

REGIONAL ACCENT ACCOMMODATION IN SPONTANEOUS SPEECH: EVIDENCE FOR LONG-TERM ACCENT CHANGE?

Wafa' Alshangiti & Bronwen G. Evans

Department of Speech, Hearing and Phonetic Sciences, University College London, UK

ucjtwal@ucl.ac.uk; bronwen.evans@ucl.ac.uk

ABSTRACT

Speech communication is a highly interactive process in which speakers actively seek to align themselves with their interlocutors [9]. This study investigates phonetic alignment in spontaneous speech in speakers from two different regional accent backgrounds; Standard Southern British English (SSBE), the prestige accent of British English, and North-East English (NE), a non-standard accent. Six female pairs of SSBE-NE speakers completed a short pre- and post-test as well as the Diapix task [2] in mismatched (SSBE-NE) pairs. Accommodation was investigated using accent ratings. There was some evidence that NE speakers accommodated to SSBE speakers. However, this was limited to a small number of speakers, was dependent on snippet-type (accent neutral or accent revealing) and, in contrast to previous research, did not persist into later talk.

Keywords: speech production, accent variation and change, talker variability

1. INTRODUCTION

Speakers use language not only to communicate a message, but also as a way to establish, contest or maintain relationships [5]. Speakers and listeners thus tailor or attune their behaviour to the interaction, using resources from a range of communicative behaviours in order to converge towards or diverge from their addressee [5]. Communication can thus be seen as a dynamic system in which speakers adapt their talk to salient aspects of the conversation, e.g., topic and addressee.

Previous research has claimed that in order for successful communication to occur, speakers actively seek to align themselves (i.e., converge) with their interlocutors [9]. Alignment has been shown to occur in speakers from the same regional accent background [7] as well as between speakers from different language backgrounds [2]. As well as facilitating communication, one could imagine that alignment also serves as a way to negotiate a shared identity [6]. Such a process is likely

common in multidialectal environments, where speakers from different accent backgrounds regularly come into contact with each other. Speakers in this environment tend to avoid particular variants in order to facilitate communication and to appear cosmopolitan, but retain others in order to show their allegiance to a particular social or geographical group [4].

It has been suggested that these short-term changes may be the locus of long-term accent change [7]. Speakers are able to change their accent throughout their lifetime, and contact with speakers from a different accent background may lead to changes in speech perception and production even at late stages in language development [3]. It has been suggested that such changes may occur as a result of interaction [3]. One could imagine that during interaction, speakers adopt variants in order to accommodate to their interlocutor, and that these changes persist into later talk, leading to long-term accent change [3, 7].

The aim of the current study is twofold: First, to investigate whether speakers from different regional accent backgrounds accommodate towards each other, and second, to investigate whether accommodation effects persist into later talk. Accommodation was investigated using Diapix, a highly interactive task, in which pairs of speakers complete a collaborative spot-the-difference task [2]. NE speakers living in the south of England completed Diapix with an SSBE interlocutor. These accents were chosen because as well as differing in their prestige, they differ markedly in their phonetic inventory (e.g., [4]). In order to investigate whether any accommodation effects persisted into later talk, subjects also completed a pre- and post-test.

2. METHOD

2.1. Subjects

Twelve subjects were tested, 6 NE speakers and 6 SSBE speakers. All speakers were female, and were living in London at the time of testing. NE speakers were aged 18-36yrs, had been born and

raised in the North-East of England (Newcastle and Middlesborough) and had moved to London for university aged 18yrs. SSBE speakers were aged 18-30yrs and had been born and raised in the south of England.

No subjects reported any speech, hearing or language difficulties.

2.2. Materials

2.2.1. Diapix

Diapix is a collaborative spot-the-difference task, in which speakers work together to find differences in pictures [2]. Each speaker has a picture of the same general scene, but there are 12 differences across the two pictures, e.g., colour differences. Eight of the differences were selected to elicit ten keywords that illustrated key phonetic differences between NE and SSBE (Table 1). The task yields very rich, unscripted interaction which unlike e.g., the Map Task [1], does not impose a power relationship (i.e., giver vs. receiver) on the talk.

Table 1: Phonetic variables and the corresponding keywords used in Diapix.

Variable	SSBE	NE	Diapix keywords
BATH	ɑ:	æ	sandcastle, sunglasses
STRUT	ʌ	ʊ	hut, bucket
FOOT	ʊ	ʊ	foot, push
GOAT	əʊ	o:	Joe, Owen
FACE	eɪ	e:	Kate, spade

2.2.2. Pre-/Post-test

Subjects recorded two repetitions of the ten keywords in the carrier sentence, *Say _____ again*, and the phonetically balanced passage *Arthur the Rat*. Due to experimental error, the keyword *sandcastle* was omitted.

2.3. Procedure

2.3.1. Recordings

Subjects were recruited in pairs, but arrived separately and completed the pre-test individually. They then completed the Diapix task. Subjects were seated in individual recording booths and communicated over headset microphones. The task was completed when subjects had found all 12 differences, or after a maximum of ten minutes. On completion of the Diapix task, subjects completed the post-test individually.

