in all languages, velaric ingressive used in the South African language Zulu, glottalic egressive which is found in the North American language Navajo and glottalic ingressive used in Sindhi, a language spoken in India (Davenport and Hannahs 1998:9).

The generation and movement of air of the pulmonic egressive airstream mechanism involves the following process: the air is pushed outward from the lungs, moving through the trachea (which begins immediately below the larynx running from the lung cavities), the larynx, and out through the mouth or nose – referred to as the vocal tract. In the trachea the air encounters the vocal folds which also has a significant role in altering the air flow and, as mentioned above, are also another category used to specify speech sounds. A range of phonation types can be produced depending on the state of the vocal folds. Figure 1 below shows a diagram of the vocal tract.

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[1] Note that in English sometimes words are also spoken with this airstream mechanism. When counting up to a high number out loud quite speedily for example, it is quite often the case where some of these numbers will be uttered on an inward breath.
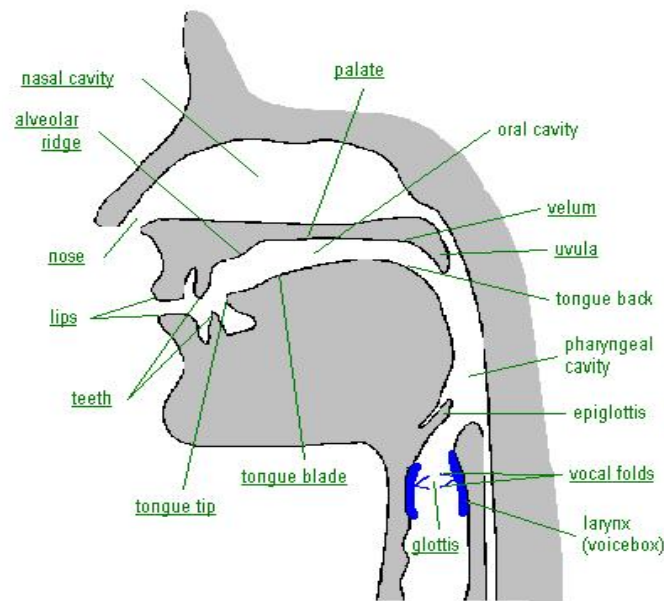
FIGURE 1 VOCAL TRACT[2]

Voiceless consonants, for example, are those in which the air flow, following initiation, passes unhindered through the vocal folds when they are apart (an open glottis). An example of this is the sound of the final velar plosive [k] in the word 'motorbike' which is classified as being voiceless due to the free air flow through the glottis. In contrast to this, if the vocal folds are close together, thereby forming a narrow gap between the folds i.e. the glottis, any air that passes through will cause the vocal folds to vibrate. This vibration will render the state of the glottis in the articulation of the speech sound as voiced. Take for example the intervocalic velar plosive [g] in the word *saga* which is classified in the IPA chart as a voiced velar plosive due to the vibration of the vocal folds caused by the outward movement of air passing through the narrow glottis.

Another category for classification of sounds is the position of the velum. When the velum is raised or lowered it regulates the flow of air through either the nose or the mouth. A raised velum will cut off the air to the nose so that it will only run through the oral tract; this is known as a velic closure and produces *oral sounds*. Conversely, a lowered velum allows air to flow into the mouth and also the nose; therefore giving rise *to nasal sounds*. The [ŋ] sound in "tank", therefore, is defined as a velar nasal.

The last two categories that are specified when describing the articulation of speech sounds are the *place of articulation* and *manner of articulation*. The manner of articulation is concerned

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[2] Taken from http://www.sil.org/mexico/ling/glosario/sup/E005bi-OrgansArticulation.gif

with the distance between the active (or primary) and passive (or secondary) articulators of the oral tract. In basic terms the primary articulators are the parts of the oral tract that move i.e. the lips and tongue while the secondary articulators are the parts that do not: the back wall of the pharynx, the roof of the mouth, the upper lip and the teeth. For the articulation of stops, which I am focusing on in this research, there is complete closure of the articulators when they are pressed together which creates air pressure to build up. When the articulators are separated the air escapes quickly in a plosive manner. The place of articulation refers to the area in the vocal tract where the constriction that produces the consonantal sound is located. /k/ in Scottish English, which is the sound I am concerned with in this study, and in particular, in its word final context, is usually produced in the velar region – roughly the area from the start of the velum back to the uvula (Clark et al 2007:38-40).

To specify in more detail the realization of English /k/, we usually find pulmonic egressive, voiceless, oral, velar stops.

2.2 What are ejectives?

Unlike the pulmonic egressive airstream mechanism that is used to produce all English stops and indeed all English sounds, the air flow initiator for ejective is the glottis. Ejectives are a distinctive speech sound that are characterized by a short, intense burst of energy that manifests itself auditorily as a loud 'popping' sound or as Jones (1956:154) observes are similar to "the sound made in drawing a cork out of a bottle". One way of understanding this in practical terms is to expel all the air in the lungs and try to make a [k] sound; this should produce the so-called 'popping' sound (Hayward 2000:269).

Typically, ejectives are stops or affricates with ejective fricatives being less common. They are usually described as being produced through an approximately simultaneous tight closure of the vocal cords along with an occlusion elsewhere in the vocal tract, usually somewhere in the mouth between the uvula and lips. The entire larynx is then raised roughly about 1cm, acting like a piston (Ladefoged and Johnson, 2011) which compresses the air in the now reduced oro-pharyngeal cavity thus generating a high build up of pressure. This pressure is expelled by the release of the closure in the mouth and the subsequent lowering of the larynx causing an

outward, or egressive, airflow that is quite abrupt and intense. Figure 2 below traces the production of a velar ejective [k'].
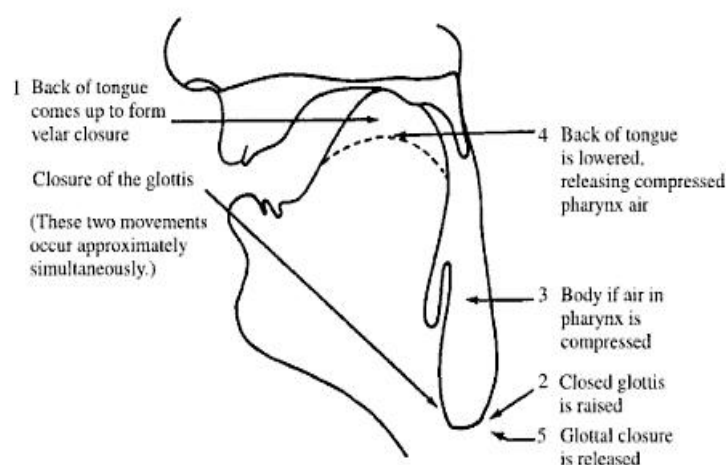
Figure 2 The sequence of events that occurs in a glottalic egressive velar stop [k']³

2.3 Earlier descriptions of ejectives

Previous attempts at describing ejectives have undergone a considerable number of revision and change due to the contentious nature of accurately classifying ejectives which were alien to the sounds of most European languages and therefore quite rare. Fallon (2002:4) points to the difficulties faced by a variety of linguistic professionals in satisfactorily defining ejectives: "Even respected linguists, linguistic anthropologists, and speech scientists in the early part of the 1900s had difficulty describing ejectives". Furthermore, he cites a remark from Clement M Doke's (1923:706:7) work, *A dissertation on the phonetics of the Zulu language*, as being typical of the dilemma of description. Doke wrote that the velar ejective affricate in Zulu is *"*perhaps the most difficult… for a foreigner to acquire and… to describe without practical demonstration". Yet, Fallon (2002:5) goes on to highlight that it was Doke (1923:707) who in fact coined the term 'ejective' and up to that point described ejectives with some accuracy defining them as affricate sounds with a simultaneous glottal stop.

Nearly two decades later Catford (1939:3), in a reaction to what he described as the rather "*chaotic state* [of phonetic terminology], *in particular* [the] *lack of system in the usual classification and naming of stop consonants…* [and the writers who] *tend to keep what are*

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³ Ladefoged and Johnson. (2011:139)

usually called implosives, ejectives and clicks apart as though they don't enter into a general classification scheme", proposed a more robust phonetic description of ejectives by placing and arranging them systematically. Catford wrote that all obstruents should be classified following the same general categories as Beach (1938) suggested in his work on the clicks of the Khoisian language group. Beach categorized three types of clicks namely: pulmonic, glottalic and velaric and Catford believed that it was necessary to extend this type of classification to all stop consonants and fricatives. In his paper, Catford describes what we now call ejectives as *glottalic pressure stops*.

Pike's (1943:90-1) chapter on major air stream mechanisms refers to ejectives, or what Catford (1939) calls glottalic pressure stops, as *glottalized stops* and describes them as being initiated by a pharyngeal air-stream mechanism. Pike's classification of ejectives as glottalized stops, however, comes in for some criticism by Catford (2001:29) who states that this is a misleading term and one to be avoided as "the –ized form of the adjective suggests that the glottal component of the sound is merely a secondary articulation… rather than an essential feature of the initiation of the sound". It seems now more usual to refer to refer to ejectives as glottalic egressive stops.

Typically ejective stops are voiceless. As ejectives cannot be produced without glottal closure, it is impossible for the vocal folds to vibrate simultaneously (Hayward 2000:269). Furthermore, because the glottal occlusion is usually released following the oral one, the phonetic symbol for the ejective reflects this e.g. [p'] where the symbol for glottalization comes after that of the oral articulation (Greenberg 1970:124).

2.4 Ejective distribution

It is estimated that ejectives occur phonemically in between 18-20% of the worlds languages. They are predominantly found in a number of Caucasian, African, and American-Indian languages (Catford, 2005). Grawunder, Simpson, and Khalilov (2010, p.210) point to the apparent link between the occurrence of ejectives and those languages with sizeable consonant

inventories. In addition, they emphasise the fact that in particular areas of the world ejectives are much more concentrated and they refer to five areal clusters of languages and language groups with consonant systems that include ejectives. These include two in the North West coast of North America (the Athabaskan and Salishan families), one in Southern Africa, principally Khoisan, one in east central Africa, as well as the area of the Caucasus. Phonemic ejective consonants are either absent in other geographical areas such as Europe or Australia or may occur marginally as allophones (Gordeeva and Scobbie 2006).

Ejectives seem paradoxical therefore both phonetically and phonologically. Firstly, due to their complex airstream production they are described as being difficult to articulate. Ladefoged (2001), highlighting the fact that speakers and listeners fundamentally like languages to have distinct sounds that are not only easy to hear but also easy to make, concedes that ejectives are difficult to make and that this outweighs any advantage they may have in being slightly louder. Secondly, they are described in most literature as "exotic" connoting a concept of rarity. However, despite all these apparent barriers to sound production and survival, they are found to be present in up to one fifth of the world's languages and in the context of world language, ejectives are the most widespread of all the non-pulmonic consonants (Ashby 1995:47).

Velar ejectives tend to be the most favoured place of articulation for glottalic obstruents (Greenberg 1970:127). Javkin (1977) states that "… [a language] will only have labial ejectives if it has alveolar and velar; it will only have alveolar [or dental] if it has velar." This hierarchy for ejective stops is confirmed by Maddieson (1984:105) who writes that the vast majority of languages that have an inventory of ejective stops will usually be constructed in the following way: if there is one ejective stop it will be velar, a second will be dental or alveolar, a third will be bilabial; and a fourth uvular.

Historically then, many phoneticians have attested to the complexity of realizing ejectives and the difficulty for some speakers, who do not have ejectives as part of their native language's consonant inventory, in attempting to reproduce them through practical demonstration as well as through transcription. The experienced and renowned phoneticians, Ladefoged and Johnson (2010:140) even attest to the difficulties faced by many in trying to learn these sounds by reminding us that "if you find ejectives difficult to produce, don't worry. Many people take years to learn to say them. Just keep practicing". Not only it seems do ejectives prove a tough acquisition for non-native learners but researchers and observers of American Indian and

Caucasian languages have reported that these extrapulmonic consonants are part of the late acquisition of native youngsters. It is a familiar practice by parents of young children who use these Indian languages to substitute these glottalic consonants for plain stops when storytelling for their young children who have not yet assimilated this ejective sounds. (Jackobson & Waugh 2002)

2.5 Variation in ejectives: Stiff and Slack ejectives

There is quite a lot of variation in the production of ejectives and not all ejectives resemble the canonical ejective described in section 2.2. There seems to be a continuum of ejectives (one which is multidimensional too), ranging from very salient 'canonical' ones to much weaker ones, which may simply arise as ephenomenal artifacts.

The vast majority of phonetic research on ejectives focuses on the American, African and Caucasian language groups who have these sounds in their inventories. As mentioned already, most of the earlier field research on ejectives was based on actually attempting to classify these sounds, while later research has mainly focused on further placing ejectives into categories based on shared or similar acoustic values.

As with the difficulties in satisfactorily describing ejectives, there have also been (and indeed still are) some disputes over categorizing the range of sub divisions of possible ejective realizations. Some phoneticians have grouped the intra- and inter-language variation of ejectives into a traditional fortis/lenis binary typology. Fallon (2002:265) states that "it has long been recognized that there are two general types of ejectives" and cites Swanton (1911:210) as perhaps being one of the earliest phoneticians to recognize in his research that there exists two general types of ejectives in Haida, a language isolate in the pacific
northwest coast of North America. Swanton observed that 'some speakers bring these [ejectives] out very forcibly, while others pass over them with considerable smoothness.' Ladefoged and Maddieson (1996:79) highlight what they regard as "considerable phonetic differences among the ejectives that occur in different languages". The acoustic results of the study of ejectives in Hausa and Navaho by Lindau (1984:154) showed highly significant acoustic measurement differences between the two languages. They suggest that contrasts could be described on the phonological level in relation to binary features values. Earlier investigations by Kingston (1985) into Tigrinya, a language spoken in Ethopia, and Quiché, a language spoken in the central highlands of Guatemala revealed significant contrasts between

the ejectives in both languages and prompted Kingston to use a phonetic typology of fortis and lenis to describe the contrast, referring to them as tense and lax ejectives.

Ladefoged (1980 498:9), in considering how to describe measurable phonetic differences between languages, also suggests that phonological theories are insufficiently adequate in describing ejectives accurately. This inadequacy is highlighted, he claims, when contrasting velar ejectives in Huasa and Navajo: both stops are phonetically transcribed with the same symbol, [k'] despite there been a clear difference in sound between them. Thus, if there is a clear difference in ejective quality that creates a fortis/lenis binary classification, then there is a clear need for that to be represented phonetically in transcription. A practical solution to this, as well as an appropriate solution, is to build upon the existing apostrophe diacritic that accompanies the stop symbol and Fallon (2002:267) proposes that a double apostrophe [k''] or double closed quotes [k"] are suitable possibilities for fortis ejectives while the single apostrophe [k'] could be used for lenis ejectives.

Specific acoustic measurements of ejectives such as voice onset time (VOT), closure duration and overall duration to categorize them into weak/strong or fortis/lenis ejectives have been expounded by phoneticians. Lindau (1984) and Kingston (1985) deem that ejectives could fall into a "stiff/slack" division depending on these acoustic features of the ejective. Kingston (1985: 16-17) points to the importance of the timing of the oral and glottal release of ejectives and explains that both closures may be simultaneously released producing weaker ejectives or there may be a delay in the release of the glottal closure after the oral one resulting in a stronger ejective impressionistically. A summary of the general categorization of ejectives - based on the work of Lindau (1984), Kingston (1985), and Wright, Hargus, and Davis (2002) - into this fortis/lenis typology is illustrated in Table 2 below.

Correlates	Stiff ejectives	Slack Ejectives
Total Duration	Long	Short
Closure Duration	Short	Long
VOT	Long	Short
Burst Intensity	Intense	Normal
Voice Quality	Modal or tense	Creaky
Rise to Peak Energy (energy slope)	Fast	Slow
Ease of Perception	Easy	Difficult
F0 of Following Voice Onset	High	Low
Ease of Perception	Easy	Difficult

TABLE 2 SUMMARY OF THE GENERAL CATEGORIZATION OF EJECTIVES

However, some research points to inconsistencies that exist in this binary classification and typology of ejectives. Warner's (1996) investigation into ejectives in Ingush, a Caucasian language, revealed that they do not pattern as fortis or lenis but instead contained acoustic properties that were a combination of both types. Likewise, Wright, Hargus, and Davis' (2002:43) acoustic study of Witsuwit'en alveolar ejective production found "considerable inter-speaker variation in VOT and f0 perturbation, with negligible correlation between these measures contrary to the predictions of the ejective typologies proposed by Lindau (1984) and Kingston (1985)". Their conclusions to the study (pp69-70) highlight that the notion of 'average ejective stop' is questionable and they point to the fact that the traditional binary typology of ejectives needs to be revised as it does not accommodate the range of variation in Witsuwit'en ejective production. Further support for these findings is presented in the research by Ham (2007) on whether Tsilhqut'in (a Northern Athabaskan language) ejectives pattern with the traditional stiff/slack binary classification. The overall results showed considerable variability at the phonetic level and conclude that "the binary classification is neither universal nor categorical and suggest [a] need for the traditional dichotomous typology of ejectives to be reconsidered" (p.14).

A more recent study on ejectives in Caucasian languages (Grawunder, Simpson, and Khalilov 2010), observed fairly homogenous behaviour in relation to acoustic patterning so that according to the classical binary typology the Caucasian data would be classed as stiff ejectives. Yet, durational measurements for VOT and closure duration did not display significant results. Evidence suggests therefore that the phonetic realization of ejectives is part of a continuum rather than a 'one size fits all' categorization. This acknowledgement echoes Ladefoged's (1973:78) recognition that these glottalic egressive sounds are part of a scale or a range and that, conceivably, there is a limitless amount of possible phonetic values for these speech sounds that fall under the umbrella term 'ejective'. He argues that the term ejective should not be used to imply a discrete phenomenon, but rather *"we need additional terms such as ... weakly ejective (to describe for example some variants of final voiceless stops in English)"*. This assertion is further reiterated in more recent literature such as Vicenik (2010:60) where he notes that ejectives in various languages and ejectives produced by different speakers within a single language range over a continuum of acoustic characteristics and may render a binary typology as nonexistent. Fallon (2002:269) also acknowledges this and states that categorizing ejectives according to the binary classification is reflective of more 'prototypical clusters of properties' and that the phonetic realization of ejectives are a 'gradient phenomenon'. He does concede

however that Kingston's (1985) binary classification is the most detailed and fits in with the 'traditional distinction of fortis and lenis ejectives'.

This lack of a definite uniform agreement for categorizing ejectives serves to highlight the need for more research and a wider selection of results from research on ejectives or ejective production in more languages.

2.6 Ejectives in varieties of English

Although ejectives do not occur phonemically in English, they do exist marginally or allophonically. Most of what is known about them in English is only recorded anecdotally or as part of general observation. There appears to be very little empirical research done on ejectives in any variety of English which seems quite surprising given that these so-called 'exotic' sounds are unquestionably produced in the everyday speech of many speakers of this language, a language whose sounds are otherwise almost exclusively driven by a pulmonic egressive airstream mechanism.

This surprise at the lack of research into these glottalic sounds in English is compounded when one takes into account that these are not something that have just recently been reported: "The occurrence of ejectives in English has been noted informally for many years – especially in some Northern English and Scottish accents in certain word final positions as the realization of /p,t.k/ - but to date a full scale sociolinguistic study of their occurrence is lacking". (MacMahon 2006 -cf. Ashby and Maidment 2005:107). There we are left musing over the question of the 'popularity' of ejectives which is a question that is difficult to answer: are ejectives on the increase or are we merely just becoming more aware of them?

The paradox of the appearance of ejectives in the context of English is clearly seen in phonetic literature when on the one hand it is referred to as an 'exotic sound' while on the other reports of its frequency of occurrence in English seem to be well acknowledged. Ladefoged (1993:131) reports that some English speakers are inclined to produce ejectives at the end of words, particularly in sentence final position noting instances such as the word 'cake' being realized with a glottal stop accompanying the final [k]. He also mentions that when the velar occlusion is released while the glottal stop is still being held, a weak ejective can be produced.

In the phonetic literature, some areas of northern England are pointed to as being predominantly associated with the realization of ejectives as an allophone of bilabial, alveolar and velar voiceless stops. These reports are again anecdotal and are said to be prevalent in word-final, pre-pausal position. Cruttenden (2001) writes that speakers in the area of south-east Lancashire can use ejectives as allophones of/p,t,k/ in this position, while Catford (1977:68) reports on the occasional occurrence of them in northern English dialects but does not expand on any phonetic or sociophonetic contexts that may condition their realization.

Moreover, Shorrocks' (1988:60) study on glottalization and gemination in the Greater Bolton area mentions that from time to time ejective consonants are encountered in words such as 'night'[nɪi.t˙], and 'week' [wɪk˙] although no other specific phonetic details are revealed . On the other hand, Roach (2009:23) points out that, in addition to being found in North England, some midlands accents – although it is not specified which ones - can also produce ejective plosives word-finally and before a pause. He notes that "*in utterances like 'On the top', 'That's right' or 'On your bike', it is often possible to hear a glottal closure just before the final consonant begins, followed by a sharp plosive release*".

Likewise, the occurrence of ejectives as possible free variants of /p,t,k/ is mentioned by Wells (1982:261) as not merely being particular to northern English dialects. He reports that southerners as well as northerners can sometimes realize ejectives as a result of emphatically articulating the glottal component in word-final /- ʔp, -ʔt, -ʔg/. Lass (1984:20) also recognizes that voiceless stops in English dialects can be produced with glottalic airstream; however he does specify which dialects.

