NORTH-SOUTH DIVIDERS IN PRIVATELY EDUCATED SPEAKERS: A SOCIOLINGUISTIC STUDY OF RECEIVED PRONUNCIATION USING THE FOOT-STRUT AND TRAP-BATH DISTINCTIONS IN THE NORTH EAST AND SOUTH EAST OF ENGLAND

Caitlin Halfacre & Ghada Khattab

Newcastle University
caitlin.halfacre@gmail.com & ghada.khattab@newcastle.ac.uk

ABSTRACT

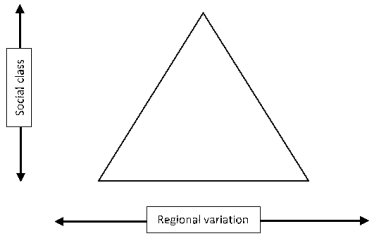
There is a long standing claim that the Received Pronunciation sociolect does not have regional features and is the same across England. We test that by looking at the FOOT-STRUT and TRAP-BATH distinctions, which are classic markers of the North-South accent divide in England. 10 speakers, who were privately educated in either the North East or the South East, were recorded for this study. Using sociolinguistic interviews, forced alignment techniques, and mixed-effect models, social and linguistic effects on vowel pronunciation are analysed. All speakers are found to have the FOOT-STRUT split. However, the TRAP-BATH distinction is less prevalent in the North East speakers, who show effects of linguistic structure rather than social factors on the BATH vowel, with a possibility of a rule simplification process occurring that is bringing them towards the system used by South East speakers.

Keywords: sociophonetics, phonology, social class, Received Pronunciation, English.

1. INTRODUCTION & BACKGROUND

This paper marks the beginning of an investigative project that looks into the current state of Received Pronunciation (henceforth RP) and how regional and social class-based variation interact. RP suffers from being both under and over-studied, having been "more carefully described than any other British accent" [12], and yet having been sorely neglected in the field of sociophonetics [4]. Claims exist that typologically it is tied to the South East [18] but also described as regionless [20]. This study contributes to our understanding of the present state of RP but takes a different approach to many. Building on Wells' [20] operationalisation of English accents across region and class shown in figure 1, we aim to investigate the claims of an accent without regional features [18] by taking speakers from two different areas, the North East [2] and the South East and comparing and contrasting the relationships between social class and regional features. Rather than pre-defining who RP speakers are likely to be, it takes speakers who can be defined as in the middle-upper range of the socio-economic spectrum by other factors, namely private school education. This is particularly relevant in the study of RP due to the origins of the accent [18, 8] in the south-eastern public schools.

Figure 1: Relationship between social and regional accents in England (adapted from Wells [20], also reported by Ward [19] from Daniel Jones).



The FOOT-STRUT and TRAP-BATH distinctions are used to discuss this topic because they are classic markers of the North-South accent divide in England. The BATH lexical set is produced as a PALM (/ɑː/) vowel by speakers from the south, but as a TRAP (/a/ or /æ/) vowel by speakers from the north. It is the product of what Wells [20] describes as a half completed sound change. A phonemic split occurred between the TRAP and BATH words with the /æ/ lengthening to [æː] (and later [ɑː]) when followed by a voiceless fricative. This split phonologised and spread but not to all lexical items, e.g. *gas* and *mass* still have a TRAP vowel in all varieties. There are also words with a following /n/ that fit into the BATH category, (e.g. *aunt, dance*); these were borrowed into Middle English from French, after the split had occurred [5]. The STRUT vowel is regionally variable, with northern speakers producing the variant that is identical to the FOOT vowel (/ʊ/) and southern speakers producing a different variant (/ʌ/) that is not found in any part of the

phonology of northern speakers. These two lexical sets were originally one, in Middle English, with the short vowel /u/, which split into /ʊ/ and /ʌ/.