All recordings were made directly onto computer using a high quality microphone with a sampling rate of 44.1 kHz, 16-bit resolution.

2.3.2. Analysis

Eleven phonetically trained listeners completed two sets of accent ratings, one for Diapix and one for the pre-/post-test. All were native British English speakers.

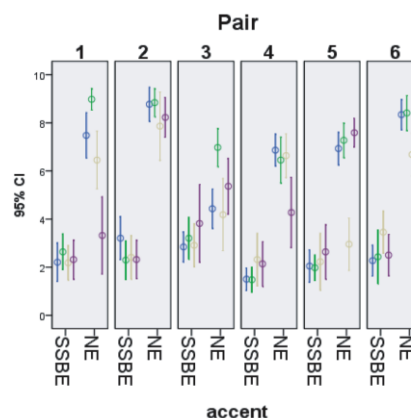
To assess convergence during Diapix, six snippets per speaker were extracted from the conversation, three from early and three from late in the conversation. Snippets were a single intonational phrase and were approximately 2-3 seconds long. Two types of snippet were selected; accent revealing (AR: two from early and late in the conversation) and accent neutral (AN: one from early and late in the conversation). AR snippets contained one of the key phonetic variables whereas AN snippets did not. To assess whether convergence persisted into the post-task, listeners gave ratings on a short section of *Arthur the Rat* extracted from the pre- and post-test recordings.

Listeners rated two repetitions of each sample on a ten-point scale, where 1 = very southern and 10 = very north-eastern. Samples were presented over headphones in a randomized order using PRAAT. Each rating session was self-paced and listeners heard each sample once.

3. RESULTS

As displayed in Fig. 1, there was a clear effect of accent background; all NE speakers were given higher ratings than were SSBE speakers. NE speakers appeared to change more than SSBE speakers, and these changes appeared to be different for AN and AR snippets. To avoid multiple statistical tests, the results were split by accent and snippet type, and analyzed separately.

Figure 1: Error bars showing accent ratings for Diapix snippets. For each pair for each accent, the groups of four error bars represent, from left to right, ratings for AR early, AR late, AN early and AN late snippets.



3.1. NE speakers

3.1.1. AR snippets

As displayed in Fig. 1, some but not all NE speakers were given higher (i.e., more northern) accent ratings for late snippets, indicating that some speakers were judged to have diverged from their SSBE interlocutors during the conversation.

A repeated measures ANOVA with time (early or late) coded as a within-subjects variable and speaker (NE1-NE6) coded as a between-subjects variable, revealed that there was a significant effect of time, $F(1,60) = 34.78$, $p < 0.001$, and significant interaction of speaker and time, $F(5,60) = 15.28$, $p < 0.001$. There was also a significant between-subjects effect of speaker, $F(5,60) = 16.15$, $p < 0.001$, confirming that some but not all speakers were given higher accent ratings for late snippets. Individual post-hoc t-tests confirmed that NE1 and NE3 diverged during the conversation; NE1, $t = -4.57$, $p < 0.008$, NE3, $t = -6.28$, $p < 0.008$ (Bonferroni corrected). There were no significant effects for any other speakers, $p > 0.05$.

3.1.2. AN snippets

As displayed in Fig. 1, the majority of NE speakers were judged not to have converged or diverged from their interlocutor. However, there appeared to be convergence in NE1 and NE4. These effects were tested in a repeated measures ANOVA with time (early or late) coded as a within-subjects variable and speaker (NE1-NE6) coded as a between-subjects variable. There was no significant effect of time, $p > 0.05$, but there was a significant between-subjects effect of speaker, $F(5,60) = 10$, $p < 0.001$, and a significant interaction of time and speaker, $F(5,60) = 21.1$, $p < 0.001$, confirming that some but not all speakers were given different ratings in late snippets.

Individual post-hoc t-tests confirmed that convergence occurred in NE1, $t = 4.72$, $p < 0.008$, and NE4, $t = 4.49$, $p < 0.008$ (Bonferroni corrected), and that divergence occurred in NE5, $t = -8.4$, $p < 0.008$ (Bonferroni corrected). Further investigation revealed that this was because, due to experimental error, a key phonetic variable had been included in the late AN snippet. There were no significant effects for any other speakers, $p > 0.05$.

3.2. SSBE speakers

3.2.1. AR snippets

As displayed in Fig. 1, there was no evidence for convergence or divergence, though there were

some overall differences in accent ratings. Even though all speakers were given low (i.e., more southern) accent ratings than NE speakers, some SSBE speakers were given lower accent ratings overall than others. The potential differences in overall accent rating were tested in a repeated measures ANOVA with time (early or late) coded as a within-subjects variable and speaker (SSBE1-SSBE6) coded as a between-subjects variable. There was no effect of time, $p > 0.05$ and no interaction of time and speaker, $p > 0.05$, confirming that speakers did not change their accent during the conversation. There was a significant between-subjects effect of speaker, $F(5,60) = 3.5$, $p < 0.001$, confirming that SSBE speakers were given different ratings.