Simpson's (2007 and 2010) study of ejectives in English, although not exclusively focusing on them in any English variety, do pertain to the language in general. He puts forward the notion that the production of some ejectives vary: alongside the canonical ones, there are also epiphenomenal ones too. As opposed to "true" ejectives which imply an active movement of the larynx with a closed glottis which subsequently compresses the air contained in the supraglottal chamber, the epiphenomenal pattern relating to the glottalic airstream mechanism described by Simpson does not involve active movement of the non-pulmonic component. This overlap of articulators can produce so-called 'novel' sounds which although will be produced unintentionally by the speaker they "can become active phonetic correlates of new phonological elements" (2010). This in line with Ohala's (1997) theory that the presence of ejectives may be

a result of a sequence of pulmonically initiated plosive and glottal stop: "There is evidence that an oral constriction can coarticulate with a glottal closure to produce not an emergent stop as such but to change a pulmonic stop into a glottalic one, i.e., an ejective" (Ohala 1997:5). Simpson (2010) also offers the hypothesis that the pressure build up that is released with the plosive burst in an ejective is as a result of a pulmonic airstream that is previously stored or reserved intraorally. He proposes that the ejective burst quality is merely on account of the resonance characteristics of a supraglottal cavity with complete occlusion.

In Scotland, ejectives have been noted for some time as being realized in emphatic speech word-finally and before a pause in phrases such as *will you please stop!* [wɪɫ jüː pɫiːz stɔpʼ] (Macafee 1983). Chirrey (1999) also reports that speakers in Edinburgh will occasionally use ejective realizations of /p t k/ in utterance-final position. Research by Shuken (1984:123) on the glottal stop shows a spectrogram that is taken of the word *great* as spoken by a Glasgow English speaker in order to highlight that glottalization is more complex than simply a closure of the glottis. The final /t/ as shown in the spectrogram clearly highlights an ejective release.

A phonetic study of the speech of the regional ethnic accent of Glaswegian Asians (Lambert, Alam and Stuart-Smith 2007) also shows the presence of ejectives word-finally for /t/. Initial perceptions of the realization of the voiceless alveolar plosive were that they were being released by the *Glaswasian* (Alam2007) speakers with much greater intensity than the Glaswegian control group. Spectrogram images from the word 'but' confirm these initial impressions. It is interesting to note that the 'ejective' category is particular to Glaswasian speakers as is their avoidance of glottal stops. Although not usually associated as allophones or free variants of stops in Urdu or Punjabi, the results of the study confirm ejectives as one accent feature that is specific to Glaswegian Asian speakers. The study did not feature word-final /k/ and although it did focus on /p/ it was only in a word-initial context. The authors point out in the conclusions that that the specific accent features, including ejectives, appear to occur in different kinds of speech; although they acknowledge that it is not yet known to what extent speech activity may constrain or promote them.

The first systematic account of ejectives in any variety of English seems to be that conducted by Gordeeva (2006), and focuses on the realization of ejectives word-finally by seven preschool speakers of Scottish Standard English (SSE).The findings corroborate some of the previous anecdotal observations: ejectives are significantly more frequent in velar stops than alveolar or bilabial and they appear more frequently (though not exclusively) in phrase-final positions.

Overall, five out of the seven children produced ejective stops and the longitudinal data suggests that some children use them categorically. It was also found that there is a systematic occurrence of word-final ejectives in these preschool children with 10% of all final stops being ejectives. The Laryngograph Pilot project data also indicates that ejectives also occur in two out of five adults leading to a conclusion that "child productions of ejectives are warranted by adult speech" (p.8).

It is further suggested that the presence of ejectives in SSE could possibly be linked to the diachronical propensity in SSE to pre-glottalize word-final stops. Additionally, although there is a recognition that domain-final VC gestures are connected with an increase in articulator strength (cf. Fougeron et al 1997; Cho 2001), there is a suggestion from the research that the high appearance of ejectives in phrase-final contexts in child's speech may act as a marker of phrasal end or as a cue to turn taking, although they concede that this must be investigated further.

Although there does not seem to be the same stigma attached to the realization of stops as ejectives in speech – due in large part to the fact that any detail about them has only been noted anecdotally – it seems that in the past at least there are some slight undertones of possible stigma attached to them. Jones (1956) short section on ejectives which he includes "because French people occasionally use them instead of ordinary voiceless plosives when final" offers advice on how to correct them. In addition Tibbitts (1963:135) in his "Practice Material for The English Sounds" presents a section on ejectives which is referred to in the index as: Ejective sounds (Avoidance of). Furthermore, Catford (1977:66) refers to ejectives in English occurring in the realization of final [p t k] in two groups of speech: some dialect of northern England and "pathological speech". He also makes reference to eastern Armenia dialects where ejectives occur but points out that in "educated Erevan speech" the stops are realized as unaspirated voiceless.
.
Simpson (2010) who points to the interactional structure of Reading aloud suggesting that the high frequency of word-final plosive aspiration among Tyneside English speakers reading word lists (Docherty, Milroy, Milroy & Walshaw 1997, Local 2003) in comparison to what they produce in casual speech is more than just the sociophonetic interpretation of speakers approximating more standard forms. He argues that reading aloud word lists produces "the phonetics of turn-finality after each word" (p5) so that essentially finishing a word on a word

list or finishing a sentence in a list of sentences acts like a floor holding pause in interaction. In this way, finding ejectives to be more frequent at the end of a list of sentences, for example, might not be anything to do with a change in sociophonetic variation but rather it may just be that interactional function is the main influencing factor.

2.7 Linguistic constraints on ejective distribution - where they occur

Due to the fact that there has possibly only been one systematic account of ejectives in any variety of English, very little is known about their distribution, their phonetic context or any social factors that may constrain or promote them. The following are an indication of the phonetic contexts that may produce ejectives but it must be noted that these are mainly based on observation and anecdotal reporting and therefore have not all been substantiated.

A widely held consensus is that ejectives in English are greatly influenced by sentence prosody and position of the carrier word in the discourse; mainly (though not exclusively) occurring phrase-finally and word-finally or as part of an utterance before a pause, in addition to at the end of an utterance (Ogden2009:163, Gordeeva & Scobbie, 2006, Macafee 1983, Chirrey 1999, Wells 1982, Simpson 2010, Lambert, Alam and Stuart-Smith 2007). In terms of possible phonetic context, ejective variants of word-final plosives have been identified in literature as following voiced sounds such as vowels, nasals (Scobbie, Gordeeva, Matthews 2006) and laterals but not following voiceless sounds like [s] and also as occurring in stressed syllables (Ogden2009:163).

The relationship between ejectives and glottalization again is an area that requires further substantial investigation. Ogden (2009) considers ejectives to be a development of glottal reinforcement while Wells (1982:261) views them as resulting from an emphatic articulation of the glottal component in word-final stops. However, with regards to SSE this idea is contradicted by Gordeeva (2010) who contests that ejectives in this variety of English are a distinct form of 'glottalization' from what Wells (1982: 261:409-10) labels '*T Glottaling'* and '*glottal reinforcement'*.

Some commentators on ejectives in English point to possible phonetic reasons for their occurrence in the language. Ogden (2009:164) believes that the fact that the burst release of ejectives are characteristically louder than the release of a more standard pulmonic plosive means that the audibility of the burst is magnified which consequently makes it easier to

perceive the place of articulation of the stop. This idea, to some extent, fits in with that of Ladefoged (2001), who highlights the fact that speakers and listeners fundamentally like languages to have distinct sounds, such as ejectives, that are easy to hear. Ladefoged does recognize, however, that they also like sounds that are easy to make, and although he concedes that they are not so easy to produce he offers a possible answer to this. Building on Greenberg's (1970:127), Javkin's (1977), and Maddieson's (1984:105) assertion that languages with an ejective inventory will have velar ejectives at the top of the hierarchy, Ladefoged (2001) points out that this illustrates the balance between ease of articulation and ease of hearing; [k'] is perhaps more slightly favoured because auditorily it is much more distinct than either [p'] or [t'].

2.8 Are ejectives increasing in English stops?

The question of whether or not ejectives are on the rise is usually met with the question of whether or not we are just becoming more aware of them. Certainly, anecdotal evidence would seem to suggest so, yet there has not been much documented to verify these observations.

2.9 Ejectives and sociophonetic variation

2.9.1 Variationist sociolinguistics

The foundation of sociolinguistic research is constructed around a most basic concept: language varies. Traditionally, sociolinguists have focused on established social categories such as age, ethnicity, gender, and social class all of which contribute to the phonetic variation of sounds and words. Labov, a pioneer of sociolinguistic research, first investigated the process of language change with specific focus on the structure and systematicness of variation and patterns in language. Labov's early work in Martha's Vineyard (1963) and New York City (1966, 1972) underlined that the variation that existed among speakers was directly correlated to their differences across social parameters such as age, gender, class, and also stylistic factors such as whether the speakers were using spontaneous speech, reading from a word list or speaking in a formal interview style situation. Thus, the linguistic variable that was focused on varied

according to these independent variables and therefore variation was demonstrated to be both systematic and layered with social meaning (Hay & Drager 2007:90). Labov's work prompted many other sociolinguists such as Wolfram (1969), Trudgill (1974), Macaulay (1977) and Milroy (1987) to conduct further research using this social stratification paradigm all of whom contributed to emphasizing how this socially patterned variation can highlight processes of language change (Milroy & Milroy 1992:1). Outlined below are some of the fundamental aspects of these variables and their relationship with linguistic variation and change.

2.9.2 Observing language variation and change

The age variable comprises a number of features that are significant for the understanding of variation and change in language. The main social correlate for indicating change is age. Very often any linguistic differences that only exist between different age groups in the community, with all other social factors being equal, are a probable indicator of a linguistic change in progress. Studies in which age and language change are interrelated will commonly exhibit results showing some slight sign of variation present in the speech of the older generation, a greater frequency of variation in the speech of the generation below them, while the youngest generation will have the greatest frequency of variation in their speech. Chambers (2002:355) points out that "[i]f the incoming variant truly represents a linguistic change, as opposed to an ephemeral innovation… it will be marked by increasing frequency down the age scale". Taking the example of /k'/ as the incoming variant (i.e. the 'new' realization of a final stop consonant) being investigated in, for true language change to be present, one would expect a high frequency of realization among the younger generation with a decrease in frequency the further up the age scale one goes.

One of the most widely used methods for investigating linguistic change in progress is apparent time analysis which is a comparison between the speech of older people and that of the younger generation within a community with any apparent differences between them assumed to be the result of linguistic change (Chambers & Trudgill 1980/1998:76). "Apparent time" is the term given to the hypothesis that proposes that people along the age scale will have preserved the speech norms and patterns of their formative years. In this way any speech differences that will exist between people of different ages will mirror the differences in the way people spoke in their formative years (Chambers 2002:358). It is assumed that when the other social factors such as class, ethnicity or gender etc are held constant together with stylistic factors such as speech take from a reading passage or word list task or from spontaneous speech, the linguistic

differences highlighted among generations of a population - the apparent-time differences - will reflect actual diachronic developments in the language or what is known as real-time linguistic changes (Bailey 2002:313).

A conflicting issue with the idea of apparent-time is age-grading which centres on the concept where that younger members of a speech community gradually change their speech over time approximating it more closely to adult norms (Chambers 2002:358). Macaulay's (1977) investigation into the glottal stop variant for post tonic /t/ in Glasgow looks at three age groups, 10-year-olds, 15-year-olds, and adults across three social classes: Lower Working Class (LWC), Upper Working Class (UWC), and Middle Middle Class (MMC).
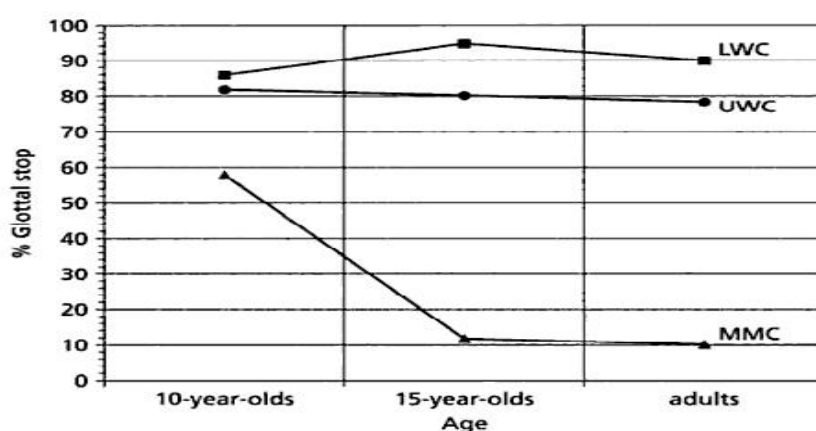
FIGURE 3 PERCENTAGE OF GLOTTAL STOP VARIANT FOR POST TONIC /T/ IN ADULTS, 15-YEAR-OLDS AND 10-YEAR-OLDS IN THREEE SOCIAL CLASSES IN GLASGOW. SOURCE:MACAULAY (1977:TABLE 16)

Figure 3 is a good illustration of the case of age grading . In Glasgow where the glottal stop variant is a stable class marker, the results of the 15-year olds and adults are what one would expect. However, as is evident the results of the 10-year-olds MMC is quite unexpected and, due to the fact that we know that the glottal stop is a stable class marker and very much a stigmatized one, this indicates that somewhere between the age of 10 and 15-years-old, possibly around the time of puberty, there is much more of an awareness of the class stigma attached to using this variable (either from peers or most likely from parental pressure) and consequently it is used increasingly less.

2.9.2.1 Real time change

Results from apparent time studies may not be fully sufficient at explaining language change due to the fact that it is accepted that over time speakers will become more conservative anyway. Therefore, it may be easy to confuse an apparent change in language use from younger speakers to older speakers as a true example of language change, with what may merely be a result of more conservative forms of language as one gets older. In order to more accurately ascertain whether patterns in age-stratified samples reflect change in progress or not, evidence in real time is needed (Eckert1998:152).

Labov (1994), believes that the only way to solve the problems throw up by studies in apparent time is by observing specific speech communities at two discrete points in time; that is, through real time observation. One method of gathering evidence for real time change analyses is to use old recordings of speech from a specific community (Van de Velde, Hout, Gerritsen, 1997). Of course the accuracy and validity of this method relies on how comparable the samples drawn from the different time periods are and the length of time difference between samples of recording (Eckert 1998:153). For these reasons trend studies, which look at different individuals but who share similar social traits such as gender, age and social class are seen as the best method for examining language change in progress (Sankoff 2006:7).

2.9.3 Adolescence and language change

Much of the research on very young children has centred on identifying the age(s) at which children acquire specific patterns of variation and their constraints. However, the ephemeral nature of the process of children's language development presents a problem for researchers in determining the stage at which children cease primarily assuming the social meaning of adults and start to use language socially themselves. (Roberts 2002:344).

Chambers (1995:169) described the juncture at which younger children begin to move away from the influence of the caregiver's linguistic norms to a more peer-orientated network as their 'declarations of adolescence'. Around this time adolescents are regarded as significant players in the role of change due to the dual fact that that they now mix among a wider network of peers

and *"their desire for a distinct social identity means that they are willing to modify their speech"*

(Kerswill 1996:198). These factors contribute to them having the highest frequency of incoming forms (Tagliamonte & D'Arcy 2009:59). This process of vernacular reorganization continues until a point of stabilization, which is taken to be around seventeen years of age Labov (2001:448), Tagliamonte & D'Arcy (2009:66). Eckert's (2000) study of the vowel shift in the speech of high school teenagers in a Detroit suburb highlighted that the best correlation for these teenagers was whether they fitted in with Jock norms or Burnout norms of the school community. The group with the highest degree of shifting was the burnouts.

2.9.4 Gender

Several studies (Fisher 1958, Trudgill 1974, Macaulay 1977) have shown that women tend to use more prestige forms than men and approximate more closely to standardized varieties of a language and rejecting the stigmatized forms. Trudgill (1972:182-3) puts forward various possible reason why females should adopt the forms associated with the prestige standard more frequently than men. He suggests that it is due in part to the fact that women's role in society is usually subordinate to men's and using the prestige forms more is a way of marking their social status linguistically. Another reason may be that men are 'rated' socially by what they do whereas women tend to be rated on how they appear, consequently their speech acts as a reflection of a status they wish to display. In addition, non standard forms are usually associated with WC speech which in turn has connotations of roughness or masculinity; all of which run contrary to the conventional traits of femininity.

These observations appear to be viewed as outdated now and Tagliamonte & D'Arcy (2009:63) caution against what they refer to as "the generalization of female dominance in language change". While on the one hand they do recognise that women are the principal leaders in linguistics change, they point to the fact that gender asymmetry will develop soon into the progression of a change. The cause for this lies in the fact that once a change becomes associated with women, men will resist the innovative form.

Furthermore, and specific to this study, Eckert (2000, 1990, 1997) sees gender as often being more apparent within gender as opposed to across gender. She argues that "[i]n developing patterns of behaviour, in assessing their own place in the world, and in evaluating their progress, people orientate above all to their own gender group". In order words girls care much more about other girls, than boys who are after all just completely different.

2.10 Ethnicity

Language variation and change has been found to be driven by ethnicity in many recent studies (Torgersen et al 2006, , Maegaard and Quist 2009, Madsen 2011). Within Scotland the principle minority ethnic group is of Asian heritage with the majority of these living in Glasgow. Almost 80% of the Glasgow Asian community is of Pakistani heritage, and Muslim religion. Stuart-Smith, Timmins and Alam (2011: 3) report that "[w]ithin the city, the notion of a Glasgow Asian accent is accepted to the extent it is even stereotyped in the media, in the form of 'Navid', a Glasgow Asian shopkeeper in the local TV comedy, *Still Game*".

This link between ethnicity and identity is further attested to in Glasgow even from the use of the blending term *Glaswasian* used by Alam (2007) to describe the phonetic features which incorporates the Glaswegian and Asian heritage. In addition, the study of Glasgow-Pakistani girls reveals that fine phonetic variation of /t/ in is indexical of local ethnic identity (Alam and Stuart-Smith 2011:219). Furthermore, Lambert et al (2007) report that the stops /t d/ in Glasgow Asian speech data are retracted and Stuart-Smith, Timmins and Alam (2011) surmise that is due to interference for the heritage language which are being "exploited by second generation Glaswegian Asians for the purposes of personal identity construction" (p.3).

Summary

This chapter begins by outlining the fundamentals of ejective articulation within the context of the pulmonic egressive airstream that is mainly responsible for the sounds in most varieties of English. It is clear then where the tag 'exotic' arises from and early literature that sought to describe ejectives attests to this rare sound. The literature review also highlights a paradox with this exotic sound in that it is use in a fifth of the world languages and even in varieties of British English ejectives can be allophones of /p t k/. The literature is quite vague concerning ejectives with the general tone being 'we know they are there, but we do not know much about them'. The rest of the chapter focuses on social factors traditionally associate with language change, with a view to setting up a context from which to examine the data from the speakers which is anticipated as a possible example of language change in progress.

3. Methodology

3.1 Overview

This chapter outlines the background information on the sample of participants and provides an account of the process of obtaining the data: the tasks and methods used and an explanation and justification of why these were employed. I refer to the pros and cons of the researcher being the participants' teacher. The chapter also considers some interesting points relating to categorizing social class within Glasgow and I offer some reasons on why it might be worth reconsidering the effectiveness of the traditional Middle Class/Working Class divide. In addition, I put forward my reflections on the merits of the Map task and discuss some points of interest regarding its coordination.

3.2 Background to school

The school is located in the west of Glasgow and has a roll of about 800 pupils. The school has a wide catchment area and pupils come from all over the city. There is also a large and varied ethnic mix within the school with over 50 different languages being spoken and one third of all the pupils have English as an additional language. The most common languages among those pupils who are bilingual in the school are Punjabi and Urdu. In addition, around a third of all pupils attending the school are from areas of multiple deprivation.

3.2.1 Issues to consider for the research

As this study took place in my work place and the participants' school there were a number of advantages and disadvantages of this situation, some of which crossed over meaning that what sometimes seemed to be helpful for data collection was also a hindrance and vice versa. The main advantages of collecting data in the school was that I already knew the pupils and they knew me as they were members of my class, therefore a relationship and familiarity had already been established for a considerable length of time. The length of time I had known the pupils ranged from eight months (for those pupils who had joined my class at the start of that school year) to four years for some pupils in S5 (fifth year in high school) who I had taught since they arrived to the school in first year. The drawback for this was, of course, that ours is a teacher/pupil relationship and brings with it the potential problems of compounding the

Observers Paradox (Labov 1970) due to perhaps elements of style shifting by pupils in an attempt to speak 'correctly'. In addition, another seemingly positive aspect of collecting data in school was that it would be easily available as access to the pupils would be quite straightforward. Again, this was considerably more advantageous for me rather than for an outsider, yet it did present some problems in terms of time constraints. Recording could only take place during a forty minute window at lunchtime due to pupils' class commitments and my teaching commitments; both of which did not allow the flexibility to record outside of this time. Consequently, the main issues that arose here were arranging enough time for recording while at the same time allowing sufficient time for the pupils to have their lunch.

3.3 Glasgow: Location and variety of English

Glasgow is the largest city in Scotland and one that has suffered greatly from high levels of industrial and economic decline (Stuart-Smith, Timmins, Tweedie 2007,). Within the context of English dialects, Glaswegian is on the one hand a dialect that is quite stigmatized but on the other, linguistically very interesting, Glaswegian English is located along the continuum of Scottish English whose poles stretch from Scots at one end to Scottish Standard English at the other. Working-class Glaswegians gravitate towards the Scots end of this continuum, which is highly stigmatized, but are able to move up and down this continuum as particular social contexts demand. (Aitken 1984; Stuart-Smith 2003, Stuart-Smith, Timmins, Tweedie 2007, Braber, Butterfint 2008).

3.3.1 The stop system in Glasgow

Stops are reported to be less aspirated in Scottish Standard English (e.g. Wells 1982: 409). /t d/ can be alveolar or dental, (Wells 1982: 409; Johnston 1997: 505). Stuart-Smith (1999: 216.) mentions that in Glasgow all speakers showed degrees of advanced tongue tip/blade, indicating a fronted or dental articulation for /t d/ (and /l n/); Macafee (1983) mentions that ejectives have been noted for some time a Glaswegian English as being realized in emphatic speech word-finally and before a pause.

