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Bakalářská práce

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Differences in Vowel Duration between Scottish English and Standard British English

Odlišnosti trvání vokálů mezi skotskou angličtinou a standardní britskou angličtinou

Vedoucí práce:

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I declare that the following BA thesis is my own work for which I used only the sources and literature mentioned, and that this thesis has not been used in the course of other university studies or in order to acquire the same or another type of diploma.

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Abstract

The aim of this thesis is to investigate the differences in vowel duration between the Received Pronunciation and Standard Scottish English. The theoretical part is concerned with the description of phonological systems of RP and SSE, and with the comparison of these two inventories. The second part of this thesis processes the sound material from six British and six Scottish speakers, and statistically analyzes the obtained data.

Keywords: English, accent, RP, Standard Scottish English, SVLR, vowel length

Abstrakt

Cílem této práce je prozkoumat rozdíly v trvání vokálů mezi standardní Britskou angličtinou a standardní Skotskou angličtinou. Teoretická část této práce se zabývá popisem fonologických systémů obou variet a následným porovnáním těchto systémů. Ve druhé části dochází k analýze zvukových nahrávek šesti britských mluvčích a šesti skotských mluvčích a následnému statistickému zpracování získaných dat.

Klíčová slova: Angličtina, přízvuk, RP, Skotská angličtina, SVLR, trvání vokálů

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1 Introduction

There have been many studies investigating accents of English and their phonological properties. The present thesis examines the differences in vowel duration between Standard Scottish English and Standard British English. It is a truth universally acknowledged that Standard Scottish English treats the vowel length differently than British English. This thesis will examine the vowel duration in both accents with respect to their phonological systems and the so called Scottish Vowel-Lengthening Rule that is applied only to certain environments in Scottish English.

The thesis is divided into two parts. The first part describes a theoretical background that is necessary for the subsequent experiment. The first two sections deal with varieties in the British Isles in general and define essential terms like ‘dialect’ or ‘accent’. The following section is dedicated to the concept of Received Pronunciation and its phonological necessities. Section 2.3 is concerned with Standard Scottish English. This section also deals with the question of Scots and Standard Scottish English, their co-existence in Scotland and its consequences resulting in difficulties with the phonemic inventory. Finally Section 2.4 provides the comparison of the phonological systems of British and Scottish English that is necessary for the subsequent data analysis.

The second part describes the data and its analysis used, and inspects the differences in vowel duration. Chapter 3 further defines the data and the sound materials. The introductory section provides information about the speakers and the process of recording. Section 3.2 is concerned with the data processing. Following section deals with the statistical analyses that needed to be carried out to evaluate the data properly.

Chapter 4 presents the results of the data analysis. In the introductory section the general overview is provided. The following three sections inspect the individual vowels and provide figures and statistical evaluation. Finally, Chapter 5 discusses the results outlined in the previous chapter and also attempts to explain the results of the experiment.

2 Theoretical Background

2.1 Varieties of English in the British Isles

There are regional variations of English all over the world. The United Kingdom especially is well known for its language diversity. In order to discuss varieties of English in Great Britain we should define this area geographically. Kortmann (2004: 25) divides Great Britain as follows: "'The British Isles' is a geographical term which refers to the two large islands that contain the mainlands of Scotland, Northern Ireland, the Irish Republic, Wales, and England, together with a large number of other, smaller islands that are part of the territories of these countries." This rough division into five main areas does not fully correspond with the large number of English accents and dialects present in this area. To be able to continue with the description of the varieties of English several terms should be defined. Firstly there is a difference between the terms accent and dialect. Trudgill (1994: 7) points out that the term 'accent' refers to pronunciation whereas the term 'dialect' refers to the grammatical forms and regional vocabulary with pronunciation being a part of it. The same distinction is made also by Wells (1982) who points out that the term 'dialect' is often incorrectly used to refer only to pronunciation and he thus suggests adopting the neutral term 'variety'. In this thesis we follow the distinction made by Trudgill and Wells; when talking about pronunciation features the term accent will be used.

Concerning the accents within the British Isles Wells (1982) recognizes two main areas a) England further divided into RP, London, The South, and The North varieties, and b) The Celtic Countries divided into Wales, Scotland, and Ireland. These areas represent a large number of varieties that can be further classified either by the social or regional means. [1]

The isoglosses separating various accents are not clear though. As Kortmann (2004: 26) points out: "[We should not think] that all speakers in one place use the same set of features with the same level of intensity, if they use them at all. It is to be expected that some speakers [...] will fairly consistently exhibit a set of features which most closely conform to a characteristic local way of speaking..." The speakers thus may or may not use the features typical of their area or variety. Even though the accent borders are not clear the data collected

[1] More e.g Kortman (2004)

in order to inspect the features of different varieties have provided a set of variations characteristic for various accents.

2.2 Accent characterization

Certain accents have a special position in that they are regarded either tacitly or explicitly, as standard. (Wells, 1982: 34). In Great Britain the standard is called RP – Received Pronunciation. Trudgill (1994: 5) further defines a standard as the dialect with greatest prestige. A standard has, according to Trudgill, "...slightly different forms in different parts of the English-speaking world. Wells (1982: 34) mentions that a standard accent is generally considered correct, and it is held up as a model of how one ought to speak. Any non-standard accent, on the other hand, will tend to have associations of provinciality and/or lower status. We will not discuss the notion of provinciality but we will rather focus on how accents can differ in general and we will inspect one of the features in particular.

It should be pointed out that the term 'standard accent' does not refer to a specific regional variety but rather to an artificial construct based on the most popular and prestigious accent. Trudgill (2008: 6) specifies: "... the RP accent has its origins in the south-east of England, but it is currently a social accent associated with the BBC, the public schools in England, and with the members of the upper-middle and upper classes." There is Standard English with its Received Pronunciation (standard accent). Since we are focusing on the problems of pronunciation we will be dealing only with accents as such and leave morphological, syntactical, and lexical features behind.

Accents may differ both at a segmental and a suprasegmental level. Wells (1982) mentions these levels: phonetic realization, phonotactic distribution, phonemic systems, lexical distribution, rhythmical characteristic, intonation, and voice quality. *Phonetic realization* may provide a difference in phonetic detail – in the phonetic realization of given phoneme (Wells, 1982). This category describes both vowels and consonants and will be further analyzed in the following chapters. Accents may also differ in *phonotactic distribution* which describes the environment in which certain phonemes can or cannot occur. *Phonemic system* describes a list of phonemes of a particular accent. Where one accent has two distinct vowels or consonants, a single phoneme may correspond to those two in another accent. As an example of *lexical*

distribution Wells (1982) provides the pronunciation variants of words "either" and "neither" where the initial syllable can be pronounced either with diphthong or with a long front closed vowel [aɪðə] or [iːðə] [naɪðə] or [niːðə]. Concerning *rhythmical characteristic* Wells (1982) mentions suprasegmental features of speech such as rhythm, stress, intonation, and voice quality. David Britain: (2007: 68) defines suprasegmentals as: "...aspects of speech which extend over domains larger than single segments. They include intonation, rhythm and vocal settings." Cruttenden (2008: 51) points out that the features of pitch, length and loudness may contribute to patterns which extend over larger chunks of utterance than a single segment, and when used this way are called suprasegmental or prosodic. Features of length must be paid greater attention since this thesis deals with differences in vowel duration between RP and Scottish English. Before doing so several more terms must be discussed and defined. Firstly RP and Scottish English and their phonemic systems in general must be properly defined. Secondly the features of vowel duration, their effect on segments and their connection to word stress should be discussed before the acoustic analysis of the data will be carried out.

2.3 RP

As it was already mentioned RP is a standard accent of British English. It is spoken throughout the British Isles and taught at schools and learned by L2 learners. Concerning the development of RP it became more widely known and accepted through the advent of radio and television (Cruttenden, 2008: 77). Because of its use in media this accent is also known as BBC English. Concerning its role as a standard Cruttenden (2008: 77) claims that a certain types of regional accent are established as alternative standards (e.g. pronunciation used in large towns or Standard Scottish English which will be dealt with in following Sections). Cruttenden (2008) distinguishes three main types of RP in order to capture the different pronunciation features present in this accent. He names General RP, Refined RP and Regional RP. Refined RP is commonly considered to be upper-class while regional RP reflects regional rather than class variation and will vary according to which region is involved. These three types of RP are not considered to be 'proper' accents but variation within RP itself can reflect the fact that there is greater tolerance and acceptance of dialectical variation than it used to be (Cruttenden 2008: 78). Various authors approach the RP classification differently. For example Wells (1982) distinguishes mainstream RP, which corresponds with Cruttenden's General RP, and then he lists "U-RP" – upper-class RP, and thirdly Near-RP. We will not be

dealing with phonetic variation among these types of RP. There are certain social stereotypes connected with each RP pronunciation type. Intention of this thesis is not to provide further explanation concerning the topic of stigmatization of various types of RP. This thesis aims to describe the phonemic system of General RP which is found in the vast majority of English textbooks and works that are dealing with RP and its pronunciation. We will focus mainly on the vowels of RP.

2.3.1 Phonemic System of RP

The aim of this section is to describe the vowels of RP via The International Phonetic Alphabet (hereafter as IPA) and standard lexical sets that are used for example in Wells (1982). Firstly the IPA charts of consonants and vowels will be provided because phonetic symbols will be used throughout this thesis.

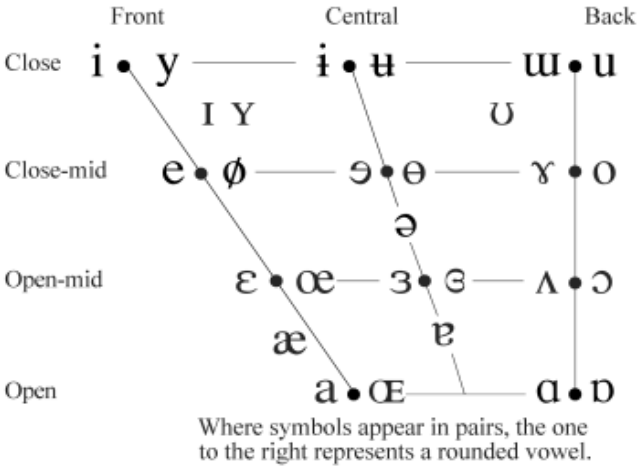
CONSONANTS (PULMONIC) © 2005 IPA

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k g	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill	ʙ			r					ʀ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

Figure 2.2 Pulmonic consonants of IPA *Figure 2.1 Vowels of IPA*

[2]



[2] IPA Chart, http://www.internationalphoneticassociation.org/content/ipa-chart, available under a Creative Commons Attribution-Sharealike 3.0 Unported License. Copyright © 2015 International Phonetic Association

2.3.2 Vowels

Kortmann(2004: 220) points out that there is some disagreement about precisely how the accent it o be represented, because some commentators are more inclined to hold the line on the older transcriptional and realizational forms than others. This publication furthermore provides three sets of phonemic symbols; RP, traditional RP and shared RP/Trad- RP saying that RP and trad-RP share the same phonemic structure but differ in realizational particulars, and differ also occasionally in the lexical distribution of phonemes. Following Table 1.1 provides overview of Kortmann's list of RP vowels.

Kortmann				**Wells**
Vowel	RP	shared RP/trad-RP	trad RP	
KIT		ɪ		ɪ
DRESS	ɛ		e	e
TRAP	a		æ	æ
LOT		ɒ		ɒ
STRUT		ʌ		ʌ
FOOT		ʊ		ʊ
BATH	ɑː a		ɑː	ɑː
CLOTH	ɒ		ɒ ɔː	ɒ
NURSE	əː		ɜː	ɜː
FLEECE		iː		iː
FACE		eɪ		eɪ
PALM		ɑː		ɑː
THOUGHT		ɔː		ɔː
GOAT	əʊ		əʊ oʊ	əʊ
GOOSE		uː		uː
PRICE	ʌɪ		aɪ	aɪ
CHOICE		ɔɪ		ɔɪ
MOUTH		aʊ		aʊ
NEAR		ɪə		ɪə
SQUARE	ɛː		ɛə	ɛə
START		ɑː		ɑː
NORTH		ɔː		ɔː
FORCE		ɔː		ɔː
CURE	uə ɔː		ʊə	ʊ
happY		i		
lettER		ə		
commA		ə		

Table 2.1The comparison of Kortmann's and Wells' vowel inventories

Table 2.1 shows 24 lexical sets plus three new categories happY, lettER and commA which are described as follows: "[happY] has s tense [i] for this unstressed vowel, where trad-RP has [ɪ]. RP [i] is sometimes attended by some, though not by full, length." (Kortman, 2004: 226). CommA and LettER describes non- rhotic ending vowel schwa [ə] and its word linking potential. LettER set represents the possibility of r-linking when word-initial vowels are preceded by word final consonants (Volín, 2002: 64). Rhoticity is further discussed in Section 2.4.1. Wells (1982) list 24 lexical sets of English vowels and alongside with these sets gives examples of words where particular vowels are occurring. Table 2.1 shows vowels of RP according to Wells. Wells' list of vowels is identical with what Kortmann calls traditional RP.

Trudgill and Hannah	
/ɪ/	bid, very, mirror…
/ɛ/	bed, merry
/æ/	bad, marry
/ɒ/	pot, long, cough
/ʌ/	putt, hurry
/ʊ/	put
/iː/	bee
/ei/	bay
/ai/	buy
/ɔi/	boy
/uː/	boot
/ou/	boat
/ɑu/	bout
/ɪə/	peer, idea
/ɛə/	pair, Mary
/ʊə/	poor
/ɔə/	pore
/ɔː/	paw, port, talk
/ɑː/	bard, path, dance…
/ɜː/	bird, furry
/ə/	about, sofa, butter
/aiə/	fire
/ɑuə/	tower

Table 2.2 Vowel inventory according to Trudgill and Hannah (2013)

The last RP vowel system we are going to present here is the one of Trudgill and Hannah (2013). They claim that there is a variation between what some writers called 'conservative' and 'advanced' RP "with 'conservative' pronunciation being most typical of older speakers and 'advanced' pronunciation typical of younger speakers." (Trudgill and Hannah, 2013: 18). They do not list vowels into the lexical sets as the two previous authors but they provide

twenty three vowels of RP (Table 2.3). Trudgill and Hannah (2013: 17) differentiate vowels of RP and vowels of near-RP accents stating that speakers of RP make up a very small percentage of the English population and that many native speakers of English are not native speakers of RP (e.g. from south or north of England).

