EFFECTS OF THE SCOTTISH VOWEL LENGTH RULE ON VOWEL QUANTITY IN TYNESIDE ENGLISH

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ABSTRACT

The Scottish Vowel Length Rule (SVLR) – formerly 'Aitken's Law' [1, 5, 6] – is a context-conditioned vowel length alternation that in Scottish and Northern Irish varieties of English co-exists with the so-called Voicing Effect (VE, or 'pre-fortis clipping') [3]. It is known that SVLR-like alternations occur in varieties of English spoken in northern England close to the Scottish border [1, 4, 8], but to date little systematic analysis of the extent to which SVLR can be said to be a property of Tyneside English (TE) has been undertaken. Pilot data presented in this paper suggest that for /iː uː aɪ/ the SVLR can be said to operate, if only partially, in TE.

Keywords: Tyneside, Scottish English, vowel duration, Voicing Effect.

1. INTRODUCTION

The phonological similarity of Scottish English (ScE) and TE is unsurprising in view of the shared ancestry of Scots and Northumbrian English and a history of contact and migration between urban Scotland and Tyneside, especially Newcastle [2]. One well-known similarity results from the failure of the vowel in *house*, *brown* or *about* to diphthongize in ScE and northern English dialects during the Great Vowel Shift of Middle English [2, 6].

Vowel quantity in ScE is a key feature distinguishing it (and the closely related accents of Northern Ireland) from other varieties. Like apparently all other varieties of English, there is a tendency for ScE vowels to be somewhat longer before voiced consonants than before voiceless ones (e.g. /i/ is perceptibly longer in *bead* than in *beat*). The SVLR is similar in that it also involves lengthening of vowels before tautosyllabic voiced consonants, but it specifies that vowels preceding voiced fricatives, /r/, and a pause (i.e. where the vowel occurs in an open syllable) are long; elsewhere, they are short. So while *beat* and *bead* both have short [i] (the second being slightly longer than the first), the vowels of *see*, *freeze* and *seethe* are long. The rule is thus simultaneously sensitive to the voicing and the manner of articulation of a post-vocalic consonant, if any.

Not all vowels in the system are equally affected by SVLR conditioning: the rule has been shown to apply chiefly or exclusively to /i ʉ ai/ in those ScE varieties which have been investigated [5, 9]. For /ai/ the context may determine a difference in quality as well as in duration, such that the nucleus of /ai/ in *price* can be markedly fronter and closer than it is in *prize*.

The presence of a following morpheme boundary is also relevant. The vowels of pairs such as *brood* and *brewed* are short and long, respectively. Although *freeze~frees*, *bruise~brews*, etc., are all expected to contain long vowels because of the following voiced fricative, the vowel in the bimorphemic form may be somewhat longer than that in its monomorphemic counterpart. The existence of such minimal pairs has led to the suggestion that ScE possesses phonemic vowel length, but because length is predictable from phonological and morphological context these alternations should be considered allophony, albeit of an unusual sort for English.

1.1. The SVLR in Tyneside English

Milroy [4] draws parallels between TE and ScE in terms of the vowels that are susceptible to conditioning by the SVLR, notably /iː/ and /aɪ/.[i] Milroy's analysis focuses only on TE /aɪ/, in which he observes systematic qualitative and quantitative variation showing that it is subject to VE and SVLR alternations. Despite indications that SVLR is less consistent among younger speakers than older ones, implying a loss of the rule in the community, Milroy concludes overall that SVLR alternations in /aɪ/ are being lost only very gradually, if at all. We therefore hypothesize that SVLR-conditioned duration alternations that are larger in magnitude than those resulting from the VE will be evident in measurements of the TE /aɪ/ diphthong, and in the monophthongs /iː/ and /uː/,

which are reported to exhibit SVLR alternations particularly markedly in ScE.

2. METHODS

The data discussed in this paper derive from a corpus of recordings collected in northeastern England for the SSATT project based at the University of York, UK.[ii] Recordings of wordlist readings by 8 male speakers of TE from the neighboring cities of Newcastle and Gateshead were selected. The speakers ranged in age from 25 to 68 years. Individual speakers are denoted by labels indicating city of origin (N = Newcastle; G = Gateshead), age, gender, and a distinguishing number where necessary. The recordings were made in speakers' own homes using a Zoom H4 digital recorder.

2.1. Vowels

In view of the results of earlier studies of the SVLR in ScE, it was decided to focus only on the close vowels /iː uː/ and the diphthong /aɪ/, on the assumption that if such a rule is present it is most likely to affect these three vowels. Further investigation may reveal SVLR-like conditioning of other vowels in the TE system.

2.2. Target words

The wordlist was designed to elicit forms exemplifying a range of phonological variables, of which SVLR was just one. The postvocalic consonantal contexts and the number of words illustrating each context type (e.g. 'preceding a voiceless plosive') are therefore not completely balanced. Rather than gather duration measurements for each of the three vowels in all the contexts available in the wordlist, a subset of contexts was chosen: before voiceless and voiced plosives (to illustrate the VE); and (to illustrate the SVLR) before voiceless and voiced fricatives; before suffixal /d/; before suffixal /z/. The target words from which the durational measurements were drawn are shown in Table 1.