3.3.2 The realisation of word-final /k/

Although from my observations I have heard bilabial and alveolar ejectives being used, I decided to restrict this study to just focusing on velar ejectives. This decision was made based on a number of reasons: firstly it was the first ejective I noticed that pupils in my class were using following a small scale study that I undertook - that was actually looking at devoicing - at the beginning of my Masters. Secondly, it seems to be the most frequent type (or at least the most auditorily distinct) and finally, I was intrigued by what I read in *The Results for Consonant Variables from Accent change in Glaswegian (1997 corpus)* (Timmins, Tweedie, Stuart-Smith 2004) which mentions "that there have been no reports either anecdotally or in the literature to suggest that /k/ may be changing in Glaswegian speech."(p. 19). One other reason for choosing one ejective to look at rather than all three together is the obvious limited scope of the study.

3.4 Phonetic Context

Tokens were chosen so that word final /k/ would follow both vowel contexts and be within a consonant cluster. Due to the fact that the literature does not make any assumptions about what vowels context may promote or constrain, ejective distribution vowel contexts were chosen to represent a range of vowels that reflect the front to back vowels on the vowel quadrilateral.

The cluster contexts –ŋk and –sk were chosen as they are both mentioned by Ogden (2009:163) as promoting and constraining ejective use respectively. –rk was purely for the ease with which recognizable words with word-final /k/can be constructed with it as a final cluster and also to investigate what effect, if any, it may have on ejective realization. Table 3 below shows the words use in both the Reading list and the map-task. Words in red were used in the Read task, words in blue were target tokens in the map-task

	_k	_rk	_ŋk	_sk
ɪ	Thick Toothpick Basic Hockey stick		Drink Think Pink	
eɪ	Fake Snake Milkshake			
a	Iraq Pack Rucksack	Park Mark Bookmark Shark	Sank Tank	Mask
aɪ	Like Mike (Motor)bike			
ɔ	Lock Sock Shamrock	Fork Cork		
o	Joke Smoke			

TABLE 3 TARGET TOKENS FOR TASKS ACROSS THEIR PHONETIC CONTEXT

3.5 Preliminaries to participant selection

Prior to selecting speakers for the study I spoke informally with the school head teacher about my research and then outlined to her in writing details of my investigation and a proposed timeframe and procedure for collecting data. Following permission from the head teacher, I applied for approval from the Faculty of Arts Ethics Committee, University of Glasgow who granted me approval to undertake my research.

3.5.1 Selection of participants

As the research focused on possible language change in progress among adolescent girls within a high school, an age stratified sample was required; therefore I chose to base my sample on participants from my S3 and S5 classes (14 – 16/17 years old).This gave me an opportunity to

collect data from two age groups; the younger group whose linguistic norms have moved passed their "declaration of adolescence" stage (Chambers 1995) and the older group who are also undergoing the process of vernacular reorganization (Labov 2001) and are moving towards the point of stabilization (Labov 2001, Tagliamonte & D'Arcy 2009:66). It was felt that if the use of ejectives was indeed an indication of language change in progress, then these age groups would allow for optimum observation of change as they are reported in literature as having the highest frequency of innovative forms (Chambers 1995, Tagliamonte & D'Arcy 2009:66 Labov 2001, Eckert 1989).

My next step was getting speakers from both groups and this involved consideration of teacher-pupil roles. I chose participants on a voluntary basis rather than asking pupils if they would like to take part for a number of reasons. Firstly, I felt that it was the best way to eliminate any issues of power or control whereby pupils would perhaps feel that because it was their teacher asking there was an obligation to take part.

Secondly, I wanted to avoid any bias from my own part in selecting pupils who I felt may satisfy some of the other social factors such as class or ethnicity or any stylistic factors such as associating them with being frequent users of the ejective variant /k'/.

Furthermore, another overriding factor for using a volunteer approach to speaker selection was that I did not want my perception of pupils' reliability or their ability in class to influence their selection for the data collection. Seligman, Tucker, and Lambert (1972:141) point out that teachers form judgements and evaluate pupils based on a combination of school work performance and also on speech style in the classroom which is a significant cue to teachers in their evaluation of the pupil.

Finally, it was felt that selecting pupils on a voluntary basis would provide a clearer picture of any possible language change in progress by essentially producing a random sample of both age groups and avoiding the danger of getting a *"self-fulfilling"* result (Feagin 2002:28).
Due to the wide catchment area of the school and the high proportion of Glaswegian Asian pupils I was confident that sampling through this type of voluntary participation –which is essentially random – would still yield a sample with a distribution that was a close representation of both the class population and the wider urban Glasgow area.

I sent a letter to the parent/guardians of those pupils who would be taking part in the recording explaining about my research and attached a consent form for them to complete and sign (Appendix 1). Given my role as an English class teacher I clearly emphasized on the letter that the research had no connection with curricular work and was in no way related to the subject I teach, thereby making them fully aware that it was neither an academic exercise nor a test of reading or language competency.

3.6 Sample size

14 S5 pupils (roughly 50%) out of a total class size of 29 volunteered for participation in the study and all consent forms were signed and returned. Initially when I enquired from the S3 class if anyone would be interested in helping me out with the research; sixteen pupils indicated interest by a show of hands, however only thirteen pupils returned their signed consent forms. The other two pupils later told me they could not commit to lunchtime attendance. I was conscious that for the purpose of a convenient balance between the age groups and also for the fact that recording the pupils in pairs would be more comfortable for them for the reading list task and essential for the map task, that I needed at least another pupil. I therefore asked once more in class if anyone would like to volunteer and a girl approached me after class expressing interest. Consequently, from a total class size of 29 S3 pupils, I had 14 participants which represented about 50% of the total class size.

3.6.1 Stratification of sample

Sankoff (1980:52) reinforces that it is essential *"that the sample be well chosen, and representative of all social subsections about which one wishes to generalise"*. [a quantitative paradigm for the study.]. This of course was kept in mind when considering the size and social stratification of the sample. Due to the manner in which participants were selected for the study, obtaining a sample that allowed me to 'generalize securely' (Milroy 1987/1997:22) about both cohorts in relation to the established social categories that influence phonetic variation (age, gender, ethnicity and class)could have proved difficult given a sample size that was too small. However, the number of participants allowed for a very good overall representation of the social categories within the classes, despite the sample being essentially random. The age variable was one that was controlled at the beginning by using volunteers from S3 and S5 groups. Having almost 50% of each class group participate in the study also helped with a true representation of

ethnicity. Out of the 29 pupils in S3, 11 of them are of Glasgow Asian (GA) ethnicity which corresponds to 38% of the overall class population. For participation in the study, 6 out of the 14 volunteers were GA pupils, which translate as 43% of the overall population. Out of the 29 pupils in S5, 12 of them are of GA ethnicity which corresponds to 41% of the overall class population. For participation in the study, 5 out of the 14 volunteers were GA pupils, which represent 38% of the overall total class group population. Therefore, the ethnic stratification was a very accurate representation of the overall distribution of both groups.

3.7 Social category

3.7.1 Ethnicity

In Scotland the minority ethnic population stands at just 2%, with the main ethnic group being Asian and in Glasgow 77% of the Asian population are of Pakistani heritage (Alam, Stuart-Smith 2011). This high percentage of the population of Pakistani heritage is also reflected in the school cohort with over 30% of the school role being pupils from Pakistani heritage. My initial observation in the classroom seemed to suggest Glaswegian Asian pupils used more ejectives, or at least their ejectives seem to be auditorily stronger or perhaps more distinct than those of the Glaswegian pupils. This different quality ejective was variable between speakers and within speakers too, but this is not just a Glaswegian Asian specific trait as the Glaswegian speakers also engage in variability within speaker.

Alam, Stuart-Smith (2011:216) emphasise the link between fine phonetic variation and age, gender and social category, but also its significance in the "construction of locally-salient social identities… including those which relate to ethnicity". Therefore, could the use of ejectives among Glaswegian Asian speakers be linked to construction of identity? It seemed possible that within a school, where Communities of Practice are tightly formed, there might be some link here, although this lay beyond the scope of the study.

3.7.1 Background

I felt that the idea of categorising pupils in terms of class according to the traditional sociolinguistic divisions of Working class and Middle class to be unsuitable. Apart from the fact that I would need to extract details of parent occupation and the issues of privacy and sensitivity

that surround that, I felt that using this broad binary categorisation for sociolinguistic studies on Glasgow was not sufficient given the socio-economic make up of Glasgow.

I decided to base my classification of pupil's social class on the Deprivation Categories (DEPCATs) identified in the *Carstairs scores for Scottish postcode sectors from the 2001 Census* (2004)[4].This report derives the DEPCAT scores by using certain variables taken from small area Census data. The scores compare areas according to postcodes and not according to "*individual material well being or relative disadvantage (p.1)*. The DEPCAT scores range from 1-7 with 1 being the most affluent areas and 7 the most deprived.

Figure 4 below taken from the report (p.7), illustrates a central problem with attempting to follow a MC/WC division in categorising speakers.
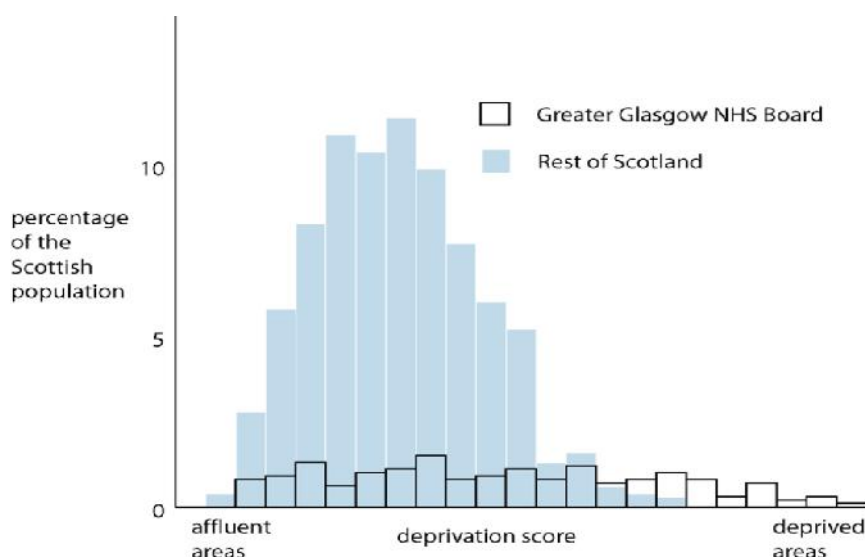
FIGURE 4 DEPRIVATION SCORES ACROSS SCOTLAND

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The distribution of the population in each of the 15 Health Board Areas of Scotland is shown by DEPCAT. Postcode sectors from the Greater Glasgow NHS Board area dominate the most deprived deprivation category (DEPCAT 7). Overall, 30% of the Greater Glasgow NHS Board area population are located within the most deprived 7% of the Scottish population. The difficulty, therefore, lies in the fact that within a sample there is a very high chance that the majority of pupils could be considered working class based on the traditional sociolinguistic division.

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4 Available at http://www.sphsu.mrc.ac.uk/library/other%20reports/Carstairs_report.pdf

3.7.2 Participant sample and DEPCAT

With regard to social class the sample distribution was again a very close and true representation of the Glasgow area. Based on the comparison with the Carstairs scores for Scottish postcode sectors from the 2001 Census, the range of participants from both groups was a close reflection of the percentage of people distributed across the Deprivation Categories (DEPCAT) 1-7 in the Greater Glasgow NHS Board area. In the S3 sample there was one pupil each in DEPCAT 2-4, two pupils in DEPCAT 5, three in DEPCAT 6 and six in DEPCAT 7. The S5 sample had almost identical distribution apart from no pupil in DEPCAT 3 and two pupils in DEPCAT 4. See Table 4 below for a comparison.

Deprivation Category (DEPCAT)

	1	2	3	4	5	6	7
Glasgow City	0	5	4	15	9	22	44
S3 Sample	0	7	7	7	14	21	43
S5 Sample	0	7	0	14	14	21	43

TABLE 4 COMPARISON BETWEEN STUDY SAMPLE AND DISTRIBUTION OF 2001 CARSTAIRS SCORES FOR GLASGOW CITY (ADAPTED FROM 2001 REPORT).

Figures are percentages of population. (As with the percentage of Greater Glasgow NHS Board area population, two-thirds of the overall sample from both the S3 and the S5 groups are in DEPCAT 6 and 7).

3.7.3 Organisation of DEPCATs for analysis

To make analysis of data more manageable according to social class, it was decided to group the data from participants in DEPCAT's 2-5 together and to group the data from DEPCATs 6-7 together. This decision was made on the basis of the number of participants in each DEPCAT: it would have been unworkable to analyse each participant according to their own DEPCAT given the high proportion of participants within DEPCAT 7 and the sparse numbers for the rest of the DEPCATs. The decision was therefore made to keep the data from the lower end of the DEPCAT together i.e. 6 and 7and to keep those in 2-5 together also. This provided 'upper and lower' social class categories that were quantifiable in terms of social class division and

manageable in terms of data to analyse with ten participants in DEPCATs 2-5 and eighteen participants in DEPCATs 6-7.

3.7.4 Overview of participant sample

Table 5 below presents the demographics of participants who took part in the study. The table is divided into

- Name,

- Year group (S5 are the older girls, S3 are the younger girls),

- Ethnicity (G is Glaswegian, GA is Glaswegian Asian).

- DEPCAT of participant

All names are anonymised with pseudonyms in accordance with confidentiality guidelines set out in University of Glasgow, Faculty of Arts Research Ethics[5].

Name	YEAR GROUP	Ethnicity	DEPCAT	Name	YEAR GROUP	Ethnicity	DEPCAT
Lucy	S3	G	2	Paula	S5	G	4
Marta	S3	G	3	Kim	S5	G	4
Jade	S3	G	5	Rose	S5	G	6
Amy	S3	G	6	Fiona	S5	G	7
Kathy	S3	G	7	Lauren	S5	G	7
Maria	S3	G	7	Liz	S5	G	7
Trisha	S3	G	7	Lisa	S5	G	7
Minah	S3	GA	4	Meg	S5	G	7
Amna	S3	GA	5	Jodie	S5	G	7
Nisha	S3	GA	6	Sehar	S5	GA	2
Fatima	S3	GA	6	Anisha	S5	GA	5
Zunera	S3	GA	7	Sara	S5	GA	5
Shivani	S3	GA	7	Shailaa	S5	GA	6
Arwa	S3	GA	7	Zara	S5	GA	6

TABLE 5 DEMOGRAPHICS OF PUPILS WHO TOOK PART IN THE STUDY

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[5] Available at: http://www.gla.ac.uk/media/media_129578_en.pdf

3.8 DATA COLLECTION

As the aim of the research was to gain a better overall understanding of the environments, both socially and phonetically, that constrain or promote ejective use in Glaswegian speech, it was necessary to collected speech data records from both formal and informal situations. Two design appropriate tasks were used to elicit speech in both these styles. A reading list of sentences was used to obtain a more formal style of speech, while a 'map-task' was designed to be used as a pair work activity in order to provide a more natural, informal styles of speech.

Pupils were asked to choose a friend who had also volunteered to take part in the recordings to accompany them during the recordings. The organisation of these dyads was quite straightforward as the pupils who volunteered did so because their friends had also volunteered or they were the ones who encouraged their friends to take part. The purpose of recording pupils in pairs was for professional as well as obvious practical reasons. Firstly, recordings taken in pairs or with pairs present permits adherence to the classroom teachers normal codes of practice regarding the potential dangers of being alone with a pupil in a private or isolated situation.[6]Given that recording would have to be done in a quieter part of the school, in an empty classroom, it was essential to have at least two pupils present together. Secondly, having a friend present helped to ease any anxiety or pressure created by the presence of microphones and reading lists. Finally, it was necessary for the collection of casual style speech as the task involved interaction between pairs of friends. For this last point friendship pairs contributed to lessening the effect of the observer's paradox.

Due to the fact that it was school children being recorded, for logistical purposes as well as for purposes of maintaining a natural setting, recording took place within the school in a quiet classroom. Recordings were made with an M-Audio Microtrack 2-channel mobile Digital recorder using a battery powered lapel microphone (AT831b). Analysis of speech was done using Praat 5.2.12. Data was stored on a password-protected external hard drive. Data was anonymised with pseudonyms used.

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[6] www.gtcs.org.uk/practiceinfo p.12

3.9 Tasks

Both the reading task and the map task looked at eliciting a range of word-final /k/tokens within a specific preceding vowel and cluster phonetic context. The list of words and their phonetic context is in Appendix 1

3.9.1 Reading lists

The reading list consisted of 44 sentences including distracter sentences. Tokens containing /k/ were positioned word finally and sentence finally with the stress falling on the final syllable. In order to further ensure that the participants would not recognize a discernible pattern of words ending in /k/, I used sentences that were broadly and thematically related to each other. For example sentence 1, 6 and sentence 32 fall under the theme of 'going out'; sentence 15 and sentence 40 relates to travel; and sentences 18 and 26 relate to sailing.

3.9.2 Reading list recording

Where time permitted, both pupils who were present were recorded consecutively. The recording equipment and the reading list were set up in advance so that, following a brief explanation of the task, participants were ready to begin reading. The lists of sentences were displayed on two separate soft blue A4 pages typed with Comic Sans MS font size 12. The pages were laid out on table and the pupils were told that they could not lift the pages with their hands to reduce the sound of rattling paper being picked up by the microphone but they could position them in front of them so that they were at a comfortable distance for them to read.

Completion of the reading task averaged about 15 minutes overall for both participants. This time included the initial 'accustomation period' which allowed the pupils to become familiar with the recording equipment.

Where a pupil made a mistake they were asked, when they had finished the reading list, to repeat the sentence once more.

3.9.3 Map-task

The map that I used to elicit the more natural, informal style of speech for the study contained easy-to-recognise, clip-art type illustrations associated with lexical items ending in /k/. These illustrations represented real-world objects. A route was drawn through the objects on one of the maps. One informant was asked to describe the route to the other informant using the drawings as a guide, so that their interlocutor could draw the exact same route. The informants were not allowed to see one another's maps, so a low 'screen' was constructed to sit between them. This ensured that they had to rely on accurate description of the route and therefore used the target tokens as useful reference point for their description of the route.

It was found after the first few recordings that some pupils were more disposed to calling the 'shamrock' that was pictured a 'clover' and calling the 'motorbike' a 'motorcycle'. To ensure that these lexical items were mentioned 'correctly' given that they contained word-final velar stops, I made certain that the words 'shamrock' and 'motorbike' were included as an example within the short explanation on how the task was to be conducted. This seemed to limit the number of times other variants of these words were mentioned.

The maps given to the informants were not identical and subtle changes were also made to some colours of the objects which provoked queries from the route follower, so that they also had a chance to speak and also to prolong the map task. For example, a platform shoe was on the map given to the informant whose task it was to direct their friend around the route, while there was none on the other informants map. The location of the platform shoe was between target tokens namely: the shamrock, the shark (the dolphin on the other map) and the chimney with smoke, so when it arose that this appeared on one map but it could not be found on the other, all attempts at discovering its location inevitably involved mentioning some or all of these other objects – which all ended in /k/. The exchange between the two S5 pupils Meg and Rose - transcribed below - on the whereabouts of this object was a typical example of the type of confusion (in good humour)that led to more instances of uttering the target tokens(underlined):

Meg: *make sure you go round the boot…*
Rose: *…wait. There's no boot…*
Meg: *well the… what do you call it?.. the platforms…*
Rose: *No there's not!*

Meg *…well the multicoloured "shoe" thing…*

Rose: *there's nothing there!.*[laughter*]… all I've got is a <u>hockey stick</u>, a flower, and a <u>shamrock</u>… and a thing with <u>smoke</u> coming out…*

This brief exchange here provided three target tokens from Rose that are positioned in two different places within the turn: 1. end of clause/sentence (*hockey stick* and *shamrock*), 2. within turn (*smoke*).

The decision to show the maps to the pupils afterwards had to be taken into consideration due to the possibility of them speaking to other pupils who were to take part in the task and thereby spoiling the desired outcomes of it. However, it was felt that the discussion that ensued following the revelation of both maps to the pupils would contribute to a significant number of target tokens being uttered by them which would increase the number of tokens obtained overall. Pupils were asked not to tell others who were still to take part in the recordings about the task. This request was appreciated by all pupils and respected by all pupils as there was no hint of any other pairs of pupils having any 'inside knowledge' of the task. I think for this to have worked it was important that I had a relationship with the pupils already and knew from class. I believe also that the fun element in the task and the surprise twist in the tail ending when they were shown the map created a situation where telling other people about the differences in the map would be akin to spoiling their classmate's fun.

Another reason for showing the maps at the end was based on the reactions of those taking part. Different sets of informants reacted in different ways; some informants didn't query their interlocutor's description of the items on the map and were happy to cut corners, so long as they got to the finish, others were real sticklers. Due to the fact that some informants did not question, or were willing to overlook the interlocutor's description when it was clearly different from the object they had in front of them – for example the shark/dolphin difference – some of the target tokens would either amount to very low numbers or no instances of the token at all. Showing the map afterwards allowed an identification of the differences and the 'controversy' (Kahn, E. A., Calhoun Walter, C Johannessen, L. R. 1984**)** surrounding the different maps provoked discussion among the pupils; thereby increasing the number of tokens obtained. Take the extract from the exchange between the two S3 pupils, Minah and Fatima. Minah, who is leading Fatima around the route, directs her to go towards the shark but when she is corrected

by Fatima that the picture actually depicts a dolphin (as this is the picture she has in front of her), she agrees that it is a dolphin and continues on:

Minah: …then turn left towards the shark.

Fatima: You mean dolphin?