It should be noted that there certainly is variation between the authors themselves. Trudgill and Hannah, for example, have listed two triphthongs which are neither present in vocalic inventory provided by Wells (1982), nor by Kortmann (2004). Trudgill and Hannah, and Kortmann agreed on RP having two sets of pronunciation: RP, and conservative/traditional RP. All three authors share opinion that 'pure' RP is spoken only by four or five percent of population and thus the authors name the near-RP accents that resemble RP but some vowels may be slightly shifted depending on which part of England the speakers of near-RP live in.

Though we are aware of those differences one phonemic system has to be named as referential in order to provide values necessary for further analysis. Therefore, this thesis is going to refer to the vowel inventory of English provided by Wells (1982) because the transcription used in the second part of this thesis resembles the phonemic inventory provided by Wells the most.

2.3.3 Consonants of RP

	Plosive	Affricate	Fricative	Nasal	Approx.
Bilabial	p,b			m	(w)
Labiodental			f,v		
Dental			θ, ð		
Alveolar	t,d		s,z		l
Post-aveolar					r
Palato-alveolar		tʃ, dʒ	ʃ, ʒ		
Palatal					j
Velar	k,g			ŋ	w
Glottal			h		

Table 2.3 The inventory of consonants of RP

Even though this thesis deals mainly with vowels we will present a list of consonants of RP for later reference. We will follow Cruttenden's (2008: 157) classification in which he works with "...twenty four distinctive units which are consonantal both in terms of their position in syllable and also [...] in terms of their phonetic nature."

Generally, consonants may be sorted according to the place and manner of their articulation. Table 2.3 mentions five manners of articulation and nine places of articulation. Concerning the second mentioned, Table 2.3 works with following places of articulation: *bilabial* (lips are the primary articulators), *labio-dental* (lower lip articulates with the upper teeth), *dental* (the tip and rims of the tongue articulate with upper teeth), *alveolar* (the blade and/or the tip of the tongue articulates with the alveolar ridge), *post-alveolar* (the tip of the tongue plus the rear part of the alveolar ridge), *palato-alveolar* (the tongue blade and tip articulate with the alveolar ridge and ".. there is at the same time a raising of the front of the tongue towards the hard palate" (Cruttenden, 2008: 28), *palatal* (front of the tongue articulates with the hard palate), *velar* (the back of the tongue articulates with the velum), *glottal* (narrowing causing friction, or an obstruction between the vocal folds).

Cruttenden (2007: 28) describes the manner of articulation as follows: "The obstruction made by the organs may be total, intermittent partial, or may merely constitute of a narrowing sufficient to cause friction." *Plosive* manner of articulation means a complete closure at some place in the vocal tract. *Affricate* manner of articulation is a combination of a complete closure followed by friction. Fricative – "Two organs approximate to such an extent that the airstream passes between them with friction" (Cruttenden 2007: 29). *Nasals* are also created by a complete closure at some point in the oral cavity but with the soft palate being lowered. *Approximant* manner of articulation is created by a narrowing made in a mouth but the narrowing is not sufficient enough to cause friction (Cruttenden 2007: 29).

Consonants can be further classified as obstruents or sonorants "... according to their noise component. Those in whose production the constriction impeding the airflow through the vocal tract is sufficient to cause noise are known as OBSRUENTS. [...] SONORANTS are those voiced sounds in which there is no noise component."(Cruttenden 2007: 29). Plosives, affricates and fricatives belong into the obstruent category, and nasals and approximants can be referred to as sonorants.

Another two terms that need to be defines are FORTIS and LENIS. "A voiceless/voices pair [..] are distinguished not only by the presence or absence of voice [vocal folds vibration] but also by the degree of breath and muscular effort involved in their articulation. Those English consonants which are usually voiced tend to be articulated with relatively weak energy, whereas those which are always voiceless are relatively strong." (Cruttenden, 2007: 30)

Therefore in English, the voiced consonants are usually lenis and voiceless are fortis. In English there is a phenomenon called pre-fortis clipping. Fortis consonant may cause shortening of the previous vowel when occurring in the same syllable (Knight, 2012: 161). This phenomenon is further dealt with in Section 2.4.2.

2.4 Scottish English

The vast majority of authors dealing with Scottish English agree that defining the term 'Scottish English' is difficult. It is a generally acknowledged fact that the linguistic situation in Scotland is rather different from that in England. It is mainly because of the political and historical reasons. Stuart-Smith (in Kortmann, 2004) states that the Scottish English continuum is the result of dialect contact and language change over many centuries. To be able to describe and define Scottish English properly a brief historical overview will be provided.

Scotland is considered to be a Celtic country together with Ireland and Wales and was predominantly Celtic-speaking until before the Anglian invasion during the seventh century. Thus a northern variety of Anglo-Saxon was introduced into south-east Scotland (Stuart-Smith in Kortmann, 2004). Stuart-Smith (2004: 48) further claims that "the twelfth to the fourteenth centuries saw a gradual development of a particular variety of English in Lowland Scotland which we recognize as Scots, but which was known as 'Inglish'. The term 'Inglish which was used up to fifteen century was considered to be an official language of the Kingdom of Scotland, and was later renamed as Scots (Wells, 1982: 394). Scots was commonly used as spoken and written language until the Union of Crowns in 1603. From this date onward Scots started to be threatened by the increasing influence of the English people and language. After the Scottish lost the war of independence, called rebellion from the English point of view, Scots and Scottish Gaelic were gradually replaced by the newly developed Scottish Standard English (hereafter SSE) – a variety of English spoken with distinctly Scottish accent. Stuart-Smith (in Kortmann, 2004) points out that despite the ongoing levelling of Scots towards SSE the distinct existence of Scots and SSE still persists. Apart from Scots and SSE there is also Scottish Gaelic which is still spoken in some parts of Scotland but unfortunately the number of its native speakers seems to be slowly declining.
Concerning the situation between Scots and SSE nowadays Aitken (in Trudgill, 1984: 529) mentions that Scots is being additionally qualified as either 'good', i.e. traditional and rural,

or ‘bad’, i.e. degenerate and urban. Wells (1982: 395) claims that the distinction between accent and dialect is even more important in Scotland than in England because non-Gaelic-speaking Scottish people have at their command two forms of speech: Scottish English, i.e. Standard English spoken with a Scottish accent, and Scots, the traditional dialect. This thesis shares the opinion that Standard Scottish English (or Scottish English in Wells) is an accent of Standard English but considers Scots to be rather a distinct language than a dialect of English. Here will be followed the definition of ‘Scots’ made by Britain and Hannah (2007: 105):

> *“Scots is, more or less, the direct descendant of the Northumbrian form of Old English, planted in south-eastern Scotland between 525 and 633, which eventually spread over the whole Lowland Zone up to Morayshire by the 1200s. [...] Scots-speaking communities live today in several places. [...]it [Scots] enjoys a special status due to an important aspect of its history: it is the only Germanic variety in Britain besides Standard English ever to have functioned as a full language within an independent state and to have been used for all domains [...] exhibiting a range of genres, styles and registers comparable to any Western European national language.”*

Concerning the difficult definition of the term ‘Scottish English’ which was mentioned at the beginning of this chapter was also defined by Aiken (in Trudgill, 1984) and Stuart-Smith (in Kortmann, 2004) who describe Scottish English as a bipolar continuum, with broad Scots at one end and Scottish Standard English at the other.

For the purposes of this thesis we need to work with the phonemic system of Scottish English. Since this thesis is dealing mainly with the accents of English we are leaving the problematic and difficult relationship between Scots, Scottish English, and Scottish Gaelic aside.

2.4.1 Phonemic System of SSE

It must be pointed out that this section focuses only on the phonemic system of SSE and leaves the phonemic system of Scots aside, firstly because the aim of this thesis is to compare the differences between the two standards, secondly because “...the picture is further complicated by Scots showing some regional differences for certain vowels.” (Stuart-Smith in Kortmann, 2004: 53), and thirdly because the speech samples this thesis works with concerns Standard Scottish only, thus we do not have the data required for the analysis of the Scots language.

2.4.2 Vowels

As Stuart-Smith (in Kortmann, 2004: 52) remarks "Describing these [Scottish] vowels is complicated by the fact that they show two distinct but intersecting systems of lexical incidence typical of Scottish Standard English and Scots." Various authors have different approaches towards the vowel inventory of Scottish English. The vowel inventory of SSE is far more complex issue than the inventory of RP. Firstly because there is an issue of a bipolar nature of Scottish English mentioned above, and secondly there are few studies that analyze speaker's 'basic phonological inventory' prior to the research. Moreover, the inventory of each speaker may vary depending on his or hers place of birth, social status etc. It is not an easy task to define general phonological inventory for SSE. We will thus present four different vowel systems defined by four authors and shortly comment on each one of them.

	Stuart-Smith	**Wells**		**Wells**	**Stuart-Smith**
KIT	ɪ / ë	ɪ	**THOUGHT**	ɔ̣	ɔ
DRESS	e	ɛ	**GOAT**	o	o
TRAP	a	a	**GOOSE**	ʉ̱	u
LOT	ɔ̣	ɔ	**BIRTH**	ɪ	
STRUT	ʌ	ʌ	**BERTH**	ɛ	
FOOT	ʉ	u	**NURSE**	ʌ	ɜr
BATH	a	a	**PRICE**	ʌi	ae, ʌi
CLOTH	ɔ̣	ɔ	**PRIZE**	ae	
FLEECE	i	i	**AFTER**	a	
CHOICE	ɔe	ɒɪ	**NEVER**	ɛ/ë	
MOUTH	ʌʉ	ʌu	**STAY**	e	
NEAR	i	ir	**STONE**	o	
SQUARE	e	er	**STAND**	a	
START	a	ar	**OFF**	ɔ̣	
NORTH	ɔ̣	ɔr	**DO**	ʉ	
FORCE	o	or	**happY**	e	e,ɪ,i
CURE	jʉ	ur	**lettER**	ɪ/ʌ	ər
HEAD	ɛ		**commA**	ʌ	ʌ
FACE	e	e	**PALM**	a	a

Table 2.4 Wells and Stuart-Smith Lexical Sets

Table 2.4 lists the vowels of SSE divided into lexical sets. Following authors do not provide vowels in sets but either in vocalic diagram (vowel quadrilateral) or in brackets, apart from Stuart-Smith and Wells who provide both lexical sets and a list of vowels.

1) **Stuart-Smith** (in Kortman, 2004) /i, ɪ, e, ɛ, a, o, ɔ, ʉ, ʌ, əi, ae, oe, ʌʉ/

Stuart-Smith presents both lexical sets and separate vowel inventory of SSE. She in fact provides three tables that contain vowels systems of Scottish Standard English, Urban Scots, and regional variants for Scots vowels. Later on she mentions the issue of Scottish vowel length. The issue of Scottish vowel quantity will be discussed in the following chapter.

The author later carries out a closer analysis of the lexical sets. The KIT vowel is analyzed as follows: "The usual realization of this vowel in ScStE is [ɪ], though it is often more open [ë]. Corresponding to KIT is Scots BIT which is generally in the region of [ë] but in certain contexts [...] may be substantially lowered [...]." DRESS vowel is described as closer than that of RP. TRAP/PALM/BATH are in SSE usually represented by a single vowel /a/. LOT/CLOTH/THOUGHT "... SSE usually shows one vowel here, transcribed / ɔ̣/, but some speakers may have a distinction between LOT and THOUGHT (2004: 58)." FACE/GOAT sets tend to be monophthongs, though "some SSE speakers, such as rather unusual-sounding Scottish-English-speaking BBC Scotland newscasters, will sometimes use diphthongs similar to Southern English English (2004: 58)."

2) **Zdziebko** (2012) /i, ɪ, e, ɛ, ə, ʌ, a, ɔ, o, ʉ, ɔi, au, aːi ~ ʌi /

Zdziebko provides the vowel inventory in a Vowel Diagram, also known as a vowel quadrilateral – a) being the inventory of RP and b) being the inventory of SSE.

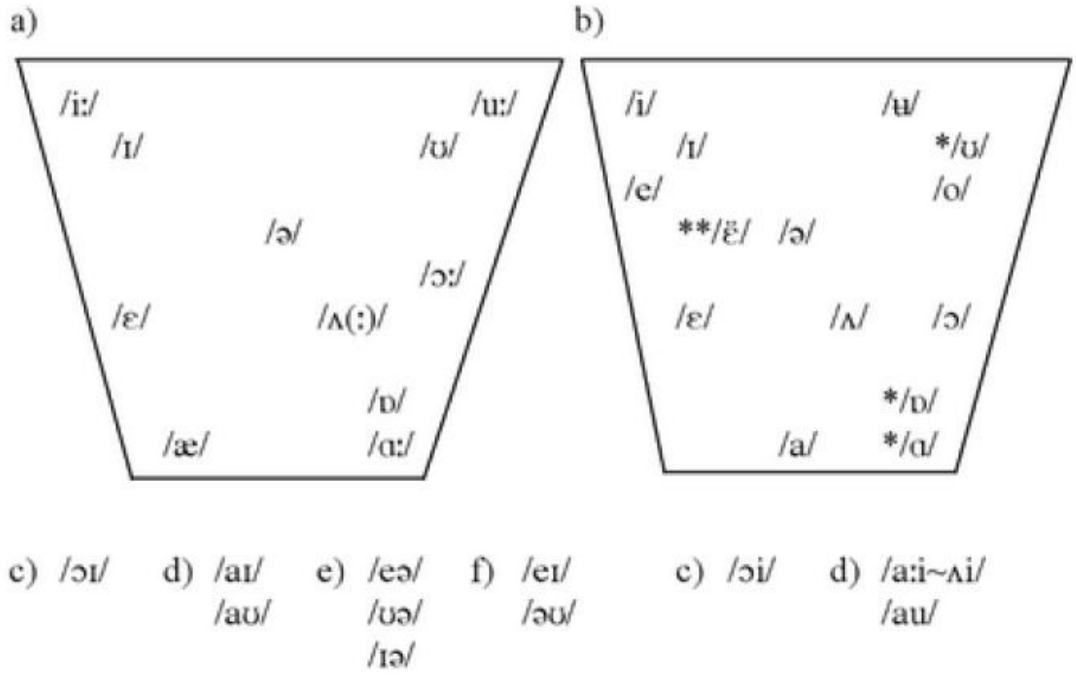


Figure 2.3Vowel Diagram of RP and SSE

Zdziebko specifies that the objects marked with an asterisk are vowels presented in only some speakers, and that the three vowels that bear single asterisk may or may not be present in the system. The vowel marked with two asterisks "... it is traditionally referred to as Aitken's vowel [...] [it] is pronounced as half closed vowel with quality between [ɪ] and [ɛ]. Its distribution is restricted to stressed positions in lexical items like *never, seven, eleven, or shepherd*."(10) Zdziebko further comments on the monophthongs but he rather discusses the historical development issues which are not the main concern of this thesis. The author points out that the set of RP diphthongs comprises more sounds that the inventory of SSE, and that /ɔi,/ is the only diphthong found in both varieties.