Where a context is exemplified by more than one target word, the mean vowel duration of all the exemplars was used. Informants read the wordlist twice, with the words arranged in different orders, and the durational values for the two readings were averaged. On a small number of occasions forms were misread, but at least one useable reading of each word by each speaker was available.

Table 1: Target words. Vp denotes a vowel followed by a [±voice] plosive; Vf a vowel followed by a [±voice] fricative; V#/d/ and V#/z/ are vowels followed by suffixal /d/ and /z/ respectively.

Alternation	Context	/iː/	/uː/	/aɪ/
VE	$Vp_{[-voi]}$	*geek*	*brute*	*tight*
	$Vp_{[+voi]}$	*heed*	*brood* *crude* *food*	*tide*
SVLR	$Vf_{[-voi]}$	*fleece*	*goose*	*lice*
	$Vf_{[+voi]}$	*freeze*	*bruise*	*prize*
	V#/d/	*he'd*	*brewed* *crewed*	-
	V#/z/	*frees*	*brews*	*lies*

2.3. Duration measurements

Duration measurements in milliseconds were made using *Praat* v.5.2.06 running on Windows PC. The vocalic portions of the relevant syllables were demarcated using *Praat*'s TextGrid facility following methods described in [7], using a combination of auditory and visual judgments to identify vowel onset and offset via repeated playback over headphones and by visual inspection of the waveform and spectrogram.[iii]

3. RESULTS AND DISCUSSION

The results of the analysis are expressed as proportions, i.e. the relative durations of the (expected) longer vowel and the (expected) shorter one. For example, according to the VE the vowel of *tide* is expected to be somewhat longer than that of *tight*. For speaker N25M2 this prediction is borne out by his figure of 1.39 (that is, /aɪ/ in *tide* is 39% longer than /aɪ/ in *tight*; note that for clarity only the figure representing the expected longer vowel will be shown). The relative effects of the VE and the SVLR (if any) on vowel duration are given by the difference between these two measures, as discussed in §3.3 below.

3.1. Voicing Effect contexts

Table 2 shows that in all cases the duration of vowels preceding a voiced plosive, i.e. /d/, is greater than that of vowels preceding voiceless plosives (/t/ or /k/). In some cases the difference is substantial: for N25M1, the vowel of *heed* is nearly two and a half times longer than that of *geek*. Hence, a moderate to strong VE is apparent in this sample.

Table 2: Relative durations of /iː uː aɪ/ vowels preceding voiceless and voiced plosives for 8 male TE speakers.

Speaker	/iː/	/uː/	/aɪ/
N25M1	2.40	1.18	1.71
N25M2	1.41	1.06	1.39
N25M3	1.19	1.29	1.20
N39M	1.65	2.05	1.52
G45M	1.77	1.53	1.49
N53M	1.66	1.74	1.13
N58M	1.29	1.60	1.36
N68M	1.84	2.31	1.50
Mean	*1.65*	*1.59*	*1.42*
SD	*0.38*	*0.43*	*0.19*

Table 3: Relative durations of /iː uː aɪ/ preceding voiceless and voiced fricatives for 8 male TE speakers.

Speaker	/iː/	/uː/	/aɪ/
N25M1	2.17	0.84	2.00
N25M2	1.92	1.89	2.32
N25M3	0.85	1.56	2.60
N39M	2.79	1.47	1.66
G45M	1.59	1.72	2.02
N53M	1.14	1.69	1.89
N58M	1.51	1.26	1.25
N68M	2.24	1.57	1.77
Mean	*1.78*	*1.50*	*1.94*
SD	*0.63*	*0.33*	*0.41*

Despite considerable between-speaker variation in terms of absolute duration differences between the vowels in the $Vp_{[\pm voi]}$ contexts, there is comparatively close agreement between individual speakers' ratios for /iː/ and /aɪ/ (Pearson's r = 0.744; df = 6; p = .017), suggesting that the VE has about the same amount of influence on these vowels from speaker to speaker. No such close relation holds between /iː/ and /uː/ or /uː/ and /aɪ/.

3.2. Scottish Vowel Length Rule contexts

The figures visible in Table 3 tell a similar story to those in Table 2: the voicing of the following consonant is a reliable predictor of vowel length. Overall, the relationship between /iː/ and /uː/ is similar to that seen in Table 2: /iː/ is on average subject to greater lengthening according to following context than is /uː/. However, there is wide disparity between the speakers, particularly for /iː/ and /uː/, as suggested by the standard deviations for these vowels. Three speakers exhibit large ratios of over 2 : 1 for /iː/, while in two cases (/uː/ for N25M1 and /iː/ for N25M3) the vowels are in fact shorter preceding /z/ than preceding /s/. For /iː/, the mean increase in duration across the $Vf_{[\pm voi]}$ contexts is slightly larger (by 13%) than that in the $Vp_{[\pm voi]}$ contexts, while for /uː/ it is somewhat smaller (9%). /aɪ/ exhibits the strongest (and in 1-tailed t-tests the only statistically significant) SVLR-context increase (p=.004), whereby the vowel is on average almost twice as long in $Vf_{[+voi]}$ contexts as is $Vf_{[-voi]}$ ones. The within-speaker similarity of the /iː/ and /aɪ/ durations seen in the VE data is not observed here. The patterns overall suggest that SVLR contexts promote vowel lengthening more than VE contexts do.