Minah: yeah the dolphin. And then go down towards the …

When both maps are revealed to the pupils at the end, they realize that one had a dolphin and the other a shark and then proceed to discuss the issue and other difference that exist, thereby mentioning a number of times some of the target tokens that they did not hit on previously. The extract below reveals their 'discovery'[7]:

Minah: *...yeah, you've got a spoon and I don't have a spoon.*

Fatima: *...she's got a shoe…I've got a ....that's a knife and a fork!*

Fatima: *…and, em...there's a dolphin here and she's got a shark...*

Minah: *Yeah, exactly, see I knew it was a shark!*

The map task was also seen as an ideal opportunity to obtain many instances of the word 'like' as it was expected that given the age and gender cohort of the participants there would be multiple instances of quotative 'like' and the discourse marker 'like' (Tagliamonte, Hudson 1999),however, curiously this was not the case. Out of all the data recorded there were only four instances of 'like' used. I will discuss this further in the Discussions chapter.

On average, participants could get through the task quite quickly and in some cases hitting the tokens just once each. To extend the task I always asked the participant who was following the directions to recap and report back the route they traced. Furthermore, following the discussion at the end when it was revealed that the maps were different, I took the maps away from the pupils and asked them to recall the route from memory, which lead to more interaction and a further increase in the number of tokens collected for my data. On average, following the set up of recording equipment, the map task lasted between 7-10 minutes.

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[7] Extract taken from File name?? between 5218 and 6.18sec

3.10 Auditory analysis

3.10.1 Extracting and coding data

A script[8] was run in PRAAT to extract sound files and segment them. This script allowed me to add a tier for the speaker's name, add the word with the final /k/ variant, extract the files and save them. The speakers' names were coded using the pseudonyms.

Then another script was run which looped through the set of already segmented sounds and Textgrid files. This script allowed me to add relevant tiers to the existing text grid for the transcription and coding for both the reading task and map task.

The following interval tiers were added to the existing Word and Name tiers:

- IPA (which contained the coding for the /k/ variants),

- Vowel (the preceding vowel context to the /k/ variant),

- Cluster (the preceding consonant together with/k/),

- Class (the speakers' DEPCAT)

- Ethnicity (G or GA).

In addition the interval tiers for casual speech also had this additional tier named "Turn". This tier was concerned with the position in the speakers turn that the /k/ variant occurred. There were three positions:

1. Turn final which was coded 2

2. End of clause/sentence which was coded 1

3. Anywhere else within the turn which was coded 0

The screenshots below highlight the tiers and coding for both Read and Casual speech.

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8 All scripts used in the study were written by Jane Stuart-Smith see **appendix [ ] for all scripts used.**
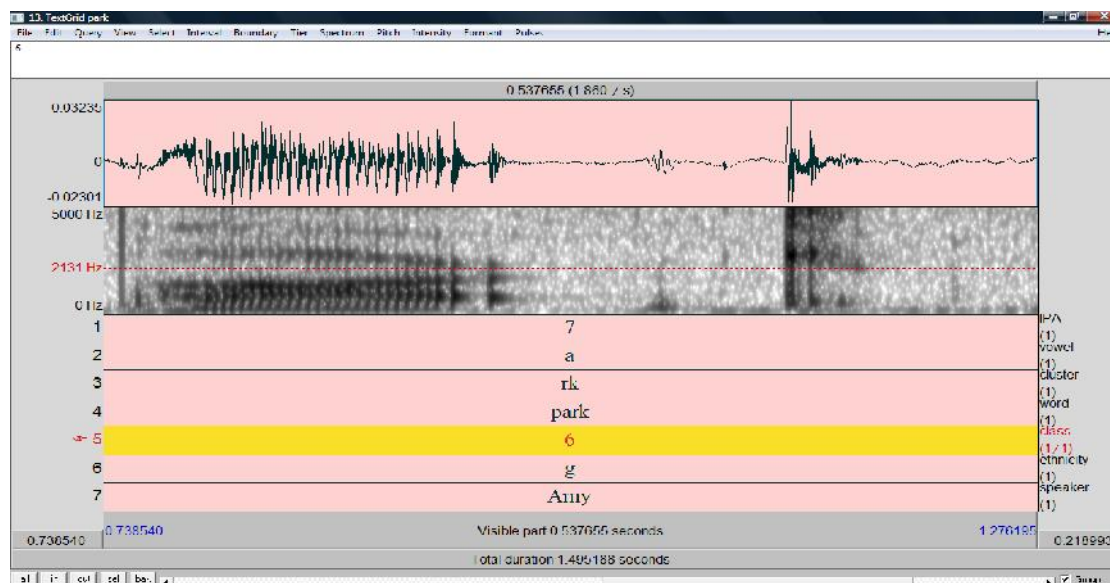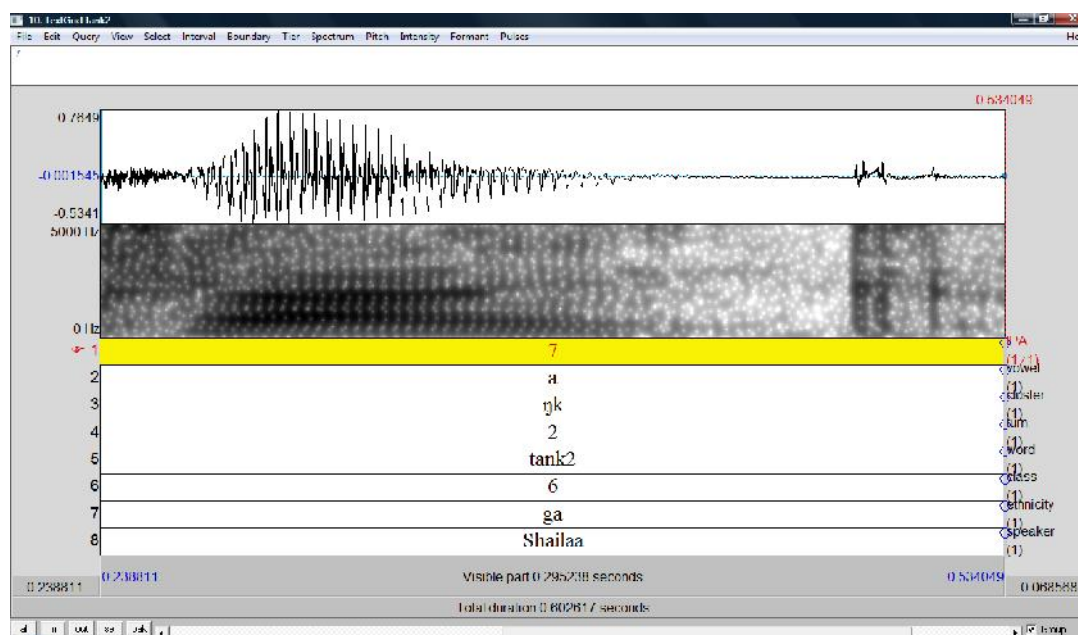
FIGURE 5 EXAMPLE OF CODING FOR READ SPEECH

FIGURE 5.1 EXAMPLE OF CODING FOR CASUAL SPEECH

3.10.2 Transcribing data

Following this, I carried out a narrow phonetic transcription of each stop and added all the relevant coding. In total I identified twelve distinct variants of /k/ occurring word finally throughout. I coded these variants by numbering them.

3.10.3 Decisions on representing ejective variants

When deciding on representing the ejective variants, I took into account the difficulties outlined by Ladefoged (1980 498:9) in contrasting sound differences between ejectives. From my auditory analysis I identified four distinct ejective types: Weak, Strong, Intense, and, although relatively low in number, Velar ejective affricate. I loosely followed Fallon's (2002:267) proposal to build on the apostrophe diacritic that already accompanies the velar stop symbol i.e. [k']and I therefore used a double apostrophe [k''] to represent the intense ejective burst, while I decided upon using a single apostrophe [k'] for the Strong ejectives. To represent Weak ejective I used a single dot under the [k] so that it becomes [ḳ'].

In addition, other ejective variants within the data were ejectives following a noticeable closure [k·'] and ejectives following a noticeably long closure [k:'].

Table 6 below outlines the variants and their corresponding code in numbers.

/k/ variant	Symbol	Coding
Glottal	ʔ	1
Unreleased stop	k̚	2
Voiceless velar plosive	k	3
Strongly aspirated plosive	kʰ	4
Voiceless velar fricative	x	5
Weak ejective	ḳ'	6
Strong ejective	k'	7
Intense ejective burst	k''	8
Velar ejective affricate	kx'	9
Closure + ejective	k·'	10
Long closure + ejective	k:'	11
Any other misc sound/poor quality recording	other	12

TABLE 6 AUDITORY CONTINUUM OF 12 VARIANT TYPES

For an example of each of the twelve categories see sound file *Total variants*.

3.11 Preliminaries to data analysis

When I had transcribed all the Read speech and the data from the map task (i.e. Casual speech) I then used two scripts, one for Read and one for Casual speech to extract the transcriptions, with all the coding, into spreadsheets. I examined them for each speaker to look at their distributions, and then collated the data into larger workbooks to create an overall spreadsheet for all the speakers, which allowed me to look at the data to answer such questions as:

- What are the variants used for /k/ overall?

- What is the distribution of variation according to: school year?

- What is the distribution of variation according to phonetic context e.g. preceding vowel? In a cluster?

- What is the distribution of variation according to position in turn?

- What is the distribution of variation according to ethnicity?

- What is the distribution of variation according to social class?

3.12 Summary

There is a distinct advantage of being a teacher when conducting a sociophonetic study such as this one and not just in terms of access to the participants. It was an important factor, especially in the collection of data for casual speech, that I already knew the pupils from working with them in class. The importance of having an already established rapport and trust with the participants lessened the significance of the observer's paradox and gave a more relaxed environment for them to speak freely and was more productive especially for the map task.

The investigation into the role of ethnicity in this study was one of the main motivational factors for pursuing this study, as my initial impressions were that Glaswegian Asian pupils

used more ejectives or certainly a different quality of ejective, but this was variable between speakers and within speakers too. This variation of /k/ between Glaswegian Asian and Glaswegian speakers was one that made me notice the use of ejectives within the classroom and it was important to set up the study to look at the inter- and intra-relationships between ethnic groups.

The choice to group pupils according to their DEPCATs rather than into a MC/WC divide seems to be the most convenient for studies in Glasgow due to the high number of the population who are from the lower end of the socio-economic scale. Grouping the pupils this way was a more suitable method of classification and allowed for more flexibility and manageability with the data.

Overall twelve variants of /k/ were identified which was quite an interesting range and gives rise to questions relating to understanding the phonetic and social factors that promote these variants, especially the variety of ejectives .

4. Results

4.1 Chapter overview

This chapter presents the results of the research and examines the factors – phonetic, prosodic, and social – that promote or constrain the realization of ejectives. The distribution of /k/ variants was tested using Chi-square test and where a significant difference was found, this was pursued further to explore all other fundamental factors that may also influence ejective realization. For example if the chi-square test indicates a significant difference in the distribution of variants across Read and Casual speech, then this would be further broken down and analysed to look at differences in age in Read and Casual speech, difference in ethnicity in Read and Casual speech etc.

The results are organized into three distinct parts based on the factors that are believed to constrain or promote ejective realization. The first part deals with the distribution of variation with the Phonetic Context, examining how preceding consonants and vowels can affect the presence or absence of ejectives. The second part is an analysis of the main effects of the distribution and the third, and final, part examines the linguistic and social factors that constrain or promote ejective use.

The findings that are presented are those which, following testing, were found to be significant. At the end of each part, a summary is provided to highlight the most important findings from the analyses.

4.1.1 Overall range of phonetic variation for /k/

In total the 28 speakers produced 1314 tokens across both styles. This was made up of 530 tokens in Read speech and 784 in Casual speech. It was clear that across all the tokens there was an effective auditory continuum which my fine phonetic transcription divided up, categorizing the variants of /k/ produced by the speakers into 12 different types as outlined in Table 7 below.

Range of variants	/k/ variant	Symbol
1	Glottal	ʔ
2	Unreleased stop	k̚
3	Voiceless velar plosive	k
4	Strongly aspirated plosive	kʰ
5	Voiceless velar fricative	x
6	Weak ejective	k̬ʼ
7	Strong ejective	kʼ
8	Intense ejective burst	kˮ
9	Velar ejective affricate	kxʼ
10	Closure + ejective	kʼ
11	Long closure + ejective	kːʼ
12	Any other misc sound/poor quality recording.	other

TABLE 7 OVERALL VARIANTS OF /K/ PRODUCED BY THE SPEAKERS

Table 8 below shows the distribution of these 12 variant categories as raw counts. Chart 1 shows the distribution as proportions of the overall realization of /k/.

Overall raw data	kʔ	k̚	k	kʰ	x	k̬ʼ	kʼ	kˮ	kxʼ	kʼ	kːʼ	other	TOTAL
Read	17	18	59	25	49	153	181	18	4	6	0	0	530
Casual	76	22	122	25	21	303	157	20	25	8	1	4	784

TABLE 8 OVERALL RAW TOKEN COUNT FOR ALL VARIANTS

The distribution was tested using Chi-square testing (the [kːʼ] and 'other' category were not included in the test due to the low distributions) and the results were found to be very significant: $(X^2(9, N=1309) = 93.625, p < 0)$. This distribution shows that across both Read and Casual speech ejective distribution is quite high, with the majority of the distribution concentrated in the Weak [k̬ʼ] and Strong ejective [kʼ] category.
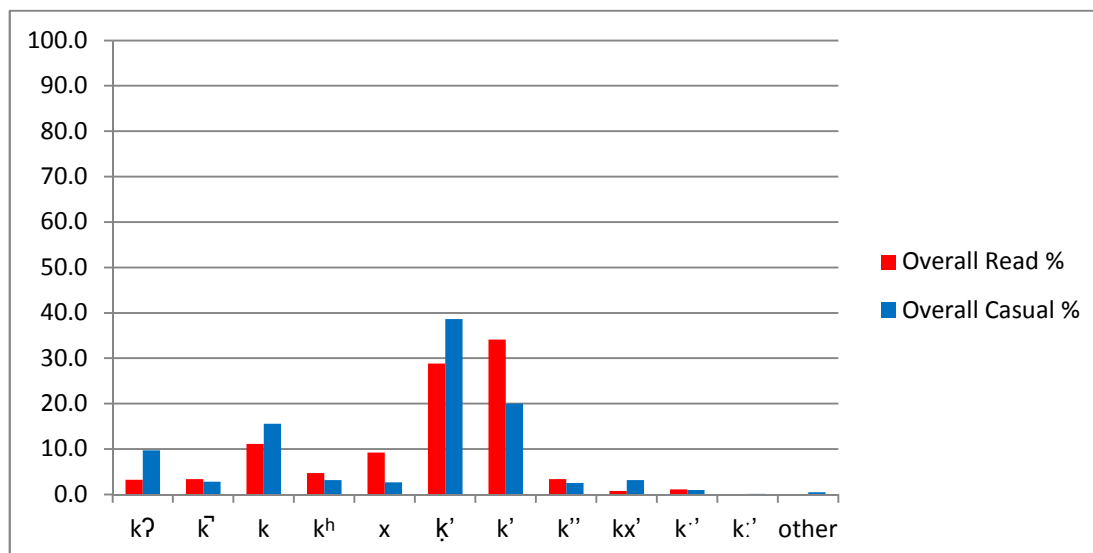
CHART 1 OVERALL DISTRIBUTION OF VARIANTS IN READ AND CASUAL SPEECH

As can be seen from this figure, ejectives are very common, accounting for 68% of the variation for Read speech and 62% of the total variation for Casual speech.

Weak ejectives [ḳ'] in Casual speech account for 29% of the total distribution, which is 10% greater than those produced in Read speech. However, the speakers produced 14% more Strong ejectives [k'] in Read speech than in Casual speech (34% V 20%). Ejectives with an intense burst [k''] and those with a long closure [kː'] were also marginally greater in Read speech than in Casual speech.

/k/ is produced as a glottal variant three times more in Casual speech than in Read speech (9% V 3%). Voiceless velar stops are more frequent in Casual speech, yet in its aspirated variant it has a 2% greater frequency in Read speech.

4.1.2 Variant categories for /k/

As mentioned already it was decided to further collapse down the 12 distinct types that equate to the range of variants found for /k/ amongst the speakers. The range was collapsed into four types based on those places with the greatest frequency distribution of /k/ variants. This allowed for better workability with the data. The four types are:

1. Glottal ([ʔ])
2. Voiceless Velar Stop (which includes both [k] and the aspirate form [k']
3. Weak ejective ([ḳ'])

4. Strong ejective (which includes [kʼ] [kʼ̈] [kʼ] [kʼ̈])

Table 9 shows the variation according to these larger categories.

	Glottal	Voiceless velar stop	Weak ejective	Strong ejective	Total
Read speech	17	84	153	203	457
Read %	3.7	18.3	33.5	44.4	100
Casual speech	76	147	343	187	753
Casual %	10.0	19.5	45.5	24.8	100
Overall % Types	7.6	19.0	40.9	32.2	100

TABLE 9 RAW TOTAL AND PERCENTAGES FOR VARIATION OVERALL

The table shows that overall ejectives account for 74% of the overall distribution of variation of /k/. This is comprised of 42% Weak ejectives and 32% Strong ejectives. Out of the 1210 tokens across all types only 93 are realised as glottals which equates to just under 8% of the overall total. Voiceless velar stops account for 19% of the overall distribution of variation.

4.1.3 Summary of range of variation for /k/

A fine phonetic transcription of the 1314 tokens obtained for analysis categorized them into 12 distinct types along an effective auditory continuum. The 28 speakers produced 530 tokens in Read speech and 784 in Casual speech.This distribution showed that ejective distribution is quite high across both Read and Casual speech, with the majority of the distribution concentrated in the Weak [kʼ̣] and Strong ejective [kʼ] category. Across the 12 different categories, weak ejectives are greater in Causal than in Read speech, but Strong ejectives greater in Read speech.

When the categories were collapsed down into four distinct types, it was highlighted that Weak ejectives were about 10% more prominent than Strong ejectives overall. And overall ejectives were used more in Read speech than in Casual speech.

4.2 Style

The distribution of variants for Read and Casual speech were tested and the results showed that they were very significant: $(X^2(3, N=1210) = 59.182, p < 0)$. Chart 2 below shows the total distribution of /k/ variants across style.
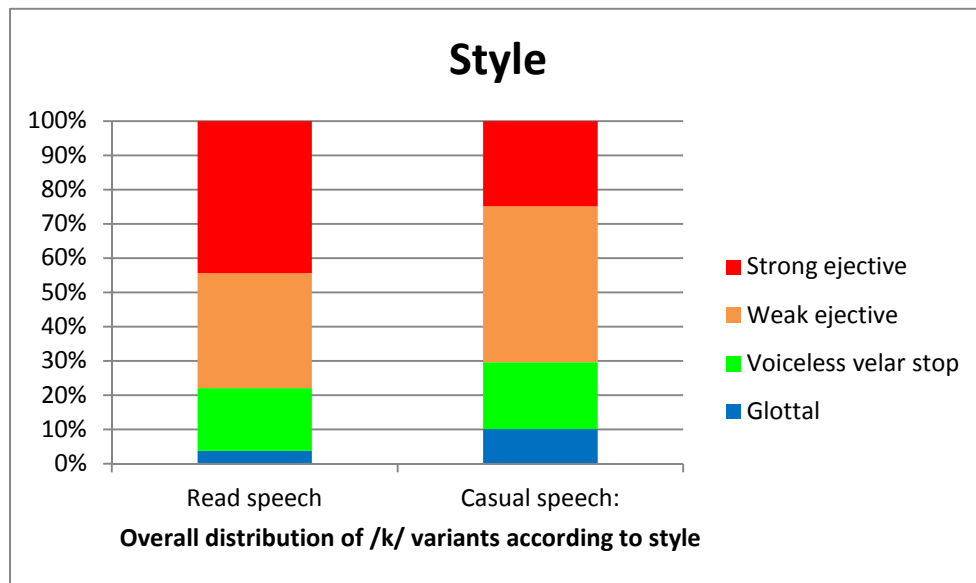
CHART 2 TOTAL DISTRIBUTION OF /K/ VARIANTS ACROSS STYLE

Read speech has 78% ejectives overall, 8% more than Casual speech. Strong ejectives are greater in Read speech also, accounting for 44% of the total distribution of /k/. In contrast, Strong ejectives make up just 25% of all /k/ variants in Casual speech. As expected, glottals are less prominent in Read speech than in casual speech (4% V 10%).

4.3 Phonetic Context

There is no significant difference overall for the vowels, however the results for clusters were marginally significant: $(X^2(3, N=449) = 7.941, p=0.0472$. The result shows that the –ŋk cluster has a greater distribution of ejectives overall.

Chart 3 below shows the overall phonetic context for all variants.
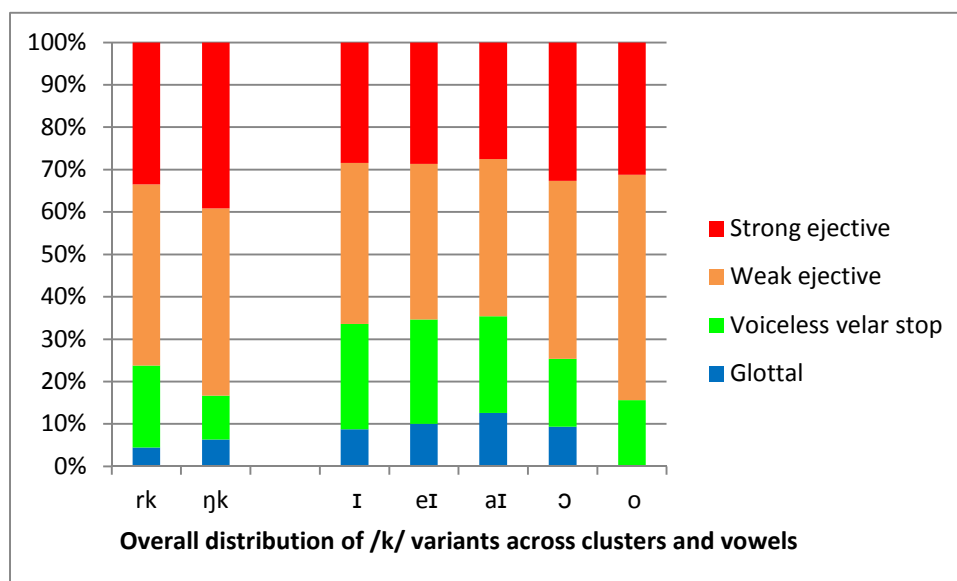
CHART 3 OVERALL PHONETIC CONTEXT FOR ALL VARIANTS

The –ŋk cluster promotes 8% more ejectives than the –rk cluster.