1.1. Research Questions

The two research questions addressed investigate the state of the variables within the two regions of speakers but also ask whether social factors between these speakers can show the effect of the triangular structure of variation in figure 1.

1. What social and linguistic factors affect the FOOT-STRUT and TRAP-BATH distinctions in speakers privately educated in the North East and the South East?
2. At what socio-economic stage do the FOOT-STRUT and TRAP-BATH distinctions disappear in speakers privately educated in the North East?

2. METHOD

As explained in section 1, speakers were not selected based on whether they speak RP or not. In order to avoid the circularity that would be caused by predefining the features of the accent under study, they were selected based on other socio-economic factors. Specifically, due to reports of the British private and boarding [1] school system being fundamental to the roots and development of RP [8, 18], all speakers in this study had been privately educated for the majority of their childhood. They were, however, variable in other socio-economic factors including type of school, occupation, and parents' education and occupations. The population under study is approximately 7% of the total British population [13], and less of the north-eastern population, since there are more private schools in the South [7, 1]. These numbers mean that speaker recruitment is difficult, hence the small number of speakers represented here.

The total number of speakers was 10, 4 educated in the North East and 6 in the South East. Sociolinguistic interviews (based on the traditional Labovian model [17]) were recorded on a Zoom H4n Pro Handy Recorder. A word list and minimal pairs task were included with various pairs that identify the FOOT-STRUT and TRAP-BATH distinctions. Demographic information, including educational background and parents' education was also collected. The interviews were transcribed in ELAN, force aligned with FAVE-align [16] and formant measurements were extracted using FAVE-extract [16], which produces normalised (Lobanov) Herz values. The vowels produced by FAVE were recoded to lexical sets [20, 21] including error correction and adjusting the classifications from the American vowel system. All data was imported into RStudio and the extracted vowel measurements combined with the social data collected from the participants. Unless otherwise stated the measurements used in the analysis were the normalised midpoint F1 and F2. Due to the tendency in casual speech to reduce the vowels in function words, these were filtered out of the data set after it had been imported into RStudio.

3. RESULTS AND DISCUSSION

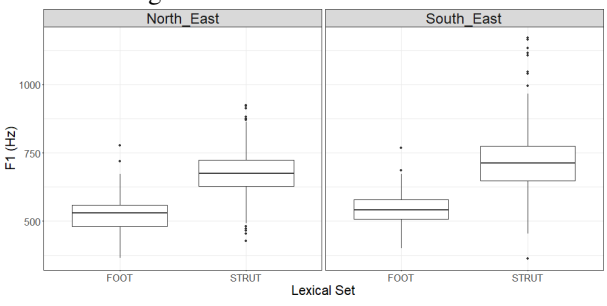
3.1. Speaker Specific Discussion

In the minimal pairs tasks seven out of the ten speakers consciously identified a difference in both the FOOT-STRUT and TRAP-BATH minimal pairs. One speaker did not identify a difference between *anti* and *auntie* (the TRAP-BATH distinction) in pre-nasal position but was aware that other speakers would. Another speaker said that she varied in her realisation of this pair, being affected by her family from further south who used /ɑː/ in *auntie*. Only one speaker did not identify a difference in any of the FOOT-STRUT minimal pairs, and also had no TRAP-BATH distinction.

3.2. FOOT-STRUT

The FOOT-STRUT distinction is primarily characterised by a difference in F1, with /ʊ/ having a lower F1 than /ʌ/. A linear mixed effects model shows the expected relationship between these vowels, with a +166Hz effect of the STRUT lexical set against the FOOT lexical set (t= 28.334). However, the region of education did not show a significant effect on the STRUT vowel (see figure 2); no predictor caused more than 46Hz of variation in this vowel (see table 1).

