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BACHELOR THESIS

Segmental Features of Standard Scottish English and Urban Scots
with Emphasis on Aspiration

Segmentální znaky standardní skotské angličtiny a městské skotštiny s důrazem
na aspiraci

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Declaration

I hereby declare that this bachelor thesis called *Segmental Features of Standard Scottish English and Urban Scots with Emphasis on Aspiration* is my own work and I used only the sources listed on the Works Cited page. I further declare I did not use it to obtain neither the same nor a different kind of an academic degree.

Prague, 3 November 2015

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Acknowledgements

Annotation

The thesis provides the reader with a brief historical background of the Scottish English continuum, which consists of Scottish Standard English and Scots. Furthermore, it contrasts the segmental features of General British with that of the Scottish norm of pronunciation and Urban Scots. In the empirical part, the paper aims to explore the often reported lack of aspiration found within the accents of Scotland. Accordingly, it offers an acoustic analysis of recordings coming from the speakers born in the Central Belt of Scotland to measure the voice-onset time of their stressed voiceless plosives.

Keywords

Standard Scottish English, Urban Scots, Aspiration, VOT

Anotace

Tato bakalářská práce čtenáře stručně obeznámí s historií kontinua skotské angličtiny, které sestává ze standardní skotské angličtiny a skotštiny. Práce dále srovnává britský standard (General British) se skotským, aby poukázala na základní segmentální znaky této normy a tzv. Urban Scots („městské skotština"). Často zmiňovaným znakem skotské angličtiny je absence aspirovaných explozív, čemuž se věnuje výzkumná část. Za tímto účelem je součástí práce analýza zvukových záznamů mluvčích z Centrálního pásu Skotska, jejímž výstupem jsou hodnoty nástupu hlasivkového tónu u přízvučných neznělých explozív.

Klíčová slova

standardní skotská angličtina, skotština, aspirace, nástup hlasivkového tónu

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1. Introduction

A language is a continuous journey from a crude tool serving the most basic needs of communication to a highly sophisticated system, which balances efficiency with just the right amount of redundancy. As such, it stays reasonably effective without the risk of the message being lost or altered somewhere on its way. Were language economy the only factor in language development, one might eventually speak an evolved tongue, which would be devoid of any non-essential elements.

This is of course a mere abstraction as languages are affected by a myriad of other influences, which range both from the linguistic to those fields that lie outside of its bounds. Regional variants such as the English of the West of Scotland span across both of these categories, linguistic and non-linguistic. Of course, this label envelops many subvarieties, which can be further divided and possibly broken all the way down into idiolects, each of which is moulded by their speaker through their historical and social background, need for new lexis etc. All these variables yield a great number of possible variants. I find this immense diversity fascinating, hence my interest in dialectology and pronunciation in particular. Having spent some six months in Glasgow, the largest Scottish city, I had no trouble deciding which accent I wanted to concentrate on in my research.

Accordingly, after outlining some basic terminology and offering a brief account of the linguistically relevant history of Scotland, this thesis attempts to provide the reader with the description of segmental features of Standard Scottish English and Urban Scots. The former is considerably different from General British, let alone the urban varieties, which are spoken mostly by the working class. These may pose great difficulty to language learners not accustomed to such speech. Major et al. (40) propose that non-native speakers have more trouble comprehending regional speech than the standard variants, as one could expect. One of the key factors mentioned is the lack of exposure to various regional accents. Indeed, when first confronted with Glaswegian, I understood very little of it. Being subjected to it on a daily basis enabled me to actually understand it and it would seem only sensible to introduce students to variants other than General American or General British (Hughes et al. 2, 8). Therefore, those striving to improve their comprehensive skills, and possibly nudge others in the same general direction, should hopefully deem the theoretical part a solid foundation for doing so.

Scotland boasts a long and rich history, which is bound to be reflected in its linguistic identity woven out of many other languages. The main threads are Scottish Gaelic, Scots and Modern English. However historically important, Gaelic is only a minor language today. Thus, the focus of the paper is then shifted to the segmental features of Scottish Standard English and Urban Scots. The accent of the former, a Scottish version of Standard English English, is compared to the English pronunciation model General British and the latter is commented upon where applicable. Additionally, recent developments are discussed such as the possible influence of Cockney (Stuart-Smith et al., "Talkin' Jockney" 221-222).

Aspiration is the subject matter of the empirical part and as such it is described in greater detail. Authors like Cruttenden (178) and Wells (409) propose this feature is very limited across the Lowlands and in Standard Scottish English, but fairly pronounced throughout the Highlands due to the influence of Gaelic. Yet Johnston ("Scottish English and Scots" 113) claims aspiration has been spreading throughout the Central Belt. For those reasons, the practical part is focused on an acoustic analysis of voice-onset time and possible realisations of stressed voiceless plosives /p, t, k/ in accents distributed across the Central Belt. The obtained recordings are carefully scrutinised to either confirm or dispute the lack of aspiration in the Scottish standard and Urban Scots.

2. Abbreviations, Acronyms and Conventions

The following acronyms and abbreviations are used throughout the paper:

GenAm – General American

GenBrit – General British

SEE – Standard English English

SSE – Standard Scottish English

SVLR – Scottish Vowel Length Rule

VOT – voice-onset time

Transcribed passages may be written using:

/*slashes*/ for broad, phonemic transcription, e.g. /skɔts/

[*square brackets*] for narrow, phonetic transcription, e.g. [skɔ̝ts]

Grapheme clusters are signified by:

<*angled brackets*>, e.g. <scots>

'*Examples*' are italicised and delimited by single quotation marks.

Additionally, the following IPA phonetic symbols are utilised (the 'o' symbol serves only as a placeholder):

T2.1 Phonetic symbols
Based on the information found on the official IPA website (International Phonetic Alphabet)

Symbol	Meaning
ʉ	close central rounded vowel
ʏ	near-close near-front rounded vowel (like /ɪ/, but rounded)
ç	voiceless palatal fricative
r	alveolar trill
ɹ	alveolar approximant
ɻ	retroflex approximant
ɾ	alveolar tap
ʔ	glottal stop
ɫ	velarized or pharyngealized alveolar lateral approximant

Symbol	Meaning
ö	centralised
o̞	lowered
o̝	raised
o̠	retracted
o˞	r-coloured
oʰ	aspirated
o̪	dental
o̥	devoiced

3. Accent, Dialect and Language Variant

In order not to confuse the reader, it is essential to clarify the relevant terminology. To begin with, we have the basic distinction between an accent, a dialect and a language variant. The first one indicates different pronunciation, which may be rooted in social diversity or originate from a certain location, which is recognised as a regional accent. Geordie, for instance, is found in the area of Tyneside, more specifically Newcastle (Wells 374). In the case of Glaswegian, the place of origin should be quite clear. Of course, these local accents can be divided even further and so in Glasgow, we could talk about West End, South Side and so on. Also when one's pronunciation exhibits a large number of regional features, we label it as broad, e.g. the h-dropping in '*happy*' /api/ marks broad Cockney (Wells 253, 322).

An example of a social accent would be Kelvinside, which is often regarded as 'posh', in other words it tends to be associated with middle and upper classes, but the variety bears its name after the eponymous area, which makes it a regional accent as well (Macafee 32). The line between these two categories can be rather fuzzy as they are often highly intertwined but working-class speakers tend to show more local features than those from higher strata of society. General British (GenBrit) on the other hand carries almost no local identity and as such reveals very little about the regional background of the speaker (Wells 117).

As for a dialect, the word is shrouded in ambiguity. For example Wells refers to a fairly general linguistic definition suggesting that a dialect "is more than an idiolect but less than a language" (3). For the sake of simplicity and transparency, the interpretation proposed by Hughes et al. (2) will be used, meaning various dialects are diversified by the alterations in their grammar and vocabulary. As with accents, we can talk about regional and social varieties. Additionally, one can stumble upon traditional dialects, which are usually encountered in isolated rural areas and thus are defined by their conservative nature. Their morphology, syntax and lexis vary greatly from the standard of the general area and a distinct accentual component is usually present as well (Hughes et al. 33; Wells 4-8). An example from Scotland would be Scots, although it has been a point of contention whether it should be considered a dialect or a separate language entirely (Wells, 395).

Finally, a language variant is a variety that differs in its grammar, vocabulary or pronunciation. Thus it incorporates both accents and dialects and all the examples provided so far can be regarded as variants. A special case would be standard variants such as Standard English English (SEE) or Standard Scottish English (SSE). These are considered to be the

norms and thus are employed in education as the main form of language to teach in. Standards usually comprise grammatical features, vocabulary and sometimes the accentual component (Dósa 82-85; Bugaj 21-23). In the case of SEE, the accent happens to be GenBrit, which is valid for England and Wales, but unsurprisingly, Scotland follows its own pronunciation model and it also has a standard of its own, specifically SSE. Fundamentally, it is SEE, but with a Scottish accent (Stuart-Smith 47).

3.1 Received Pronunciation and General British

When language learners begin to acquire a foreign tongue, one of the choices they, or rather their teachers, will have to make is the selection of a model accent. Justifiably, they often opt for a standard accent, if any. If they are headed towards British English, the accent happens to be none other than GenBrit (Cruttenden 82-83). This replacement of the term RP relates to a continuum of similar accents bearing little regional variation. As for RP, or Received Pronunciation, the word 'Received' is to be understood in its archaic meaning of 'accepted into the higher circles', as in spoken by upper-middle and upper classes (Hughes et al. 2-3; Wells 117). In the eyes of those unconcerned with linguistics, RP is encountered only within the upper echelon of the British society. Realistically, the regionally neutral accent is ever-evolving like any other and as any other variety, RP branches further out. What is perceived as 'posh' just equates to Gimson's (qtd. in Wells 279-280) Conservative RP. Nevertheless, the more neutral GenBrit is used throughout this thesis to avoid any negative connotations associated with RP.

As for some further classification, Gimson (qtd. in Wells 279-280) observes two other recognisable forms, specifically general and advanced RP. The first is analogous to Wells's (279) mainstream RP and the bare term GenBrit (Cruttenden 80-81). These cover the speakers whose pronunciation is not noticeably influenced by regional varieties and serve as a viable point of reference when comparing various accents. Conservative RP is employed by older speakers and the advanced variant refers to the speech of younger generations. Similarly, Cruttenden (81-82) expands GenBrit by proposing two accompanying categories, i.e. Conspicuous and Regional GenBrit. Conspicuous GenBrit, which partly overlaps with conservative RP, is a class-based distinction as it refers to the pronunciation of upper-crust speakers, while the other label denotes the varieties with stronger regional features.

4. Comparison and Classification of Accents

When describing an accent from the synchronic perspective, meaning in its current state as opposed to its historical development, various factors have to be taken into consideration. Those aspects of variability are systemic and realisational differences and lexical incidence. While Hughes et al. (39-40) stop there, Wells (78-82) and Cruttenden (86-87) include phonotactic distribution as well.

4.1 Systemic Differences, Merger and Split

Systemic differences are related to the phonemic inventory of given accents. To paraphrase, the discrepancy lies in the available phonemes. Usually, English accents differ mainly in their vowel systems. For instance, GenBrit offers the distinction between the words '*full*' /fʊl/and '*fool*' /fuːl/. In SSE, there is only /u/ and as a consequence, the words are homophonous and thus pronounced /ful/ by most Scots. There are also variations in the consonant systems. The well-known '*loch*' exemplifies the voiceless velar fricative /x/ present in Scottish English. The phoneme is not to be encountered in GenBrit, or only as a borrowing (Cruttenden 86; Wells 76-78).

However, over great periods of time, the phonemic inventory of an accent may change. The two major transformations it may undergo are called a merger and a split. When the ranges of phonemes overlap to the point of losing their contrastive property, we talk about a merger, e.g. the already mentioned lack of distinction between '*full*' and '*fool*' in SSE. On the other hand, when a phoneme cannot carry its whole functional load, it may split into two as a result. Usually, an allophone already used in the given environment gains the contrastive character and thus becomes a phoneme (Wells 99-101). Some SSE speakers differentiate their articulation of /e/ between [e] and [ë], so a possibility of a split seems to exist, but Wells (404) suggests the adoption of this distinction is highly inconsistent.

4.2 Realisational Differences

A phonemic inventory is just an abstract system, hence this form of representation does not precisely reflect the actual realisation of speech, not that it necessarily attempts to. That is where realisational differences come into play as certain phonemes may be pronounced differently in one accent than another. Once again, these changes usually happen to be more prominent in the vowel system (Wells 73-75). To illustrate, the vowel /u/ in '*shoot*' is more centralised in SSE [ʃʉt] than in GenBrit [ʃuːt], however in Glaswegian it can be lowered and even fronted (Stuart-Smith 58-59). As for consonants, one quintessential example is the

possible lack of aspiration of the voiceless plosives /p, t, k/, as in '*pet*', '*two*' and '*because*'. The aspirated allophones are present in GenBrit [pʰɛt], [tʰuː] and [bɪˈkʰɒz] (Cruttenden 164-166), whereas in SSE the unaspirated variants [pɛt], [tuː] and [bɪˈkɔz] can be found (Wells 409).

4.3 Lexical Incidence

One line of George and Ira Gerschwin's song *Let's Call the Whole Thing Off* goes 'You like *tomatoes* /təˈmeɪtoʊz/ and I like *tomatoes* /təˈmɑːtoʊz/'. The contrast between the altered pronunciations of the word '*tomato*', namely the stressed syllable, nicely demonstrates lexical incidence. The diphthong /eɪ/ appears in the first occurrence of the word, while the reader may notice a pure vowel /ɑː/ in the other instance of the same word. However, this example seems rather trivial as it simply comes down to personal preference which alternative the speaker favours. The same applies to the pronunciation of '*either*', which may be realised as /aɪðə/ or /iːðə/, thus the diversity lies within the speaker's idiolect rather than a certain accent. Even so, sometimes a pronunciation pattern can be observed among a greater number of words. One such case are lexical items like '*grass*' or '*banana*'. In GenBrit, those are stored as /ɡrɑːs/ and /bəˈnɑːnə/, but in a General American (GenAm) accent, they would be realised as /ɡræs/ and /bəˈnænə/. Consequently, such words can be used to distinguish between the two standards as well as more specific regional variants, assisting in recognising the south from the north of the UK or even Glaswegian from Edinburgh English (Hughes et al. 40; Wells 78-80).