There is a trend however in the vowels that shows a pattern of greater ejective realization as the context moves from the front to the back vowels.

4.3.1 Read Speech

There is a significant difference among the consonant cluster context: $(X^2(2, N=198) = 6.6631, p=0.0357)$. The overall distribution of /k/ variants for Read speech shows that the -ŋk cluster has the highest distribution of ejectives – 90% with 50% of these being Strong ejectives. The –rk cluster also has a quite high overall distribution of ejectives 76% overall with 41% of these being Strong ejectives. Overall there is no significant difference for the vowel context, however, it is clear that there is a trend taking place with a "rise-fall" pattern for ejectives and velar stops in vowels from diphthong [eɪ] to the high mid back rounded vowel [o].

Read Speech

Legend:
- Strong ejective
- Weak ejective
- Voiceless velar stop
- Glottal

X-axis: rk, ŋk, READ ɪ, READ eɪ, READ a, READ aɪ, READ ɔ, READ o

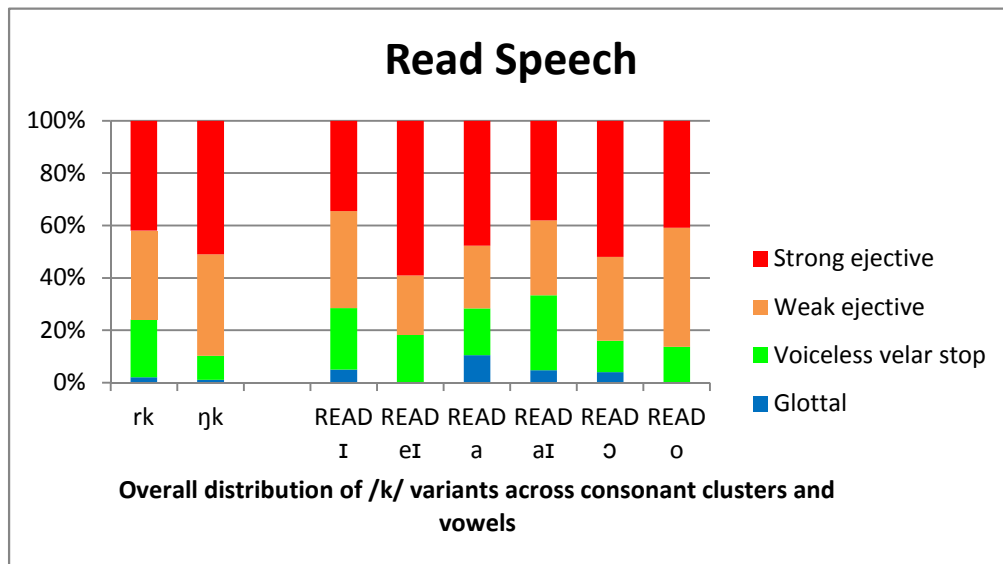**Overall distribution of /k/ variants across consonant clusters and vowels**

CHART 3.1 DISTRIBUTION OF /K/ ACROSS CONSONANT CLUSTER

4.3.2 Casual speech

Overall there is a significant difference between the consonant cluster contexts for Casual speech: (X^2(6, N = 320) = 12.89, p=0.044, while there is no significant difference for vowels. Ejectives again occur more when /k/ is in the -ŋk cluster with a 78% distribution of ejectives overall. This cluster also has the highest percentage of Strong ejectives across both consonants and vowels (30%). The –rk cluster follows closely with 76% overall ejectives distribution, 27% of these being Strong ejectives.

The results of the –sk cluster distribution are quite noteworthy as, out of a total of 66 tokens recorded, this context is 65% of the time an ejective. This is a very significant result in terms of our understanding of the phonetic contexts that constrain or promote ejectives as it dismisses the notion that ejectives do not follow voiceless sounds such as [s] (cf Ogden 2009:163).

Overall there is a far greater frequency of Strong ejectives within consonant clusters in Read speech than in Casual speech.

However, it is evidently apparent from Chart 3.2 that a clear pattern has emerged in terms of ejective frequency across the contexts from the near-high near-front unrounded vowel [ɪ] to the high mid back rounded vowel [o]. When tested there is a significant difference between both these vowels – (X^2(2, N = 98) = 6.75, p=0.034).

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It is clear that a very nice pattern has emerged which clearly illustrates an increase in ejective frequency from front to back vowels, indicating that ejective realisation has a preference for vowel contexts [ɪ] to [o], i.e. spanning from close to open unrounded front vowels and from open to close rounded back vowels.

The near-high near-front unrounded vowel [ɪ] precedes the lowest frequency of ejectives (59%) while the close-mid back unrounded vowel[o] precedes the highest frequency of ejectives (82%). The percentage frequency of Strong vowels is higher however for the low mid back rounded vowel [ɔ].

Overall there is a far greater frequency of Strong ejectives following vowel contexts in Read speech than in Casual speech.
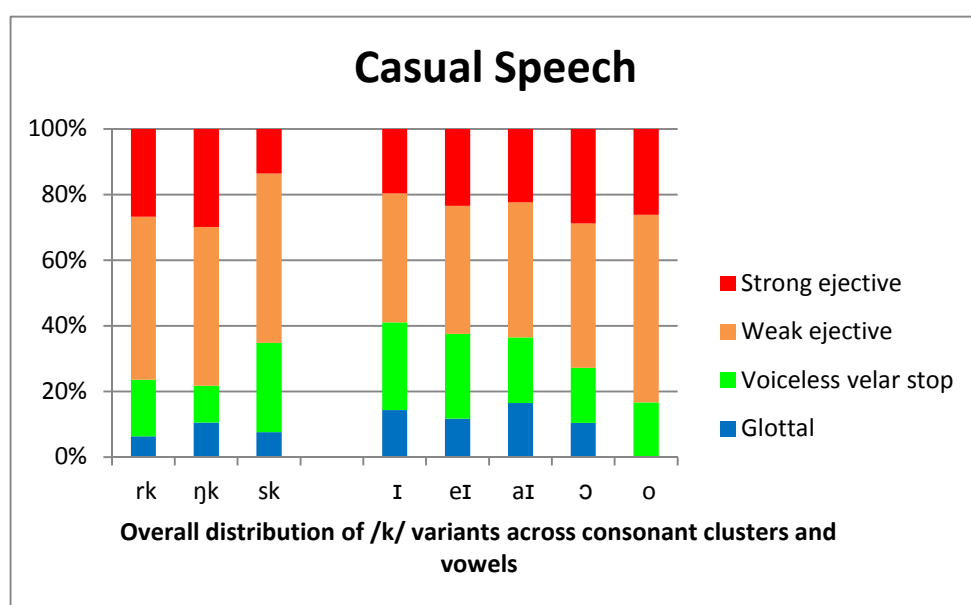

CHART 3.2 DISTRIBUTIONS OF VARIANTS ACROSS CLUSTERS AND VOWELS

4.3.3 Realization of /k/ according to phonetic context and style

The consonants clusters were tested and showed a significant result: $(X^2(6, N=449) = 22.129,$ p=0.0011), Chart 3.3 the result show that strong ejectives are found more in Read speech despite the cluster context.
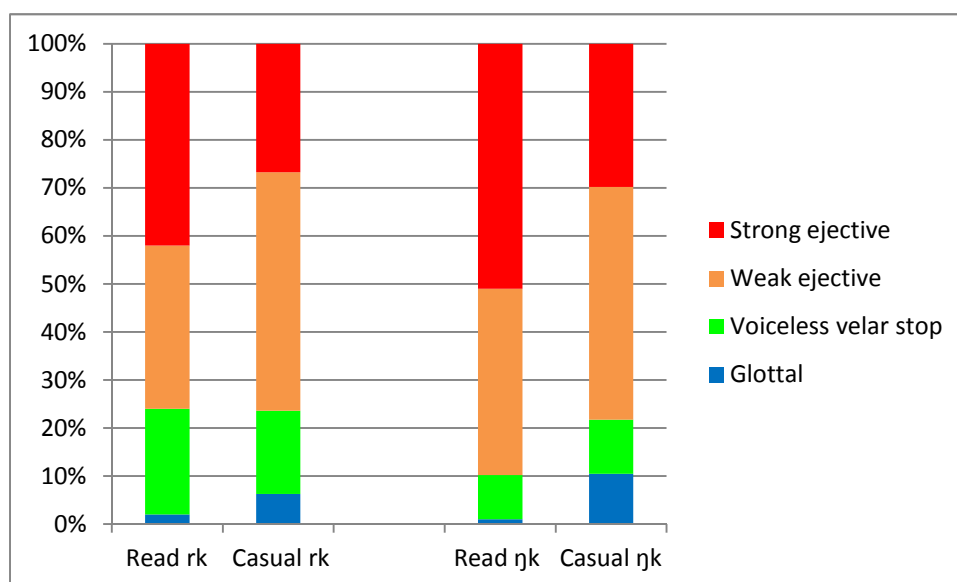
CHART 3.3 REALIZATION OF /K/ ACCORDING TO CLUSTER CONTEXT AND STYLE

The cluster –ŋk has a 12% greater distribution of ejectives in Read speech (90% V 78%). Likewise, Strong ejectives are much greater in Read speech for this cluster and are 20% higher than those in Casual speech. Glottals are also higher in Casual speech within this cluster context.

While the distribution of ejectives overall are equal across Read and Casual speech (76%) for the –rk cluster, there is a greater distribution of Strong ejectives for Read speech than Casual speech (42% V 27%). Glottals are more are also higher in Casual speech in this cluster context.

Chart 3.3 illustrates the differences in vowels across styles:

CHART 3.3 VOWEL DIFFERENCES ACROSS STYLE

In addition the vowels also returned a significant result: (X^2(18, N=628) = 53.066, p < 0). All vowels have a greater distribution of ejectives in Read speech than in Casual speech. Furthermore, the frequency of Strong ejectives is also higher across Read speech.

Where glottals appear following a vowel context – namely [ɪ] [eɪ] [aɪ] and [ɔ] – they all have a higher frequency in Casual speech. The only vowel context that does not precede any glottals is [o].
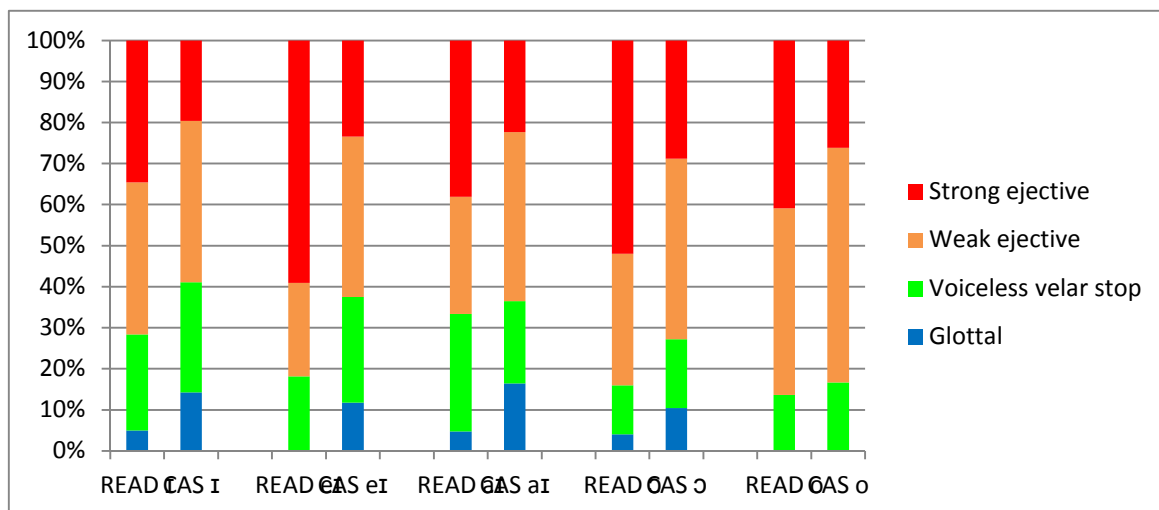
4.4 Position in Turn

In addition to examining phonetic context, the tokens were analysed in terms of prosodic turn-taking in Casual speech. Because ejectives are reported anecdotally to occur word finally and phrase finally in some dialects of English (Aarts and MacMahon 2006 -cf. Ashby and Maidement 2005:107, Ladefoged 1993:131, Cruttenden 2001, Roach 2001:23, Simpson 2010) and in Scottish English (Gordeeva & Scobbie 2006, Macafee 1983, Lambert, Alam and Stuart-Smith 2007). The distribution of /k/ variants among all speakers were analysed according to turn in Casual speech and categorised according to their position within the turn.

There are three categories: namely /k/ variants that appear:
1. Turn finally i.e. at the end of speakers sentence or utterance and before the other speakers' turn.

2. End of clause/sentence.

3. within turn (anywhere else within a sentence or an utterance)

The distribution of variants was tested and the results were shown to be very significant: (X^2(6, N=751) = 55.72, p=3E-10) see chart 4. Ejectives are much more likely to occur when syllable final /k/ is in a word which is turn-final or at the end of clause/sentence.

Turn

Overall distribution of /k/variants according to turn.
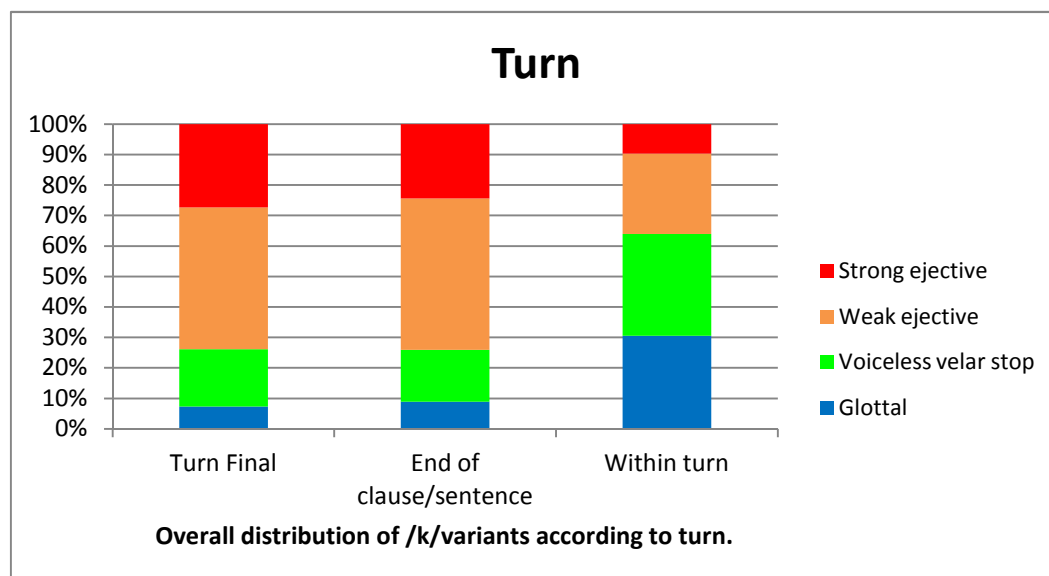
CHART 4 DISTRIBUTION OF VARIANTS ACROSS TURN

The frequency of ejectives occurring in the Turn Final and End of clause/end of sentence positions are both equally distributed, accounting for 74% of the total /k/ variants. There is a higher percentage frequency distribution of Strong ejectives however in the Turn Final position and also interestingly there is fewer glottals in this position.

Within the turn - as expected – there is a low number of ejectives but it does account for about 35%. There a higher number of glottals in this position, accounting for just over 30% of all variants.

4.5 Age

Chart 5 below shows a comparison between age groups of the total distribution of variants across all tokens. When tested the differences were not found to be significant.
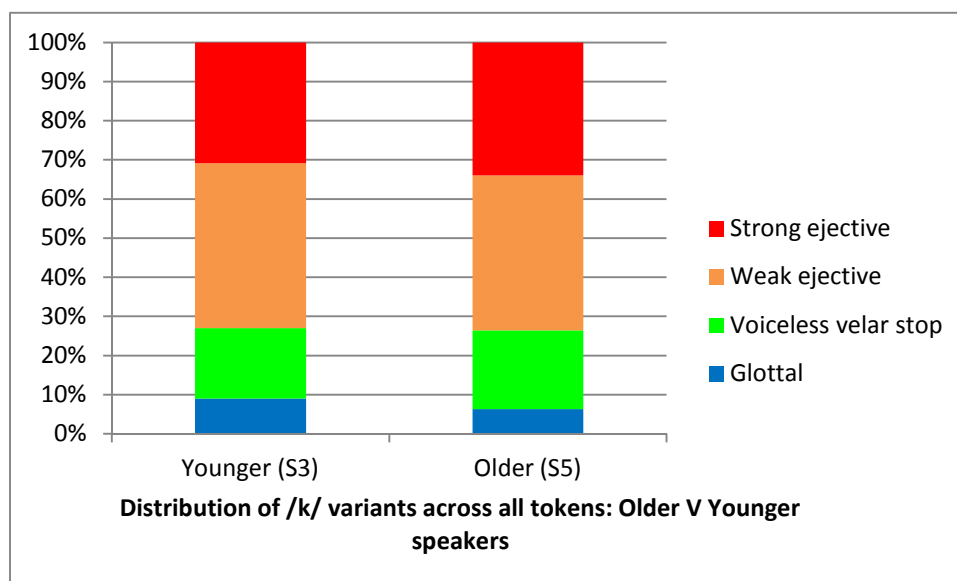
CHART 5 OVERALL COMPARISON BETWEEN AGE

4.5.1 Age and style

The distribution of /k/ variants were tested in Read speech across age groups and found to be significant: (X^2(3, N=459) = 8.457, p=0.0374), while the distribution of variants in Casual speech across age was found not to be significant. The result shows that older speakers use more ejectives than younger speakers, but only in Read speech.
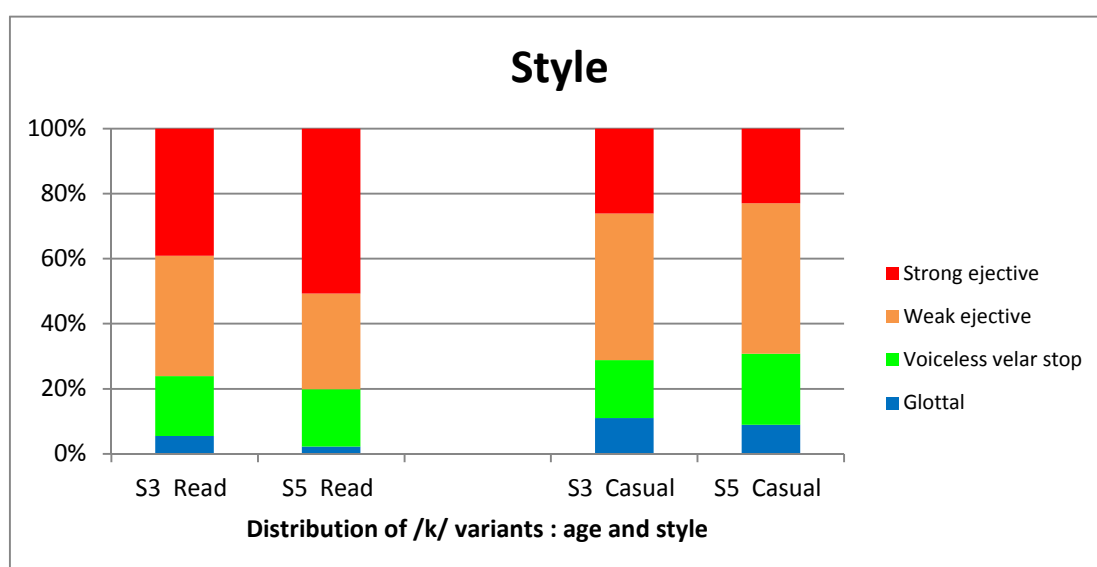
CHART 5.1 AGE AND STYLE

In Read speech, the older (S5) speakers have a greater overall distribution of ejectives compared to the younger (S3) speakers (76% V 69%). Strong ejectives are also 10% higher among older speakers who have a 50% percentage distribution.

The younger speakers' distributions of glottals are higher than the older speakers' distribution.