3) **Wells** (1982) / i, ɪ, ɛ, a, ʌ, e, ae, ʌu, u, o, ɔ (ë, ɒ, ʌi, ɒɪ, ɜ, ɑ)/

Wells, as well as Stuart-Smith, provides both a list of vowels of SSE and their lexical distribution as shown in Table 2.5. The parenthesized vowels may or may not be present. Concerning the issue of monophthongs Wells(1982: 400) states: " ... /i, e, ɛ, a, ɔ, o/ are typically monopthongs with qualities in general areas implied by the corresponding cardinal vowels [...], / u, ʌ, ɑ/ are also monophthongal, but somewhat advanced from cardinal values, /u/ may be [ʉ] or even fronter." The Scottish vowel system lacks the opposition FOOT vs. GOOSE; it may also lack the opposition TRAP vs. PALM, and LOT vs. THOUGHT. Wells

also points out: “From a diagnostic point of view, the most important characteristic of the Scottish vowel system is its lack of a phoneme / ʊ/. The vowel of FOOT words is identical with that of GOOSE words [...] this FOOT-GOOSE merger is characteristic of all Scottish accents of all regional and social types.” Wells also mentions that many speakers of SSE have a single phoneme / ɔ/ common to LOT/THOUGHT/CLOTH. Wells follows Aitken in using symbol / ë/ and he further points out that there is an opposition between /ɛ/ and /ë/ which applies only to some speakers (Wells, 1982: 404).

Concerning the diphthong issue Wells states that many speakers of SSE have two perceptibly distinct diphthongs in PRICE words which are in complementary distribution. Wells believes that the fact that PRICE diphthong may be realized either as [aˑe] or as [ʌi] is due to length variation in accordance with Aitken’s Law. The MOUTH vowel reflects the sociolinguistic variability – high-status [au] or [ʌu], and popular [u+]. The FACE and GOAT vowels are “... generally monophthongal” but the diphthongal realization may be spreading due to English influence.

We can see that there is a considerable variation within the vowel inventory of SSE. Table 2.5 provides comparison of all the three vowel systems discussed above.

Table 2.5 Vowel Inventory Comparison

Stuart-Smith	**Zdiebko**	**Wells**
i	i	i
ɪ	ɪ	ɪ
e	e	e
ɛ	ɛ	ɛ
a	a	a
ʌ	ʌ	ʌ
o	o	o
ɔ	ɔ	ɔ
~~ʉ~~	~~ʉ~~	u
əi		
ae		ae
oe		(ɒɪ)
ʌ~~ʉ~~	au	ʌu
	ə	
	ɔi	
	aːi ~ ʌi	

Summary:

Concerning the monophthongs there is an agreement between all authors. The symbols used for the diphthong description, on the other hand, vary greatly. Not only do the authors work with the phonological systems using different in symbols representing particular diphthongs but the systems also describe various total number of diphthongs. The count varies from two to four diphthongs per one system. Stuart-Smith works with four-diphthong system, Wells mentions two diphthongs and he points out that there may and may not be an optional third one. Wells states that its occurrence will depend on the speaker. For a comparison of RP and SSE phonological systems we will be using the descriptions of Wells in combination with the one of Stuart-Smith because those two bear resemblance, and provide reasonable variability needed for the further analysis.

Before we move on to the description of the inventory of SSE consonants we will briefly mention Scobbie's attitude towards the SSE vowel inventory. Scobbie (1999) describes a single phonological system, of nine monophthongs /i e a ɔ u ɪ ɛ ʌ/ and three diphthongs /ai au ɔi/. Scobbie advocates this system claiming that two important studies, Abercrombie (1979) and McKenna (1988), work with the exact same 'basic Scottish vowel system'. These systems were based on the recording of the speakers of SSE and the phonological systems they were using. Therefore, Scobbie (1999) follows Abercrombie and McKenna and bases his data on this phonological inventory.

2.4.3 Consonants

The phonological system of SSE consonants resembles the system of RP. As Stuart-Smith (in Kortman, 2004: 59) points out: "As for the vowels, alternations arise from Scots lexical incidence, but fewer consonants are involved." Johnston (in Britain, 2007) and Stuart-Smith agree on the inventory of the phonological system of the SSE consonants. Johnston mentions: "Most forms of both Scots and SSE include the stops /p t k b d g/, the affricates /tʃ dʒ/ , the fricatives /f v θ ð s y ʃ ʒ x h/ , the nasals /m n ŋ/ , the lateral /l/ the tap or approximant /r/ ans the semi-vowels /j w ʍ/." Stuart-Smith presents the exact same list of SSE consonants as Johnston. Concerning the realization of the stops authors (e.g Wells, 1982 or Johnston, 2007) point out that SSE the initial stops /p t k/ are less aspirated than the initial stops of RP, or even unaspirated. Special attention must be paid to the realization of alveolar stop /t/ because "in

case of non-initial /t/, popular Scottish English shows a good deal of T glottaling." (Wells, 1982: 409). Johnston (in Britain, 2007: 113) states that the glottaling of /t/ is frequent, and has spread recently to rural as well as urban varieties.
The realization on lateral /l/ is claimed to be dark [ɬ] in all positions. Wells (1982: 411) sums up that SSE does not exhibit the alternations of clear and dark /l/ found in RP but its realization tends to be velarized.

2.5 Further Theoretical Background

This chapter focuses on additional information concerning the phonological systems of RP and SSE. We will mention the problems of rhoticity, pre-fortis shortening, and so called Scottish Vowel-Lengthening Rule which will also be a main issue of the following data analysis. Both phonological systems are going to be compared and contrasted in order to define our hypotheses for the practical part of this thesis.

2.5.1 Rhoticity

Foulkes and Docherty (in Britain, 2007: 65) point out that the variability in phonotactic distribution primarily concerns whether or not /r/ is articulated in postvocalic positions. It is generally acknowledged that the English accents are either rhotic or non-rhotic. RP is non-rhotic accent, as opposed to Irish, Scottish or North American accents which are rhotic. Foulkes and Docherty (in Britain, 2007: 65) also mention that most non-rhotic accents have a contextualised alternation between [r] and ∅. In non-rhotic accents there are certain environments where the postvocalic /r/ is present. The phenomenon is called 'linking' or 'intrusive' /r/ depending on the context in which the phone occurs. Volín (2002: 64) states: "Non- rhotic accents of English have silent 'r' in the syllabic codas of some words. These 'r's are written but not pronounced. If, however, such a silent 'r' is followed by a vowel of another word, it is restored, and pronounced as a linking element." These 'r' are therefore called linking. Intrusive 'r' is used for the same reason as the previously mentioned one differing in context in which it occurs. Intrusive 'r', on the other hand, is not represented in the spelling but it is usually used by the speakers in order to "... avoid intervocalic glottal stops and to prevent two vowels from a direct contact. [...] Any word finishing with /ɔː/, /ɑː/, or /ə/ can induce intrusive [r]." (Volín, 2002: 65).

Standard Scottish English is a rhotic accent. Stuart-Smith (in Kortman, 2004: 62) claims that the realization of /r/ is variable: "... usual are approximants, post-alveolar [ɹ] and retroflex [ɻ], and alveolar taps [ɾ], which vary according to position in the word, phonetic environment, and sociolinguistic factor." Both Wells and Stuart-Smith pay special attention to the realization of vowels before /r/. Stuart-Smith(2004: 56) states that "... in Scottish Standards English, in words as *fir, fern* and *fur,* some speakers will show one vowel /ɪ/ or /ʌ/ others two /ɛ ʌ/, and still others all three /ɪ, ɛ, ʌ/." Wells (1982: 407) describes the same phenomenon and points out that the variation is dependent on the sociolonguistic factors. The realization in SSE according to Wells is as follows: *pert, heard*... → /ɛr/, *dirt, bird*... → /ɪr/, *hurt, word*... → /ʌr/.

2.5.2 Vowel Duration

English vowels are subjected to the pre-fortis clipping when they are followed by a fortis consonant within the same syllable (Wells in Ramsaran, 1990: 79). Volín (2002: 70) states this phenomenon is especially salient in monosyllabic words with a final fortis consonant. The difference between fortis and lenis consonants is discussed in Section 2.2.3. Cruttenden (2008: 104) points out that the feature of shortening is most obviously apparent in long vowels and diphthongs. Therefore there will be various vowel duration in words such as *feet* /fi:t/ and *feed* /fi:d/, or *write* /rait/ and *ride* /raid/. Volín (2002: 70) clarifies: "... certain vowel followed by a fortis consonant is shorter than it would be if it were followed by a lenis consonant or no consonant at all..."

Concerning the vowel length in Standard Scottish English there is a phenomenon called *Scottish Vowel-Length Rule* (hereafter SVLR). Zdziebko (2012: 18) on this phenomenon: "...the observation that the words *pool, naught* and *lead* possess long vowels as opposed to *pull, not* or *lid,* the vowels which are short, is the established textbook assumption. All but one accents of English possess this kind of phonemic quantity distinction in their systems. The notable exception to this pattern is SSE. In SSE certain vowels are invariably long, some are long only in relevant contexts, while others remain short irrespective of the environment they are located in." The relevant context is defined by the Scottish Vowel-Length Rule.

It was first named and described by Aitken (1981) and widely labelled by other writers as 'Aitken's Law'. SVLR "... refers to the phenomenon whereby vowels are phonetically long in

certain environments: before voiced fricatives, before /r/ and before boundary, including morpheme boundary [...], in diphthongs, [...], the SVLR manifests itself in quantity and quality differences...” (Stuart-Smith, in Kortmann, 2004: 57). Another broader definition of the SVLR was is provided by Scobbie (1999: 231): “ The typical English pattern of extrinsic vowel duration is that phonetically much shorter allophones of vowels are found before voiceless consonants as opposed to voices ones. In Scottish varieties voiced stops condition short duration vowels, as indeed do nasals and /l/. Only voiced fricatives /v, ð z ʒ/ and /r/ condition long duration. [...] In Scots and Scottish English, consonantal suffixes such as /d/ do not condition shorter vowels. These are cases of quasi phonemic contrast arising from the interplay of extrinsic vowel duration and suffixation.”

There is an ongoing debate which vowels, in SSE, are affected by the SVLR and which are not. Wells (1982), and Aitken (1981) claim that every vowel, apart from /ɪ/ and /ʌ/ that are short in every context, may undergo so called SVLR. Wells (1982) follows Aitken and furthermore provides measurements of vowel duration relying on McClure’s (1977) data which were unfortunately based only on one informant who happened to be the author himself (Pukli, 2004). Scobbie (1999) points out that the original Aitken’s research was dependent on the Scots data rather than on the SSE data. Since the phonological system of Scots is different from the one of SSE there would obviously be distinct results when applying the SVLR to the Standard Scottish English inventory only.

Scobbie (in Foulkes and Dochertry, 1999) therefore disagrees with Aitken’s conclusion concerning the lists of vowels affected by SVLR. Scobbie points out even though Aitken’s paper has been highly influential: “...his conclusions address mainly Scots, and SSE only to some extent.” Scobbie carries out a new research aimed only at SSE claiming that the SVLR in Middle Ćlass and Working Class Scottish Standard English applies only to the three vowels /i/, /u/ and /ai/. The same conclusion was reached for example by McKeena (1988) in his unpublished thesis. Since this thesis is dealing with SSE we will follow Scobbie’s proposals and we shall inspect our data mainly with respect to his conclusions.

2.5.3 Comparison of the phonological inventories

The phonological systems provided in Section 2.3.2 and lexical sets in Table 2.6 show the realization of SSE and RP vowels in various environments. In this part of our thesis we shall

compare these two systems. Wells (1982: 400): “The Scottish vowel system is clearly distinct typologically from the vowel systems of all other accents of English. It lacks any opposition of the kind /ʊ/ vs /u/ (FOOT vs. GOOSE). It may also lack opposition /a/ vs. /ɑ/ (TRAP vs. PALM) and /ɒ/ vs. /ɔ/ (LOT vs. THOUGHT).” Concerning the monophthongs there are no long-short opposition in SSE as opposed to RP. As table 2.6 shows where RP vowel is long SSE realization is short (BATH, FORCE, NORTH, NURCE, GOOSE, etc.). In SSE there is also a process called diphthong levelling in which some SSE diphthongs (SQUARE, FACE, GOAT) are monophthongized.