Figure 2: F1 of FOOT and STRUT lexical sets, by School Region



Regarding F2, the FOOT words are significantly fronter, by 88Hz (t = -3.349), than the STRUT lexical set and STRUT words do not vary based on region

Predictor	Estimate	Standard Error	t-value
(Intercept)	746.703	15.481	48.234
School Region			
South East (baseline)			
North East	-44.405	21.740	-2.043
Following segment Voicing			
Voiceless (baseline)			
Voiced	-34.828	5.835	-5.968
Preceding Segment			
None (baseline)			
Oral Labial	-2.045	10.315	-0.198
Nasal Labial	32.926	14.124	2.331
Oral Apical	-14.869	8.777	-1.694
Nasal Apical	32.926	14.124	2.331
Palatal	-37.775	23.724	-1.592
Velar	8.354	12.019	0.695
Liquid	1.193	10.485	0.114
Obstruent + Liquid	-20.696	11.987	-1.727
Approximant	-18.609	10.748	-1.731
Following Sequence			
None (baseline)			
One Syllable	-15.058	6.852	-2.198
Two Syllables	46.371	19.936	2.326
Complex Coda	-15.95	8.074	-1.976
Complex Coda + one or more syllables	-9.232	7.594	-1.216

Table 1: Model of the F1 of the STRUT lexical set

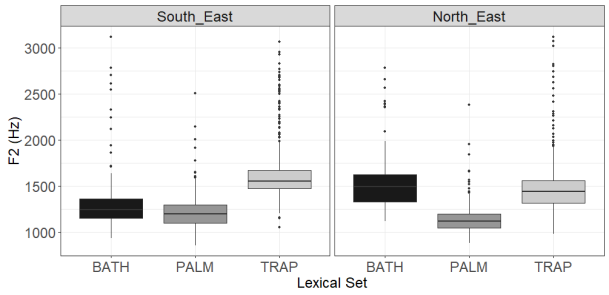
but show some variation by phonetic environment.

3.3. TRAP-BATH

3.3.1. F2

Figure 3 shows that for speakers educated in the South East the BATH lexical set has a similar range of F2 to the PALM lexical set, and different to the TRAP lexical set, as would be expected from the literature. For the speakers educated in the North East, the BATH words pattern closer to the TRAP words but have more variation.

Figure 3: F2 of the TRAP , BATH and PALM lexical sets

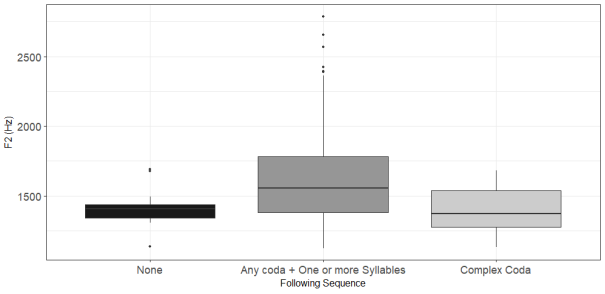


The best linear mixed effects model for the F2 of the BATH lexical set shows an effect of +224Hz for speakers educated in the North East, compared to those educated in the South East (t = 3.546). Considering the model of social variation discussed in section 1 and shown in figure 1, it would be expected that factors determining social class (e.g. occupation) would be the strongest predictors for any variation in the BATH vowel. However, when models were run and ANOVA tests conducted to compare them it was found that the social factors (including age, sex and occupation) and most of the factors that described phonetic environment did not have significant effects. The best model found showed that structure of the following sequence did have a significant effect, see table 2. One or more syllables after the BATH vowel has an effect of +340Hz. The difference between these following sequences can be seen in figure 4.