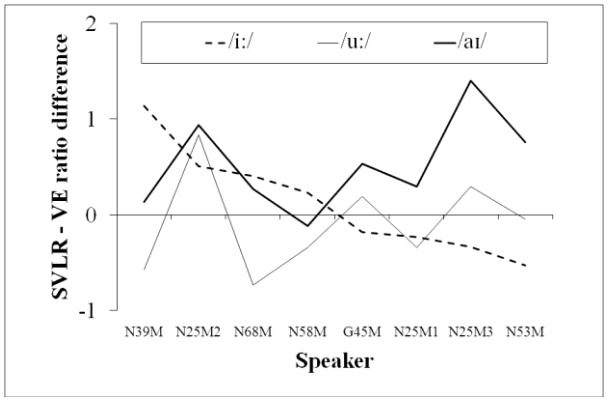
3.3. Difference between SVLR and VE effects

There is no agreed threshold at which the difference between VE- and SVLR-context conditioned lengthening becomes sufficient to establish whether it is valid to talk of an SVLR effect distinct from the VE in TE, or indeed in any other variety of English. However, for current purposes a SVLR-to-VE difference of +20% (=0.2) seems a reasonable estimate. The differences between the SVLR and VE ratios per speaker per vowel is shown in Figure 1. Larger positive values mean the SVLR lengthens vowels substantially more than the VE does, as predicted on the basis of the ScE pattern, while negative values indicate that the VE has the greater influence on vowel quantity. Values close to zero indicate parity, removing any justification for assuming a separate SVLR on the basis of these data.

Aside from the clear interspeaker variability evident in Figure 1, two obvious features are apparent. It is clear that among the three vowels, SVLR-conditioning is most marked for /aɪ/, as with only one exception (N58M) the SVLR-VE difference is a positive value. This greater susceptibility is reflected by the fact that in Tables 2 and 3 the average duration ratios for /aɪ/ differ by 52% (versus 13% and 9% for /iː/ and /uː/, respectively). Secondly, the curves for /uː/ and /aɪ/ reveal a strong positive correlation between the two vowels (r = 0.737; df = 6; p = .018), although half of the SVLR-VE values for /uː/ are negative. It appears to be the case that where a speaker's SVLR-VE value is low for /aɪ/ his corresponding value for /uː/ tends to be negative, such that weak SVLR conditioning for /aɪ/ predicts a collapse (perhaps even a reversal) of the SVLR/VE

distinction for this vowel. No speaker age effect was detected in these data.

Figure 1: SVLR-VE ratio differences for /iː uː aɪ/, by descending order of SVLR-VE difference for /iː/.



3.4. Morpheme boundary contexts

As mentioned in §1, the presence of a morpheme boundary predicts a longer vowel than in a segmentally-identical monomorphemic syllable (e.g. *brewed* and *frees* have longer vowels than their counterparts *brood* and *freeze*). In these data, however, the duration ratios for /iː/ and /uː/ in V/d/ (e.g. *heed*) and V#/d/ (e.g. *he'd*) contexts are close to 1 (mean for /iː/ = 0.93, SD = 0.12; mean for /uː/ = 1.09, SD = 0.16), indicating no SVLR lengthening effect (note that the wordlist contained no forms representing this context for /aɪ/). For the V/z/~V#/z/ context (*freeze* vs. *frees*, etc.) the effect for /iː/ fell below 1 (mean = 0.93, SD = 0.32) but was more robust for /uː/ (mean = 1.45, SD = 0.51) and /aɪ/ (mean = 1.26, SD = 0.16). For these two vowels, and more consistently for /aɪ/ than for /uː/ despite the greater mean value for the latter, the SVLR does appear to be in operation in these contexts.

4. CONCLUSIONS

The preliminary data described in the preceding sections indicate that the SVLR is operative in TE, but in the sample investigated it affects /aɪ/ much more consistently than it does the close monophthongs /iː/ and /uː/. This confirms Milroy's findings [4] and lends weight to the assertion that some northern British varieties of English possess quasi-contrastive vowel quantity.

5. REFERENCES

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[i] The vowels investigated are henceforth denoted /iː uː aɪ/, representations which differ from those used in discussions of ScEng phonology such as [5]. The notational differences are unimportant in the present context.

[ii] 'Stability and Shift in Accents from Tyne to Tees'. The data collection was supported by a University of York pump-priming grant.

[iii] We are grateful to Dominic Armstrong for assistance with the durational measurements.