4.4 Phonotactic Distribution

Finally, phonotactic distribution represents legal phoneme sequences. It could seem quite negligible whether a language variant allows for a certain cluster or not, but there is a noteworthy exception – rhoticity. When contrasting accents, the restriction of /r/ in pre-consonantal and final positions plays a vital role. For the words '*form*' and '*more*', the non-rhotic GenBrit thus shows /fɔːm/ and /mɔː/, whereas the rhotic SSE results in /fɔːrm/ along with /mɔːr/ (Wells 76-76).

4.5 Standard Lexical Sets

To simplify the process of comparing vocalic systems across various accents, Wells (122-168) proposed a framework known as Standard Lexical Sets. Based on the differences between GenAm and GenBrit, it contains 24 keywords, which match a substantial amount of vocabulary and thus allow for contrasting accents, mainly their systemic variability and

lexical incidence. For instance, the already utilised words 'grass' and 'form' fall into the BATH and NORTH categories respectively. As the reader may notice, the capitalised keywords are monosyllabic, because we are concerned with the full vowel quality of the analysed sounds. For the study of unstressed vowels, Wells added three disyllabic keywords ending in a vowel and the relevant segments are written in upper case letters. What follows is the complete set of the keywords along with the phonemic representation of their corresponding vowels in GenBrit:

T4.1 Standard Lexical Sets
Based on Wells (123) and Cruttenden (96-97)

KIT	ɪ	PALM	ɑː	FORCE	ɔː	MOUTH	aʊ		happY	ɪ
FLEECE	iː	BATH	ɑː	NORTH	ɔː	NEAR	ɪə		lettER	ə
DRESS	e	START	ɑː	FOOT	ʊ	CURE	ʊə		commA	ə
SQUARE	ɛː	LOT	ɒ	GOOSE	uː	FACE	eɪ			
STRUT	ʌ	CLOTH	ɒ	NURSE	ɜː	GOAT	əʊ			
TRAP	a	THOUGHT	ɔː	CHOICE	ɔɪ	PRICE	aɪ			

Additionally, this system presents the option to address vowels by their appropriate keyword, for example /ɪ/ in '*city*' can be regarded as 'the happY vowel' as opposed to something cumbersome like 'a short close front vowel in an unstressed position'. Furthermore, splits and mergers may be treated in a similar manner, so that the lack of contrast between '*pull*' and '*pool*' may be labelled as a FOOT-GOOSE merger (Wells 124).

4.5.2 Extended Lexical Sets

The starting 24 standard lexical sets stem from the lexical differences between GenBrit and GenAm. This basic array of words covers the two standards, but may be rendered insufficient when comparing other accents. In the case of SSE, there is for instance a lack of the NURSE-merger and where both the English and American norms have /ɜː/, the Scottish standard may produce /ɪ, ɛ, ʌ/. Therefore additional words are used to account for this, e.g. NURSE is accompanied by BERTH and BIRTH. This is even more prominent when considering Scots as the lexical incidence differs from GenBrit to a greater degree and thus an extended collection is utilised (Stuart-Smith 52-55).

5. History of Scotland

In this chapter, we briefly look at linguistically relevant history of Scotland, while introducing Scots and Scottish Gaelic and then summarize their significance at present and outline the current state of Scottish English. Then the scope is narrowed down to major historical events related to Glasgow, which are approached in a similarly diachronic manner to demonstrate the influences on modern Glaswegian and surrounding areas.

5.1 Gaelic and Scots

Around the fifth century AD, Gaels started to colonize Scotland and with them, they brought Celtic languages. In the Highlands and Islands survives their descendant known as Scottish Gaelic. After the Roman withdrawal in the early fifth century, the Kingdom of Northumbria, which was occupied by Angles began to spread towards the south-east of Scotland. They spoke a northern variant of Old English. With the added features of Norman-French and Old Norse, this amalgamation eventually developed into Scots, which was used throughout the south and north-east of Scotland (Macafee 7-10; Wells 393-394; Cruttenden 63-64; Pödör 174; Stuart-Smith 47-48).

At least until the 16th century, the majority of the Scottish people communicated in Gaelic, yet when the Stuarts had come to rule in the 14th century, the formal language of the land, i.e. used in court and the parliament, became Scots (Macaulay 26-27). Unsurprisingly, this led to its adoption as a literary language throughout the following century and the emergence of poets such as Henryson and Dunbar (Dósa 70; Wells 394).

5.2 English of the South

However, in the absence of an appropriate translation of the Bible, attention shifted towards the English version of the holy book, which thus became the source of religious language and along with it scholarly discourse. Furthermore, in 1603 James VI, the king of Scotland, inherited the English throne. The newly crowned James I of England moved south from Edinburgh to London and he was accompanied by most of the literary authors. Finally, in 1707, the Acts of Union meant that English of Southern England would displace Scots in its role of a formal language of Scotland (Dósa 70; Macafee 10). Gradually, the Scottish adapted to this transition while Scots was reduced to, as Wells (394) puts it, 'a domestic dialect', although there were many attempts to restore Scots. Those include the efforts of the poet Burns in 18th century and those of MacDiarmid two centuries later during the Scottish

Renaissance, which resulted in an artificial literary form of Scots known as Lallans (Dósa 70; Wells 394).

A simplified fragment of a language tree follows, showing only the relevant items starting with Proto-Indo-European:

Fig5.1 Simplified language family tree
based on Crystal (364)
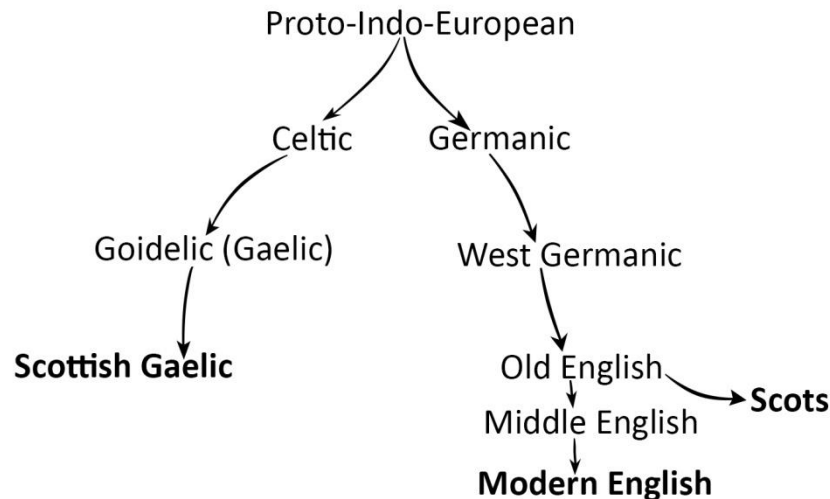
5.3 Recent History of Glasgow

Throughout the 19th century, large-scale coal and iron production and shipbuilding commenced in the West and Glasgow became the commercial capital of Scotland. This situation persisted until WWI and generated a great increase of population. The number of inhabitants grew mainly through immigration. People either migrated south from the Highlands or moved from rural to urban areas. Also both the Highlanders and the Irish suffered from potato famine mid-18th century, which resulted in further influx of newcomers. Linguistically speaking, this led to a melting pot of languages and language variants, including broad rural varieties, northern Scots, Scottish Gaelic and Hibernian English, i.e. Irish English (Macafee 10-12).

Macafee (15) mentions that "the rapid expansion of Glasgow in the 19th century created classical slum conditions". Indeed, in conjunction with the loss of the overseas market caused by the 'Great War', the living conditions were not exactly delightful and the rates of unemployment skyrocketed, at their highest involving almost a third of the population. In turn, this initiated the housing and slum clearance policies with the aim of reducing the problem of overcrowding. Thus a vast transformation of the city was set in motion and many

were forced to relocate from the centre to the outskirts (Macafee 15-18). Stuart-Smith et al. ("Talkin' Jockney" 225-227) propose members of working class are usually tied together more closely than those from higher classes, who are conversely more mobile and connected to other regions and language variants. Thus one would expect the latter group to exhibit speech of a more innovative nature showing aspects from other regional variations while possibly omitting traditional variables and vice versa in regards to lower-class speakers.

5.3.1 Social Stratification of Glaswegian

However, the restructuring of Glasgow tore apart the networks of lower strata (Macafee 15-18). On that account, a study by Stuart-Smith et al. ("Talkin' Jockney" 227, 245-253) proves the opposite of the above mentioned assumption. The paper focuses on several consonantal features and describes social stratification within the metropolis and further suggests the division is even more pronounced due to the working class blaming higher classes for the transformation of Glasgow. Hence the former attempt to differentiate themselves from those above them on the social ladder by opting for nonstandard features both from local and other regional varieties whereas the latter tend to adhere to the norm. For instance, the first group pronounce [x] in 'loch', while the other produce it with [k], considering the traditional pronunciation snobbish. The lower class also demonstrate possible influence of Cockney by incorporating TH-fronting into their vernacular, so that 'think' [θɪnk] becomes [fɪnk]. Consequently, working class speakers, especially adolescents, employ certain elements from Scots along with regional features from other accents to shape their linguistic identity.

5.4 The Status of Scots

The current status of Scots presents a great difficulty and not only for linguists. Still, it plays a great part in the identity of Scottish English and Scotland itself. It has been labelled both as a language and a group of dialects, which brings us back to a certain ambiguity of the term (see section 3). Dósa (78) approaches this vagueness by suggesting that "A dialect is a form of speech […] which is not accepted as standard, whereas a language is a collection of regional and/or social varieties, one of which is accepted as standard". This definition poses its own problems by stressing the standardisation aspect, which might be problematic for minor languages lacking written forms, but it bars Scots from being classified as a language and thus puts it in the variant category, even though the European Bureau for Lesser-Used Languages considers Scots a language (Stuart-Smith 48-49) and Johnston ("Scottish English and Scots" 112) argues some speakers wielding both SSE and Scots are conscious of the bipolar nature of

Scottish English. That is to say they tend to be fully aware of the chosen form of speech, when they code-switch from one variety to another and thus deem Scots a separate language.

5.5 Scottish Gaelic

Next to English, another language can be heard in the Highlands and Islands, namely Scottish Gaelic. However, this remnant of the Celtic era is spoken by relatively few people. Interestingly, Scots spread very little throughout the north. Therefore its influence in those parts is only marginal as Gaelic was directly supplanted by southern English in 18th century, which is thus marked by the Celtic language (Macaulay 25). According to Stuart-Smith (50), only 1.8% of the Scottish population is bilingual in Gaelic and English, so the impact of the Celtic language upon local English is not examined here. For further discussion on Gaelic, see Bosch for the phonology of modern Gaelic and for other fields of study see Watson and Macleod.

6. Segmental Features of Scottish Standard English and Urban Scots

The following section examines segmental features of Scottish English. Firstly, the rather complex nature of the language is briefly covered. Secondly, the differences in vowels and consonants are tackled. Social aspects are mentioned where applicable with special emphasis on aspiration, which is investigated in the empirical part.

6.1 Scottish English as a Continuum

In its present state, Scottish English in the Lowlands occupies a far-reaching language continuum. It spans from SSE, to broad Scots. Some speakers have both of these forms at their disposal. In rural areas, switching between these variants should be rather conspicuous, whereas in urban areas it may go unnoticed as the distinction between them diminishes and their borders become fuzzy. Of course, middle class speakers fluent in Scots are able to code-switch between the two forms more discernibly than members of the working class, who tend to code-drift, i.e. mix the variants (Johnston, "Scottish English and Scots" 112). Therefore outlining the standard alone would result in the exclusion of the vernacular form, limiting the account to the speech of mostly middle or higher classes (Stuart-Smith 52). Consequently, the following chapter describes both SSE and Scots, albeit with the caveat of simplification which necessarily comes with such endeavour.

As for SSE, it shows little regional variation. Scots on the other hand is geographically divided into Southern or Border Scots, Central or Mid Scots, Northern Scots or Doric and Insular Scots (Wells 397). Urban Scots derives from the Mid variety and covers the Central Belt, which includes Glasgow and Edinburgh and it applies to around two thirds of the Scottish population. Thus, the following description concentrates on that variant with the focal point being Glasgow simply because the majority of research investigated Glaswegian and most of speech data was collected in Scotland's largest city (Stuart-Smith 51-52). For a rough outline of the other forms of Scots see Stuart-Smith (55-56) and for a more detailed analysis see Jones ("Regional Variation").

Fig6.1 Map of Scots variants
(Wells 398)

Throughout the following account of segmental features, General British is utilised as a reference point for comparison to SSE. The two standards are juxtaposed putting in practice the four classification criteria described above (see section 4). Subsequently, Scots is commented on where applicable. Of course, this is an artificial division. Speakers who have both options available alternate between the forms and may mingle them together. Therefore a

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reference to working class speech may often relate to SSE and Scots simultaneously (Johnston, "Scottish English and Scots" 112-113).

6.2 Vowels

As for systemic differences, the phonemic inventory of GenBrit incorporates these vowels (Cruttenden 97):

    o /ɪ, iː, e, ɛː, a, ɑː, ɒ, ɔː, ʊ, uː, ʌ, ə, ɜː, eɪ, aɪ, ɔɪ, əʊ, aʊ, ɪə, ʊə/

Whereas Scottish English contains at least these (Stuart-Smith 52):

    o /ɪ, i, e, ɛ, a, o, ɔ, u, ʌ, əi, ae, oe, ʌu/

SSE may further provide /ɒ, ɑ/ and possibly /ʊ/, but the last one seems rather unlikely (see 6.2.4).