Table 2: BATH lexical set for speakers educated in the North East

Predictor	Estimate	Standard Error	t-value
(Intercept)	1303.35	206.19	6.321
Following Segment Manner			
Fricative (baseline)			
Nasal	-171.40	112.70	-1.521
Following Segment Place			
Labial (baseline)			
Labio-dental	30.37	208.24	0.146
Apical	117.11	170.58	0.687
Following Sequence			
None (baseline)			
One or more syllables	343.77	124.54	2.760
Complex Coda	77.82	148.22	0.525

Figure 4: F2 of the BATH lexical sets by following sequence for speakers educated in the North-East



Examples of the words in the category showing an effect include: *after, castle, laughing, examples*. Historically the TRAP-BATH split, as described in section 1, is defined as lengthening and then backing in a pre-fricative environment, however the process did not complete lexical diffusion. Therefore, it is likely that the current state of TRAP-BATH distinction is controlled by a complex rule system. Even a speaker with a complete TRAP-BATH split would still have a TRAP vowel in words such as *gas*. It also does not apply in every phonological environment; for example, a speaker with the split would have a TRAP vowel in *classic*. The effect of follow-

ing sequence seen in the BATH vowels of the speakers educated in the North East could be a case of rule simplification.

Another example of a lexically specific split is /æ/-tensing in Philadelphia [10], which has a complex set of rules. Payne [15], for instance, found that children from out of state learning the Philadelphia vowel system do not show the correct system because they have acquired only some of the rules, or have simplified them. There is also evidence that native speakers are now simplifying the vowel system [11].

Older quantitative studies on the southern BATH vowel are not available but there is other evidence in the literature that it has changed. For example, Fudge [6] states that in his own speech (describing himself as a middle class southern British speaker), the TRAP vowel never occurs before a voiceless fricative and Wells [21] states that older, often upper class speakers of RP, used to have an /ɑː/ vowel in words such as *plastic*. None of the speakers educated in the South East have this pattern and all of them have at least some words with a following voiceless fricative that are realised with a TRAP vowel (e.g. *mass, lass*). We propose that the explanation for the difference in predictors for the North East speaker set is that they are moving towards a system more like the South East speakers, but either have not acquired all of the necessary rules, or have simplified the rules. The North East speakers could be following a rule that states that the fricative or nasal that causes the vowel change must be in the same syllable:

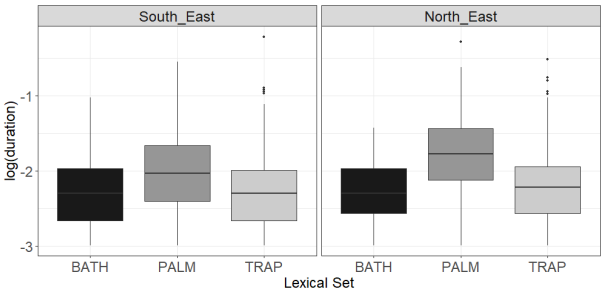
$$\begin{bmatrix} +\text{low} \\ +\text{front} \\ -\text{long} \end{bmatrix} \rightarrow \begin{bmatrix} +\text{low} \\ +\text{back} \\ +\text{long} \end{bmatrix} / \begin{Bmatrix} \text{\_fricatives\$} \\ \text{\_nasal\$} \end{Bmatrix}$$

The speakers educated in the South East show very little variation in the BATH vowel and do not display the same phonological conditioning (see figure 3).

3.3.2. Duration

It would be expected that BATH vowels, which have undergone pre-fricative lengthening (section 1), would have a longer duration, patterning with PALM vowels rather than TRAP vowels [9, 14] (comparing with both allows for possible TRAP lengthening [9]). However, as can be seen in figure 5, across both school regions, the BATH words in this data set show the same duration as the TRAP words, not the PALM words. This pattern was confirmed in models. These results will be the subject of further research but mean that duration cannot be used to analyse the state of the TRAP-BATH in the speakers in this study.

Figure 5: Duration of the BATH, PALM and TRAP lexical sets



4. CONCLUSION

Returning to the research questions, the following conclusions can be drawn:
1: The STRUT vowel does not show any effect of region; there is only a small amount of variation in F1, caused by phonetic environment, and the F2 shows variation based on preceding and following segment. For the speakers educated in the North East the BATH lexical set is not variable based on any identifiable social factors but there is an effect of following sequence on the vowel, meaning that depending on the syllable structure the BATH vowel is more or less like the TRAP vowel. For those educated in the South East there is no pattern of variation in the BATH vowel.
2: There is no effect of school region on the STRUT vowels; speakers privately educated in the North East have no less of a distinction than those educated in the South East. The TRAP-BATH distinction is not affected by social factors, instead a simplified system governing the lexical occurrence is found in the speakers educated in the North East.

