Vowel convergence and divergence between two Swiss German dialects

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ABSTRACT

Short-term accommodation is considered as one of the main factors in dialect levelling and the spread of linguistic innovations. This study investigates how speakers of Grison and Zurich German - two Swiss German dialects - shift their productions of short vowels after being exposed to each other's dialect in a dialogue. We found asymmetrical behaviour in accommodation between the two dialects: on the whole, speakers from Zurich converged towards Grison German, while Grison speakers tended to diverge from Zurich German. The degree of accommodation for both dialects was most marked in low vowels in words that also served as stimuli in the dialogue. The findings confirm lexical effects found in previous studies and suggest that phonetically more distant vowels are more prone to accommodation.

Keywords: Phonetic accommodation, dialect contact, vowels, Swiss German dialects

1. INTRODUCTION

1.1. Phonetic accommodation

The term *accommodation* refers to the process of mutual adaptations in communication behaviours that speakers make during an interaction ([11]). Interactants *converge* when their speaking style, pronounciation, pitch, speech rate etc. becomes more similar to each other over an interaction, and they *diverge* when the distance between their linguistic or non-linguistic behaviour increases with time. A growing body of research has been concerned with phonetic accommodation in dialogues and in so-called shadowing tasks in which speakers repeat words they hear spoken by a model talker.

Dialogue studies on phonetic accommodation have shown that speakers of the same variety converge on various acoustic parameters within a dialogue (e.g. [25], [9], [18]) or within turns (e.g. [27], [6]). From shadowing tasks and imitation studies there is evidence that speakers converge phonetically towards the model talker after having been exposed to words of the same variety (e.g. [12], [28], [2], [24]) or to words of a variety other than their own (e.g. [7], [1], [22]) even in a laboratory setting where the model talker is not physically present. Most work on accommodation in dialogues has been carried out with speakers of the same variety, and most shadowing studies have dealt with English.

Dialogue studies with speakers from different dialectal regions have shown conflicting results. Kim et al. [15] found more convergence (assessed in perception experiments) in dialogues between talkers of the same compared to talkers of different varieties of Korean and English. In [21], however, some, but not all, talkers from Buenos Aires adopted a Madrid-like pronunciation of some words after having held a conversation with a person from Madrid, as shown in acoustic measurements of six dialectal differences. Sociolinguistic studies also variously report a lack of accommodation ([19]), convergence ([26]) and convergence towards a stereotype ([30]) in a dialect contact situation. The previously mentioned shadowing tasks ([7], [1], [22]), however, indicate that in a laboratory setting phonetic convergence towards another dialect is possible.

The aim of the present study is to investigate acoustically measurable phonetic accommodation between dialects. We test if speakers of two Swiss German dialects - Grison and Zurich German - pronounce the same vowels in a more similar way after having been exposed to each other's dialect in a dialogue. The long-term aim to this project is to test Trudgill's ([29]) assumption that short-term accommodation plays a main role in dialect levelling and in the diffusion of linguistic innovations, and that short-term accommodation may become permanent "if a speaker accommodates frequently enough to a particular accent or dialect" ([29]: 39).

It has been shown that not only sociolinguistic and socio-psychological (e.g. [23], [1], [31]), but also linguistic factors affect the direction and magnitude of phonetic accommodation. In two imitation studies ([7], [1]), less convergence towards the model talker's dialect was found for vowels that were dialect markers. On the other hand, the assumption that differences must be perceptible in order to be imitated ([22]) leads to the hypothesis that there should be more accommodation for features that differ between the two dialects. Experimental results reported in [21] and [2] support this assumption. In [2], participants converged more towards the model talker for low than for high vowels. This was explained with the greater phonetic distance for these vowels

between the participants and the model talker. The effect of new vs. heard words has been tested in several experiments, which have reported more imitation for previously heard than for new words (e.g. [12], [24].)

1.2. Grison and Zurich German

Grison German, a High Alemannic dialect, is spoken in the canton of Grisons (Graubünden) around Chur in the southeastern Alpine region of Switzerland, and has been in contact with Romansh and with Highest Alemannic varieties for several hundred years ([8]). Zurich German, also a High Alemannic dialect, is spoken in the canton of Zurich. The two dialects show important segmental ([8], [10], [5]) and suprasegmental differences (speech rate and intonation; [17]) but are, nonetheless, mutually understandable.

The linguistic situation in the German part of Switzerland can be characterised as a diglossia: dialect, and not Standard German, is spoken in all everyday situations ([5]: 22) and with people from other regions of German-speaking Switzerland. Although some Swiss German dialects are more popular than others ([14], [3]), Swiss Germans would never switch to standard German but instead speak their own dialect ([5]: 26-27).