The following table shows the lexical incidence of the vowels with the exception of [ʌi], which has not been mentioned so far. The vowel of PRICE is usually categorised as an allophone of /ae/ as they are in complementary distribution. Also /əi/ is not to be found in the chart as it ranks among the vowels of Scots. Some symbols vary between the standards to suggest different qualities of the speech sounds and the most common allophones may differ, e.g. the MOUTH vowel in GenBrit is represented as /aʊ/, but /ʌu/ in SSE (Cruttenden 49). More symbols delimited by a comma indicate possible alternatives.

T6.1 Lexical incidence of SSE and GenBrit
Based on Wells (123), Cruttenden (96-97) and Stuart-Smith (53-54)

Keyword	GenBrit	SSE	Keyword	GenBrit	SSE
KIT	ɪ	ɪ, e	FOOT	ʊ	u
BIT	ɪ	ɪ	GOOSE	uː	u
FLEECE	iː	i	BIRTH	ɜː	ɪ
DRESS	ɛ	ɛ	BERTH	ɜː	ɛ
NEVer	ɛ	ɛ, ë	NURSE	ɜː	ʌ
SQUARE	ɛː	e	CHOICE	ɔɪ	oe
STRUT	ʌ	ʌ	MOUTH	aʊ	ʌu
TRAP	a	a	NEAR	ɪə	i
PALM	ɑː	a	CURE	ʊə	u
BATH	ɑː	a	FACE	eɪ	e
START	ɑː	a	GOAT	əʊ	o
LOT	ɒ	ɔ	PRICE	aɪ	ʌi
CLOTH	ɒ	ɔ	PRIZE	aɪ	ae
THOUGHT	ɔː	ɔ	happY	i	e
NORTH	ɔː	ɔ	lettER	ə	ɪ, ʌ
FORCE	ɔː	o	commA	ə	ʌ

T6.2 demonstrates the lexical incidence of Urban Scots compared to SSE. The symbols used are actually of a more phonemic, i.e. descriptive, nature than in T6.1 since Scots shares its phonemic inventory with SSE, at least mostly. On the other hand, the actual incidence varies greatly, so for example SSE has [a] in START whereas Scots shows [ɛ̞] (Hughes et al. 128). The columns marked with the symbol '↔' denote the transition found in speakers from Glasgow. The symbol itself indicates possible alterations when speakers regularly utilise vowels from both varieties, e.g. the most likely adjustment for the mentioned set START is a switch between the Scots [ɛ̞] and a retracted version [a̠] of SSE [a] (Stuart-Smith 53):

T6.2 Lexical incidence of Urban Scots and SSE
Adapted from Stuart- Smith (54-55)

Keyword	Urban Scots	↔	SSE	Keyword	Urban Scots	↔	SSE
MEET	i	i	i	LONG	a̠	a̠ ↔ ɔ	ɔ̧
DEAD	i	i ↔ ɛ̧	ɛ	NEW	ʉ	ʉ	ʉ̠
EYE	i	i ↔ ae	ae	OUT	ʉ	ʉ ↔ ʌʉ	ʌʉ
MATE	e	e	e	COAT	o	o	o
BOTH	e	e ↔ o	o	COT	o	o ↔ ɔ	ɔ̧
DO	e	e ↔ ʉ	ʉ	CAUGHT	ɔ	ɔ ↔ a̠	ɔ̧
BOOT	ë	ë ↔ ʉ	ʉ	SNOW	ɔ	ɔ ↔ o	o
BIT	ë	ë	ɪ	HAND	ɔ	ɔ ↔ a̠	a
BET	ɛ̧	ɛ̧	ɛ	TRY	ae	ae	ae
START	ɛ̧	ɛ̧ ↔ a̠	a	PAY	əi	əi ↔ e	e
CUT	ʌ̈	ʌ̈	ʌ	BITE	əi	əi	əi
PULL	ʌ̈	ʌ̈ ↔ ʉ	ʉ̠	LOIN	əi	əi ↔ oe	oe
OFF	a̠	a̠ ↔ ɔ	ɔ̧	VOICE	oe	oe	oe
CAT	a̠	a̠	a	LOUP	ʌʉ	ʌʉ	ʌʉ

Keyword	Urban Scots	SSE
happY	e, ë	e
lettER	ʌ̈	ɪ, ʌ
commA	ʌ̈	ʌ

6.2.2 Scottish Vowel Length Rule

No item from the phonemic inventory of Scottish English is enhanced by additional length marks unlike GenBrit and most other accents for that matter. However, that does not mean there are no quantitative differences. Vowel duration is governed, at least somewhat, by the Scottish Vowel Length Rule (SVLR) or Aitken's Law (Wells 400). With the exception of /ɪ, ʌ/, all vowels are long when followed by /v, z, ð, r/ or in morpheme-final position (Aitken 3-9, 11-12). Thus /u/ in 'move' [muːv] is longer than in 'mood' [mud], word-medial /e/ in 'lace' [les] tends to be shorter when compared to word-final /e/ in 'stay' [steː] and similarly, the duration of the vowel in 'brewed' [bruːd] is greater than that of 'brood' [brud] due to being adjacent to a morphemic boundary.

Then again, Macafee (35) and even Aitken (9-11) himself state the rule in not in full effect in SSE and it fully applies only to some local varieties of Scots. According to Wells (401) some speakers even reduce the vowels Aitken's Law operates on just /i, u/. Stuart-Smith (57)

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mentions /i, u, ae/ and Johnston ("Scottish English and Scots" 114) notes a possible reduction just to the PRIZE and PRIZE vowels. However, the research of Aberdeen English by Watt and Yurkova (1523) showed ambiguous results with rather complex patterns, calling into question such a severe restriction of the rule. Additionally, open and open-mid vowels tend "to be at least half-long in much of central and southern Scotland before all voiced sounds" (Johnston, "Scottish English and Scots" 114). Macafee (35) also notes the secondary lengthening of stressed vowels in Glasgow and surrounding areas, which Johnston ("Scottish English and Scots" 114) limits to non-high vowels.

The titles of the upcoming sections are structured according to the following notation:

- use of lexical sets for vowels, e.g. KIT
- commas ',' separate related sets, usually splits and a hyphenation marks mergers, e.g. NORTH, FORCE and GOOSE-FOOT
- slashes '/' show a correlation between SSE and Scots sets, e.g. DRESS/BET
- semicolons ';' simply divide subsections

Additionally, for all vowel sections and some consonants, there can be found tables with examples. In these, underlined text stands for the features of interest and commas ',' delimit possible alternatives. The data for GenBrit and Scots was gathered from Oxford Dictionaries and Scots Online respectively.

T6.3 Scottish vowel length rule
Adapted from Wells (400-401)

Word	GenBrit	SSE, Urban Scots	Additional Notes
bid	[bɪd]	[bɪd]	
bead	[bi:d]	[bid]	
sleeve	[sli:v]	[sli:v]	vowel followed by /v/
agree	[əˈgri:]	[əˈgri:]	morpheme-boundary (word-final)
agreed	[əˈgri:d]	[əˈgri:d]	morpheme-boundary
greed	[gri:d]	[grid]	

6.2.3 KIT, BIT; DRESS/BET, NEVer

The realisation of the KIT vowel is determined socially, which applies to many other vowels as well. The educated variant tends to be akin to GenBrit raised and centralised cardinal [e] (Cruttenden 97). According to Wells (404), the lower class tend to prefer lower and retracted variants and in Glasgow, they show anything between [ɪ] and [ʌ], which also means it can be

pronounced quite similarly to [ə]. Yet Stuart-Smith (57) reports Glaswegian working-class boys show less retracted variants and conversely, younger middle-class speakers lower their pronunciation of the vowel, suggesting a possible assimilation. Scots BIT is generally articulated as [ɛ̈], but it may be more open and retracted, even to the point of merging with CUT (Stuart-Smith 57).

In GenBrit, the vowel of DRESS is very similar to the cardinal [ɛ] (Cruttenden 97). The SSE realisation [ɛ̣] is raised in comparison and the Scots articulation even more so (Johnston, "Regional Variation" 472; Stuart-Smith 57-58). For some speakers, Abercrombie (74, qtd. in Stuart-Smith 57) recognises a phoneme lying between [ɪ] and [ɛ], which is transcribed as /ɛ̈/ and used for the set NEVer. Yet its incidence is of an idiolectal nature, varying from one speaker to another. Those who do not distinguish /ɛ̈/ split the set between BIT and BET (Stuart-Smith 57-58; Wells 404).

T6.4 KIT, BIT; DRESS/BET, NEVer
Adapted from Wells (400-401, 404), Stuart-Smith (57-58)

Word	GenBrit	SSE	Urban Scots	Additional Notes
f<u>i</u>n	/ɪ/	/ɪ, ɛ/	/ɛ/	possible BIT-CUT merger for some Glaswegian speakers
fun	/ʌ/	/ʌ/	/ʌ/	
r<u>i</u>ver	/ɪ/	/ɪ/	/ɛ/	
s<u>e</u>ver	/ɛ/	/ɛ/	/ɛ/	
n<u>e</u>ver	/ɛ/	/ɛ/	/ɛ/	/ɛ̈/ for those who have it in SSE, BIT-BET split in Scots

6.2.4 Mergers – TRAP-PALM-BATH; LOT-CLOTH-THOUGHT/COT, CAUGHT; GOOSE-FOOT/OUT

Compared to GenBrit, SSE speakers often lack the distinction between TRAP and PALM resulting in /a/. Some of the Scottish, especially those from Edinburgh, may be able to produce /ɑ/ as well, although the lexical incidence differs from that of the southern standard. The realisation of /a/ varies considerably according to one's social position. Lower classes show a backer variant, while those from the higher strata a fronter one. The aforementioned Kelvinside (see 3) may display an even fronter [æ] (Macafee 35; Stuart-Smith 58; Wells 403).

Similarly, SSE usually merges the LOT and THOUGHT vowels, result of which is transcribed as /ɔ/, although it is realised as lowered [ɔ̞] when compared to GenBrit /ɔ:/, which tends to be raised (Cruttenden 97). The possibility of a contrasting /ɒ/ arises, but once again,

the incidence diverges from GenBrit. As for Scots, the corresponding COT and CAUGHT are split into [o] and [ɔ] (Stuart-Smith 58; Wells 402).

Wells (401-402) considers the FOOT-GOOSE merger to be "the most important characteristic of the Scottish vowel system" under which even higher class speakers operate. For some middle-class members, however, there is a low probability of a contrasting /ʊ/. The FOOT-GOOSE merger is unique to Scotland, Ulster and northern part of Northumberland (North East England) and Ulster (Northern Ireland) (Wells 402). Realisation of /u/ tends to be central [ʉ] or even fronter as opposed to the centralised, but still backer /u/ of GenBrit. In Scots, the FOOT and GOOSE sets are split into /ɛ, u, ʏ/ and /u, ʏ/ respectively. In regard to the social class, the fronter variants are found in lower classes and vice versa (Stuart-Smith 58-59; Cruttenden 97).

T6.5 TRAP-PALM-BATH; LOT-CLOTH-THOUGHT/COT, CAUGHT; GOOSE-FOOT
Adapted from Wells (396-397, 401-404) , Stuart-Smith (53-55)

Word	GenBrit	SSE	Urban Scots	Additional Notes
grass	/ɑ:/	/a, ɑ/	/a/	some SSE speakers may show /ɑ/ and upper-crust speakers may realise it as [æ]
value	/a/	/a, ɑ/	/a/	possible varying incidence for those who have /ɑ/
don	/ɒ/	/ɔ, ɒ/	/o/	SSE speakers may differentiate between /ɔ/ and /ɒ/
dawn	/ɔ:/	/ɔ/	/ɔ/	
watch	/ɒ/	/ɔ/	/o/	possible varying incidence for those who have /ɒ/
pull	/ʊ/	/u, ʊ/	/u/	unlikely FOOT-GOOSE split in SSE; the FOOT-GOOSE split in Scots
pool	/u:/	/u/	/ʏ/	
put	/ʊ/	/u, ʊ/	/ɛ/	

Abercrombie (77, qtd. in Stuart-Smith 58) argues the availability of the phonemes /ɑ, ɒ, ʊ/ is interconnected in that /ɒ/ implies the presence of /ɑ/ and /ʊ/ is accompanied by both /ɑ, ɒ/, but not the other way around. Carr and Brulard (39-40, 43) challenge this notion, claiming /ɑ/ and /ɒ/ are not conditioned in such a way. They link the acquisition of the contrasting vowels to the exposure to accents like GenBrit, mentioning that speakers with inconsistent rhoticity are more likely to adopt these phonemes.

6.2.5 Vowels followed by /r/ - NORTH, FORCE; NURSE, BIRTH, BERTH; SQUARE

Since Scottish-English is rhotic (see 6.3.1), unlike GenBrit it does not exhibit centring diphthongs (Stuart-Smith 56). Virtually unaffected by the subsequent /r/, the realisation of /ɔ/ in NORTH is very much like in THOUGHT, unless speakers have /ɒ/. Furthermore, most

Scottish speakers have not undergone the NORTH-FORCE merger. As a result, former has /ɔ/ and the latter set is pronounced with /o/ (Wells 408).

Where GenBrit shows /ɜː/, SSE allows for many possibilities due to its lack of the NURSE merger (Cruttenden 96). Stuart-Smith (56) proposes some speakers of the standard realise it as [ə]. Wells's (407) description is somewhat similar, suggesting "r-coloured [ɝ]" can be heard from middle-class speakers in Edinburgh and possibly elsewhere. The majority, who lack these options, may offer just /ɪ/ or /ʌ/ in all three sets while others show /ɛ, ʌ/ and some may even recognise all three phonemes /ɪ, ɛ, ʌ/ (Wells 407). Both BIRTH and NURSE are split between the BIT and CUT vowels. BERTH is divided amongst BET and BIT as well (Stuart-Smith 53-54).

SQUARE is usually monophthongised as [ɛː] in GenBrit, although older speakers may show the diphthong [ɛə] (Cruttenden 118). In SSE, /e/ prevails, yet there exists the possibility of the GenBrit pronunciation. Interestingly, Wells (408) remarks that could be due to the Irish and, according to Stuart-Smith (59), the same holds for Urban Scots, although in that scenario a raised variant [ɛ̝] is more likely.