4.6 Social category

Chart 6 below shows a comparison between DEPCATs of the total distribution of variants across all tokens. When tested the differences were not found to be significant.
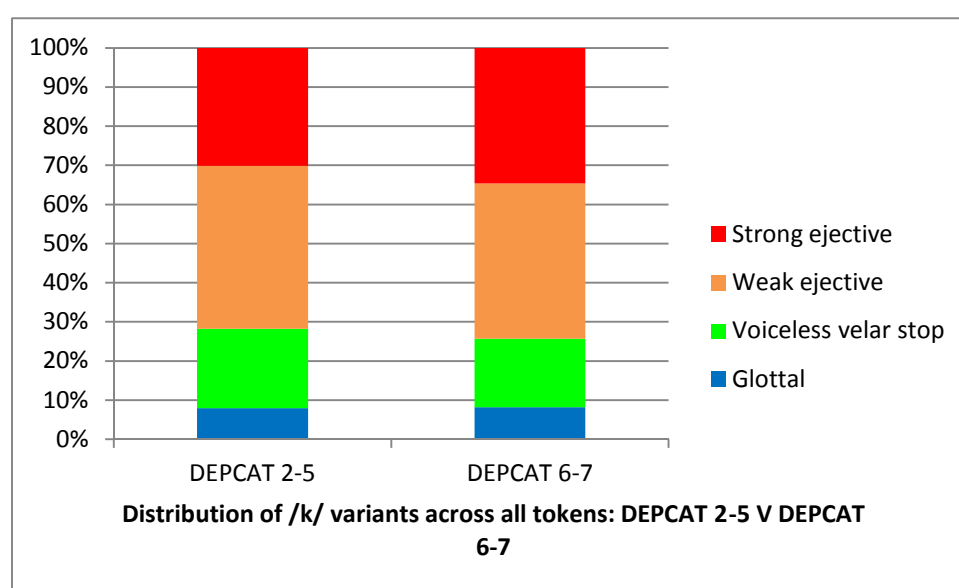
CHART 6 COMPARISON BETWEEN DEPCATS

4.6.1 Social category and style

When distributions for Read speech and Casual speech were tested, they were not found to be significant; however there is an intriguing trend that highlights a pattern that girls in DEPCAT 6-7 are using more Strong ejectives in Read speech.
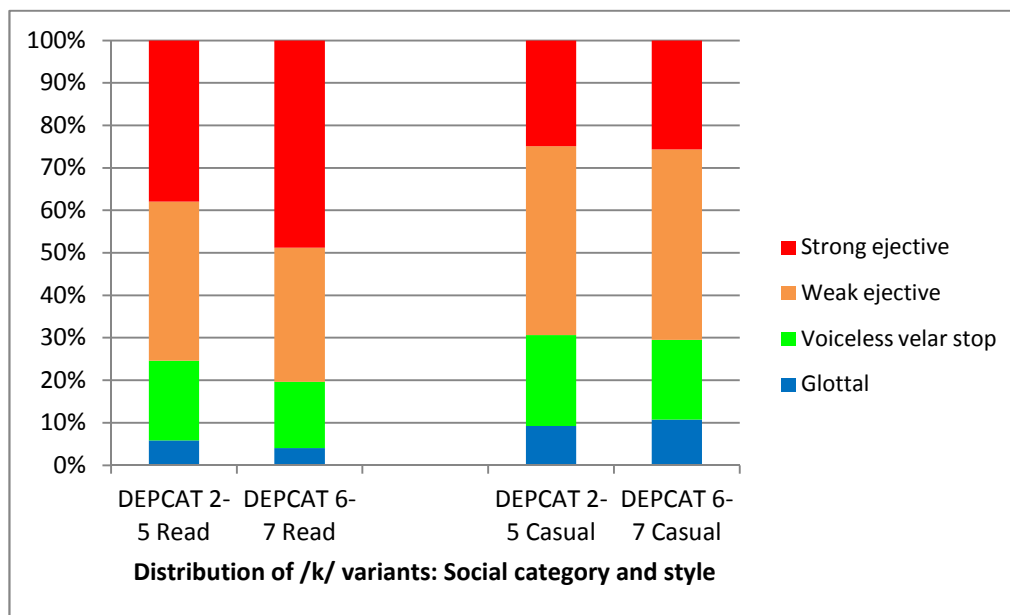
CHART 6.1 DISTRIBUTION OF VARIANTS: SOCIAL CATEGORY AND STYLE

In Read speech Strong ejectives are 10 % higher in DEPCAT 6-7, accounting for 49% compared with 39% for DEPCAT 2-5.

4.7 Ethnicity

The overall distribution of variants for all tokens according to ethnicity was tested and found to be significant: $(X^2(3, N=1245) = 22.02, p < 0)$. Glaswegian speakers use more ejectives than Glaswegian Asian speakers.
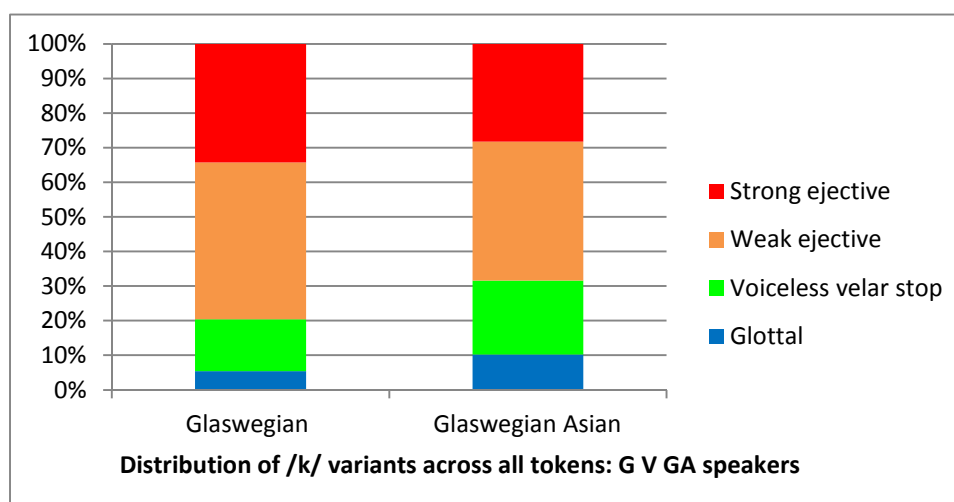
CHART 7 DISTRIBUTION OF VARIANTS ACROSS ALL TOKENS: GV GA SPEAKERS

Glaswegian speakers use over 10% more ejectives overall compared with Glaswegian Asian speakers. Glaswegian speakers also use more strong ejectives. On the other hand, Glaswegian Asian speakers use more glottals and velar stops overall.

4.7.1 Ethnicity and style

The distribution of variants for Read speech was tested and found to be significant: (X^2(3, N=493) = 29.54, p < 0). The distribution of variants for Casual speech was not found to be significant. The results show that Glaswegians use more ejectives than Glaswegian Asians, but only in Read speech.
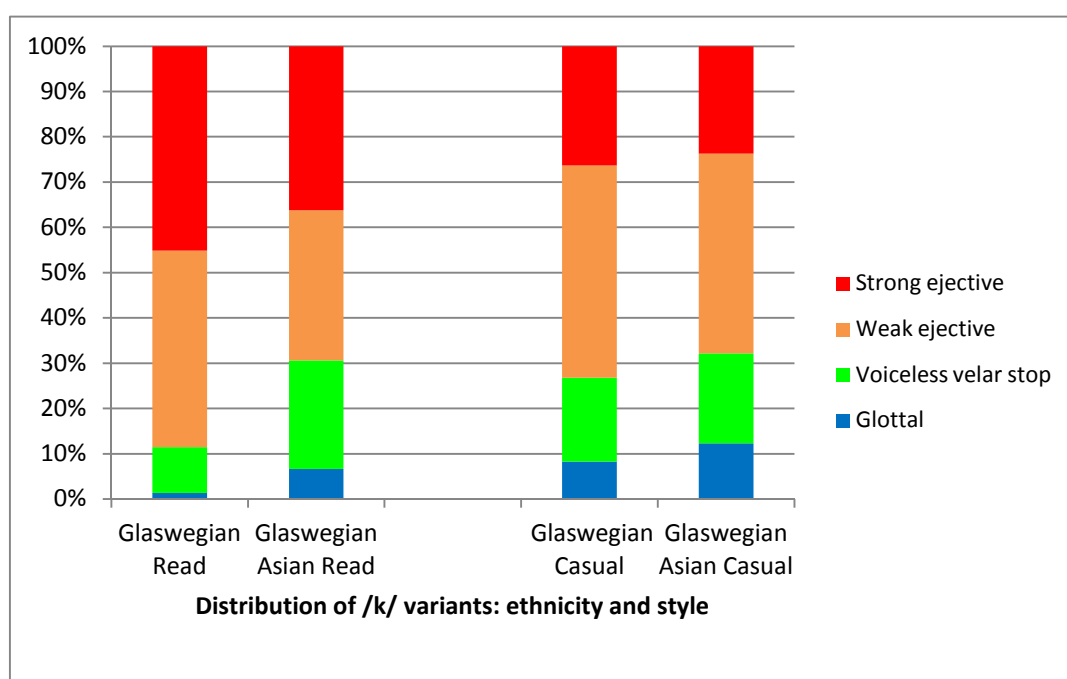
CHART 7.1 DISTRIBUTION OF VARIANTS: ETHNICITY AND STYLE

In Read speech Glaswegian speakers have a 20% greater distribution of ejectives overall (89% V 69%). In addition their distribution of Strong ejectives is also higher accounting for 45% compared with 37% for Glaswegian Asian speakers. Glaswegian Asian speakers have, however, a higher distribution of glottals in Read speech.

4.8 Summary of main effects

- With regard to style, ejectives are greater overall in Read speech than in Casual speech with Read speech producing almost 20% more Strong ejectives than casual speech.

- In terms of phonetic context, the result shows that the –ŋk cluster has a greater distribution of ejectives overall. However, the overall distribution indicates that vowels are not significant, though there is a trend which indicates that ejectives have a preference for the back vowel contexts. When this is broken down into Read speech the –ŋk has the highest distribution of ejectives and although there is no significant difference in vowels, a trend indicates a 'rise-fall' pattern, with the back vowel preceding the highest distribution of ejectives out of all the vowels. In casual speech the –ŋk and –rk context have a similarly high distribution of ejectives. The distribution of variants following vowels is significant and a nice pattern has emerged which again illustrates an increase in ejective frequency from front to back vowels, Once more this suggests that ejective realisation has a preference for vowel contexts [ɪ] to [o], i.e. spanning from close to open unrounded front vowels and from open to close rounded back vowels. Overall there is a far greater frequency of Strong ejectives within consonant clusters in Read speech than in Casual speech and overall there is a far greater frequency of Strong ejectives following vowel contexts in Read speech than in Casual speech.

- Within the consonant cluster context, /k/ is realized more as an ejective in Read speech than in Casual speech. Vowels precede a greater distribution of ejectives in Read speech also.

- The results show that ejectives are much more likely to occur when syllable final /k/ is in a word which is turn-final or one that occurs at the end of a clause/sentence. Glottals are more frequent within the turn although ejectives do make up 35% of the overall distribution of variants within the turn.

- Older speakers use more Strong ejectives than younger speakers in Read speech.

- While there is no significant difference for social category and style, there is a trend that girls in DEPCAT 6-7 use more Strong ejectives in Read speech.

- Glaswegian girls use over 10% more ejectives overall than Glaswegian Asian girls. Glaswegian Asian girls use more glottals. Glaswegians use more ejectives than Glaswegian Asian girls but only in Read speech.

4.9 Phonetic context and social factors

The main findings for phonetic context showed that vowels were not significant overall in Read or Casual speech, although trends indicate a pattern that ejectives have a preference for the back vowels. The –ŋk cluster has the highest distribution of ejectives within the clusters in both Read and Casual speech.

4.9.1 Phonetic Context and Age

Age was tested across all phonetic contexts and styles and was found to be only significant for clusters in Read speech: $(X^2(6, N=199) = 13.572, p=0.0348)$, see Chart 8
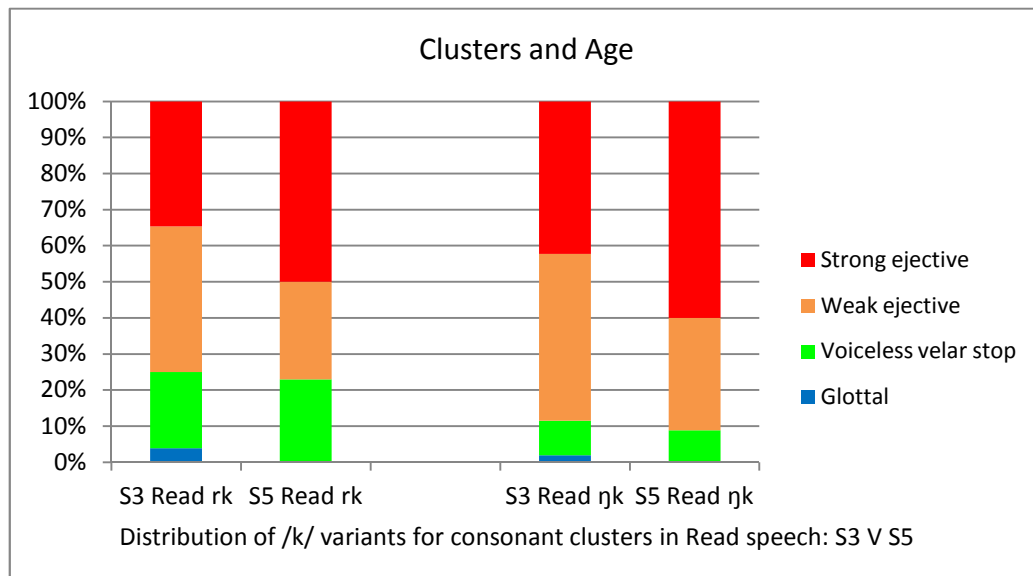
CHART 8 DISTRIBUTION OF VARIANTS FOR CONSONANT CLUSTER

The older S5 speakers use more ejectives across both consonant clusters. In the –rk context S5 speakers have a 76% distribution of ejectives overall, 2% more than the younger S3 speakers.

The older S5 speakers have a wider margin of Strong ejectives in this context – 50% V 34%. The younger S3 speakers produce glottals, while the older S5 speakers do not.

Similarly, in the –ŋk context there is again a 2% difference in the distribution of ejectives overall with S5 speakers again having the greatest frequency. Likewise, the older S5 speakers show a greater distribution of Strong ejectives in this context: 60% V 41%. Again, the younger S3 speakers produce glottals in this context, while the S5 speakers do not.

–ŋk cluster promotes a much greater frequency of ejectives overall.

4.9.2 Phonetic Context and Social Category

DEPCATs were tested across all phonetic contexts and were found to be only marginally significant for clusters in Read speech: $(X^2(6, N=195)=12.172, p=0.058)$. DEPCAT 6-7 use more ejectives in the cluster context; see Chart 8.1
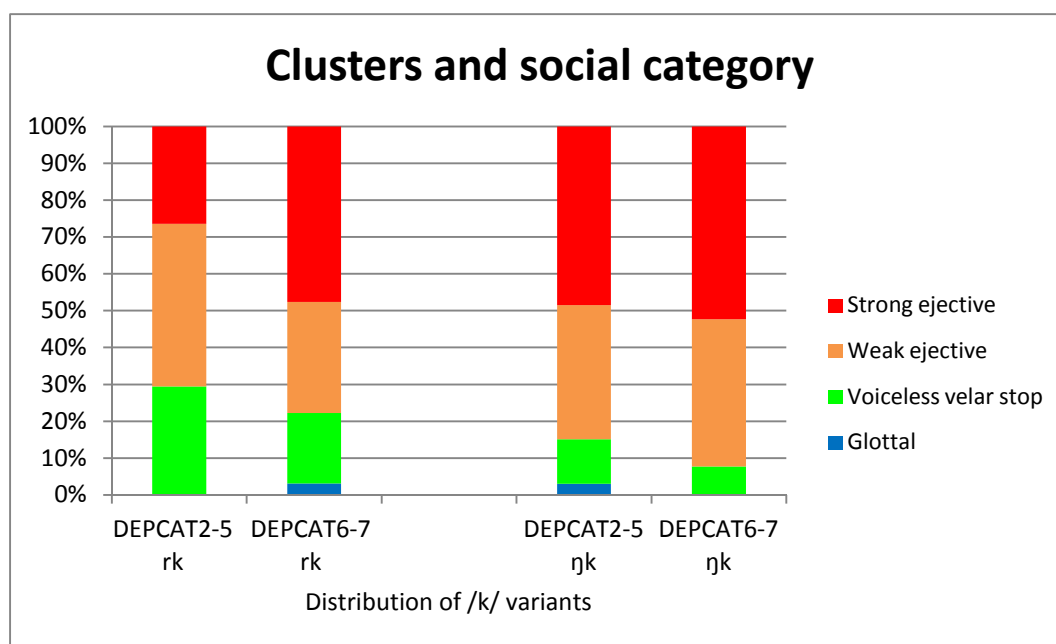
CHART 8.1CLUSTER CONTEXT AND SOCIAL CATEGORY

The –rk cluster has a greater distribution of ejectives in DEPCAT 6-7 with a significantly greater distribution of Strong ejectives: 48% V 26%.

In the –ŋk cluster DEPCAT 6-7 also has a higher distribution of ejectives overall including Strong ejectives. DEPCAT 6-7's overall distribution of Strong ejectives is greater than its distribution of Weak ejectives.

4.9.3 Phonetic Context and Ethnicity

Ethnicity was tested across all phonetic contexts and styles and was found to be only significant for clusters in Read speech: $(X^2(6, N=196) = 14.764, p=o.0222)$. The results show that Glaswegian speakers use more Strong ejectives overall than Glaswegian Asian speakers.
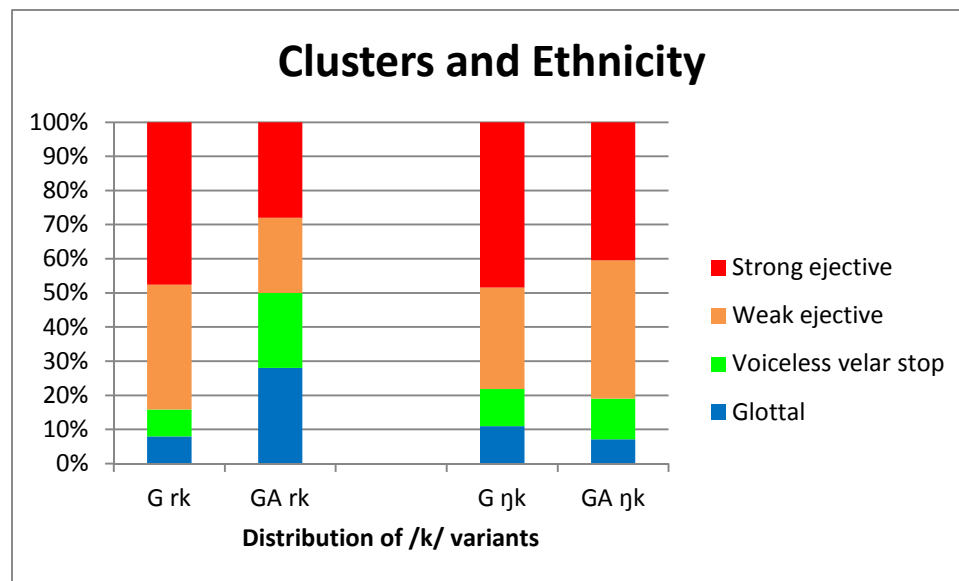
CHART 8.2 PHONETIC CONTEXT AND ETHNICITY

Glaswegian speakers use significantly more ejectives overall in the –rk cluster context: 88% V 50%; see chart 8.2. This also hold true for the use of Strong ejectives: 48% V 28%. Glaswegian Asian speakers use a relatively high number of glottals compared to the Glaswegian speakers in this context 28% V 8%.

In the –ŋk context the Glaswegian Asian speakers use marginally more ejectives than the Glaswegian speakers: 78% V 81%, however Glaswegian speakers use more Strong ejectives. In this context Glaswegian speakers also use more glottals.

4.9.4 Summary of findings for Phonetic Context

Only clusters were found to be significant for phonetic context. While the main effects (section 4.5.1) showed that older speakers use more Strong ejectives than the younger speakers in Read

speech, within phonetic context and age the pattern was similar. The older speakers were found to use more ejectives overall, and produced an average of 20% more Strong ejectives in both the –rk and –ŋk contexts.

Furthermore, within the main effects for social category and age (4.6.1) although no significant difference was found, there was a trend that speakers in DEPCAT 6-7 used more Strong ejectives in Read speech than the speakers in DEPCAT 2-5. Likewise, a significant difference was found within phonetic context and social category, with speakers in DEPCAT 6-7 producing more ejective overall and more Strong ejectives compared with those speakers in DEPCAT 2-5.

Glaswegian speakers were found to use 10% more ejectives than Glaswegian Asian speakers overall with Glaswegian Asian speakers using more glottals (4.7).when this was broken down into style, Glaswegians were found to produce more ejectives than Glaswegian Asian speakers but only in Read speech (4.7.1). Within phonetic context and ethnicity, Glaswegian speakers were found to use more Strong ejectives than Glaswegian Asian speakers overall. Moreover, it was found that Glaswegian Asian speakers produced 20% more glottals within the –rk cluster than Glaswegian speakers.

4.10 Position in Turn and social factors

4.10.1 Position in Turn and Age

The distributions of variants across both age groups were then tested for differences and gave a very significant result: $(X^2(15, N=750) = 71.572, p<0)$. The results clearly show a significant difference according to where the variants are; see Chart 9 below:
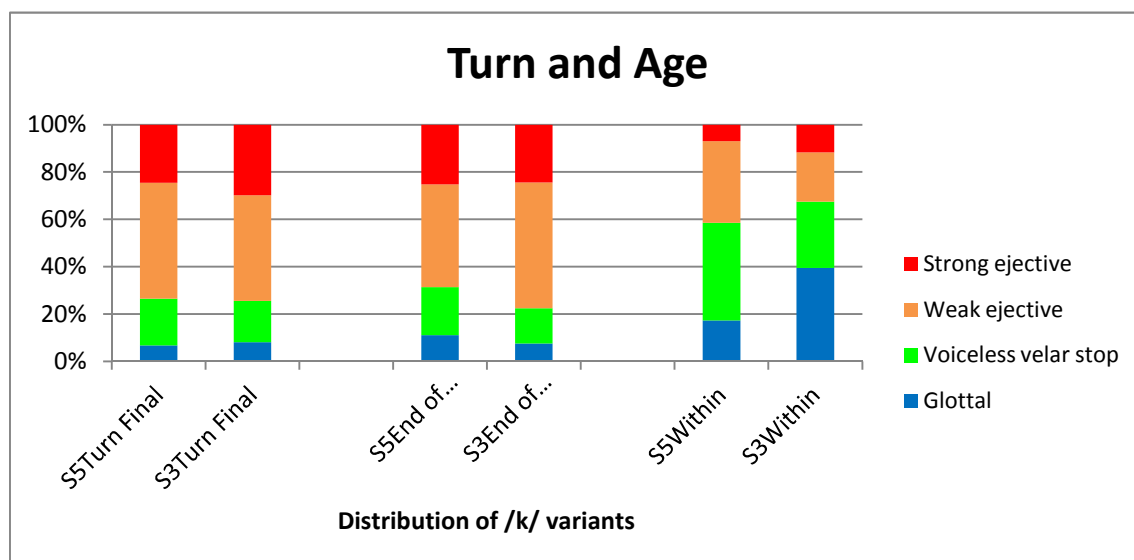
CHART 9 POSITION IN TURN AND AGE

In the Turn final position both age groups showed a similar distribution of ejectives overall (74% V 73%).