	SSE		**RP**	
	Stuart-Smith	Wells	Wells	
KIT	ɪ / ë	ɪ	ɪ	KIT
DRESS	e	ɛ	e	DRESS
TRAP	a	a	æ	TRAP
LOT	ɔ̣	ɔ	ɒ	LOT
STRUT	ʌ	ʌ	ʌ	STRUT
FOOT	ʉ	u	ʊ	FOOT
BATH	a	a	ɑː	BATH
CLOTH	ɔ̣	ɔ	ɒ	CLOTH
FLEECE	i	i	iː	FLEECE
CHOICE	ɔe	ɒɪ	ɔɪ	CHOICE
MOUTH	ʌʉ	ʌu	aʊ	MOUTH
NEAR	i	ir	ɪə	NEAR
SQUARE	e	er	ɛə	SQUARE
START	a	ar	ɑː	START
NORTH	ɔ̣	ɔr	ɔː	NORTH
FORCE	o	or	ɔː	FORCE
CURE	ʉ	ur	ʊ	CURE
HEAD	ɛ		(e)	
FACE	e	e	eɪ	FACE
THOUGHT	ɔ̣	ɔ	ɔː	THOUGHT
GOAT	o	o	əʊ	GOAT
GOOSE	ʉ̲	u	uː	GOOSE
BIRTH	ɪ		(ɜː)	
BERTH	ɛ		(ɜː)	
NURSE	ʌ	ɜr	ɜː	NURSE
PRICE	ʌi	ae, ʌi	aɪ	PRICE
PRIZE	ae		(aɪ)	
AFTER	a		(aː)	
NEVER	ɛ/ë		(e)	
STAY	e		(eɪ)	
STONE	o		(əʊ)	
STAND	a		(æ)	
OFF	ɔ̣		(ɒ)	
DO	ʉ		(uː)	

happY	e	e,ɪ,i	(ɪ)	
lettER	ɪ/ʌ	ər	(ə)	
commA	ʌ	ʌ	(ə)	
PALM	a	a	ɑː	PALM

Table 2.6 Comparison of phonological systems.

Concerning the differences in the systems of consonants only two of them /x, ʍ/ are not generally found in accents of RP (Wells, 1982: 408). Johnston (in Britain, 2007: 112) states: "/x/ occurs in SSE in place and personal names from Gaelic [...], while /ʍ/ occurs in words from OE /xw/, spelled <wh-> like *where, whisky, whine*." Cruttenden (2008: 86) also mentions differences in realization or phones /r/ and /l/ that are discussed above.

2.6 Hypothesis

The data analysis carried out in Chapter 4 will investigate the differences in vowel duration between RP and SSE. Taking the theoretical assumptions made in the previous sections into consideration we can formulate two hypotheses:

1) Given that the SSE inventory lacks the short-long opposition, the vowels corresponding to long vowels in RP (e.g. /u:/) will be shorter in the SSE speakers than in the RP speakers.

2) The duration of the SSE vowels in particular environments will follow the SVLR rule, as defined by Scobbie (1999), i.e. vowels /i/, /u/, and /ai/ will be longer when they are followed by voiced fricatives, or /r/, or boundary including morpheme boundary (e.g. consonantal suffix /d/).

3 Materials and Method

This chapter aims to describe the type of data used in order to inspect the vowel duration of RP and SSE.

3.1 Speakers

This thesis is based on the analysis of the recordings from six British male speakers and six male speakers of Standard Scottish English. Three of the Scottish speakers (GXL, CLJ, and MCS), have been living in Prague for about three years. All of the speakers were born and raised in Glasgow. Their age ranged from 33 to 60. Their social background is unknown. The three subjects living in Prague were also able to speak Scots but whenever they were to communicate with someone of non-Scottish origin they swiftly switched to SSE. These three speakers were recorded at the Institute of Phonetics at Charles University in Prague. The other three Scottish speakers (DEN, KIR, and RAD), were recorded in Glasgow in their homes by the members of the Institute of Phonetics. Their age ranged from 30 to 60. Their social background or further information is unknown. The recording of the six British speakers (BRXN, DANL, HAXN, JXN TMLN, and TXN), were taken from the corpus of the Institute of Phonetics. The British speakers originated from Southern England and they were recorded at the Institute of Phonetics. The speakers were younger or middle aged adults who did not wish to reveal any personal information.

3.2 Recording procedure and data processing

All speakers, apart from three Scottish speakers recorded at their homes in Glasgow, were recorded in a specialized room at the Institute of Phonetics in Prague. The studio is equipped with the condenser microphone AKG C4500 B-BC which was used to record the data. The recordings were sampled at 16- bit, 32 kHz. The speakers were asked to read a series of BBC news extracts. There were two versions of the BBC text which differed in the content but were of the same form and length (478 words each). The texts were divided into nine paragraphs. Each paragraph was read as a whole and the recording was then split into breath groups. The segmentation into phones was done automatically using Penn Phonetics Lab Forced Aligner (P2FA;Yuan & Liberman, 2008). The vowel boundaries were subsequently manually corrected using the program Praat (Boersma & Weenink, 2016) following the guidelines set out by Skarnitzl & Machač (2009).

In order to extract the vowel duration a script in Praat was written. The data was saved as Excel table providing further information about the speakers, type of accent, the following phonological context etc. The duration of vowels was normalized with respect to the speakers' different articulation rates (AR) using the formula: DurNorm = Dur × meanAR(Speaker)/meanAR(Accent).

3.3 Statistical analysis

The statistical analyses were done using R software (R Core Team, 2016) and the R package *lme4* (Bates, Maechler, Bolker & Walker, 2016). We employed linear mixed-effects (LME) modelling, which adds a random effect for both SPEAKER and WORD. Each subject/word is assumed to have a different baseline value (random intercept). The following factors were entered as fixed effects: ACCENT (Scottish vs. English), STRESS (stressed vs. unstressed), FOLPHONETYPE (fortis vs. lenis vs. boundary vs. vowel vs. sonorant), and SVL (yes vs. no). Visual inspection of residual plots did not reveal any obvious deviations from homoscedasticity or normality.

Statistical significance was tested by comparing the goodness of fit of two models (e.g. full model with two factors and a reduced model with one of the factors) using standard likelihood ratio tests. In case of more than two levels of factor, Turkey post hoc tests of means were performed in order to obtain *p*-values, using the package *multcomp* (Horthorn, Bretz & Westfall, 2008). Following R packages were used in data processing: *ggplot2* (Wickham, 2009), package *effects* (Fox, 2003),

3.4 Data

In total, 9622 vowel tokens were extracted from the recordings. Several words of foreign origin (e.g. Havana, Likud, Sharon, Bajconur, etc) were excluded in order to eliminate the pronunciation discrepancies. Vowel durations, lower than 8 ms and higher than 400 ms, were deleted as well resulting in 8918 vowel tokens. For further information see Table 5.2 in Section 5.5.

4 Results

In this chapter the data will be analyzed. We shall start with a general overview of the collected data. Afterwards the duration of individual SSE and RP monophthongs and diphthongs will be inspected.

4.1 Vowel duration in general

Firstly we inspected the relationship of stressed and unstressed syllables in RP and SSE. As Figure 4.1 shows the two accents treat stress the same way. STRESS proved to be a significant predictor with the stressed syllables being 35 ms longer than the unstressed syllables ($\chi(1) = 52$, $p < 0.05$). However, there were no significant differences between the accents $\chi(1) = 0.23$ ($p > 0.05$), and there was no interaction with ACCENT ($\chi(1) = 0.51$, $p > 0.05$).

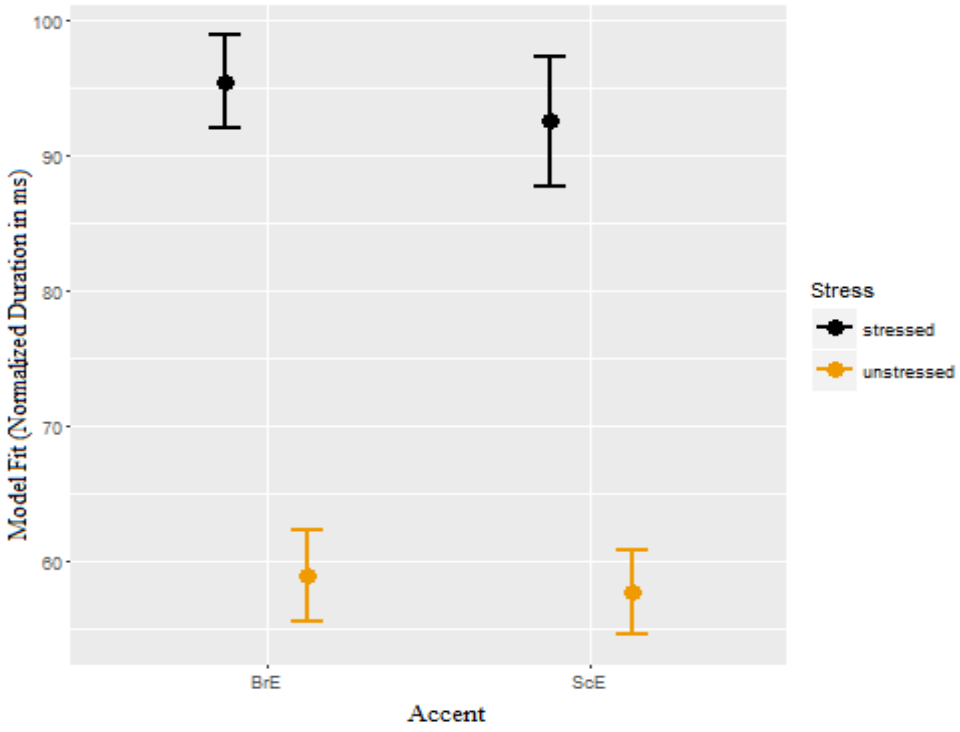


Figure 4.1 Treating of stressed and unstressed vowels of RP and SSE

Figure 4.2 shows the relationship between duration of vowels in various environments in RP and SSE. Inspection of the confidence intervals suggests no significant differences between British and Scottish accent with respect to the following context. In both accents vowels

before sonorants tend to be pronounced shorter than before obstruents. Interestingly, there seems to be no difference between pre-fortis and pre-lenis contexts.

Because the statistical data shows no interaction between stress and accent, or between accent and following phone type (see also figure 4.3) we may proceed to the analysis of the individual vowels.

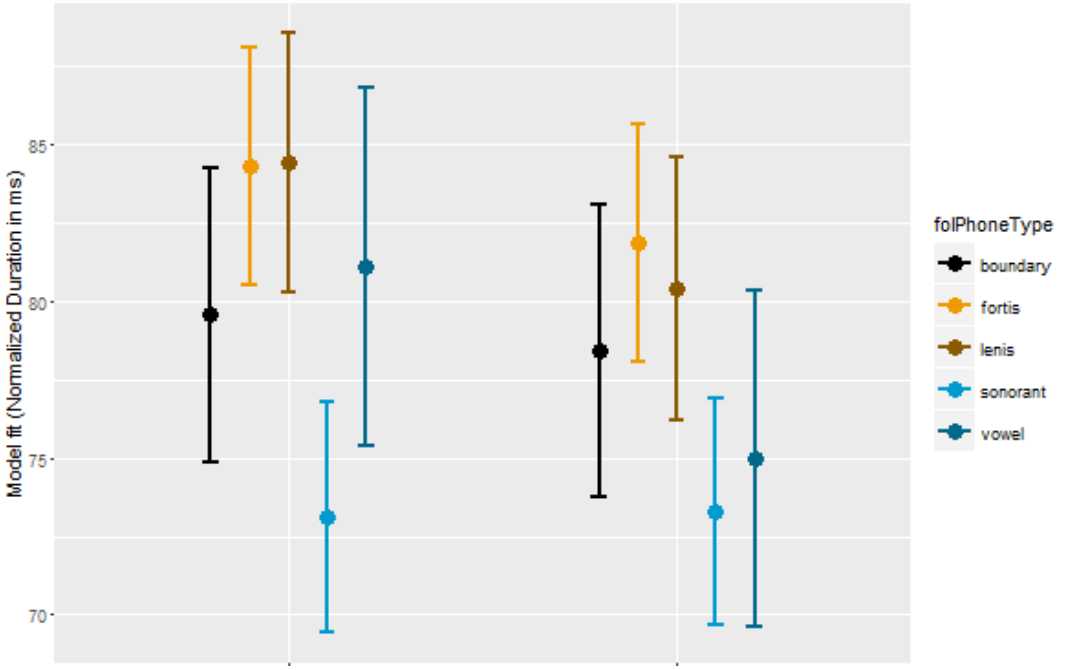


Figure 4.2.Confidence intervals of the vowel contexts

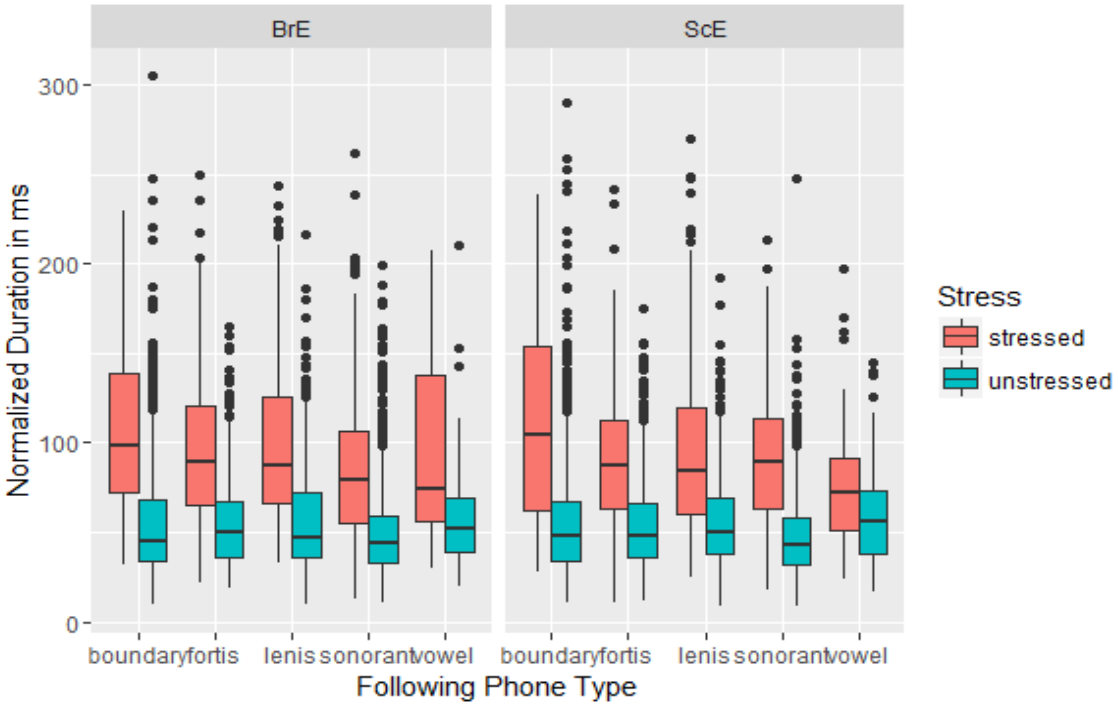


Figure 4.3Boxplot of the vowel durations in various contexts in stressed and unstressed syllables

4.2 Front vowels

A) /ɪ/ (1792 tokens)

Vowel durations of the vowel /ɪ/ were inspected. No significant differences were discovered. Duration of the vowel /ɪ/ is similar in both accents. The estimated intercept for the vowel duration in RP accent was 55 ms (SSE estimated duration being only 2 ms shorter). The factor of ACCENT did not prove to be statistically significant ($\chi(1) = 1.56$, $p>0.05$).