1.3. Research questions and hypotheses

The main aim of this study is to investigate whether and how the production of short vowels changes for speakers of Grison and Zurich German after having participated in dialogues with each other, and in what direction this hypothetical convergence takes place. To address these issues we compare pre- and post-dialogue productions. We analyse the role of vowel quality (high vs. low vowels), phonetic distance (same vs. different realisation of a phoneme in the two dialects) and word type (word from dialogue vs. new word) in phonetic accommodation. Based on the literature summarised above, we make the following hypotheses:

H1: Speakers of Grison and Zurich German pronounce the same vowels more similarly after having participated in a dialogue.
H2: Speakers from Grisons show the same degree of accommodation as speakers from Zurich and in the same direction (i.e. towards or away from the other variety).
H3: Speakers accommodate more for low than for high vowels.
H4: There is more accommodation for words included in the dialogue than for new words.

2. METHOD

2.1. Design of the study

The present study is part of a larger project on linguistic accommodation in dialect contact situations. Materials for this study comprise pre- and post-dialogue target words taken from parts 1 and 5 of the study, respectively (as listed below). Recordings were made with a head-mounted microphone in a sound-attenuated room. All five parts were completed in one recording session for both Grison (GR) and Zurich (ZH) speakers and took around 90 minutes. Parts 1, 2, 4 and 5 were completed individually by each speaker.

1. Production of 33 target words and 44 distractors based on a picture naming task
2. Retelling a story based on a comic with embedded target words
3. Dialogue: two diapix tasks with some of the target words out of 1 and 2
4. Retelling of the comic story (cf. 2)
5. Production of the isolated target words and distractors (cf. 1)

Participants filled out a sociolinguistic questionnaire several weeks before, and another questionnaire immediately after the recording session.

2.2. Speakers

14 female GR speakers and 14 female ZH speakers participated in the experiment (age range: 18-24 years). Speakers from GR were randomly assigned to a speaker from ZH that they had never previously met. All participants were monolingual native speakers of Swiss German, self-reported speakers of the GR or ZH dialect, and grew up in the Rhine Valley around Chur or the Zurich area, respectively. All but five participants were students at one of the universities or technical colleges in the region of Zurich. At the time of recording, the GR speakers had been living in Zurich between 1 and 18 months (median: 3 months).

2.3. Materials

For every speaker, 2 (productions: one pre- vs. one post-dialogue) × 43 (vowels) = 86 tokens of seven short vowels (see Table 1) were analysed. All short vowels except schwa occurred in the stressed syllable of one of 33 target words; ten target words contained two target vowels, one stressed and one unstressed (schwa). From these 33 (words) × 2 (productions) × 2 (dialects) × 14 (pairs) = 1848 word tokens, 21 had to be discarded because the word produced by the speaker differed from the intended word. In total, 2376 vowel tokens were analysed.

2.4. Data processing and analysis

Target word productions were first segmented automatically with WebMAUS ([16]) and segment boundaries for target vowels were corrected manually. Formants were then calculated and processed in Emu/R ([13]). 0-values in formants were considered as measurement errors and removed from further processing. F1 and F2 means were then calculated over the middle 50% of the vowel. After removing 12 outliers following the procedure in [2], the Lobanov normalisation ([20]) for the remaining 2364 segments was carried out.

Accommodation (convergence/divergence) was quantified acoustically following [2]. That is, in order to quantify the degree of accommodation within an individual, we calculated the Euclidean distance in the F1 × F2 space between the two speakers' first production of a word (*dist1*). Then, for each speaker in a pair, the Euclidean distance between her own second and her dialogue partner's first production of a word was calculated (*dist2*). The difference in distance per speaker, *ddspk*, was computed by subtracting *dist1* from *dist2*. The degree of accommodation within a pair (*ddpair*) was calculated in a similar way, except that the distance between the second productions was subtracted from the distance between the first productions.

3. RESULTS

3.1. Extralinguistic factors

Figure 1 shows the vowel space in pre- and post-dialogue productions separately for GR and ZH speakers. The two dialects differ clearly in the realisation of AE, A, and @, slightly in O and I, but not appreciably in E and U. No clear differences between pre- and post-dialogue productions are observable.

Table 1: Examples of target words and their realisation in each dialect. Analysed vowels are marked in bold.

Vowel type	Example (std. Germ.)	GR	ZH	Number of words
A	L**a**mpe	/ˈl**a**mpɐ/	/ˈl**ɒ**mpə/	7
AE	Schn**e**cke	/ʃn**ɛ**k:/	/ʃn**æ**k:/	7
@	Lamp**e**	/ˈlamp**ɐ**/	/ˈlɒmp**ə**/	10
I	Sp**i**nne	/ˈʃp**i**n:ɐ/	/ˈʃp**i**nə/	2
E	D**e**cke	/ˈt**e**k:i/	/ˈt**e**kxi/	4
O	L**o**ch	/l**ɔ**x/	/l**o**x/	9
U	S**u**ppe	/ˈs**u**p:ɐ/	/ˈs**u**p:ə/	4

In order to test H1 we calculated the difference in distance for each word and each speaker pair. Figure 2 suggests that *ddpair* is mostly negative. That is, within a pair, target vowels were pronounced in a more similar way after the dialogue. There are important differences between speaker pairs, some of them diverging rather than converging. A one-sided t-test on the averaged *ddpair* values indicated they were not significantly lower than 0 ($t[13] = 1.5$, $p = 0.08$), which led to rejection of H1.