In the end of clause/sentence position, the younger S3 speakers again have a greater distribution of ejectives overall – 78% V 69%, while there is a similar distribution of Strong ejectives in this position among both younger and older speakers.

In the Within Turn position the older S5 speakers use 12% more ejectives than their S3 counterparts but have less Strong ejectives. The Within turn position has the highest frequency of glottals across the three turns and the younger S3 speakers have a noticeably higher percentage (40%) distribution of glottals compared with the older S5 speakers (17%).

4.10.2 Position in Turn and Social category

The distributions of variants across both DEPCATs were then tested for differences and were show to be significant: $(X^2(15, N=733) = 81.581, p=4E-11)$. The results show that speakers in DEPCAT 6-7 use more ejectives overall in the Turn final position and also significantly more glottals within the turn; see Chart 9.2
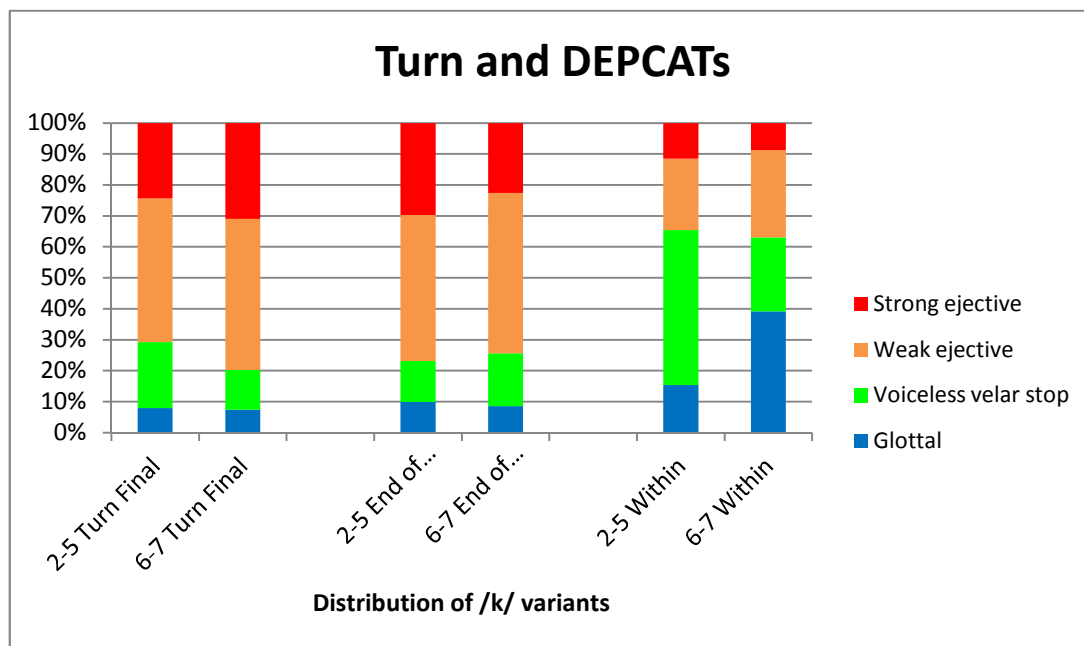
CHART 9.2 POSITION IN TURN AND SOCIAL CATEGORY

In the Turn final position speakers in DEPCAT6-7 produce 10% more ejectives overall and also more Strong ejectives.

In the End of clause/sentence position speakers in DEPCAT2-5 have a marginally greater percentage of ejectives overall. In addition, they have a higher distribution of Strong ejectives (30% V 23%).

The trend of a relatively high distribution of glottals within the turn continues with DEPCAT6-7 producing 39% of glottals in this position compared with 15% glottals for DEPCAT2-5. The distribution of ejectives is relatively even..

4.10.3 Position in Turn and Ethnicity

The distribution across both ethnic groups were tested for differences and returned a significant result: $(X^2(15, N=733) = 81.581, p < 0)$. The results show that Glaswegian speakers produce more ejectives in the End of clause/sentence position and while Glaswegian Asian speakers use more glottals Turn finally and in the end of clause/sentence position, Glaswegian speakers use a much greater number of glottals within the turn, see chart 9.3 below
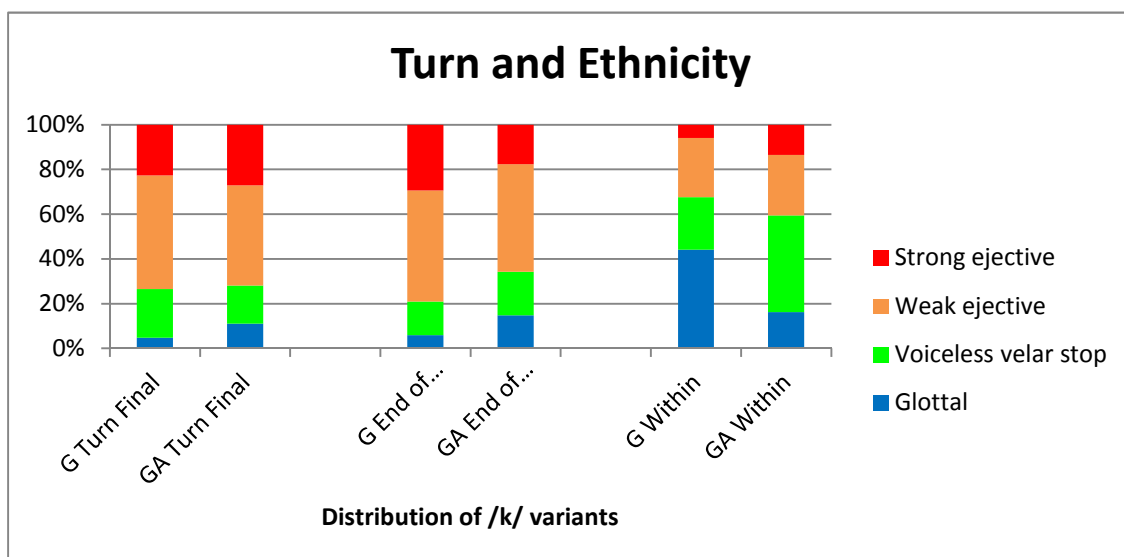
CHART 9.3 POSITION IN TURN AND ETHNICITY

The distribution of ejectives remains quite similar in the Turn final position; the Glaswegian Asian speakers use more glottals in this position.

Similarly, in the end of clause/sentence position, the Glaswegian speakers use more ejectives overall (13% more) – including more strong ejectives. The Glaswegian Asian speakers again have a higher percentage distribution of glottals in this position.

However, a very interesting find is that within the turn, the Glaswegian Asian speakers have a higher distribution of ejectives compared to the Glaswegian speakers (41% V 32%). In addition, it is clearly seen that the Glaswegian speakers have a noticeably high distribution of glottals in this position – 44% overall.

4.10.4 Summary of findings for Position in Turn

The main effects of turn (4.4) showed ejectives are much more likely to occur when syllable final /k/ is in a word which is turn-final or at the end of clause/sentence. Glottals are more frequent within the turn and ejectives account for 35% of the overall distribution of variants within the turn also.

The distribution of variants across position in turn and age found that there was a similar distribution of ejectives among the ages turn finally. While there were also similar percentage distributions of Strong ejectives in the end of clause/sentence position, the younger S3 speakers use more ejectives in this position. The older speakers use more ejectives than the younger speakers within the turn but use marginally less Strong ejectives. The younger speakers use 23% more glottals than the older speakers in this position also.

The distribution of variants across position in turn and social category show that speakers in DEPCAT 6-7 use more ejectives overall in the Turn final position, and also significantly more glottals within the turn.

In addition, the results of the distribution of /k/ variants across position in turn and ethnicity show that Glaswegian speakers produce more ejectives in the End of clause/sentence position and while Glaswegian Asian speakers use more glottals Turn finally and in the end of clause/sentence position, Glaswegian speakers use a much greater number of glottals within the turn.

4.11 Social factors and Style

The results for the younger S3 speakers were not significant so this section deals with the results for the older S5 speakers.

4.11.1 Age and Style

The older S5 speakers use more ejectives overall in Read speech – 80% in total. Strong ejectives also account for 50% of the total distribution
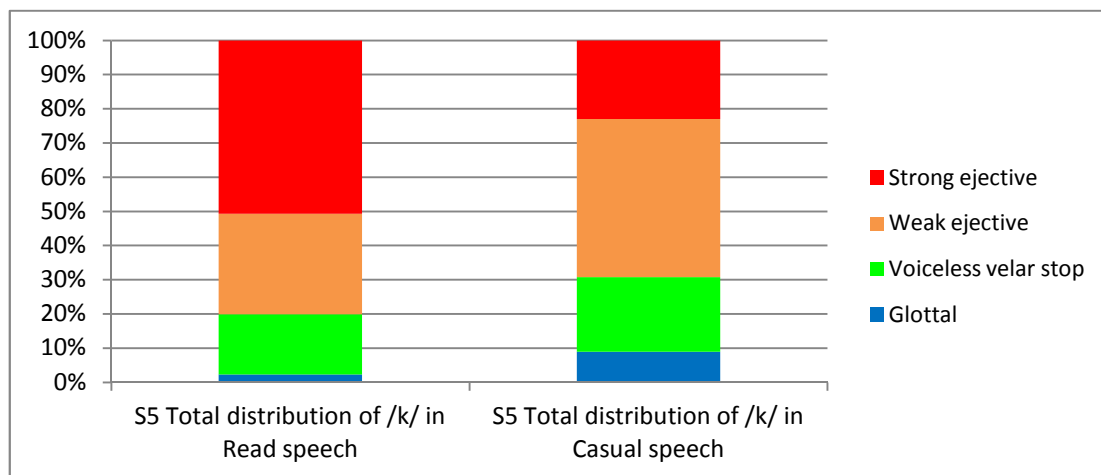
CHART 10 AGE AND STYLE

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4.11.2 Age and Ethnicity

When tested the distribution of variants across ethnicity for S5 speakers was not found to be significant in Read speech, whereas in Casual speech it was significant: $(X^2(3, N=335) = 15.969, p=0.0012)$. Ethnicity is a significant social factor among the older speakers with S5 Glaswegians using more ejectives overall than S5 Glaswegian Asian speakers in Casual speech.

CHART 10.1 AGE AND ETHNICITY

In the older speakers (S5), ethnicity is a significant social factor in the production of ejectives with Glaswegian speakers producing more ejectives overall (including Strong ejectives) compared with their Glaswegian Asian counter parts. Again as seen before in the results for Turn, Glaswegian Asian speakers use a higher rate of glottals than Glaswegian speakers.

4.11.3 Age and Social Category

The distribution of variants in Read speech is not significant, but there is a significant difference in social category for S5 speakers in Casual speech: $(X^2(3, N=335) = 15.453, p=0.0015)$. Among the older speakers DEPCAT is a significant social factor, with speakers in DEPCATs 6-7 using more ejectives than those speakers in DEPCATs 2-5.
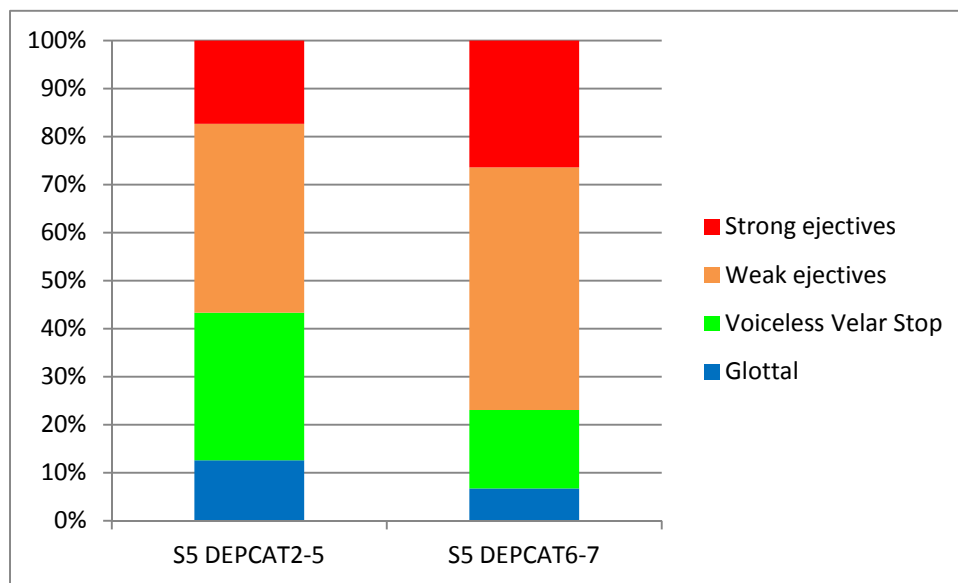
CHART 10.2 AGE AND SOCIAL CATEGORY

Within the S5 speakers in DEPCAT 6-7, there is a greater use of ejectives compared with those speakers in DEPCAT2-5. Overall speakers in DEPCAT 6-7 use 20% more ejectives overall (77% in total) compared with those speakers in DEPCAT 2-5. Their use of Strong ejectives is also greater. In addition, they use fewer glottals and fewer velars than speakers in DEPCAT 2-

4.11.4 Style, Ethnicity, and Age

In Read speech the chi-square test showed that the distribution of variants in Read speech was not significant while in Casual speech there is a significant difference: $(X^2(3, M=341)=8.5947,$

p=0.0352). In Casual speech younger Glaswegian Asian girls use more ejectives than older ones.
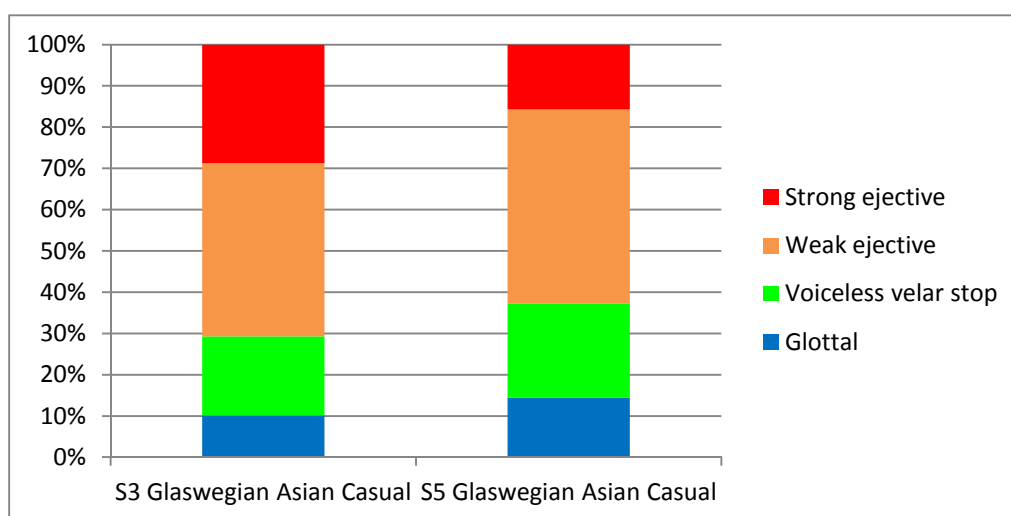
CHART 10.3 STYLE, ETHNICITY AND AGE

The younger S3 Glaswegian Asian speakers use 8% more ejectives overall including 13% more Strong ejectives. The older S5 Glaswegian Asian speakers use more glottals.

4.11.5 Summary of Social factors and style

The result of the main effects of age and style (4.5.1) shows that older speakers use more ejectives than younger speakers, but only in Read speech. Within social factors and style only the results for the older speakers were significant and show that they use more ejectives overall in Read speech than in Casual.

The results of the main effects of ethnicity (4.7) highlight that Glaswegian speakers use more ejectives than Glaswegian Asian speakers. Ethnicity was also found to be a significant social factor among the older speakers with S5 Glaswegians using more ejectives overall than S5 Glaswegian Asian speakers in Casual speech.

The results for the main effects of social category and style (4.6.1) found no significant difference but there was a trend that showed that speakers in DEPCATs 6-7 use more Strong ejectives in READ speech. Within age and social category there was a significant difference and the results highlighted that among the older S5 speakers DEPCAT is a significant social factor, with speakers in DEPCATs 6-7 using more ejectives than those speakers in DEPCATs 2-5.

4.12 Results – Summary

4.12.1 The variants used for /k/ overall

Out of the 1314 tokens obtained for analysis the overall distribution of variants were first categorized into 12 distinct types along an effective auditory continuum. The 28 speakers produced 530 tokens in Read speech and 784 in Casual speech. Across these 12 categories, Weak ejectives are greater in Causal than in Read speech, but Strong ejectives greater in Read speech. When the categories were collapsed down into four distinct types, it was highlighted that Weak ejectives were about 10% more prominent than Strong ejectives overall, with ejectives variants used more in Read speech than in Casual speech.

4.12.2 The distribution of variation according to cluster context

The main effects of the distribution of variation according to phonetic context showed that clusters were categorically significant. The results shows that the –ŋk is the cluster context with the greatest distribution of ejectives overall. When this is broken down into Read speech the –ŋk cluster also has the highest distribution of ejectives. In Casual speech the –ŋk and –rk context have a similarly high distribution of ejectives. The results of the –sk cluster distribution are quite noteworthy as, this context produces 65% ejectives. Within cluster context and age the pattern shows older speakers were found to use more ejectives overall, and produced an average of 20% more Strong ejectives in both the –rk and –ŋk contexts. In terms of cluster context and social category, DEPCAT 6-7 use more ejectives in the cluster context. With regards the cluster context and ethnicity, results show that Glaswegian speakers use more Strong ejectives overall than Glaswegian Asian speakers.

4.12.3 The distribution of variation according to preceding vowel context

There is no significant difference in the distribution of vowels overall and a trend indicates a 'rise-fall' pattern, with the back vowel preceding the highest distribution of ejectives out of all the vowels. When looked at in Casual speech, the distribution of variants following vowels is significant and it shows a pattern which reveals an increase in ejective frequency from front to

back vowels. Again this reinforces the suggestion that ejective realisation increases as /k/ variants move from following vowel contexts from [ɪ] to [o], i.e. spanning from close to open unrounded front vowels and from open to close rounded back vowels. Overall there is a far greater frequency of Strong ejectives following vowel contexts in Read speech than in Casual speech. The vowel context was not found to be significant for age, social category, or ethnicity.

4.12.5 The distribution of variation according to position in turn

The main effects show that ejectives are much more likely to occur when syllable final /k/ is in a word which is turn-final or one that occurs at the end of a clause/sentence. Glottals are more frequent within the turn although ejectives do make up 35% of the overall distribution of variants within the turn.

4.12.5 The distribution of variation according to year group in school

With regards to the overall distribution, the only significant difference was found in Read speech with older S5 pupils using more Strong ejectives than the younger S3 pupils. The distribution of ejectives according to turn was found to be quite similar for the older and younger speakers turn finally. While there were also similar percentage distributions of Strong ejectives in the end of clause/sentence position, the younger S3 speakers use more ejectives overall in this position. Within the turn the older speakers use more ejectives than the younger speakers but use marginally less Strong ejectives. In addition the younger speakers use 23% more glottals than the older speakers in this position also. Within social factors and style only the results for the older pupils are significant and this result shows that overall they use more ejectives in Read speech than in Casual speech. Within age social category is significant and the results highlight that among the older S5 speakers DEPCAT is a significant social factor, with S5 speakers in DEPCATs 6-7 using more ejectives than S5 speakers in DEPCATs 2-5.

4.12.6 The distribution of variation according to ethnicity

The main effects of the distribution of /k/ variants according to ethnicity show Glaswegian speakers using over 10% more ejectives overall than Glaswegian Asian girls while Glaswegian Asian girls use more glottals. When analysed further in terms of style, it was found that Glaswegians use more ejectives than Glaswegian Asian girls but only in Read speech. Within phonetic context terms, Glaswegian speakers were found to use more Strong ejectives than Glaswegian Asian speakers overall. Moreover, Glaswegian Asian speakers produced 20% more glottals within the –rk cluster than Glaswegian speakers.

Glaswegian speakers produce more ejectives in the End of clause/sentence position and while Glaswegian Asian speakers use more glottals Turn finally and in the end of clause/sentence position, Glaswegian speakers use a much greater number of glottals within the turn. Ethnicity was found to be a significant social factor among the older speakers with S5 Glaswegians using more ejectives overall than S5 Glaswegian Asian speakers in Casual speech.

4.12.7 The distribution of variation according to social category

The main effects show a trend that girls in DEPCAT 6-7 use more Strong ejectives in Read speech. However, a significant difference was found within phonetic context and social category, with speakers in DEPCAT 6-7 producing more ejective overall and more Strong ejectives compared with those speakers in DEPCAT 2-5. The results also revealed that speakers in DEPCAT 6-7 use more ejectives overall in the Turn final position, and also significantly more glottals in within the turn.

Chapter 5: Discussion

5.1 Discussion on initial questions regarding distribution of /k/

This study analysed the realization of word-final /k/ in read and casual speech by female pupils in a Glasgow high school specifically focusing on the realization of word final velar ejectives. The girls differed in age (one group of 14 year old girls and another group of 17 year old girls), ethnicity (Glaswegian and Glaswegian Asian speakers), and social background The overall main results of the research provided an answer to the initial questions I had before I began my investigation which concerned some general interests in the usage of ejectives in Glaswegian and what specific factors might contribute to promoting or constraining them.

5.2 Ejective realization of word-final /k/ in Glaswegian

Before focusing on ejectives, it was important for me to ascertain the scope of phonetic realizations of /k/ in word-final position in read and spontaneous speech in these speakers. This was necessary in order to answer my first question: *how common are ejectives?*
The results show the expected range of phonetic variants realized: glottals, velar plosives, strongly aspirated plosives, but they also showed that overall 73% of all /k/ variants are some type of ejective.