The influence of the SVLR on the vowel /ɪ/ was inspected. Figure 4.5 presents the comparison of the vowel durations in the contexts with and without the SVLR application. Both RP and SSE vowel duration seems to be longer after the SVLR is applied. The estimated duration of /ɪ/ in the contexts where the rule is applied was 10 ms longer than in the contexts without the SVLR application. This value proved to be significant ($\chi(1) = 5.6$, $p<0.05$). However, there was no interaction with the ACCENT factor ($\chi(1) = 0.27$, $p<0.05$) . The later performed Tukey post-hoc tests did not reveal any significance concerning SSE YES and SSE NO relationship. There was a mild trend that suggested a relationship between RP YES and SSE NO tokens.

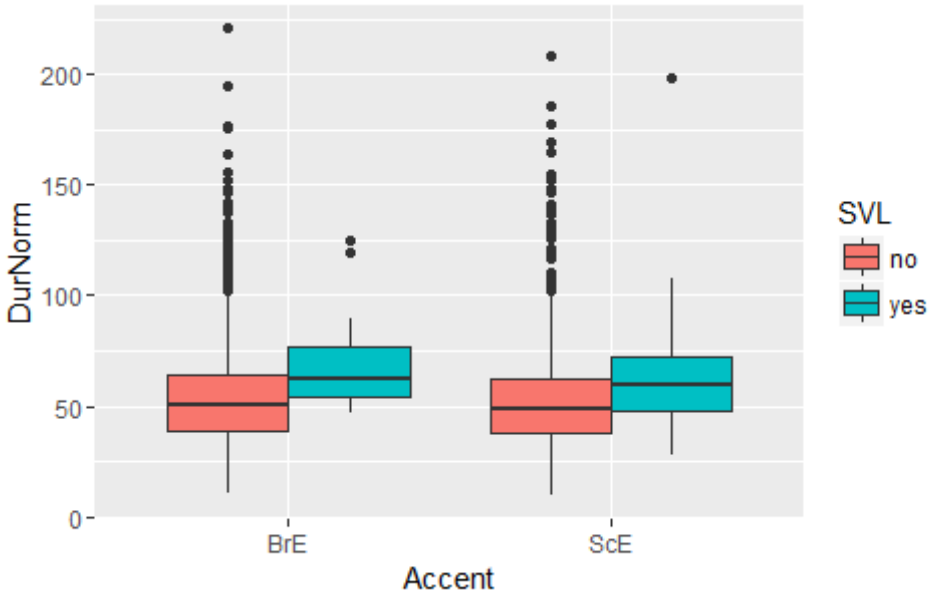


Figure 4.5 The SVLR in RP and SSE

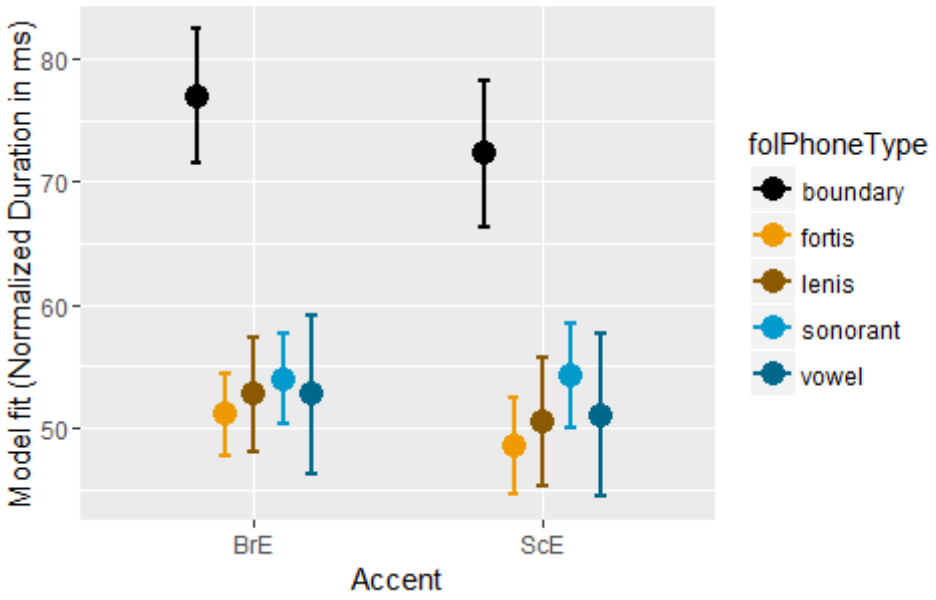


Figure 4.6Vowel contexts

Figure 4.6 suggests no significant differences between the RP and SSE accent in the following environments. In both accents, the vowel was significantly longer before the boundary than in other contexts.

B) /i:/ (642 tokens)

As Figure 4.7 shows RP and SSE treat the duration of the vowel /i:/ differently. The estimated length of the high front vowel /i:/ in RP was 85 ms, and its length in SSE was 14 ms shorter. Statistical analysis suggested this difference to be significant with respect to the factor of ACCENT ($\chi(1) = 13.99$, $p<0.05$).

Figure 4.8 presents the application of the SVLR. There appears to be a difference in the vowel duration when the SVLR is applied. In order to evaluate the statistical significance of the SVLR application we performed the Tukey post-hoc tests that showed that the vowel duration, in the contexts where the rule is applied, was longer. These findings were significant both in RP and SSE (RP: $z = 5.17$, $p <1e-05$, SSE: $z = 7.07$, $p <1e-05$). However, the inspection of the interaction between ACCENT and STRESS did not proved to be significant ($p = 0.66$)

The confidence intervals of the vowel in different contexts suggest that both accents treat the SVLR similarly: Before the boundary the vowel duration is greater than in the other contexts apart from the pre-lenis context.

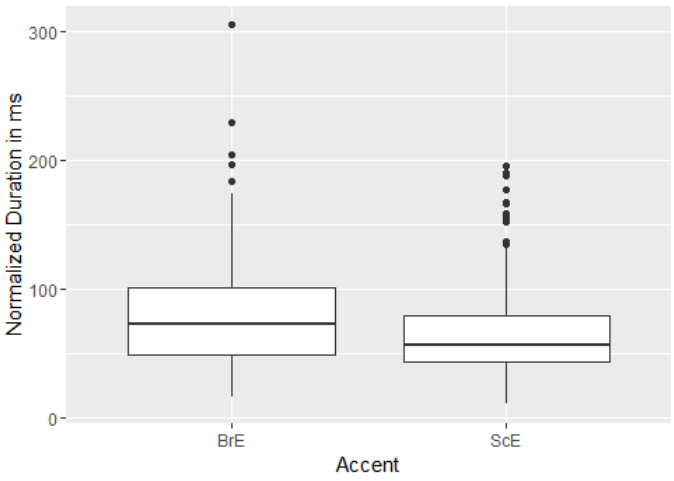


Figure 4.7 Duration of the high front vowel /i:/

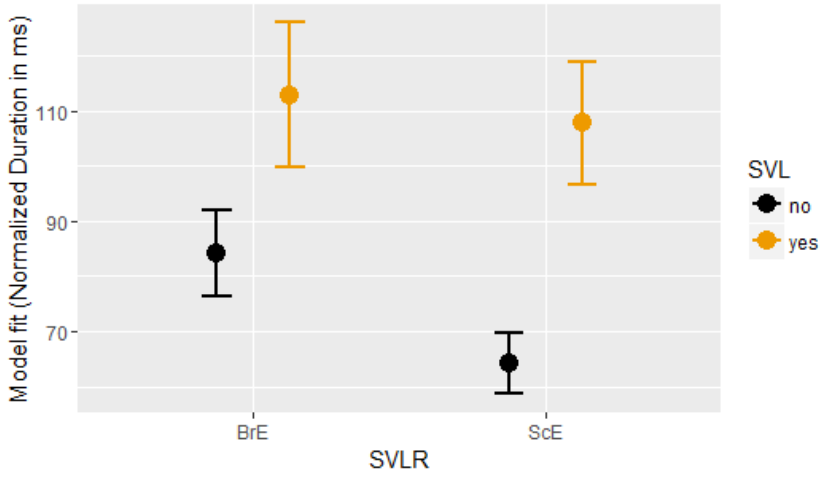


Figure 4.8 The application of SVLR

C) /e/ (598 tokens)

As can be seen in Figure 4.9 the close-mid vowel /e/ duration is greater is SSE than in RP. The estimated value for the SSE vowel duration was 23 ms greater (duration of the vowel in RP was 75 ms). The factor of ACCENT was statistically significant ($\chi(1) = 21.25$, $p<0.05$). There was no suggested difference in the vowel duration with respect to the SVLR application. The estimated duration of the vowel /e/ in SSE, after the rule was applied, was only 7 ms greater which did not prove to be statistically significant. Concerning the vowel contexts both accents treat the vowel /e/ in similar fashion as the previous vowel /i:/ is treated: the duration is greater before the boundary than in other contexts apart from the pre-lenis environment.

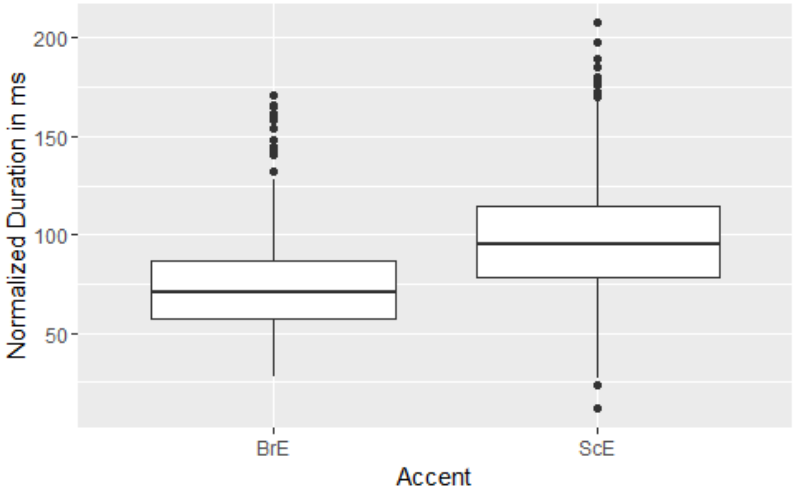


Figure 4.9 Duration of the vowel /e/ in the RP and SSE

D) /æ/ (422 tokens)

The estimated duration of the open front vowel /æ/ in the British accent was 93 ms with SSE vowel being 9 ms longer. The influence of ACCENT proved to be significant ($\chi(1) = 4.34$, $p = 0.037$). Concerning the SVLR application in SSE the duration of the vowel /æ/ seems shorter when the rule is applied as shown in Figure 4.10. The estimated values are as follows: the vowel length in RP accent after the application of the rule is 10 ms (103ms). The vowel length is 16 ms shorter when the rule is applied in SSE (77 ms). Neither the factor of SVL nor the interaction of ACCENT proved to be significant.

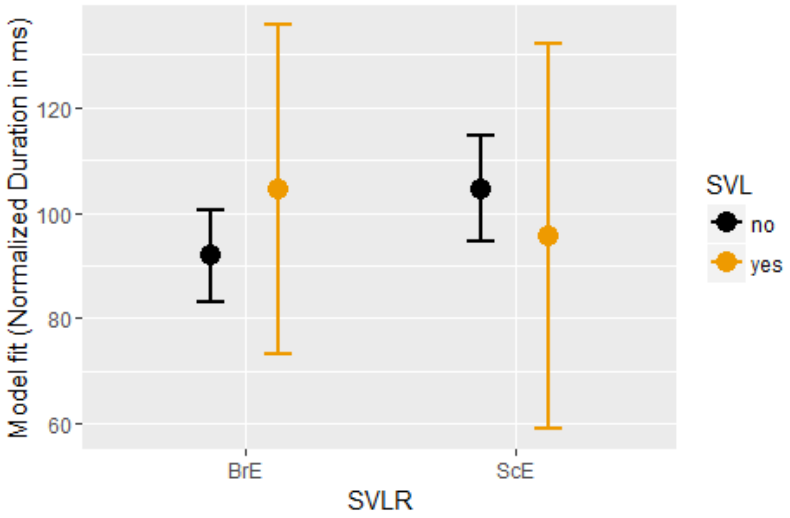


Figure 4.10 The confidence intervals of the SVLR application

4.3 Back and Central vowels

A) /ʌ/ (258 tokens)

Figure 4.11 shows that the duration of the vowel in SSE is shorter. The estimated duration is 7 ms shorter in SSE (65) than in RP (72 ms). However, the influence of the ACCENT was not significant.

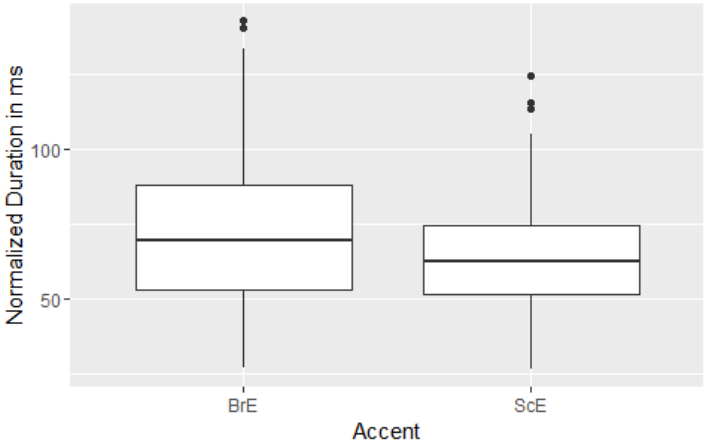


Figure 4.11The duration of the vowel /ʌ/

The confidence intervals in Figure 4.12 illustrate the SVLR. As can be seen the vowel is treated differently in SSE and RP. There appear to be no difference between YES and NO in SSE, in RP, on the other hand, the difference is noticeable. Even though he factor of SVL was evaluated as insignificant there appeared to be a significant interaction with ACCENT. In order to inspect the interaction the Tukey post-hoc tests were performed. No significant results were found apart from the relationship between RP YES and SSE YES where a significant difference (z = -3.1, p = 0.01) was found.