An epenthetic /ə/, or a schwa-like sound, may emerge before /r/ in Scots as it is a stepping stone to r-vocalisation. The prospect of vowel-breaking, or diphthongisation, applies to close vowels and it occasionally occurs in the environment of preceding /n, l/ as well (Johnston, "Regional Variation" 455).

T6.6 NORTH, FORCE; NURSE, BIRTH, BERTH; SQUARE
Adapted from Wells (407-408)

Word	GenBrit	SSE	Urban Scots	Additional Notes
sh<u>or</u>t	/ɔː/	/ɔr, ɒr/	/ɔr/	lack of the NORTH-FORCE merger; some SSE speakers may show /ɒ/ in NORTH; FORCE may be split into /o/ and /ɔ/ in Scots
sp<u>or</u>t	/ɔː/	/or/	/or/	
h<u>ear</u>d	/ɜː/	/ɛr, ɜr/	/ɛr/	lack of the NURSE merger in Scottish English
b<u>ir</u>d	/ɜː/	/ɪr, ʌr, ɜr/	/ɛr, ʌr/	
h<u>ur</u>t	/ɜː/	/ʌr, ɜr/	/ʌr/	
p<u>ear</u>	/ɛː/	/er, ɛr/	/er, ɛr/	possibility of /ɛ/ in both SSE and Scots
<u>gear</u>	/gɪə/	/giːr/	/giər/	reasonably likely occurence of an epinthetic schwa before /r/ in Scots

6.2.6 FACE; GOAT

Whereas in GenBrit both FACE and GOAT are pronounced as diphthongs, that is /eɪ/ and /əʊ/ respectively, the Scottish usually show the monophthongs /e/ and /o/. Additionally, middle-class members may opt for variants similar to those of GenBrit. Scots can display closer vowels for the equivalent sets MATE, COT and CAUGHT (Stuart-Smith 59).

T6.7 FACE, GOAT

Word	GenBrit	SSE	Urban Scots	Additional Notes
sp<u>a</u>ce	/eɪ/	/e, eɪ/	/e/	middle class speakers may exhibit GenBrit diphthongs
n<u>o</u>te	/əʊ/	/o, əʊ/	/o/	

6.2.7 PRICE, PRIZE; CHOICE; MOUTH/OUT

The /ae/ phoneme shows two distinct allophones, namely [ae] and [ʌi], which are in complementary distribution, hence they are generally not considered phonemes. See Wells (405-406) for further discussion of this topic. Their occurrence is determined by Aitken's Law. Thus in GenBrit, both PRICE and PRIZE are homophonous, but the latter is realised as [ae] in Scottish English due to following the SVLR and the former displays [ʌi], which also means that due to Aitken's Law there is not only a quantitative difference, but also a qualitative one. As for variability on the social scale, Stuart-Smith (57) observes higher classes may merge the allophones together as [ae], in which case they tend to raise the first vowel while reducing the second element. Wells (405) notes working class speakers may realise PRICE as [ɛ̈ɪ], which is nearing the notation [əi] employed by Stuart-Smith (54).

Besides the standard realisation of CHOICE, which ranges from [əe] to [oe] (Macafee 35; Stuart-Smith 52-53, 55), Wells (406-407) suggests two additional possibilities. In non-final positions, some speakers merge the set with PRICE hence producing [ʌi] and others, particularly those from Clyde Valley, show a dissyllabic sequence.

The vowel of MOUTH is significantly marked by social stratification. Middle and higher class speech fluctuates between [ä̈ʊ], [ʌʉ] and [aʊ] whereas the lower strata prefer [ʉ], which is an influence from Scots (Macafee 35). The analogous OUT may also be advanced and unrounded. As can be expected, the stereotypical Scots form is avoided by mid-scale speakers. At the same time, working class occasionally show variants other than the Scots realisation of OUT (Stuart-Smith 59).

T6.8 PRICE, PRIZE; CHOICE; MOUTH/OUT
Adapted from Wells (405-406)

Word	GenBrit	SSE	Urban Scots	Additional Notes
s<u>i</u>de	[aɪ]	[ʌi, ae]	[əi]	Scottish English allophones of /ae/ in complementary distribution; middle class speakers may realise both as [ae]
t<u>ie</u>	[aɪ]	[ae]	[ae]	
t<u>oy</u>	/ɔɪ/	/ɔe/	/ɔe/	some Scottish speakers may produce a disyllabic sequence [to.ɪ] (the full stop symbol .' identifies a syllable boundary)
v<u>oi</u>ce	[ɔɪ]	[ɔe, ʌi]	[ɔe, əi]	possible CHOICE-PRICE merger in non-final positions
v<u>i</u>ce	[aɪ]	[ʌi]	[əi]	
h<u>ou</u>se	/aʊ/	/ʌu/	/u/	

6.2.8 Unstressed Vowels - happY, lettER, commA

In unstressed positions where GenBrit has /ə/, Scottish speakers may produce /ɪ/ in non-final environment, the realisation of which varies greatly and can be close to [ə]. However, some Scottish speakers differentiate between /ɪ/ and /ʌ/. In commA, there is a lower vowel, which is traditionally transcribed as /ʌ/. For speakers from Edinburgh, Wells (405) recognises /ə/ in both lettER and commA. As for happY, GenBrit shows /i/. Scottish English generally has /e/, although /ɪ/ and /i/ may be encountered, the latter especially in the north-east (Macafee 35; Wells 405).

T6.9 happY, lettER, commA
Adapted from Wells (405)

Word	GenBrit	SSE	Urban Scots	Additional Notes
lad<u>y</u>	/i/	/e/	/e/	
pil<u>o</u>t	/ə/	/ɪ, ə/	/ʌ/	lack of the NURSE merger in Scottish English, although some SSE speakers may show /ə/ like GenBrit
mann<u>er</u>	/ə/	/ɪr, ər/	/ʌr/	
mann<u>a</u>	/ə/	/ʌ, ə/	/ʌ/	

6.3 Consonants

The consonantal inventory of Scottish English includes two additional phonemes /x/ and /ʍ/. Thus the Scottish standard contains the following consonants (Johnston, "Scottish English and Scots" 112):

- o the approximant or the tap /r/
- o fricatives /f, v, θ, ð, s, z, ʃ, ʒ, x, h/
- o affricates /tʃ, dʒ/
- o nasals /m, n, ŋ/
- o the lateral /l/
- o semi-vowels /w, ʍ, j/
- o plosives /p b, t, d, k, g/

Since the consonantal system is much more stable than the vowel one, the agreement in incidence between SSE and Scots in that regard is much greater and similarly, the realisational differences are not as prominent (Johnston, "Scottish English and Scots" 112).

Some consonants are granted no further treatment throughout this section. These are considered very similar, if not identical, to their counterparts from GenBrit. Take h-dropping for instance. Like GenBrit, SSE and Urban Scots are not subject to this phenomenon with the exception of certain weak forms (Stuart-Smith 62).

6.3.1 /r/

As mentioned above, Scottish English is fully rhotic, i.e. /r/ is to be found in pre-consonantal and final positions as opposed to GenBrit, which does not show /r/ in these environments and thus falls into the non-rhotic category (Wells 410). Stuart-Smith (62) states that in her Glasgow corpus from 1997 "articulated /r/ made up around 90% of all variants for postvocalic /r/ in middle-class speakers" and the remaining 10% mainly consisted of unpronounced /r/ and vocalised variants. Similarly Macafee (32) describes r-loss in lower-class children from Edinburgh and adults from Glasgow.

There are various realisations of the consonant. In the early 20th century, the most frequent one was the trilled variant [r]. Today, [r] is perceived as stereotypical for Scottish English, even though the rate of its occurrence is reported to be very low as it is mostly used for emphasis (Johnston, "Regional Variation" 510; Macafee 32; Wells 410). Stuart-Smith (63) proposes that the most frequent variant among the working class appears to be the alveolar tap

[ɾ], while middle class speakers prefer either the post-alveolar approximant [ɹ] or the retroflex approximant [ɻ]. She also adds men seem to be more prone to r-loss and using the tap whereas women favour the approximants. Still, all speakers show all variants, just with varying incidence. In Urban Scots, R-vocalisation is increasingly common and while the tap [ɾ] outweighs the other variants of articulated /r/, the post-alveolar approximant [ɹ] seems to be making headway (Johnston, "Regional Variation" 511).

6.3.2 /x/

Wells (396, 408) notes that in SSE, /x/ is to be found just in proper names with Gaelic roots, words of Greek or Hebrew origin and loans from Scots, which shows the velar fricative much more frequently. Then again, Macafee (32) suggests the consonant is likely to merge with /k/. This is supported by Stuart-Smith et al. ("Talkin' Jockney" 239) revealing that "working-class adolescents used [k] almost exclusively in spontaneous speech". Yet they also describe how young middle class persist in realising it as [x] (249).

T6.10 /x/
Adapted from Wells (408)

Word	GenBrit	SSE	Urban Scots	Additional Notes
lo<u>ch</u>	/k, x/	/x, k/	/k/	middle class usually maintain /x/ whereas speakers of Urban Scots tend to merge it with /k/; even in GenBrit, the infamous word 'loch' can be expected with /x/
te<u>ch</u>nical	/k/	/x, k/	/k/	
Sau<u>ch</u>iehall	/k/	/x, k/	/k/	

6.3.3 /θ,ð/

Scottish English varies slightly in the incidence of the dental fricatives in comparison to GenBrit. Lexical items like 'thence', 'although, 'with' etc. display /θ/ instead of the voiced variant, which is encountered in most other accents (Wells 410).

Scots allows for many possible realisations of either of the fricatives. Macafee (33) proposes [h] for /θ/ and Stuart Smith et al. ("Talkin' Jockney" 252) report th-fronting as a common feature amongst working class adolescents. Additionally, Scots also exhibits the alveolo-palatal fricative and the voiceless alveolar approximant in initial /θr/ cluster as well as possible elision. All these alternatives constitute more than two thirds of the realisations of /θ/ (Stuart-Smith 61-62). The situation is not so radical in the case of /ð/. Still, it is frequently

pronounced as the alveolar tap [ɾ] or it may be dropped altogether. Less often, speakers show stopped variants and [v] in final positions (Stuart-Smith 61-62; Macafee 33).

6.3.4 /s, z/

The Scottish actor Sean Connery exemplifies fairly well the possible apico-alveolar realisation of /s/. Its voiced counterpart /z/ can be altered in the same manner (Johnston, "Regional Variation" 509). Stuart-Smith (62) states the use of this feature of Urban Scots could be determined by gender.

6.3.5 /w, ʍ/

Scottish speakers may differentiate between /w/ and /ʍ/, which also may be transcribed as /hw/ or even /xw/ if the initial element is conspicuous enough (Wells 408-409). The voiceless approximant generally appears in the sequence <wh>. However Stuart-Smith et al. ("Talkin' Jockney" 239) propose an ongoing merger with /w/, which is a feature of GenBrit. In their research, working-class adolescents showed mostly [w]. Young middle-class speakers merged quite often as well while only middle-class adults clearly preferred [ʍ].

T6.11 /ʍ/
Adapted from Wells (408)

Word	GenBrit	SSE	Urban Scots	Additional Notes
<u>wh</u>ich	/w/	/ʍ, w/	/w/	very likely merger of /ʍ/ and /w/ for Urban Scots, possible for SSE
<u>w</u>itch	/w/	/w/	/w/	

6.3.6 /j/

Yod-coalescence is less prominent in Scottish English than in GenBrit, so for example the cluster in /tj/ in nature remains [tj ~ ʔj] instead of being replaced by [tʃ] (Macafee 32-33). The semivowel is usually dropped after /s/ and /l/ (Wells 412). In Urban Scots, the sequence /hj/ may be realised as [ç] or [ʃ] (Johnston, "Regional Variation" 509).

T6.12 /j/
Adapted from Wells (412)

Word	GenBrit	SSE, Urban Scots	Additional Notes
<u>su</u>it	/s/	/s/	yod-dropping after /s, l/
so<u>l</u>ution	/l/	/l/	
sta<u>t</u>ue	/tʃ, tj/	/tj, tʃ/	limited yod-coalescence
na<u>t</u>ure	/tʃ/	/tj, tʃ/	

6.3.7 /l/

Both Scots and SSE show a velarized articulation [ɫ] for /l/, or 'dark l', in all positions and Stuart-Smith (63) mentions a possibility of a pharyngealised variant [lˤ]. Both forms bear a vocalic resonance (Johnston, "Regional Variation" 510). Speakers from higher classes may adopt the pattern of GenBrit, that is [l] in initial, post-consonantal and intervocalic positions and [ɫ] elsewhere (Macafee 33). Furthermore, there are two distinct variations of l-vocalisation. One stems from Scots and requires a preceding back vowel. "The result for present day Glaswegian Scots is a small set of lexically determined alternations" (Stuart-Smith et al., "L-vocalisation" 74), which are in such cases reflected in spelling. The other form of l-vocalisation mirrors the kind found in Cockney. What would be [ɫ] in GenBrit is realised as high back vowel (Stuart-Smith et al., "L-vocalisation" 78; Wells 258-259). Interestingly, working-class adolescents utilise both, with the former appearing mostly in spontaneous speech while the latter occurs in reading. Other speakers show this feature, but to a much lesser extent (Stuart-Smith et al., "L-vocalisation" 84; Stuart-Smith et al., "Talkin' Jockney" 236-237).