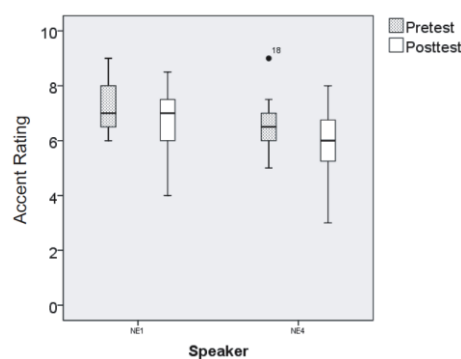
3.2.2. AN snippets

As displayed in Fig. 1, there was no evidence for convergence or divergence during the conversation in SSBE speakers and few differences in accent rating between speakers. These observations were investigated in a repeated measures ANOVA with time (early or late) coded as a within-subjects variable and speaker (SSBE1-SSBE6) coded as a between-subjects variable. There were no main effects of time or speaker, $p > 0.05$ and no interaction of time and speaker, $p > 0.05$, confirming that SSBE speakers did not change their accent during the conversation.

3.3. Persistence of convergence

Fig. 2 displays the accent ratings for the pre- and post-test (*Arthur the Rat*) for NE1 and NE4, both of whom showed convergence effects in the Diapix task. Although there was more variability in the post-test, individual paired sampled t-tests confirmed that there was no evidence for the persistence of convergence effects, $p > 0.025$ (Bonferroni corrected).

Figure 2: Boxplot to show accent ratings for NE1 and NE4 for Arthur the Rat in the pre- and post-test.



4. DISCUSSION

The results demonstrated that some but not all speakers accommodated towards each other. As hypothesized, accommodation was always in the direction of the lower prestige/minority towards the higher prestige/majority accent. That is, NE speakers were judged to have accommodated towards SSBE speakers. However, accommodation only occurred in two speakers; NE1 and NE4. This was surprising as previous research has demonstrated that accommodation effects, though subtle, are pervasive even amongst speakers from the same accent background (e.g., [7]). One possibility is that the differences in the degree of accommodation amongst our NE speakers reflect different attitudes towards SSBE (cf. [3]). Another possibility is that our NE speakers had already changed their accent to include SSBE-like variants as they had been living in London for a minimum of 4 mths. Furthermore, speakers in each pair were friends. Consequently, as the Diapix task was conducted in quiet conditions, it is possible that as these speakers were highly familiar with each other, they did not need to change their accent in order to facilitate communication.

Although there was evidence to suggest that some NE speakers changed their accent to sound more SSBE-like, these observed accommodation effects were not direct imitations (cf. [8]). That is, NE speakers were not rated as sounding the same as SSBE speakers. Moreover, even where NE speakers were judged to have converged in AN snippets, they were judged to have diverged in AR snippets (e.g., NE1). This suggests that they had developed a hybrid accent, in which they used SSBE-like variants to show belonging to their new community, but retained some NE variants to show allegiance to their home community (see also [3, 4]). This has implications for the methodological design of accent rating experiments; when judging regional accent, it appears that listeners weight phonetic variables differently with the result that measurements of accent accommodation may be over or under-estimated depending on the snippet selected.

In contrast to previous research [7], there was no evidence to suggest that accommodation effects persisted into the post-test. This suggests that accommodation effects are driven by short-term interaction effects rather than changes to long-term production targets. Consequently, whilst short-term accommodation effects could be the

mechanism for long-term accent change (cf. [7]), it is likely that as well as being modulated by social factors, repeated interaction is needed for these short-term changes to lead to lower-level changes in production (cf. [3]).

5. REFERENCES

- [1] Anderson, A.H., Clark, A., Mullin, J. 1991. Introducing information in dialogues: How young speakers refer and how young listeners respond. *Journal of Child Language* 18, 663-687.
- [2] Baker, R., Hazan, V. In press. DiapixUK: a task for the elicitation of spontaneous speech dialogs. *Behavior Research Methods*.
- [3] Evans, B.G., Iverson, P. 2007. Plasticity in speech production and perception: A study of accent change in young adults. *Journal of the Acoustical Society of America* 121, 3814-3826.
- [4] Foulkes, P., Docherty, G.J. 1999. Urban Voices—Overview. In Foulkes, P., Docherty, G. J. (eds.), *Urban Voices: Accent Studies in the British Isles*. Arnold, London.
- [5] Giles, H. 1973. Accent mobility: A model and some data. *Anthropological Linguistics* 15, 87-105.
- [6] Giles, H., Powesland, P.F. 1975. *Speech Style and Social Evaluation*. London: Academic Press.
- [7] Pardo, J. 2006. On phonetic convergence during conversational interaction. *Journal of the Acoustical Society of America* 119, 2382-2393.
- [8] Pardo, J., Cajori Jay, I., Krauss, R. 2010. Conversational role influences imitation. *Attention, Perception and Psychophysics* 72, 2254-2264.
- [9] Pickering, M.J., Garrod, S. 2006. Alignment as the basis for successful communication. *Research on Language and Computation* 2, 203-228.