Another initial question I had was: *do the pupils use more ejectives when reading or when speaking casually in an unmonitored, natural way in school?*

The preliminary analysis of my results for their recorded Read and Casual speech tokens showed that overall the pupils used more ejectives in Read speech than in Casual speech and indicated a much greater use of ejectives in this position. This was the first interesting result because it linked to the recent findings of Simpson (2010) who points to the interactional structure of Reading aloud. In this paper Simpson suggests that the high frequency of word-final plosive aspiration among Tyneside English speakers reading word lists (Docherty, Milroy, Milroy & Walshaw 1997, Local 2003) in comparison to what they produce in casual speech is more than just the sociophonetic interpretation of speakers approximating more standard forms.

He argues that reading aloud word lists produces "the phonetics of turn-finality after each word" (p5) so that essentially finishing a word on a word list or finishing a sentence in a list of sentences acts like a floor holding pause in interaction.

This prompted another question to investigate in my research: *is the presence of more Strong ejectives in Read speech due to the fact that Read speech correlates to a sentence final interactional position?* The discussion of social factor results in section 5.2 would appear to suggest that this is not exactly the case.

5.3 Specific research questions

The study also aimed to uncover the phonetic, linguistic and social factors that constrain or promote ejective use among Glasgow high school girls and also to understand better the way these two factors intersect and work together.

In this section I discuss the results of the research with reference to my research questions:

1. What are the phonetic and linguistic factors that promote ejective use?
2. Who is using ejectives more and what social factors does this depend on? Ethnicity? Age? Social category?
3. Can the use of ejectives among speakers be regarded as language change in progress?

Research question 1: What are the phonetic and linguistic factors that promote ejective use?

In terms of possible phonetic context, ejective variants of word-final plosives are identified in literature as following voiced sounds such as vowels, nasals (Scobbie, Gordeeva, Matthews 2006) and laterals but not following voiceless sounds like [s] and also as occurring in stressed syllables (Ogden2009:163). The research looked at the distribution of /k/ across two kinds of phonetic context: consonant clusters and vowel preceding /k/.

Cluster context

The /k/ variants were analysed at as part of three different consonant clusters: –ŋk, -rk, and –sk. Ejectives were expected to occur in the nasal cluster –ŋk (Scobbie, Gordeeva, Matthews 2006)

but not in the –sk cluster (Ogden2009:163), nothing was reported in literature about ejectives following [r] so it was difficult to predict the outcome here.

Through the analysis, the cluster consonant context returned significant results. Out of the three cluster contexts the results show that –ŋk is the cluster context with the greatest amount of ejectives overall. This cluster also remains the highest for ejective realization in Read speech. In Casual speech the –ŋk and –rk context have a similarly high distribution of ejectives.

The results of the –sk cluster distribution are interesting and show that contrary to what is reported by Ogden(2009:163), in Glaswegian English, ejectives may follow voiceless sounds. The distribution of ejectives within this context (following [s]) accounted to 65% of the overall distribution of /k/.

Interestingly ejectives found in consonant clusters also showed social patterning. Within cluster context and age older speakers were found to use more ejectives overall, and produced an average of 20% more Strong ejectives in both the –rk and –ŋk contexts.

In terms of cluster context and social category, more working-class girls (DEPCAT 6-7) use more ejectives in the cluster context. With regards the cluster context and ethnicity, results show that Glaswegian speakers use more Strong ejectives overall than Glaswegian Asian speakers.

Vowel context

The lack of literature on the phonetic contexts that constrain or promote ejectives makes it more difficult to predict a pattern. A vague reference to ejectives following voiced sounds such as vowels (Scobbie, Gordeeva, Matthews 2006) seems to be the only mention of vowels preceding ejective realizations. The results from this research hope to add colour to this vague picture. Despite there being no significant difference in the distribution of vowels overall in this research, a trend indicates a 'rise-fall' pattern across the vowel quadrilateral, with the back vowel preceding the highest distribution of ejectives out of all the vowels. The preference for back vowel contexts for ejectives was again supported by analysis of variants in Casual speech which found a significant distribution and indicated an increase in ejective frequency from the front to back vowels.

It looks likely from the findings of this research that ejective realisation increases as /k/ variants move from following vowel contexts from [ɪ] to [o], i.e. spanning from close to open unrounded front vowels and from open to close rounded back vowels. It is possible that this may be linked with the relative size of cavity across these vowels from front to back,

Another reason may relate to the timing of the oral and glottal release and the effect that the preceding vowel can have their release. Kingston (1985: 16-17) points to the importance of the timing of the oral and glottal release of ejectives and explains that when both closures are simultaneously released weaker ejectives are produced or there may be a delay in the release of the glottal closure after the oral one resulting in a stronger ejective impressionistically. As this research is based on auditory analysis only this is difficult to ascertain without acoustic analysis.

In addition, the realisation of Strong ejectives was found to be promoted by style: there is a far greater frequency of Strong ejectives following all vowels in Read speech than in Casual speech. The vowel context was not found to be significant for, age, social category, or ethnicity within this study. It is also interesting that there was no patterning with social factors and vowel context. The reasons for may be due to lexis, it is possible that certain words used in tasks may produce be a contributory factor to ejective promotion or constraint.

Position in turn (Casual speech)

In Read speech the words containing final /k/ were all at the end of the sentence, which was also the end of the turn (cf Simpson 2010). In the casual speech elicited by the map task, it was possible to consider these two positions separately. The main effects for the distribution of variants according to their position in the Turn highlight that ejectives are much more likely to occur when syllable final /k/ is in a word which is turn-final or one that occurs at the end of a clause/sentence but is still within the turn. The frequency of ejectives occurring in the Turn Final and End of clause/end of sentence positions are both equally distributed, suggesting turn final position does not specifically favour ejective realizations. This is in line with what is reported in literature, which suggests that ejectives English are greatly influenced by sentence prosody and position of the carrier word in the discourse; mainly (though not exclusively) occurring phrase-finally and word-finally or as part of an utterance before a pause, in addition

to at the end of an utterance (Ogden2009:163, Gordeeva & Scobbie, 2006, Macafee 1983, Chirrey 1999, Wells 1982, Simpson 2010, Lambert, Alam and Stuart-Smith 2007).

Again, previous observations only mention that ejectives are influenced by position in turn, but does not tease apart phrase- final from turn-final. The results of this research however show that while both these position seem to provoke a high number of ejectives equating to nearly three quarters of all /k/ distribution, neither of the positions has more or less of an influence. It is really interesting that the turn-final position does not eclipse the end of clause/sentence within the turn, suggesting that ejective realization is not all to do with interaction. Other factors, like sentence prosody, are also important, along with position in interaction.

Another interesting finding is that ejective realizations were surprisingly frequent in words which were simply within the turn (not sentence or turn final) It was found that 35% of the overall distributions of variants within the turn were ejectives, though the majority of these were Weak ejectives. The salience of Strong ejectives might account for them being more likely to be noticed in turn-final position and for the observations in literature.

Where position in turn may have an influential factor is in the number of Strong ejectives being produced: Speakers use more Strong ejectives turn finally but this overall pattern hides an interaction with social factors. The results for position in turn and age show both age groups with a similar distribution of ejectives overall in the Turn final position.

The Within turn position has the highest frequency of glottals across the three turns and the younger S3 speakers have a noticeably higher percentage (40%) distribution of glottals compared with the older S5 speakers (17%). This position is also interesting with regards to ethnicity as it show that Glaswegians are producing more glottals in this position. This position also shows a difference in social categories: DEPCAT 6-7 use much higher glottals in this position. Again this highlights the social factors that are at work here, with a greater number of glottals expected in the within turn position for younger speakers, Glaswegian speakers, and working class speakers.

Research question 2: *Who is using ejectives more and what social factors does this depend on? Ethnicity? Age? Social category?*

The crux of this research was to discover more about ejective use in the context of variants of /k/, and to find out who uses them more and what social factors influenced speaker's variation of them. In the following section I will discuss the social factors that promote and constrain ejective use based on the findings from the Read and Casual speech data. I discuss the results of the distribution of variants according to age, ethnicity and social category and tease apart other determining factors with those contexts

The distribution of variation according to age

The results for age are quite interesting as it shows that the older S5 speakers use more ejectives than younger S3 speakers, but only in Read speech. This is a classic interaction as the discussion in 5.1 shows that there is an overall effect of style, but here we see that different speakers do something different in one style. Therefore, while Read speech clearly encourages Strong ejectives, it can be said that it does not determine them as speakers of different ages can manipulate the amount of them.

Among the older speakers ethnicity was found to be a significant social factor with S5 Glaswegians using more ejectives overall than S5 Glaswegian Asian speakers in Casual speech. Similar to the pattern shown for the distribution of variants in Turn, Glaswegian Asian speakers use a higher rate of glottals than Glaswegian speakers. This shines a light on what was discussed relating to turn where it was suggested that Glaswegian speakers may be 'swapping' their use of glottals for a preferred ejective realization. We can now build on this theory by adding to it that it is the older Glaswegian speakers who are 'swapping' their glottals for ejectives.

Among the older S5 speakers social category is a significant social factor, with the older speakers in DEPCATs 6-7 using more ejectives than the older speakers in DEPCATs 2-5. To summarize the distribution of variation according to age with respect to ejectives, one can now say that among the older S5 speakers they are expected to be found more in Read speech than in Casual speech, in spontaneous speech they will be used more by the older Glaswegian speakers and they will be used more by working class S5 speakers.

The distribution of variation according to ethnicity

The results for ethnicity are very interesting with the main effects of the distribution of /k/ variants according to ethnicity showing that Glaswegian speakers use over 10% more ejectives overall than Glaswegian Asian girls. However, when analysed further in terms of style, it was found that Glaswegians use more ejectives than Glaswegian Asian girls but *only* in Read speech. As discussed already, Read speech produces more ejectives overall, so it is interesting that in the environment where ejectives are more likely (and more salient, with the Strong ejectives being greater there too), this is the place where the social (ethnic) differences are also.

The differences in ethnicity are also seen in phonetic context terms, Glaswegian speakers were found to use more Strong ejectives than Glaswegian Asian speakers overall. Moreover, Glaswegian Asian speakers produced 20% more glottals within the –rk cluster than Glaswegian speakers. My impressions as discussed already from the results are that the Glaswegian speakers seem to be 'swapping' their glottals for ejectives as all result relating to ethnicity would seem to point to this notion. This can be seen clearly in the comparison between both ethnic groups' distribution of variants according to position in turn. Glaswegian speakers produce more ejectives in the End of clause/sentence position and while Glaswegian Asian speakers use more glottals Turn finally and in the end of clause/sentence position, Glaswegian speakers use a much greater number of glottals within the turn. This variation in glottal and ejective distribution indicates that the Glaswegian Asian speakers use glottals more consistently across all positions in the turn, with very little variation, while the Glaswegian speakers have variation in glottal use according to turn.

The distribution of variation according to social category

When the main effects for social category were tested they were not shown to be significant and there was no real pattern emerging that suggested anything other than a distribution that was not significant. The only place where social category was significant was among the older S5 speakers: S5 speakers from DEPCAT 6-7 use 20% more overall in Casual speech and do not use as many glottals.

Research question 3: *Can the use of ejectives among speakers be regarded as language change in progress?*

The lack of a proper sociophonetic study on ejectives in any variety of English and the consequent absence of any real in-depth literature on ejectives relating to varieties of English would seemingly support the idea that ejectives are a relatively new allophonic phenomenon in English. Yet, the literature that does exist on ejectives all testifies to them being around for a while and at least existing marginally. It is this paradox in terms of reporting that I also wanted to challenge and explore in order to learn if the frequent use of ejectives I hear within the classroom can be described as a change in progress.

Within Glasgow, the earliest reference to ejectives being used in Glaswegian English is by Macafee (1983) who mentions that ejectives have been noted for some time as being realized in emphatic speech word-finally and before a pause in phrases such as *will you please stop!* [wɪɫ jüː pɫiːz stɔpʼ]. Shuken's (1984:123) research on the glottal stop shows a spectrogram that is taken of the word *great* as spoken by a Glasgow English speaker which highlights an ejective release of the final stop. Maddieson's (1984:105) assertion that languages with an ejective inventory will have velar ejectives at the top of the hierarchy, might then suggest that if nearly 30 years ago in Glasgow there were reports of bilabilal ejectives and alveolar ejectives, then velar ejectives must be used somewhere also. Whether or not this hierarchy of ejectives applies to languages that only have ejectives as allophones is not clear.

While conducting my research, I looked at the Results for Consonant Variables from Accent change in Glaswegian (1997 corpus) (Timmins, Tweedie, Stuart-Smith 2004). The data is taken from participants similar to mine in age, gender and social category however, the results for /k/ do not include a velar ejective variant and it is stated that "there have been no reports either anecdotally or in the literature to suggest that /k/ may be changing in Glaswegian speech."(p.19). To investigate this further, I then listened to the data and the tokens that were analysed with word-final /k/: *lock, beak, peak,*. Out of all the token I listened to only 2 could be described as very Weak ejectives.

Following Labov's(1994), belief that the only way to truly discover a true example of language change is by observing specific speech communities at two discrete points in time; that is, through real time observation. Having done this it seems that the answer to the research question is that the use of ejectives among speakers can at this stage be assumed to be an example of language change in progress.

Chapter 6: Conclusions

Shortly after beginning my Masters course I undertook a small scale phonetics project that looked at devoicing word-finally in English words among by two Polish EAL pupils in my class. The results for this small scale study indicated that among the variants of /p t k/ were a high number of ejectives. As a classroom teacher in a high school I am in a unique position to hear language use in all it sociophonetic complexity on a daily basis. My own further observations indicated that velar ejectives were very common among the pupils in my class and I following some research on ejectives I decided that it was an area that merited further research.

I based my research on these two age groups due to the fact that I taught both these classes for a number of months and would have them in my class for another school year; this made making general observations and basic field notes more manageable. My initial impressions was that the Glasgow Asian pupils used ejectives more but I soon realized that this was not just part of the sounds in one particular groups language but that it occurred allophonically in the speech of *every* pupil in both my classes with some more frequent users than others, and some who produced more audible (Strong) ejectives. My other initial impressions were that the velar ejectives were the only ones being produced but I have also heard bilabial and alveolar ejectives in the classroom too, albeit not as 'blatantly' as the velar ejectives.

My anecdotal observations found that these speakers in my class seemed to use a large number of ejectives for word-final /k/, especially when being emphatic, stating a point or a fact. In all cases it seemed that they occurred either turn finally or at the end of a clause or the end of a sentence. I focused my research on discovering more about ejective use: who uses them, what phonetic and linguistic, and social factors promote or constrain their realization.

My results found that the phonetic and social factors play an important role in the realization of ejectives. For example ejectives found in consonant clusters showed social patterning: within cluster context and age, older speakers were found to use more ejectives overall, and produced an average of 20% more Strong ejectives in both the –rk and –ŋk contexts. In addition an interesting find in the cluster context showed that–sk cluster distribution are interesting and demonstrated that in Glaswegian English at least, ejectives may follow voiceless sounds. The research also put forward the possibility that ejectives have a preference for back vowel contexts supported by the results of the variants in Casual speech which found a significant

distribution and indicated an increase in ejective frequency from the front to back vowels. This is something that might be considered for future investigation.

Although ejective literature indicates that ejectives mainly are realized turn finally, this research also finds that ejective realizations were surprisingly frequent in words which were simply within the turn (not sentence or turn final).

The aspect of showing possible real time change is also something that I think is quite exciting given that the corpus of speech from 14 years ago explicitly states that there have been no reports to suggest that /k/ may be changing in Glaswegian speech. This statement coupled with my own auditory analysis of some of the tokens from that data which revealed only two borderline weak ejectives was a very interesting part of the overall results.

The research overall was quite an excellent and fulfilling learning experience for me but was also quite challenging given the amount of possibilities that could be explored within the context of research on this particular area. The fact that the researcher is also a teacher in the school has many advantages but can also be a drawback. The main difficulties faced in this respect are all ones of time constraints. Firstly the time period for recording was during lunch which can lead to difficulties in ensuring that I allowed enough time for the pupils to have their lunch but also enough time to record my data. The problem then with recording during lunch time is the issue of finding a quiet place to record. The balance between being a full time professional and undertaking research for a Masters was also quite challenging and any setbacks with time can have a big impact when one is a part-time student. For example the recordings I made were scheduled for December but due to heavy snow and school closures they had to be postponed, at the end of January there were prelim exams meaning a lot of the S5 pupils were involved. Recording much earlier is something I would do differently, as there is never a guarantee that all participants will be there on the day you wish to record.

Due to time limits with the research and the Masters year there still remains much more still to look at in these data, which might help us understand these data better. These include carrying out an acoustic analysis of the data which would help us link these data to acoustic analyses of ejectives in other languages; and also give us continuous measures for some dimensions. This could be very interesting to see the kinds of patterns that are revealed for phonetic/linguistic and social factors at a greater resolution of detail. In addition it would be good to examine lexical distribution: there is no analysis of ejectives according to the lexicon; but particular words

might well be more or less likely to show ejectives. Some of the results presented here might also relate to the lexicon, and/or lexical frequency.

Some other general research for the future would be to conduct a real time study of ejectives over a longer time span and look at ejectives in all places of articulation, not just velars. It would also be interesting to see what is going on with other ethnicities and of course what about male speakers – do they use as many ejectives? What are the differences? Maybe it would be good if some perception as well as productions studies could be carried out. We make assumptions about ejectives being salient, and some seem to be auditorily stronger than others, but are they really? What do listeners think?

Overall this study gives us some intriguing initial results showing that ejective realization of /k/ is now very common in these Glaswegian girls. It seems as if this represents a real-time change in Glasgow – though more data/study is needed to establish this. Certainly ejectives have been around for a long time. What we find here is that they can be a very common allophone for /k/.

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Appendix 1

CONSENT TO THE USE OF DATA

I understand that Owen McCarthy is collecting data in the form of recorded interviews for use in an academic research project focusing on language variation and usage among adolescent females, on behalf of the department of English Language, University of Glasgow. The research will be conducted as outlined in the attached information sheet.

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 material will be treated as confidential and kept in secure storage at all times.

Signed by the contributor: date:

OR

Signed on behalf of the contributor (i.e. parent/guardian in case of a person under 18)

_____   date:

Researcher's name: Owen McCarthy
Supervisor's name: Dr. Jane Stuart-Smith
Department address: 12 University Gardens,
                                  G12 8QH
                                  0141 330 6852

Dear Parent/Guardian,

I am currently undertaking a small scale research study with the Department of English Language in Glasgow University, which explores language variation and usage among adolescent females in Glasgow.

I am writing to ask your permission to include _____ in the study. The collection of data for the research will take the form of some short tasks that will be conducted in school during lunchtime and/or incorporated into class work. These tasks will take the form of a sound recording of a short straightforward reading list and also some group discussion with classmates.

I would like to stress that **this is not a test of reading or competency in reading** and indeed is in no way directly linked with school work or academic performance. I would also like to emphasize that as **the study is a focus on the sounds of language and not on pupils, any sound data collected will remain entirely anonymous**. I have asked pupils who are interested in taking part to do so on voluntary basis, so there is no obligation to participate.

If you agree to your daughter taking part in this study please sign the attached sheet and return it to me.

All information and data obtained from the study will be held in the strictest confidence. If you have any further questions please do not hesitate to contact me at my workplace or contact the study supervisor, Dr Jane Stuart-Smith (details on attached sheet).

Best wishes,
Owen McCarthy

_____

Appendix 2

1. There seems to be a big party in her house every weekend.

2. Out of all the outfits Sarah and Emma tried on this is the one they like.

3. Kampala is not in Nigeria it is the capital city of Uganda.

4. Blue is for boys while girls usually prefer pink.

5. Maria says that when she is finished school she will get a good job

6. Samantha said last week that she didn't want to invite Mark.

7. They went to the movies twice last week, they said it was fun.

8. I could have easily told you that Bagdad is in Iraq

9. I think we spend far too much time in school, we'd be better off at home.

10. There's nothing worse than turning up late for an event, I hate people staring.

11. I had to upgrade to a more advanced model as the one I had was far too basic.

12. The spectacular green rolling hills were dotted with sheep.

13. My mum has banned me from going out at weekends during exam time.

14. Every Sunday they go for a run in the park

15. She has travelled all over Europe but has never actually been to Spain.

16. .If you join they will send you out a starting out pack.

17. At the dancing in town last night I saw Daniel and Matt.

18. The huge hole in the bottom of the boat was the reason it sank.

19. Rose knew she had to start writing the essay but she didn't know where to start.

20. On Saturday mornings Luke takes his dogs for a long walk before breakfast.

21. I like to spend time by myself, it helps me to think.

22. The exams begin next week; I better start studying Romeo and Juliet.

23. Peter said that he wants to work far away like on an oil rig.

24. Brian sat there, showing no emotion, casually chewing on a toothpick.

25. The feeling of being surrounded by too many people is like being stuck in a trap.

26. The conditions for sailing were very dangerous; the fog was dense and thick.

27. I can't believe it! You're cancelling all the flights, this is a joke!

28. I don't think I'll be going out tonight, I've got no money.

29. The movie was nowhere near as interesting or as exciting as the novel.

30. Steven tried to push the door as hard as he could but it wouldn't lock.

31. As usual the last person to leave the house was Mike.

32. I don't think I'll be going out tonight, I've got no money.

33. I hate when people bend over the pages of a book rather than using a bookmark.

34. He likes to get away from it all sometimes and just walk the dog.

35. Denise said that she never drank tea or coffee.

36. Chloe said that her new bag was the real deal but we all knew it was a fake.

37. I can't wait to go on holiday; it's going to be the best yet.

38. Martin's mouth suddenly went dry but the interviewer told him to take a drink.

39. Before you call to the house be sure to give me a ring

40. John went on holiday to Ireland; he flew from Glasgow to Cork.

41. If I could live anywhere I wanted I would definitely choose to be near the sea.

42. It would be a pretty boring Friday night if all you did was tidy the house.

43. David sold his car last week but bought a much more modern one.

44. Gavin says that the only thing you need for travelling is a good rucksack.