T6.13 /l/
Adapted from Stuart-Smith (63)

Word	GenBrit	SSE	Urban Scots	Additional Notes
<u>l</u>uck	[l]	[ɫ, l]	[ɫ]	dark l in all positions, although middle class may show a pattern following GenBrit
f<u>all</u>	[ɔːɫ]	[ɔɫ]	[ɔɫ]	
f<u>all</u>	-"-	-"-	[ɔo]	newer kind of l-vocalisation
f<u>all</u>	-"-	-"-	[ɔː]	Scots l-vocalisation, spelt 'baw'
<u>shoulder</u>	/ʃəʊldə/	/ʃoldr/	/ʃudr/	Scots l-vocalisation
<u>ball</u>	/bɔːl/	/bɔl/	/bɔl/, /bɔo/, /bɔː/	similar to 'fall', spelt 'faw' in Scots

6.3.8 /p, k, t, d/

Voiceless plosives are reported to show only a small degree of aspiration (see 7.4) throughout the Scottish English continuum (Wells 410). In all but initial position, glottaling is also possible for these consonants, particularly when final, but not equally for all the plosives. /p/ and /k/ are much less prone to be realised as [ʔ] than /t/ is, although they may be masked by glottal reinforcement (Macafee 33; Wells 410-411). Working class, especially adolescents, glottalise /t/ so frequently that Stuart-Smith (60-61) argues [t] is only an optional realisation

for them, while the glottal stop proves to be their norm and the opposite seems to apply to middle-class speakers. Yet another alternatives for /t/ are the alveolar tap and affricated [ts], but according to data from Stuart-Smith ("Talkin' Jockney" 237-238), occurrence of the former seems to be minimal and the latter is produced only by middle class adolescents. When pre-pausal, the voiceless stops can be ejective (Macafee 33). Finally, the articulation of /t, d/ may be dental in Scots (Johnston, "Regional Variation" 500; Wells 409).

T6.14 /p, t, k/
Adapted from Wells (410)

Word	GenBrit	SSE	Urban Scots	Additional Notes
pin	[pʰ]	[p, pʰ]	[p, pʰ]	possible lack of aspiration
spin	[p]	[p]	[p]	
nut	[t]	[t, ʔ]	[ʔ, t, t̪]	glottaling
nutty	[t]	[t]	[ʔ, t]	
happy	[p]	[p]	[p, pʔ]	possible glottal reinforcement

7. Aspiration and Voice-onset Time

7.1 Plosives

Plosives are produced in three phases. Firstly, the articulators move together in order to create a complete closure. In the case of /t, d/ the tongue touches the alveolar ridge in order to stop air from escaping. In the second stage, the egressive airstream is blocked by the obstruction, thus pressure in the oral cavity increases. In the case of voiced stops, vocal folds start vibrating at this point, although not necessarily throughout the whole stage. Accordingly, they do so for /d/ but not for /t/. The articulators are rapidly separated in the final phase and the accumulated air is suddenly released with an explosive sound (Cruttenden 162-166; Crystal 60). In the case of an incomplete closure, the resulting sound is pronounced like a fricative. Machač and Skarnitzl (32) regard this as spirantisation. If the articulators move apart too slowly, the plosive is either less prominent and co-occurs with a fricative sound or is realised as a fricative. In these cases we speak about affrication and frication respectively (Buizza and Plug 2). The distinction between the latter and spirantisation lies in the absence or presence of fricative noise during the second phase. It should also be noted, the burst can be multiple, inaudible, lateral or nasal. Additionally, the oral obstruction can be accompanied by a glottal closure, which leads to the above-mentioned glottal reinforcement (Cruttenden 169-172). Glottal stop falls within the broader category of stops. These include sounds employing sources other than the eggresive pulmonic airstream may not exhibit the explosion stage. Therefore, plosives are a more specific category (Crystal 60).

7.2 Aspiration

Cruttenden defines aspiration as "a voiceless interval consisting of strongly expelled breath between the release of the plosive and the onset of a following vowel" (164) and if a voiceless plosive precedes tautosyllabic /l, r, j, w/, then these are devoiced to allow for aspiration. An exception are clusters starting with /s/, i.e. /st, sp, sk/. These are always unaspirated, hence the feature can be perceived in 'pin' [pʰɪn], but not in 'spin' [spɪn].

7.3 Voice-onset Time and the Factors Affecting It

The interval of voicelessness ranges from the burst of a plosive to the start of voicing and is regarded as voice-onset time (VOT), a term coined by Lisker and Abramson ("Cross-Language Study of Voicing" 375-377). According to Cruttenden (164), the average VOT for English aspirated stops fluctuates between 40 and 75 ms. The value actually varies with each

plosive. Voiced stops usually show negative VOT, because their voicing tends to start before their explosion (Docherty et al. 592). Cho and Ladefoged (208) report that "the further back the closure […], the more extended the contact area […] and the [slower] the movement of the articulators, the longer the VOT" actually is. Nonetheless, Yang's (53) contrastive study of English and Korean plosives revealed a different pattern. His English subjects, seven American speakers, read a word-list that included both stressed and non-stressed tokens and they produced the highest mean for /t/:

T7.1 VOT according to the place of articulation
Yang (53)

sound	VOT
p	57 ms
t	95 ms
k	88 ms

Lisker and Abramson ("Cross-Language Study of Voicing" 394, 410, "Effects of Context on VOT" 17) measured the average VOT of plosives in isolated words and from longer stretches of speech, yet still scripted. Their results, based on four speakers of GenAm, are to be found in the following tables. Notice how the word-list items show higher values than the results for longer stretches of speech:

T7.2 VOT according to the place of articulation and the form of speech
Lisker and Abramson ("Effects of Context on VOT" 17)

sound	VOT
p	59 ms
t	67 ms
k	84 ms

source	VOT
word list	70 ms
scripted speech	41 ms

Besides the form of speech and the articulatory criteria mentioned above, VOT is affected by a plethora of other variables. It is of greater length in stressed syllables and shorter otherwise. Thus in the word 'potato' [pəˈtʰeɪtəʊ], all three plosives may be aspirated in GenBrit, but not equally. The stop in the second syllable is generally more aspirated than the other two, which may display VOT so short as to be considered unaspirated (Cruttenden 165-166). 'Unaspirated' is one of the four levels of aspiration recognised by Cho and Ladefoged (223) based on their cross-language study of VOT and it concerns values under 30 ms. The other categories are slightly aspirated plosives ranging from 30 to 50 ms, aspirated ones stretching towards 90 ms and highly aspired plosives, which show even greater values. The authors

themselves acknowledge this classification is highly artificial, i.e. even plosives labelled as unaspirated may show positive VOT values, yet too short to be perceptible under regular listening conditions. It is, however, helpful to have such a system at one's disposal, so when the term 'unaspirated' is utilised there on, it relates to the VOT below the 30ms threshold. An alternative terminology utilises the phrases short-lag for unaspirated stops, long-lag for aspirated ones and voicing lead for those with negative VOT (Docherty et al. 591-593).

As for other factors, Morris et al. (314-315) argue the sex of speakers does not significantly influence the length of VOT and possible divergence between males and females may be related rather to their speech rate, which also affects the realisation of plosives. In utterances nearing the rate of 6 syllables per second, frication seems more likely, whereas affrication usually occurs at rates below five syllables per second with aspiration somewhere in between those values (Buizza and Plug 25). Age also seems to be of importance as younger speakers generally have longer VOTs than older ones (Docherty et al. 594) and Morris et al. (311-314) note that the following speech sound plays a significant role in VOT length, so for instance /k/ tends to display greater values when preceding /i/ as opposed to /u/.

7.4 Aspiration in Scottish English

The role of aspiration in English, at least in some accents including GenBrit, is to aid the listener to discern between initial voiced plosives and their voiceless counterparts. A devoiced bilabial plosive [b̥] in 'bat' can closely resemble a short-lag [p] in 'pat', since /b, d, g/ are fully voiced only in medial positions and devoiced otherwise, although they retain their lenis character. Thus to differentiate the pairs, speakers may aspirate their voiceless stops (Cruttenden 5, 164).

However, Wells (409) and Cruttenden (178) report short-lag or only slightly aspirated /p, t, k/ for Lowland Scottish English. If, in fact, the voiceless plosives show only short-lag, their voiced counterparts may be pre-voiced as a counter-balance in order to retain their contrastive character (Watt 1521). On the other hand, Scottish Highlanders show strong aspiration, including post-aspiration of final plosives. This is probably due to the influence of Scottish Gaelic (Wells 409).

Yet Johnston ("Scottish English and Scots" 113) mentions that the lack of long-lag stops in Scottish English "is recessive" and "aspiration is creeping into the dialects of the Central Belt" (Johnston, "Regional Variation" 505, qtd. in Stuart-Smith 60). Watt and Yurkova (1522) actually found long-lag voiceless stops in speakers from Aberdeen, i.e. northern

Lowlands, and Docherty et al. (592) compared the varieties along the Anglo-Scottish border and concluded the analysed Scottish speakers realised voiceless plosives "predominantly with relatively long VOTs in the range that is associated with audible aspiration".

Empirical Part

8. VOT throughout the Central Belt of Scotland

Current research on Scottish English explores a great deal of segmental features of Scots and SSE. These accents are generally reported to show little or no aspiration, which translates into short voice-onset time. Yet VOT, one of the most scrutinised elements in phonetics (Skarnitzl 75), received little attention in regards to its variability in voiceless plosives. Stuart-Smith (60) notes that "[Glaswegian] speakers are less aspirated than typical Southern English English, but this has yet to be investigated acoustically". Accordingly, this study focuses on VOT of syllable-initial stressed voiceless plosives, which entails an acoustic analysis of seven Scottish speakers from the Central Belt.

8.1 Method

8.1.1 Recordings

The analysed recordings were acquired from The International Dialects of English Archive (Scotland). The website focuses on the accents of English, both native and foreign. Most of the material is accompanied by sufficient linguistic background of the speakers, so even though the authors mention the target audience are mainly actors and directors, many of the recordings are suitable for acoustic analysis. They consist of a text-reading and spontaneous speech, or at least semi-spontaneous as in prompted by a field-worker. The prompt to the latter seems to be related to languages, one's birthplace or travel as those are the topics that most of the speakers talk about.

As might be expected, the section of the website addressing Scotland holds the required data. More precisely, it contains 22 specimens of various Scottish accents (as of the day of writing). Out of the total, 12 originated in the Central Belt, however five of those were deemed unsuitable, either due to poor quality or they did not fit the target age group. Therefore seven is the final number.

This kind of source obviously poses its own drawbacks. Firstly, the data is distributed in regards to geography and time. If one was to focus on a finer variety, only Edinburgh for example, the already low number of available recordings would shrink even further. With the aim of this particular research in mind, this proves to be only a small caveat. The temporal variance, however, has to be taken into consideration. The recordings span across around a decade and a half. From a diachronic standpoint it seems rather unlikely that aspiration would

change in such a short period (Johnston, "Scottish English and Scots" 112), but this fact should be mentioned nevertheless.

Secondly, the material was recorded using various devices by different field-workers. This resulted in the aforementioned reduced selection owing to insufficient quality and the inability to affect the demography of respondents. Even the selected recordings display varying signal-to-noise ratio, which had to be accounted for during the analysis. Lastly, the scripted text does not specifically cater to the needs of this research. Luckily, the tally of tokens present is at least adequate for the scope of this paper (see T8.2).

8.1.2 Speakers

From this point onward, the speakers and the recordings are regarded as Sp1, Sp2 etc. The numbers are based on the date of the recording with the exception of two speakers. Although the exact dates are not known, these are most likely the two oldest recordings, thus they bear the labels Sp1 and Sp2.

All of the respondents were in their early 20's at the time of recording. A possible exception is Sp1 who might have been in her late teens. Similarly, all speakers either underwent undergraduate studies or were in the process of doing so bar Sp1, but based on the available data, she most likely also attended university at the time, although the possibility of secondary education cannot be excluded altogether. As for the geographic distribution of the speakers, see the following map:

Fig8.1 Geographical distribution of the selected speakers
generated with My Maps
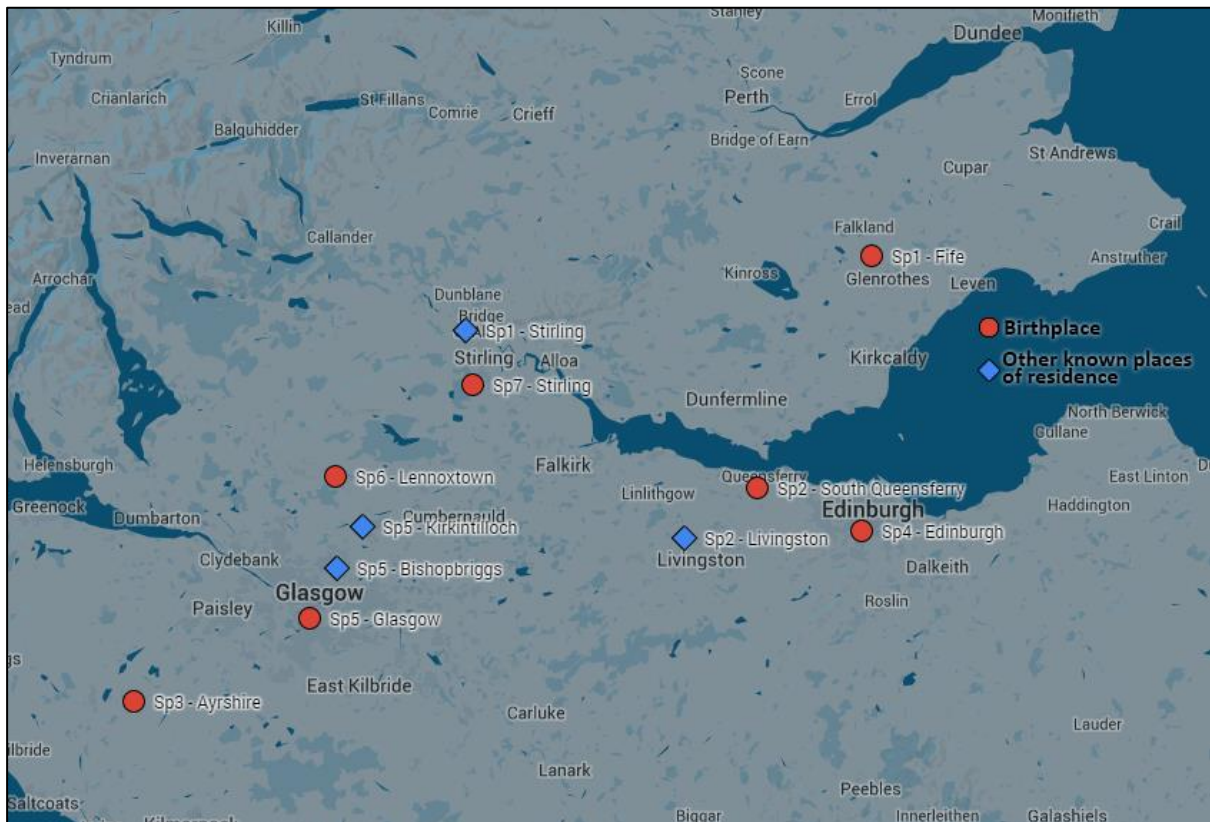
Sp1, Sp2 and Sp5 are known to have moved around the Central Belt. More importantly however, Sp4 and Sp6 headed south for their degree, more specifically Sp6 studied in Wales and Sp4 in Cambridge and afterwards Sp4 relocated to London where she met her London-born partner and as such, she is likely to display an anglicised accent. Additionally, few months prior to the recording Sp3, Sp5 and Sp6 stayed in the US where they took part in a university exchange programme. The length of the visit is unknown for Sp6, who is however likely to have been affected by his previous relocation to Wales. Sp3 was recorded after two months in the US and Sp5 after seven to eight months. In the case of the latter, an influence of GenAm seems plausible. This could be relevant mainly because both Welsh English and GenAm are generally described as showing aspiration (Lisker and Abramson, "Cross-Language Study of Voicing" 394; Penhallurick 161).