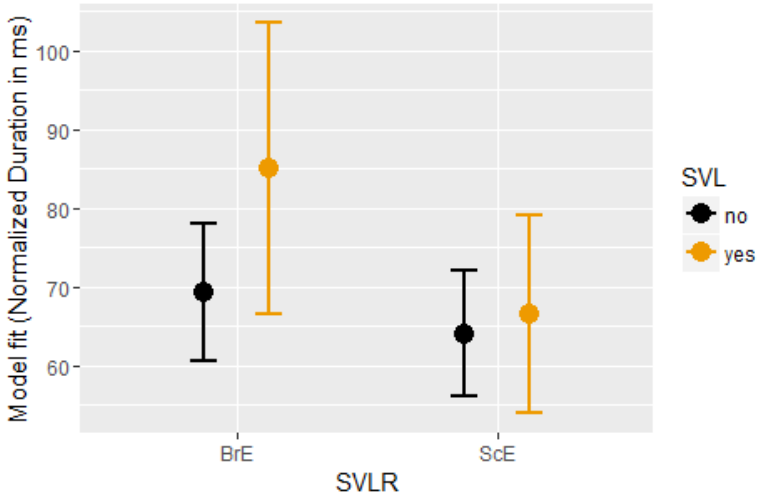


Figure 4.12 The confidence intervals of the SVLR application

B) /ɑ:/ (155 tokens)

The estimated duration of the open back vowel /ɑ:/ appeared to be longer in RP (133 ms) than in SSE (114 ms). However, the factor of ACCENT did not prove to be significant. Because of the lack of the YES tokens the statistical analysis concerning SVLR could not be performed.

The vowel is treated similarly in all contexts apart from the pre-sonorant one. Vowel seems to have greater duration before sonorants in RP than in SSE.

C) /ɒ/ (251 tokens)

As can be seen in Figure 4.13 the duration of the vowel /ɒ/ in SSE appears to be longer than in RP. To be specific, the estimated length of the vowel in RP is 71 ms which is 19 ms less than in SSE. The factor of ACCENT proved to be significant ($\chi(1) = 15.38$, $p < 0.05$).

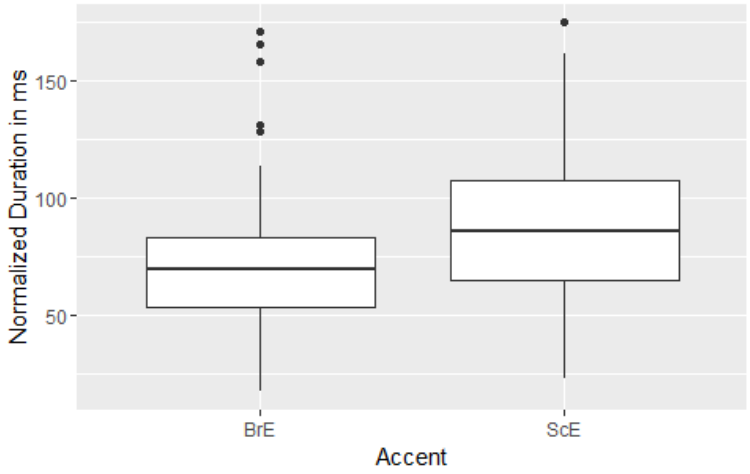


Figure 4.13The differences in vowel /ɒ/ duration

Concerning the lengthening rule neither the significance of the SVL factor nor the interaction with ACCENT was proven.

As shown in Figure 4.14 in RP the duration in the pre-lenis context is greater and with greater variance than in SSE. Pre- fortis and pre-sonorant contexts are treated similarly in both varieties

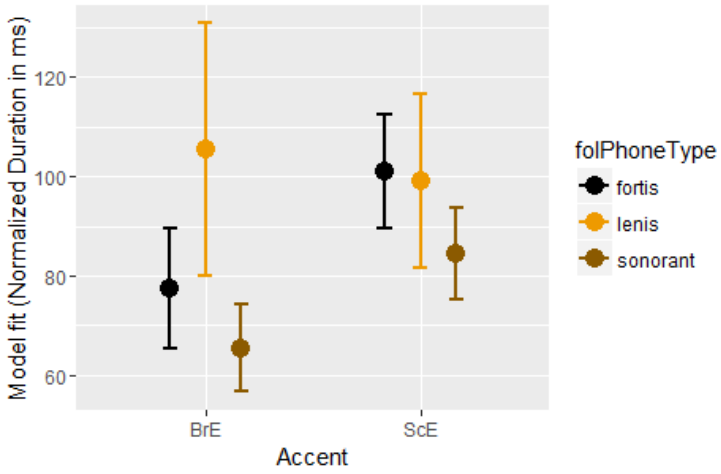


Figure 4.14 Confidence intervals of the various contexts of the vowel /ɒ/

D) /ɔ:/ (203 tokens)

The estimated duration of the vowel /ɔ:/ in RP was 109 ms. The duration of this vowel in SSE was 15 ms shorter as illustrated in Figure 4.15. This difference (the factor of ACCENT) proved to be significant ($\chi(1) = 8.88$, $p < 0.05$). The influence of the SVLR was not significant and there was no interaction with ACCENT.

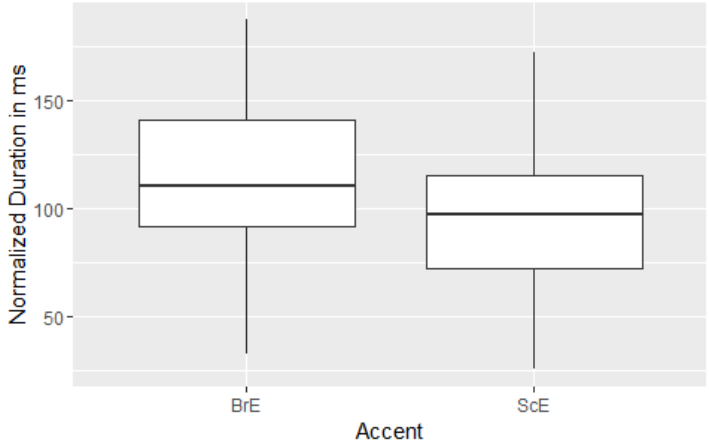


Figure 4.15Comparison of the duration of the vowel /ɔ:/

E) /ʊ/ (105 tokens)

There was an insignificant difference between the duration of the vowel /ʊ/ in RP and SSE (the estimated values for RP = 52 ms, and for SSE = 48 ms). Concerning the lack of the SVLR YES tokens it was not possible to carry out further statistical analysis.

Figure 4.16 illustrates the contexts of vowel. It can be seen that pre-fortis contexts appear to be longer in both varieties with SSE having longer pre-boundary context as well. The rest of the contexts are treated similarly.

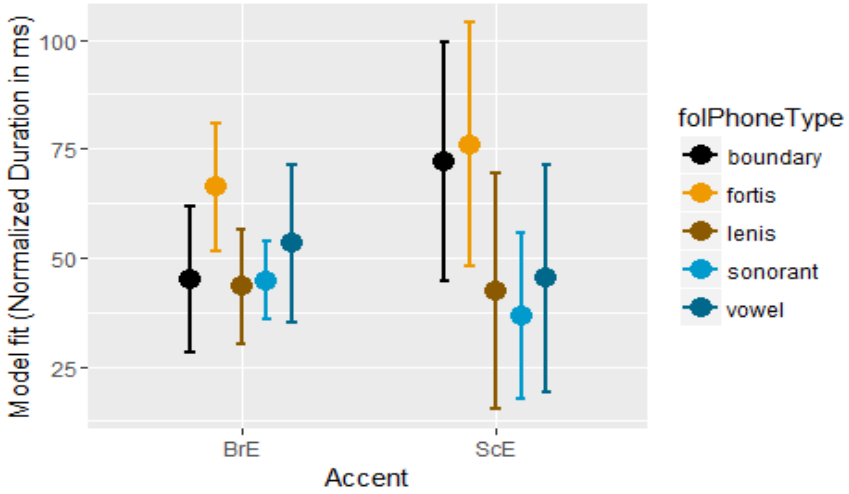


Figure 4.16 Confidence intervals of the vowel duration in various contexts

F) /u:/ (361 tokens)

The statistical analysis did not confirm ACCENT as a significant factor. The estimated durations were 75 ms for RP, and 69 ms for SSE.

Figure 4.17 illustrates the application of the SVLR. Even though there seemed to be a difference in SSE YES and SSE NO contexts the statistical analysis did not prove any significant data apart from the interaction with ACCENT ($\chi(1) = 5.65$, $p = 0.01$). After performing Tukey post-hoc tests the interaction between YES and NO in SSE was not proven. The test revealed that there is a mild trend in interaction between NO in RP and NO in SSE ($z = -2.34$, $p = 0.07$)

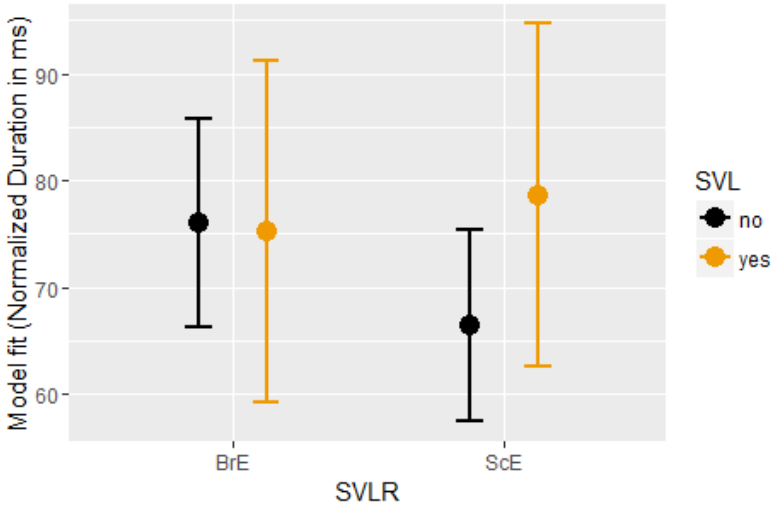


Figure 4.17The SVLR application

G) /ə , ɚ/ (2889 tokens)/

The estimated duration of the schwa vowel was 49 ms in RP and 50 ms in SSE. Therefore, the factor of ACCENT did not prove to be significant. Since the schwa, in English, occurs only in unstressed syllables there were no YES tokens and thus we could not carry out the statistical analysis concerning SVLR.

As can be seen in Figure 4.18 the duration of the schwa differs depending on the context. In both accents the duration is longer before the morpheme boundary and before vowels. In SSE it is also pre-fortis context that seems to have an effect on the vowel length.

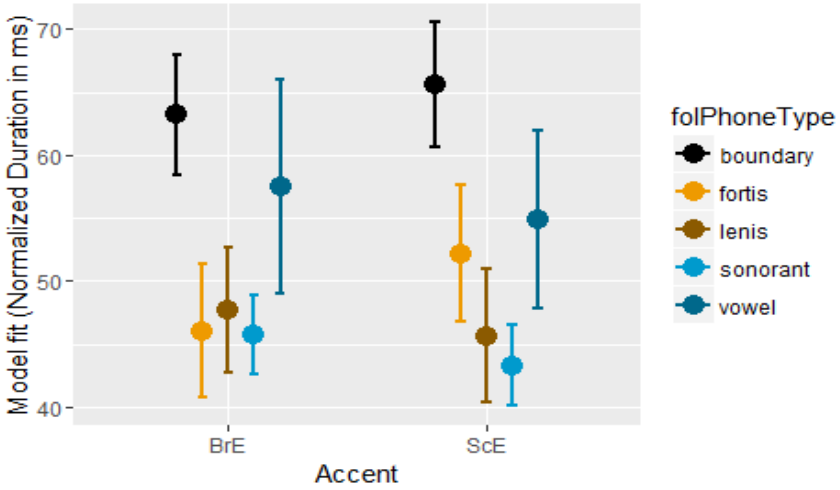


Figure 4.18 Confidence intervals of the vowel duration in various contexts

H) /ɜ:, ɜ :ə˞/ (98 tokens)

The duration of the vowel / ɜ:/ is illustrated in Figure 4.19. The estimated duration of the vowel in RP is 131 ms. In SSE the estimated duration is 37 ms shorter than in RP. The factor of ACCENT proven to be significant ($\chi(1) = 19.91$, $p < 0.05$). As shown in Figure 4.20 the duration of the vowel in SSE is similar both in YES and NO contexts. In RP these contexts are treated differently: vowel in YES context being slightly longer. This difference in the vowel duration did not prove to be significant.