Overall, this data set shows that the model of social variation seen in figure 1 works for some variables but not all variables together. The model would predict that regional differences would reduce with progression up the socio-economic spectrum. However, we have shown that all the speakers show the same variation in the FOOT-STRUT split and different variation in the TRAP-BATH distinction. Therefore, the North-South difference as measured by the FOOT-STRUT split is lost lower down the social spectrum than as measured with the TRAP-BATH distinction, despite the phonological complexity of acquiring a STRUT vowel [3]. This is likely due to the social saliency of the BATH vowel. Wells [21] ascribes retention of the TRAP vowel in the BATH lexical set to its status as a northern identity marker.

5. REFERENCES

[1] Public Schools Act. CAP. CXVIII. 1868.

[2] Corrigan, K. P., Buchstaller, I., Mearns, A., Moisl, H. 2012. The Talk of the Toon.

[3] Evans, B. G., Iverson, P. 2007. Plasticity in vowel perception and production: A study of accent change in young adults. *The Journal of the Acoustical Society of America* 121(6), 3814–3826.

[4] Fabricius, A. H. 2002. RP as sociolinguistic object. *Nordic Journal of English Studies* 1(2), 355–372.

[5] Fraser Gupta, A. 2005. Baths and becks. *English Today* 21(1), 21–27.

[6] Fudge, E. 1976. Long and short [æ] in one Southern British speaker's English. *Journal of the International Phonetic Association* 7(2), 55–65.

[7] Headmasters' and Headmistresses' Conference, 2018. School Directory.

[8] Jones, D. 1917. *An English Pronouncing Dictionary*. Cambridge: Cambridge University Press.

[9] Kettig, T. 2016. The BAD-LAD split: Secondary /æ/-lengthening in Southern Standard British English. *Proceedings of the Linguistic Society of America* 1, 1–14.

[10] Labov, W. 1994. Principles of language change: Internal factors.

[11] Labov, W., Fisher, S., Gylfadottír, D., Henderson, A., Sneller, B. 2016. Competing systems in Philadelphia phonology. *Language Variation and Change* 28(3), 273–305.

[12] Macaulay, R. 1988. RP R.I.P. *Applied Linguistics* 9(2), 115–124.

[13] Milburn, A. 2014. Elitist Britain? Technical report.

[14] Moore, E., Carter, P. 2015. Dialect contact and distinctiveness: The social meaning of language variation in an island community. *Journal of Sociolinguistics* 19(1), 3–36.

[15] Payne, A. 1980. Factors controlling the acquisition of the Philadelphia dialect by out-of-state children. In: Labov, W., (ed), *Locating language in time and space*. New York: Academic Pr chapter 7, 143–178.

[16] Rosenfelder, I., Fruehwald, J., Evanini, K., Seyfarth, S., Gorman, K., Prichard, H., Yuan, J. 2014. FAVE (Forced Alignment and Vowel Extraction) Program Suite.

[17] Tagliamonte, S. A., Mesthrie, R. 2006. *Analysing Sociolinguistic Variation*. Cambridge New York: Cambridge University Press.

[18] Trudgill, P. 2002. *Sociolinguistic Variation and Change*. Edinburgh: Edinburgh University Press.

[19] Ward, I. 1929. *The Phonetics of English*. Cambridge: Heffer.

[20] Wells, J. 1982. *Accents of English: 1 An Introduction*. Cambridge: Cambridge University Press.

[21] Wells, J. 1982. *Accents of English 2: The British Isles*. Cambridge: Cambridge University Press.