All the information about the speakers is summarised in the following table:

T8.1 Information about the selected speakers

Speaker	Year of birth	Year of recording	Age at the time of recording	Gender	Place of birth	Other known places of residence
Sp1	1980	?	20's	female	Fife	Stirling, Newcastle
Sp2	1982	?	late teens or 20's	female	South Queensferry	Livingston
Sp3	1980	2000	20	female	Ayrshire	Kansas
Sp4	1983	2007	24	female	Edinburgh	Cambridge, London
Sp5	1988	2008	20	male	Glasgow	Bishopbriggs, Kirkintiloch, Kansas
Sp6	1989	2009	20	male	Lennoxtown	Wales, California
Sp7	1988	2010	22	female	Stirling	

Speaker	Education	Occupation	Other linguistically relevant information
Sp1	university student in Newcastle	student	studied in Newcastle from 18
Sp2	most likely an university student	student, bank data input	
Sp3	university student	student	relocated to Kansas, US 2 months prior to the recording (exchange program)
Sp4	Arts degree from Cambridge	actress, writer	spent three years in Cambridge, at the time of recording lived in London and had a boyfriend from London
Sp5	university student	student	relocated to Kansas, US 7-8 months prior to the recording (exchange program)
Sp6	university student in Wales	student	when the recording was made, the speaker lived in California, US (exchange program)
Sp7	Arts degree	waitress	

8.1.3 Procedure

First of all, all the likely occurrences of stressed syllable-initial voiceless plosives were located within two possible reading texts. The two options were 'The Rainbow Passage' and 'Comma Gets a Cure', which is based on Wells's standard lexical sets (see Appendix 1 for both texts). Speakers 3 through 7 read out loud the latter, which happens to be the newer one

and comprises 38 instances of the analysed feature. Unfortunately, the remaining Sp1 and Sp2 were captured saying only a shortened version of the former, which contained only eight occurrences. Five of these were /p/, thus the analysis was limited to the bilabial plosive in these two cases as the chosen lowest threshold for examination was three occurrences.

An orthographic transcription was included with each recording (Scotland), so after determining the possible number of tokens for the scripted part of the recordings, the same process was repeated for the semi-spontaneous speech of each speaker. Understandably, the numbers of selected segments varied greatly, spanning from just six to 45. Therefore for Sp5, only /p/ was analysed in the second part of the recording and similarly for Sp2, just /t/ and /k/ were explored.

Then, the MP3 files were imported into Praat (version 6.0.04), which is an application for phonetic analysis. Each recording was labelled using the TextGrid capability of the software. For the purpose of this research, four tiers were created. First tier was utilised to separate reading from spontaneous speech, second to mark words of interest, third for the actual VOT measurements and fourth for any additional notes.

Fig8.2 TextGrid tiers
This screenshot and all other pictures were processed in Adobe Photoshop CC
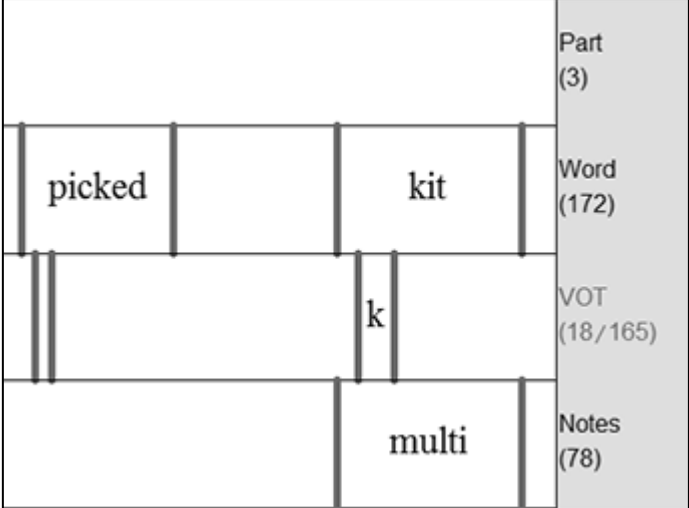
For each recording, the spontaneous speech and the reading were marked to begin with. Then, the recording was listened to using a pair of earphones (SoundMAGIC MP21) and the relevant words were labelled. The spectrogram was relied upon as the primary source of information for the identification of VOT. In uncertain situations, the waveform was utilised as well and listening was employed only for confirmation of boundaries, which had been already set.

Generally, VOT is measured in voiceless plosives from the onset of the burst to the onset of voicing, i.e. the first voicing bar in the spectrogram (Cho and Ladefoged 215; Docherty et al. 592; Morris 310). If there happens to be more than one release, the convention proposed by Skarnitzl (84) is followed, that is the first burst is marked as the onset of VOT. Two instances of easily identifiable VOTs follow:

Fig8.3 Canonical realisation
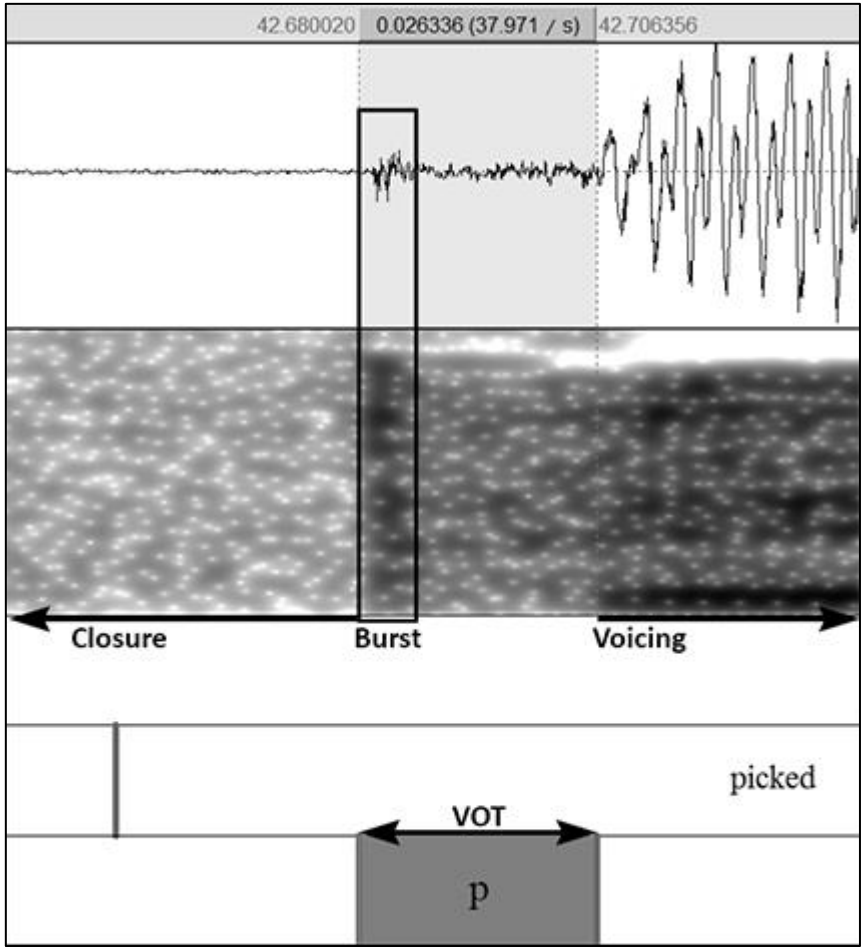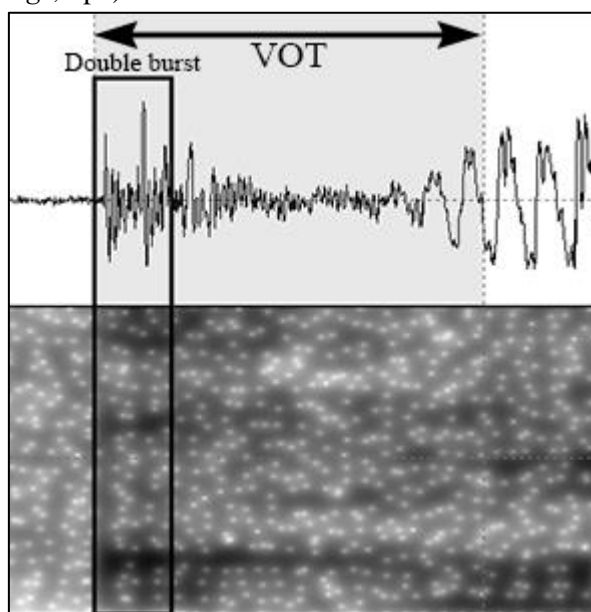a canonical realisation of /p/ ('*picked*', Sp4)

Fig8.4 Multiple burst
a double burst in /k/ ('*calling*', Sp7)

However, not every plosive is realised canonically. As described in 7.1 speakers may also show affrication or frication. An affricated plosive was measured in the very same manner as has been already outlined, i.e. from the burst to the start of voicing. The criterion for the offset of VOT was also shared with fricated stops, but the onset was treated differently. In such cases, the start of the fricative noise was considered as the beginning of VOT. For obstruent clusters Machač and Skartnitzl (101) propose the very system which is used here in all positions for fricated plosives. Additionally, they (42) recommend the "offset of full formant structure" as a segmentation rule for intervocalic fricatives. However, we are not concerned with segmentation as much as with duration, so this approach would have skewed the results significantly.

Fig8.5 Affrication; Frication
an affricated [tˢ] ('*treatment*', Sp7); a fricated [t̞] ('*times*', Sp4)
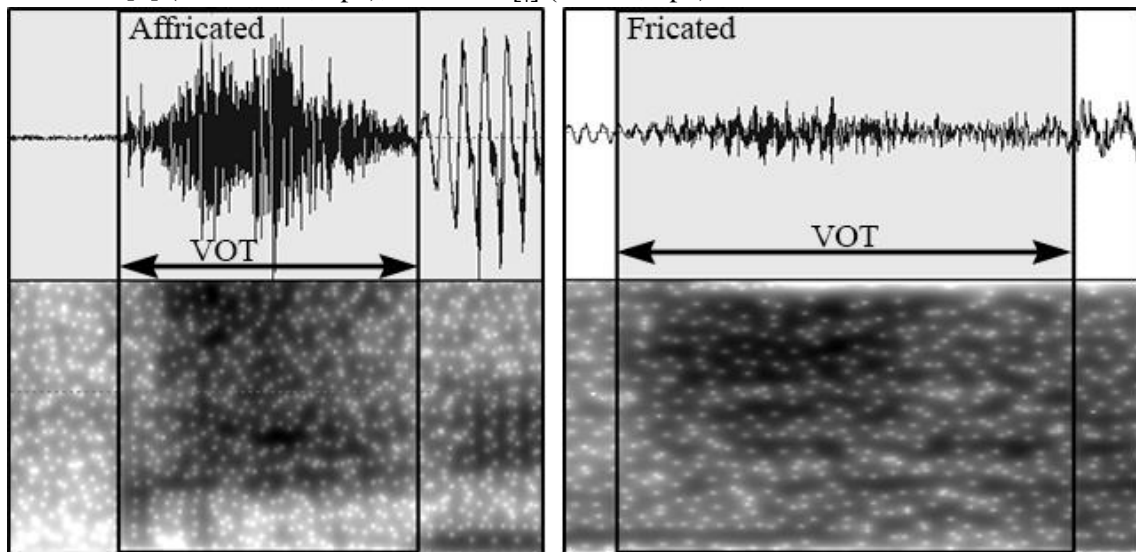
Nevertheless, there were cases with unrecognisable boundaries, e.g. a fricated stop preceded by a fricative. Such tokens were discarded.