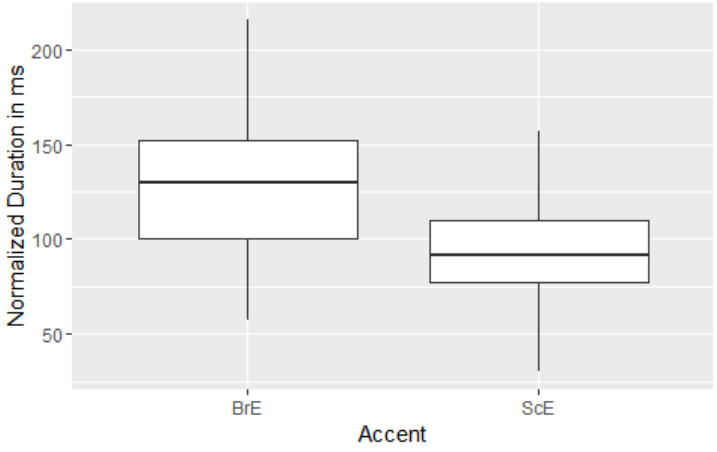


Figure 4.19 The duration of the vowel / ɜ:/

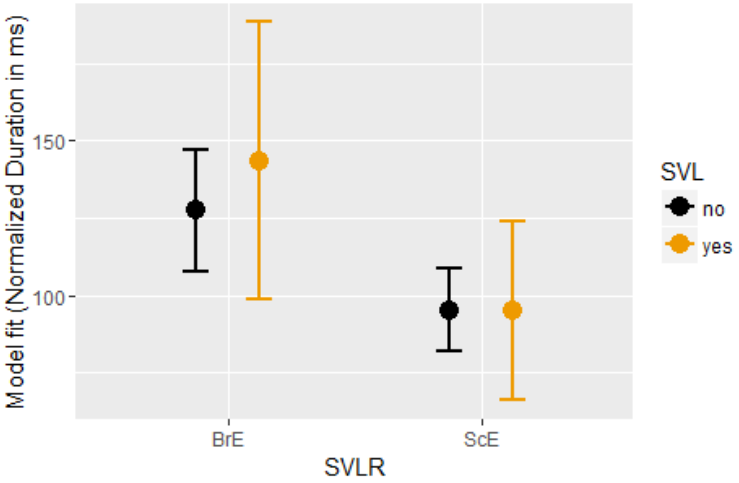


Figure 4.20 Confidence intervals of the SVLE application

4.4 Diphthongs

A) /aɪ/ (270 tokens)

The estimated duration in both accents is 122 ms. Therefore there is no significant influence of the factor ACCENT concerning the vowel duration.

The application of the SVLR in SSE seemed to be significant (Figure 4.21) with the YES vowel context being 30 ms longer. The Tukey pos-hoc tests were performed in order to inspect the significance of the SSE pre- YES and pre- NO context duration. Following results were obtained: ($z = 2.978$, $p = 0.013$). The interaction with ACCENT also appeared to be significant ($\chi(1) = 8.38$, $p < 0.05$).

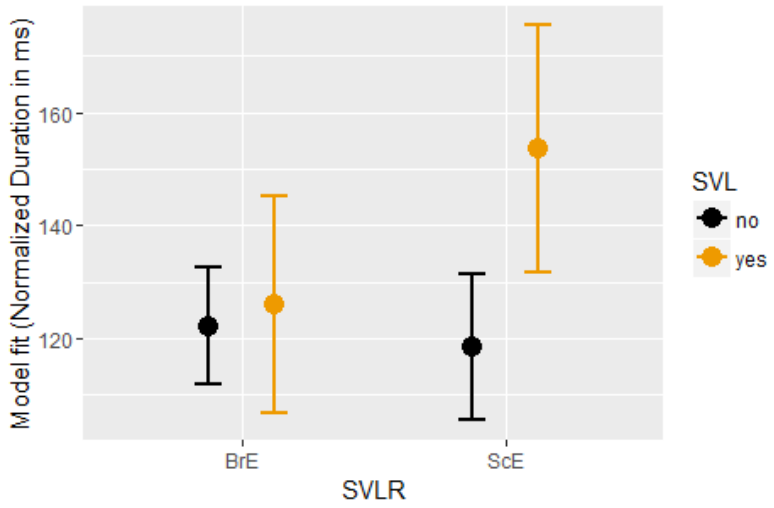


Figure 4.21 Confidence intervals of the SVLE application

Figure 4.22 presents the diphthong /aɪ/ in various contexts comparing RP and SSE: It can be observed that there is a difference in how the pre-boundary and pre-vowel contexts are treated. In SSE, the vowels in pre-boundary and pre-lenis contexts are longer than in the other contexts whereas in RP it is pre-lenis and pre-vowel contexts that appear to be longer than the other contexts.

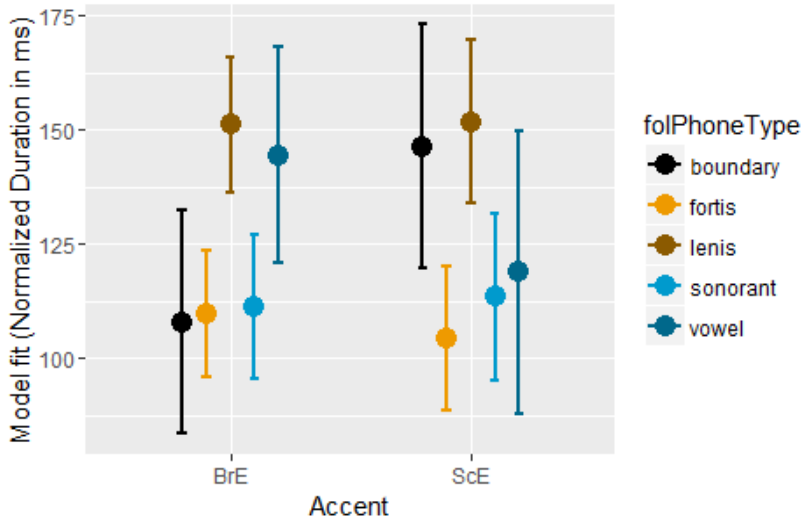


Figure 4.22 The vowel duration in various contexts

B) /eɪ/ (406 tokens)

The duration of the diphthong /eɪ/ in RP is 118 ms having19 ms greater duration than in SSE. Therefore the factor of ACCENT was significant ($\chi(1) = 12.60$, $p < 0.05$). As Figure 4.23

illustrates each variety seems to treat the SVLR application differently. The Tokey post-hoc tests were carried out revealing a statistical significance between YES and NO values in SSE ($z = 2.78$, $p = 0.024$). The interaction with ACCENT proved to be significant as well ($\chi(1) = 13.18$, $p < 0.05$).

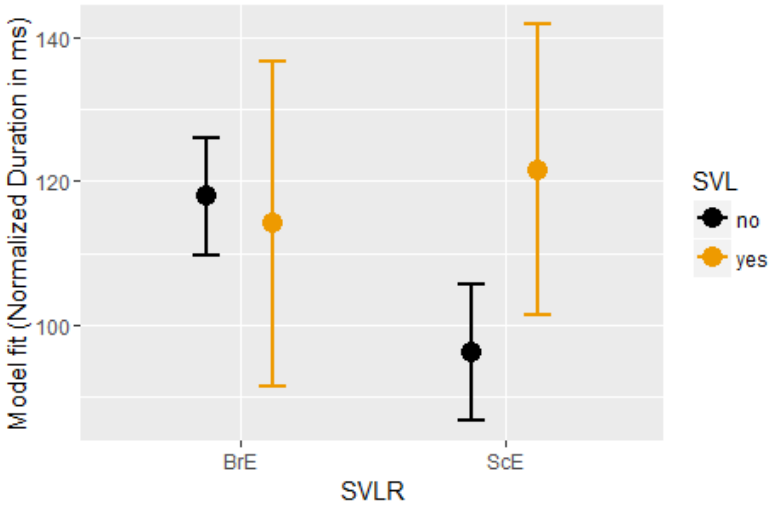


Figure 4.23 SVLR application

C) /əʊ/ (227 tokens)

The estimated duration of the diphthong in RP is 109 ms. This diphthong is 11 ms in SSE shorter than in RP. The statistical analysis shown that the factor of ACCENT is on the border of significance with the p-value = 0.053. Neither factor of the SVLR nor the interaction with ACCENT proved to be significant. Figure 4.24 present the duration of the diphthong in various contexts. The only noticeable difference can be observed in a pre-sonorant context where the duration of the diphthong in RP before the sonorants seems to be greater.

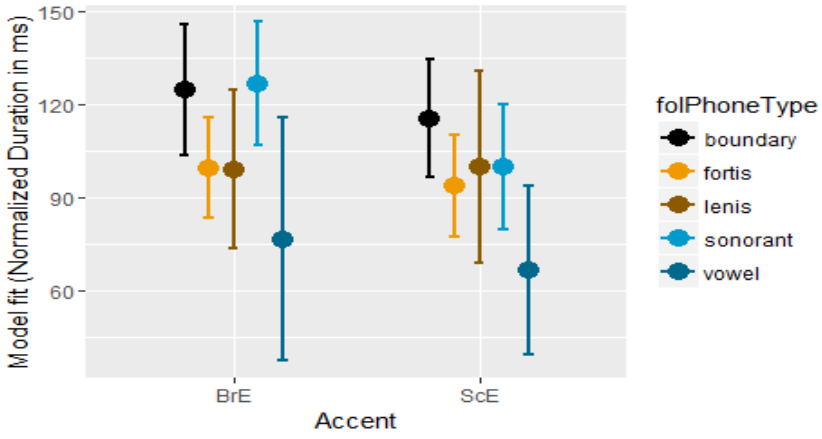


Figure 4.24 Vowel duration in various contexts

D) / aʊ/ (101 tokens)

As illustrated in Figure 4.25 the duration of the diphthong is different in each accent. The estimated vowel length in RP is 148 ms. In SSE, the duration is 34 ms shorter than in RP. Therefore the factor of ACCENT was proved to be significant ($\chi(1) = 17.96$, $p < 0.05$). Further statistical analysis could not be performed because of the small number of the YES tokens.

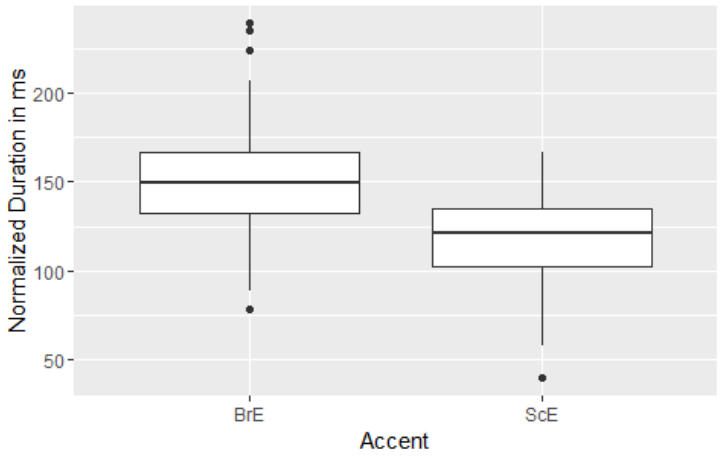


Figure 4.25Duration of the vowel in general

As seen in Figure 4.26 there appears to be a similar trend in treating vowel duration in all contexts apart from the pre-vowel position where the RP accent seems to have greater duration in the pre-vowel context.

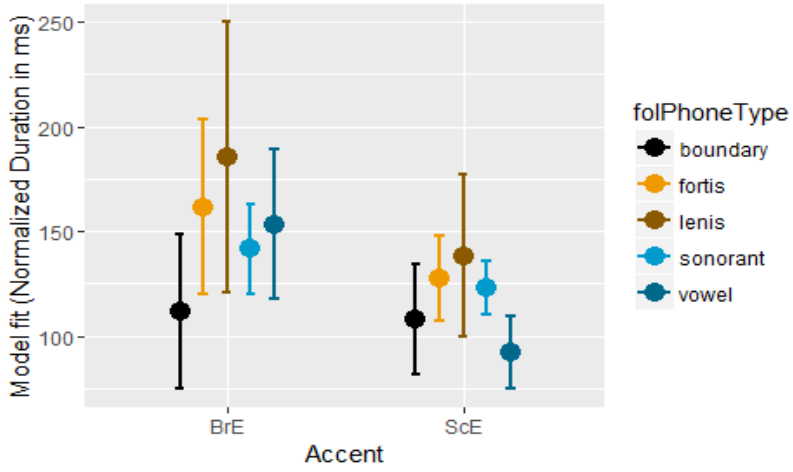


Figure 4.26Duration of the vowel in various contexts

5 Discussion

Our hypothesis laid out two assumptions. Firstly, since the SSE inventory lacks the short-long oppositions, the vowels corresponding to long vowels in RP will be shorter in SSE speakers than in RP speakers. Secondly, there was the assumption that the duration of the SSE vowels (/i/, /u/, and /ai/) in particular environments will follow the Scottish Vowel-Lengthening Rule (see Section 2.5 for more details).

5.1 Data

As chapter 3 points out this thesis works with 8918 vowel tokens in total. There are several problematic areas concerning our data. Firstly, there is a problem of the style. Since the informants were to read a formal BBC news text our data is concerned only with a formal read style. The data lacks a spontaneous speech or dialogue that would provide more information about informal speech. In order to inspect the aspects of vowel duration and the SVLR application in detail more tokens (e.g. spontaneous speech or a list of words aimed at particular features) are needed. Concerning the phonetic transcription of the texts we did not pay attention to the different realizations of particular vowels in SSE. We transcribed it canonically according to RP pronunciation presented in dictionaries (e.g. OED). The only feature of SSE that was paid attention to during transcription was rhoticity and rhotic vowels. Specialized IPA symbols for rhotic vowels were used when the context required it.
Because each text consisted of 478 words there were sometimes not enough vowel tokens for a statistical analysis to be performed. These vowels will be discussed later in this chapter.

5.2 RP vs. SSE vowel length

The above mentioned assumption claimed that the duration of the vowels /i:, ɑ:, ɔ:, u:, and ɜ:/ will be significantly shorter in SSE than in RP. Our hypothesis proved to be true in these cases: the high front vowel /i:/, realized as /i/ in SSE proved to be significantly shorter in SSE (71 ms) than in RP (85 ms). Two other vowels, /ɔ:/ (109 ms vs. 94 ms) and /ɜ:/ (131 ms vs. 94 ms) proved to be significantly shorter as well. The differences in duration were statistically significant in all three above mentioned cases.

Concerning the differences in duration of vowels /ɑ:/ (133 ms vs. 119 ms), and /u:/ (75 ms vs. 69 ms) the statistical analysis did not evaluate the distinction as significant. In other words the influence of the factor ACCENT did not prove to be significant. We will inspect the possible causes of not confirming our hypothesis separately for each vowel.

1) /ɑ:/

Concerning the open back vowel /ɑ:/ there were 155 tokens to inspect, fourteen of which were unstressed. The rest of the tokens occurred in the stressed syllables. The vowel occurred only in three contexts (fortis, lenis, and sonorant). There were not enough tokens for the statistical analysis concerning SVLR application to be carried out. The only SVLR relevant vowels (39) were before /r/ in SSE. To be able to confirm or reject our hypothesis concerning the long-short vowel relationship in RP and SSE more tokens in various contexts and positions would be required. The realization of the vowel in SSE should be also taken into consideration. The differences in the normalized duration suggest a trend that needs to be further inspected using larger number of tokens.