Fig8.6 Unclear VOT onset
a discarded token due to its unclear onset ('*porridge*', Sp4)
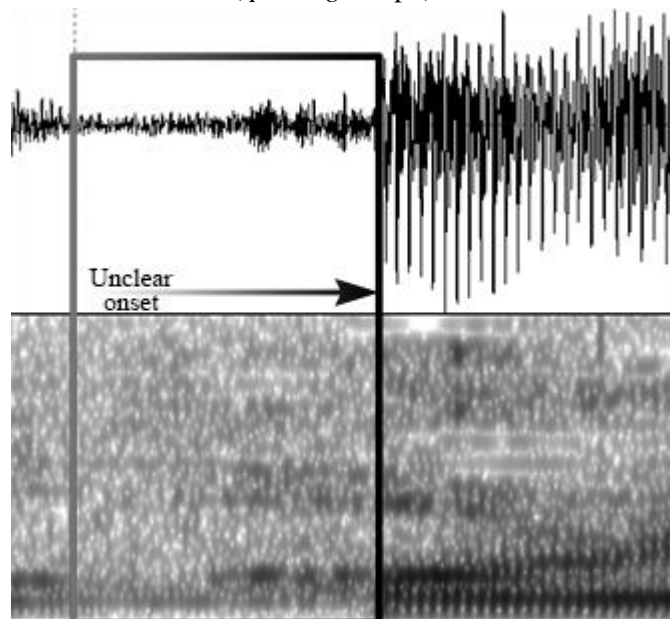
Finally, a Praat script was written in order to export the duration of the labelled segments (see the enclosed zip archive for the code of the script and the textGrids). Quite simply, it iterates through the items from the VOT tier and checks if the label value is not empty and its duration is converted to milliseconds. Subsequently, the appropriate 'word' and 'notes' labels are added based on their timestamp. The script then outputs all the information as a basic

CSV (comma-separated-values) file. The CSV file was then imported into Microsoft Excel 2010 for evaluation of the results.

As noted in 7.3, speech rate affects VOT. To account for that, an automatic analysis was carried out. Using Audacity (version 2.1.1), the recordings were split into their individual parts and saved as separate wav files. Subsequently, a Praat script (Praat Script Syllable Nuclei V2 - Speechrate) detecting syllable nuclei was executed. It finds all the peaks in signal which exceed a set threshold. Then it looks for dips in intensity to exclude multiple peaks within one nucleus and it discards non-voiced segments. For each file, the output of the process is a textGrid. Finally, based on the durational data from the textGrids, the script calculates the speech rate. Subsequently, the textGrids were checked for consistency and accordingly, the initial settings of the script had to be tweaked for Sp4 due to her careful enunciation. The final results were, once again, imported into Excel.

8.2 Research questions

These are the research question the empirical part aims to address:

- Did the selected speakers exhibit mean averages of VOT that fall within the unaspirated category or the opposite?
- Did the spontaneous speech data display lower VOT averages than the readings?
- Some speakers, namely Sp4, Sp5 and Sp6, are known to have come into long-term contact with accents that show aspiration. Did they show greater VOT values than the rest?

Based on the available data, as mentioned in section 7, the mean averages are expected to fluctuate around the 30 ms border between unaspirated and slightly aspirated plosives. Data gathered from text readings seem more likely to show higher VOT values as do Sp4, Sp5 and Sp6.

8.3 Results

The tables and graphs found below represent the results of the analysis. The first chart reflects the overall values. It includes the arithmetic means for all the voiceless plosives, both together and separately, as well as the sums of the appropriate tokens. Since just averages could deceive one into ignoring the actual range of values, the standard deviations for each category are also provided. Temporal data is supplied in milliseconds and rounded to two decimal places.

T8.2 Average VOT of all tokens

Sound(s)	Average	Standard deviation	Tokens
All voiceless plosives	60.24 ms	19.16 ms	352
p	52.29 ms	16.72 ms	122
t	70.88 ms	19.66 ms	89
k	60.41 ms	17.44 ms	141

However, T8.2 does not paint the whole picture as it does not account for different articulations. One of the unexpected outcomes of the analysis was the considerable number of non-canonical realisations. Out of the 352 selected tokens, 51 were affricated and 48 fricated and this does not include the discarded items. A substantial amount of those were fricated, but with an unclear onset of the noise component.

/t/ in particular showed a great deal of variation, which gains greater significance when one realises that affricated stops tend to be longer. On average, the canonical stops were shorter by almost 16 ms. For those reasons, the following tables contrast the variation between canonical, affricated and fricated /p, t, k/:

T8.3 Average VOT canonical plosives

Sound(s)	Average	Standard deviation	Tokens
All voiceless plosives	56.62 ms	19.16 ms	253
p	50.66 ms	16.72 ms	93
t	64.46 ms	19.66 ms	29
k	59.11 ms	17.44 ms	131

T8.4 Average VOT affricated and fricated plosives

Sound(s)	Average		Standard deviation		Tokens	
	Affricated	Fricated	Affricated	Fricated	Affric.	Fric.
All voiceless plosives	72.42 ms	66.41 ms	20.26 ms	20.71 ms	51	48
p	61.22 ms	55.59 ms	16.10 ms	14.53 ms	10	19
t	74.80 ms	72.60 ms	18.96 ms	23.56 ms	38	22
k	79.70 ms	76.34 ms	31.95 ms	9.35 ms	3	7

8.3.2 Reading and Spontaneous Speech

T8.5 and T8.6 exemplify the divergence between the scripted and the spontaneous speech. The charts contrast the two categories for all tokens and canonical realisations. Notice, that with the exception of /t/, spontaneous speech shows greater averages. See Appendix 2 for the results in regard to affricated and fricated plosives and for a representation of the lowest and highest measured VOTs.

T8.5 Comparison of reading and scripted speech - all tokens

Sound(s)	Average		Standard deviation		Tokens	
	Reading	Spont. speech	Reading	Spont. speech	Reading	Spont. speech
All voiceless plosives	59.48 ms	61.22 ms	18.85 ms	19.50 ms	198	154
p	50.56 ms	60.56 ms	16.02 ms	17.39 ms	73	49
t	71.90 ms	60.03 ms	16.65 ms	24.41 ms	59	30
k	58.25 ms	63.10 ms	17.51 ms	17.15 ms	66	75

T8.6 Comparison of reading and scripted speech - canonical plosives

Sound(s)	Average		Standard deviation		Tokens	
	Reading	Spont. speech	Reading	Spont. speech	Reading	Spont. speech
All voiceless plosives	55.94 ms	57.51 ms	17.26 ms	17.10 ms	143	110
p	50.20 ms	51.45 ms	16.69 ms	16.95 ms	59	34
t	67.35 ms	58.05 ms	10.51 ms	20.93 ms	20	9
k	50.20 ms	60.51 ms	17.33 ms	15.74 ms	64	67

8.3.3 Individual Speakers

This section firstly lays out the graphical representations of both analysed speech forms for all seven speakers. However only canonical realisations are taken into consideration as the alternative articulations would distort the results (see the excel document from the enclosed zip file for more detailed tables and statistics). Similarly to the data presented above, Gr1 and Gr2 display means and standard deviations. If a sound is omitted, the speaker in question did not produce any canonical realisations of the variable and if there are no deviation bars, there was only one example.

Sp7 showed the lowest mean VOT in both parts of the recording. She was the only one whose average dropped below 50 ms, although only in scripted speech. The rest fluctuated between 50 and 60 ms with the exception of Sp1 and Sp6. The former surpassed 60 ms in spontaneous speech and the latter exceeded the threshold in both parts. Nevertheless, Sp6 corrected himself a great deal due to many mispronunciations. Many of the subsequent repeated phrases were more emphatic and thus showed longer VOT, e.g. mispronounced /k/ in 'Comma' lasted 65 ms, but the following correction was stretched to 93 ms.
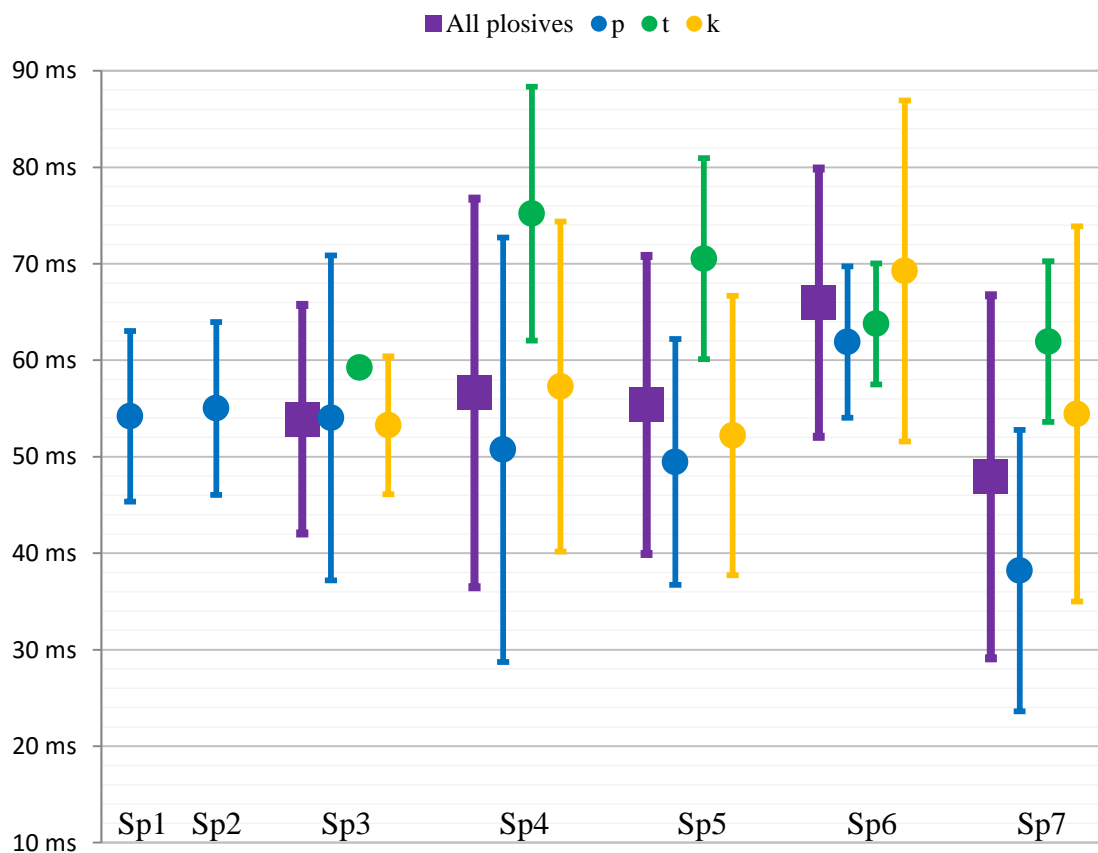
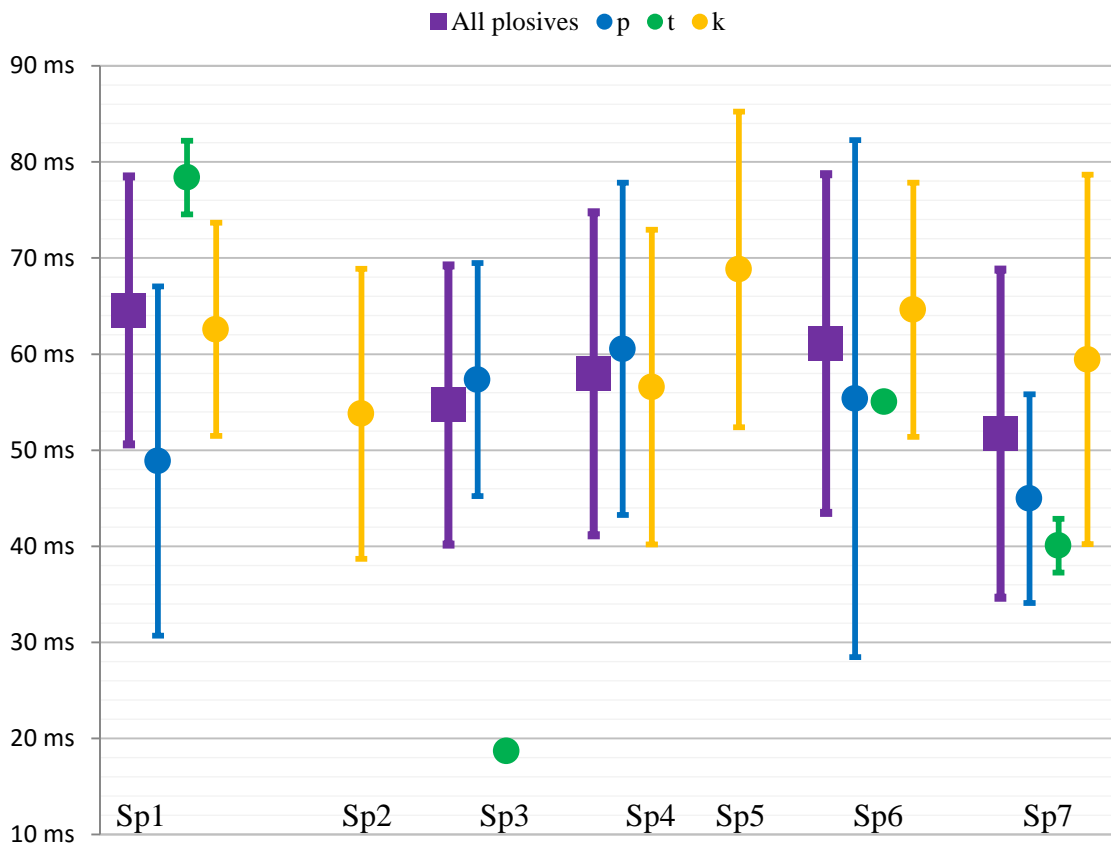Fig8.7 Reading - canonical realisations of all speakers