2) /u:/

In total, there were 361 vowel /u:/ tokens, 86 of which occurred in unstressed syllables. The realization of this vowel in SSE is described as / ʉ/ (see Table 2.6). The lack of the GOOSE – FOOT distinction in SSE is a truth generally acknowledged. The fact that our assumption was not confirmed may have been caused by the use of the formal style while reading the provided text. Since all of the informants read only BBC news texts, no informal speech styles were included into our research, it is possible that the Scottish speakers were unintentionally reading the text in 'more-RP manner'. Perhaps if we added spontaneous speech and isolated word reading into the data base the statistical significance would occur.

The behaviour of the rest of the vowels was as expected, apart from the vowels /e/, /æ/ and /ɒ/ that were longer in SSE than in RP but did not prove to be significant concerning the SVLR application (for the SSE realization see Table 2.6). Vowels /ɪ, ʌ, ʊ, ə, aɪ/ occurred to have the same or similar length both in SSE and RP.

3) /e/

Vowel /e/ proved to be significantly longer in SSE than in RP. There was also a trend of the potential SVLR application (see Figure 5.1) but this trend has not been confirmed statistically.

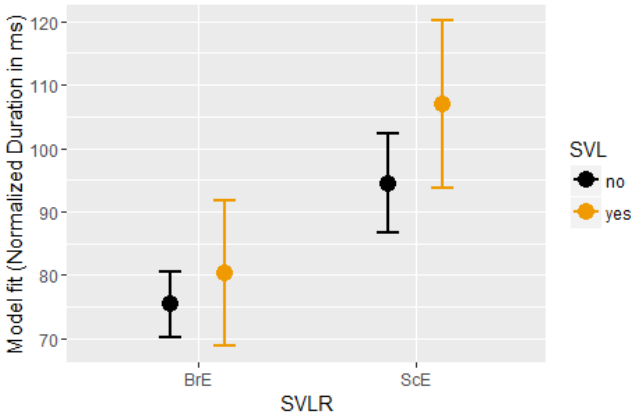


Figure 5.1 Trend in the SVLR application

4) /æ/

Figure 4.10 suggests a great variance within confidence intervals concerning the YES token. After a detailed inspection of /æ/ tokens was carried out it was discovered that there are only 11 YES tokens in both accents. The small number of the tokens, most probably, caused the great variance. The statistically confirmed shorter duration that evaluated the difference as significant (RP = 93 ms, SSE = 84 ms) was on the border of significance (p = 0.037). Further analysis is required in order to confirm or reject this occurring trend.

5) /ɒ/

Pre-sonorant context in RP shows great variance. The tokens were carefully inspected and it was discovered that there are only 4 vowels occurring in the pre-sonorant context in RP. The variation between RP and SSE pre-sonorant context is probably caused by the feature of rhoticity where the phone /r/ in SSE represents the vast majority of the pre-sonorant context.

Diphthongs /aʊ/ and /əʊ/ were also a part of the statistical analysis. Both diphthongs proved to be significantly shorter in SSE than in RP. Again, their phonetic realization in SSE must be taken into consideration: /aʊ/ is in SSE realized as /ʌʉ/ and diphthong /əʊ/ has undergone a process of monophthongization and therefore it is realized as/o/ (see Table 2.6). Based on our data, the only explanation that could be provided is that various phonological realizations conditioned the shorter duration in SSE.

5.3 SVLR

The second task of our thesis was to inspect the vowel behaviour in SSE in a certain context. The context where the vowels are lengthened is as follows: vowels before voiced fricatives, /r/, word-final stressed vowels in open syllables including morpheme boundary.

After a statistical analyses were performed three vowels appeared to follow SVLR: vowel /i:/, diphthong /aɪ/ and /eɪ/. Our original assumption was that vowels /i:/, /u:/, and /aɪ/ will be following the SVLR. This assumption was confirmed in /i:/ and /aɪ/ vowel tokens. The vowel /u:/ did not fulfil neither of our two assumptions. Scobbie's theory (1999: 233) may provide a satisfactory explanation: "Some middle-class speakers [of Scottish English] have phonological systems closer to RP than others by the presence of RP-like contrasts: /a/-/ɑ/, /ɔ/-/ɒ/, /u/-/ʊ/. These additional tense/lax vowel contrasts and the attendant phonetic reorganisation interfere considerably with the SVLR." It must be pointed out that we did not inspect the phonological systems of our Scottish speakers nor did we inspect their social background. There is also a question of a nature of our tokens Scobbie (1999: 231) provides broad characterization for vowel /ʉ/ (/u:/ in RP) of the conditioning effects of various contexts.

Dialect	Duration	Consonantal context					Morphological context	
		_n	_s	_z	_t	_d	_#	_#d
Scottish English	*longer*	—	—	bruise	—	—	brew	brewed
	shorter	spoon	Bruce	—	brute	brood	—	—
Anglo English	*longer*	spoon	—	bruise	—	brood	brew	brewed
	shorter	—	Bruce	—	brute	—	—	—

Table 5.1 Comparison of RP and SSE pre-consonantal context duration. Taken from Scobbie (1999:231)

As can be seen from Table 5.1 the only consonantal context where RP and SSE differ is before /n/ and /d/. After a closer inspection of our data it was discovered that there are only 18 pre-/d/ tokens, and 14 pre-/n/ tokens. More tokens would be needed to perform a reliable statistical analysis. This concerns also our first assumption concerning various length of /u:/ in RP and SSE.

Our data has confirmed Scobbie's suggestions that vowels /i:/ and /aɪ/ are affected by the SVLR and the rest of the vowels is not. Apart from the diphthong /eɪ/ which, in our thesis, seemed to be affected as well. There is a question of its realization in SSE. As can be seen in

Section 2.4.3 SSE realization of the FACE vowel is /e/. The analysis further proved that the vowel is significantly shorter in SSE than in RP. The duration of this vowel (99 ms) corresponds to the duration of SSE canonical vowel /e/ (96 ms). The confidence intervals of both /e/ and /eɪ/ (Figure 4.22) showed an increasing trend in the SLVR application. To confirm or to reject this trend further recording and data analysis is required.

5.4 Excluded tokens

Table 5.2 provides an overview of the count of the vowel tokens. Those marked with a red number were not used in the research part because of their low numbers.

Vowel	RP	SSE	TOTAL
ɪ	944	848	1792
iː	324	318	642
e	292	311	603
ɛː	27	x	27
ɛːɚ	x	27	27
æ	212	210	422
ʌ	129	129	258
ɑː	76	79	155
ɒ	114	137	251
ɔː	99	104	203
ʊ	51	54	105
uː	173	188	361
ə	1508	1158	2666
ɚ	x	223	223
ɜː	57	x	57
ɜːɚ	x	48	48
aɪ	138	132	270
eɪ	199	207	406
ɔɪ	4	4	8
aʊ	50	51	101
əʊ	120	107	227
ɪə	19	23	42
ʊə	17	14	31

Table 5.2 Excluded tokens

6 Conclusion

The purpose of this thesis was to conduct a data analysis which would attempt to discover the relationship between RP and SSE vowel duration. The theoretical background provided information necessary for the following research. Firstly the phonological inventories of Standard British English and Standard Scottish English were described. Secondly, we attempted to present an overview of various attitudes towards the phonological system of SSE and its relationship with Scots. Thirdly, the theoretical background dealt with the comparison of RP and SSE phonological systems.

For the purposes of the experiment 12 speakers were recorded and the subsequent sound material was analyzed. We worked with recordings from six British speakers and six Scottish speakers. The speech signal was segmented automatically and vowel boundaries were manually corrected. The duration of the vowels was and subsequently normalized in order to prevent the effect of different articulation rate. In order to inspect the data the statistical analyses were performed.

We hypothesized that since the SSE inventory lacks the long-short opposition the vowels corresponding to long vowels in RP will be shorter in the SSE speakers than in the RP speakers. Our second assumption was that the duration of some SSE vowels will follow the Scottish Vowel-Lengthening Rule as defined by Scobbie (1999). Concerning the differences in vowel length between RP and SSE it was confirmed that three of five RP long vowels are significantly shorter in SSE. Although all of the five vowels /iː, ɑː, ɔː, uː, ɜː/ were shorter in SSE than in RP only /iː, ɔː, ɜː/ showed statistically significant differences. All SSE diphthongs, apart from /aɪ/, were significantly shorter as well.

Concerning our second assumption Scobbie (1999) claims that the SVLR in Standard Scottish English is applicable only on vowels /aɪ/, /iː/, and /uː/. The duration of the first two vowels proved to be significantly different in YES (the contexts where the lengthening occurs) and NO (the contexts where the lengthening does not occur) contexts. The vowel /uː/ also showed similar behaviour but the data did not prove to be statistically significant. We also discovered that the results for the diphthong /eɪ/ were significant both concerning the differences in length and the application of the SVLR. Although its different realization in SSE must be taken into consideration.

To be able to generalize our assumptions the replication of the research with more sound material and subsequent data is necessary. Our data was based on the recordings from the twelve speakers who read one piece of formal style text in a specialized studio. In order to inspect the behaviour of the SVLR properly spontaneous speech material on the one hand and isolated words (minimal pairs) on the other hand are required.

7 Shrnutí

Tato bakalářská práce se zabývá srovnáváním délky vokálů ve standardní britské angličtině a standardní skotské angličtině. Práce je rozdělena do dvou částí na teoretickou a praktickou. V první teoretické části je poskytnut obecný úvod do dialektologie na Britských ostrovech. Dále je popisován fonologický systém britské a skotské angličtiny zaměřující se především na vokály. V kapitole 2.4, která se zabývá právě skotskou angličtinou, je také krátce řešena otázka vztahu britské a skotské angličtiny v průběhu historie. První část dále poskytuje srovnání fonologických systémů RP a SSE, které je nezbytné pro následující analýzu a vyhodnocení dat v části druhé.

Byly stanoveny dvě hypotézy. První vyslovila předpoklad, že jelikož skotská angličtina nerozlišuje kontrast mezi dlouhými a krátkými vokály tak, jak to dělá angličtina britská, budou mít dlouhé vokály z britské angličtiny o poznání kratší trvání v angličtině skotské než v první zmíněné varietě. Druhá část naší hypotézy se týkala působení tzv. Skotského pravidla pro dloužení vokálů. V této části hypotézy bylo přihlédnuto k výsledkům Scobbieho (1999), který tvrdil, že toto pravidlo je spouštěno pouze určitými vokály v určitých kontextech. Pravidlo říká, že trvání hláskek /i:/, /u:/ a /ai/ ve skotské angličtině bude delší, vyskytnou-li se tyto vokály před znělou frikativou, hláskou /r/, vokálem, koncem slova nebo hranicí morfému.

Kapitola 2.5 poskytuje další teoretické podklady, jako ‚Scottish Vowel-Lengthening rule' nebo ‚pre-fortis shortining', pro následnou analýzu. Ve třetí kapitole je pojednáváno o zvukovém materiálů použitém pro výzkum. Použili jsme nahrávky od dvanácti mluvčích, šesti britských a šesti skotských. Subjekty byly nahrávány buď ve studiu na Fonetickém ústavu ve studiu, nebo u sebe doma za použití specializovaného diktafonu. Mluvčí měli za úkol co nejplynuleji přečíst vybraný úsek (úsek A či úsek B, které se lišily pouze obsahem nikoliv však formou nebo počtem slov) z BBC news. Poté, co byly nahrávky opatřeny textgridy v programu Praat, proběhla automatická segmentace hlásek. Hranice vokálů byly manuálně upraveny podle normy, kterou stanovili Skarnitzl a Machač (2009). Byl napsán skript v Praatu, který vypsal trvání všech vokálů spolu s dalšími údaji o mluvčích a podobně. Byla vytvořena excelová tabulka, která shrnovala všechny údaje. Trvání všech vokálů muselo být normalizováno na tzv. ‚Normalizované trvání', aby se předešlo případným rozdílům v artikulačním tempu jednotlivých mluvčích.

Statistická analýza dat probíhala v programu R za použití tzv. ‚Mixed Effects' Modelů, které umožňují počítat s náhodnými efekty. Co se samotných dat týká, při statistických analýzách bylo k dispozici 8918 vokálových položek. Některá slova musela být vyřazena vzhledem k jejich nejednotné výslovnosti. Jednalo se o slova cizího původu jako například Bajconur nebo Havana.

Kapitola čtvrtá se zabývá popisem výsledků. Co se týká obecného srovnání délky vokálů jednotlivých variet. Naše hypotéza byla statisticky potvrzena ve třech případech z pěti, a to u vokálů /iː/, /ɔː/ a /ɜː/, které se všechny ukázaly být signifikantně kratší ve skotské varietě než v té britské. U zbývajících dvou dlouhých vokálů /ɑː/ a /uː/ nebyl rozdíl v trvání statisticky významný, ačkoliv bylo trvání tyto vokály ve skotské angličtině kratší než v britské. Tento trend by bylo třeba ověřit na rozsáhlejší sbírce dat. Druhá část naší hypotézy se potvrdila také, avšak opět ne u všech výše jmenovaných hlásek. Platnost pravidla byla statisticky prokázána pouze u vokálu /iː/ a diftongu /aɪ/. Oproti hypotéze se ještě navíc přidal mezi tyto vokály diftong /eɪ/, který se podle dat, jež máme k dispozici, lišil v oblasti trvání v kontextech s a bez působení výše zmíněného pravidla.

Kapitola diskuze se snaží objasnit výsledky čtvrté kapitoly. Dochází se zde k poznatku, že aby naše nálezy mohly být potvrzeny a trendy, které se objevují napříč hláskami prozkoumány, bylo by třeba sebrat větší množství dat. Problém našich zvukových materiálů je ten, že se jedná pouze o jeden styl a to o formální a čtený. Aby mohl být výzkum úspěšně replikován, bylo by potřeba opatřit nahrávky spontánních rozhovorů a čtených izolovaných slov (minimální páry), která by lépe odhalila působení výše zmíněného pravidla o dloužení skotských vokálů.

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