Fig8.8 Spontaneous speech - canonical realisations of all speakers

Sp2 and Sp3 - the 'Sloppy' Speakers

Sp2 and Sp3 produced the highest percentage of non-standard forms. Whereas Sp3 articulated non-standard variants in almost half of all of her stops, Sp2 realised all instances of /p/ canonically in the reading as did Sp1. This is not too surprising, however, as velar and bilabial plosives show much less frication and affrication than the alveolar stop.
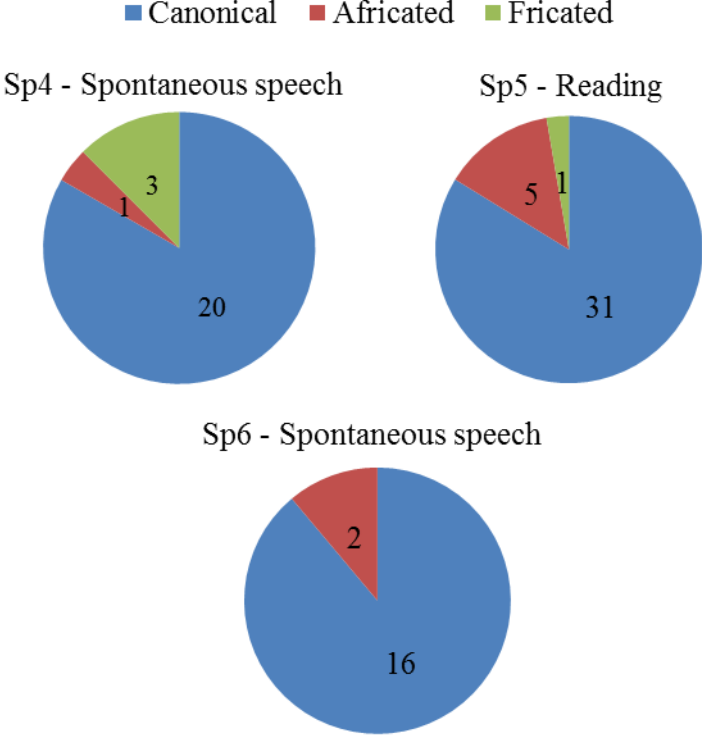
Fig8.9 Mostly non-canonical realisations
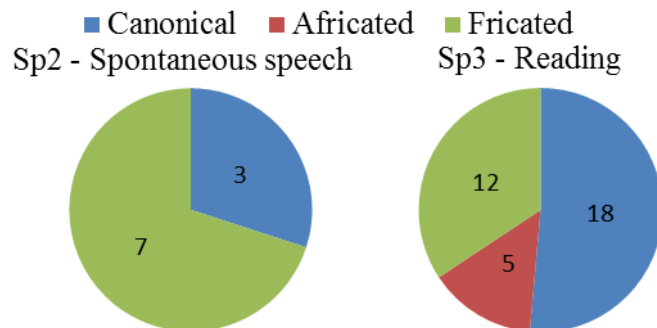
Sp4, Sp5 and Sp6 - the 'by the Book' Speakers

On the other hand, speakers 4 through 6 released the majority of their plosives canonically in both scripted and spontaneous speech. The rest, i.e. Sp1 and Sp7, lie somewhere in between these two groups.

Fig8.10 Primarily canonical realisations

8.3.4 Speech Rate

The VOT data presented above were not normalised for varying speech rate. To rectify that, speech rate was automatically measured (see 8.1.3) and even though the resulting readings were not exact in terms of the actual numbers, the final temporal ratios were accurate. Thus, the measured speech rate was transformed into percentages, where the fastest speech represented 100 %, and the remaining values were calculated proportionally.

The tempo of Sp6 was significantly lower than other speakers and conversely, Sp7 showed a fairly high speech rate. This sheds some light on the differences in VOTs between these speakers. If they had spoken at the same pace, their VOT means would most likely be closer (Kessinger and Blumstein 125-126; Morris et al. 314-315).

Fig8.11 Speech rate

● Reading   ● Spontaneous speech
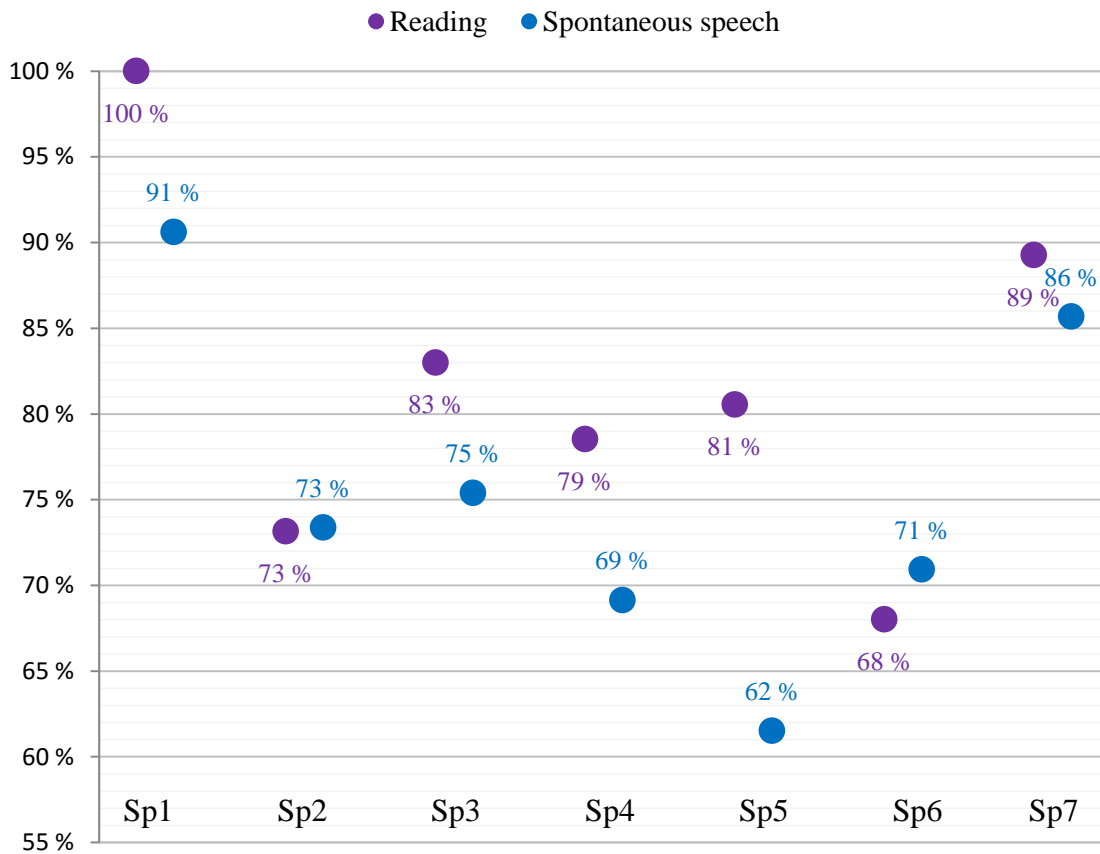
8.4 Discussion

The results imply that the selected speakers show not only slightly aspirated voiceless plosives in stressed syllables, but they actually approach the aspirated category and Sp1 and Sp6 exceeded the 60 ms threshold. To contrast, the VOT values from Yang (see T7.1) from seven American speakers are significantly higher. Of course, Yang's method utilised word-list reading, so differences are to be expected. As for spontaneous speech, Buizza and Plug measured mean 94 ms for [tʰ] in GenBrit speakers whereas the sample of this research showed 58 ms (see T8.3). This is in line with Stuart-Smith (60) in saying that Glaswegian is less aspirated than the Southern standard, but it defies the notion of no or just very minimal aspiration in Scottish English.

The initial expectations laid out in 8.2 were surpassed by a wide margin. Of course, several factors were in favour of higher VOTs. Firstly, the sample comprised only respondents aged below 30. Secondly, with the possible exception of Sp1, all the speakers attended university. While not necessarily indicative of their class or speech patterns, the level of their education puts the speakers nearer to SSE on the Scottish English continuum. Both of these aspects generally lead to longer VOTs.

Similarly surprising were the differences between the means for scripted and spontaneous speech (see 8.3.2). The latter actually showed higher averages for /p/ and /k/ in all realisations and vice versa for /t/. In Sp1, Sp3, Sp5, Sp6 and Sp7, this seems to coincide with their speech rate, thus slower tempo in spontaneous speech was translated into higher VOTs of their canonical articulations of /p, k/. There did not seem to be a corresponding pattern for the affricated and fricated alternatives.

As for the influence coming from other accents, only Sp6 produced notably higher VOT average. The cause could have been the relatively long-term exposure to the Welsh and American varieties of English. However, he also showed lower speech rate than most others and mispronounced a notable number of tokens, many of which were emphasised when the speaker corrected himself. Consequently, the evidence was deemed inconclusive.

9. Conclusion

This paper was penned with two main objectives in mind. Firstly, it described the Scottish English continuum and secondly, it focused on the acoustic analysis of voice-onset time in /p, t, k/. The introductory part briefly outlined some basic terminology relevant for the comparison of accents and summarised the history of Scotland with regard to the origins and evolution of Scottish Standard English and Scots. The former and the urban variant of Scots were then contrasted to General British in order to supply an account of their segmental features. Aspiration, which is often reported to be absent from Scottish English, was highlighted since it is the subject matter of the practical part.

The analysis dealt with VOT and the realisations of stressed voiceless plosives. For that purpose, the previously selected recordings of seven speakers from the Central Belt were scrutinised in order to determine their VOT means in both spontaneous speech and reading. The results surpassed the expected outcome. Only one speaker showed average VOT in canonical realisations shorter than 50 ms and that could be most likely attributed to her comparatively high speech rate. In any case, all of the subjects aspirated the majority of their stressed voiceless stops. Also rather surprisingly, spontaneous speech exceeded reading in the duration of canonical /p,k/, which is also most likely related to the tempo of the speakers. Lastly, the recordings contained a high number of non-canonical realisations of the voiceless plosives. Affricated and fricated stops amounted to 28 % of all tokens, but /t/ was the most prominent in that respect as only one third of it was articulated canonically.

The results offer answers to most of the inquiries from 8.2, but raise additional questions and thus suggest topics for future research. The effects of different forms of speech on VOT could be examined by adding a word-list reading next to a text reading and spontaneous speech. Unstressed syllables could also be a part of the equation. Furthermore, working class speech could be measured to determine possible social differences and the proportion of non-canonical realisations seems worthy of exploration as well. Of course, these research questions would necessitate a much larger and more controlled sample.

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Sources of the Recordings

The recordings were obtained from IDEA. The website states the following copyright information: "Consistent with fair-use law, you may cite the URL of an IDEA sample in any book, article, paper, training manual, or lecture, etc., without special permission, though you may not include a hard copy or digital file without special permission and the payment of an appropriate fee" (IDEA International Dialects of English Archive). Therefore, only the links to the recordings are provided:

Sp1
http://www.dialectsarchive.com/scotland-4

Sp2
http://www.dialectsarchive.com/scotland-5

Sp3
http://www.dialectsarchive.com/scotland-3

Sp4
http://www.dialectsarchive.com/scotland-16

Sp5
http://www.dialectsarchive.com/scotland-17

Sp6
http://www.dialectsarchive.com/scotland-18

Sp7
http://www.dialectsarchive.com/scotland-21

Appendices

Appendix 1: Reading texts

Both of the texts were obtained from IDEA (IDEA International Dialects of English Archive).
Underlined items mark potential tokens.

Comma Gets a Cure

Well, here's a story for you: Sarah Perry was a veterinary nurse who had been working daily at an old zoo in a deserted district of the territory, so she was very happy to start a new job at a superb private practice in North Square near the Duke Street Tower. That area was much nearer for her and more to her liking. Even so, on her first morning, she felt stressed. She ate a bowl of porridge, checked herself in the mirror and washed her face in a hurry. Then she put on a plain yellow dress and a fleece jacket, picked up her kit and headed for work.

When she got there, there was a woman with a goose waiting for her. The woman gave Sarah an official letter from the vet. The letter implied that the animal could be suffering from a rare form of foot and mouth disease, which was surprising, because normally you would only expect to see it in a dog or a goat. Sarah was sentimental, so this made her feel sorry for the beautiful bird.

Before long, that itchy goose began to strut around the office like a lunatic, which made an unsanitary mess. The goose's owner, Mary Harrison, kept calling, "Comma, Comma," which Sarah thought was an odd choice for a name. Comma was strong and huge, so it would take some force to trap her, but Sarah had a different idea. First she tried gently stroking the goose's lower back with her palm, then singing a tune to her. Finally, she administered ether. Her efforts were not futile. In no time, the goose began to tire, so Sarah was able to hold onto Comma and give her a relaxing bath.

Once Sarah had managed to bathe the goose, she wiped her off with a cloth and laid her on her right side. Then Sarah confirmed the vet's diagnosis. Almost immediately, she remembered an effective treatment that required her to measure out a lot of medicine. Sarah warned that this course of treatment might be expensive-either five or six times the cost of penicillin. I can't imagine paying so much, but Mrs. Harrison-a millionaire lawyer-thought it was a fair price for a cure.

The Rainbow Passage

The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

Appendix 2: Further tables - reading contrasted to scripted speech

TAppend2.1 Comparison of reading and scripted speech - affricated plosives

Sound(s)	Average		Standard deviation		Tokens	
	Reading	Spont. speech	Reading	Spont. speech	Reading	Spont. speech
All voiceless plosives	71.87 ms	73.21 ms	17.27 ms	23.87 ms	30	21
p	45.67 ms	67.89 ms	6.75 ms	14.24 ms	3	7
t	74.24 ms	76.01 ms	15.59 ms	24.69 ms	26	12
k	89.02 ms	75.04 ms	x	38.28 ms	1	2

TAppend2.2 Comparison of reading and scripted speech - fricated plosives

Sound(s)	Average		Standard deviation		Tokens	
	Reading	Spont. speech	Reading	Spont. speech	Reading	Spont. speech
All voiceless plosives	64.90 ms	68.05 ms	21.58 ms	19.59 ms	25	23
p	53.80 ms	58.04 ms	13.35 ms	15.67 ms	11	8
t	74.23 ms	70.24 ms	23.52 ms	23.41 ms	13	9
k	65.69 ms	78.12 ms	x	8.94 ms	1	6

TAppend2.3 VOT extremes in reading and spontaneous speech

Sound(s)	Minimum		Maximum		Tokens	
	Reading	Spont. speech	Reading	Spont. speech	Reading	Spont. speech
All voiceless plosives	11.63 ms	17.53 ms	115.52 ms	128.57 ms	198	154
p	13.10 ms	17.53 ms	86.99 ms	99.07 ms	73	49
t	37.19 ms	18.70 ms	115.52 ms	128.57 ms	59	30
k	11.63 ms	22.40 ms	97.38 ms	115.43 ms	66	75