Figure 1: F1 × F2 vowel space for short vowels in pre- and post-dialogue productions

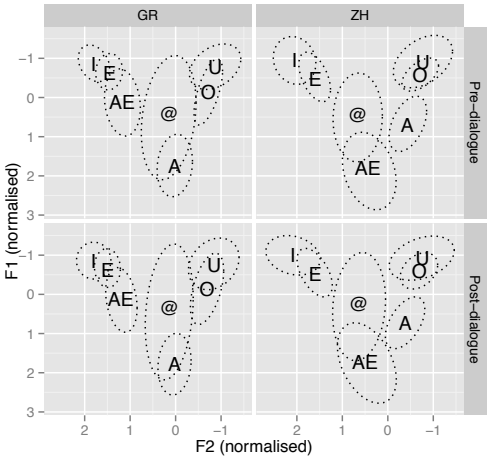
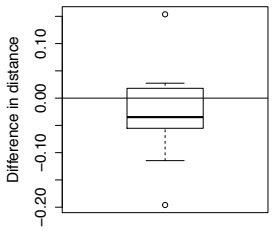
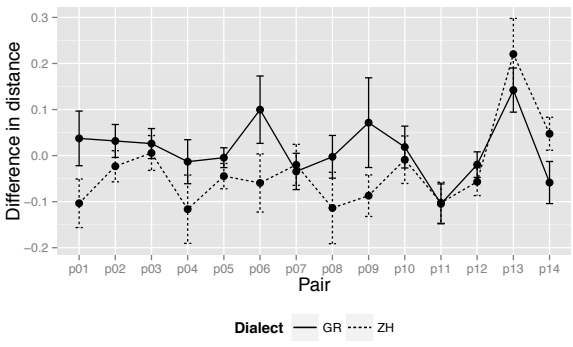


Figure 2: Difference in distance between pre- and post-dialogue productions (*ddpair*), averaged over speaker pair



As is apparent from the mostly negative *ddspk* values for ZH and the values around 0 for GR speakers (Figure 3), the former were, contrary to H2, slightly more inclined to converge than the latter. A Wilcoxon test showed a significant effect of dialect ($W = 145$, $p < 0.05$) on *ddspk*. However, there are important differences between speakers and speaker pairs (e.g. in p11 both speakers converge, in p13 both diverge).

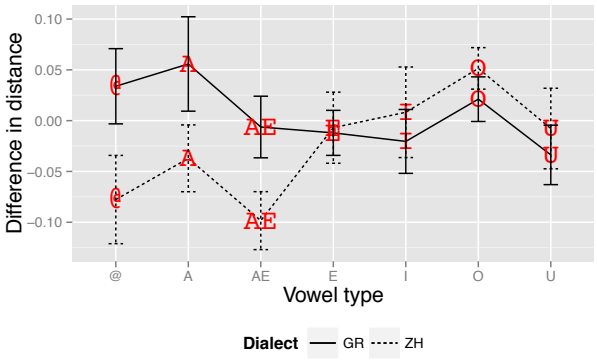
Figure 3: Difference in distance; mean value (dot) and standard deviation (whisker) over all target words for each speaker



3.2. Linguistic factors

Figure 4 shows the degree and direction of accommodation according to vowel type. ZH speakers showed greater convergence in @, A, AE than in I, E, O, and U. GR speakers showed a tendency to diverge in @, A and O.

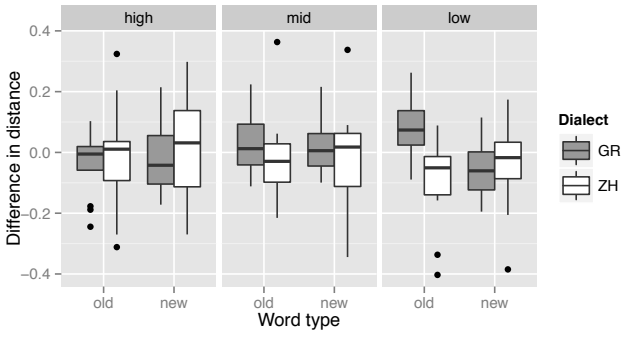
Figure 4: Degree of accommodation according to vowel type



A repeated measures ANOVA with *ddspk* as the dependent variable, vowel type as within-subject factor and dialect as between-subject factor showed no significant effects of the independent variables and no interaction between them.

Figure 5 displays the effect of word type (words present in the diapix vs. new words) on *ddspk* in high, mid and low vowels and GR and ZH speakers, respectively. The difference between GR and ZH speakers seems to be most distinctive for low vowels in old words. A repeated measures ANOVA with *ddspk* as the dependent variable, vowel height and word type as within- and dialect as a between-subject factor showed a significant three-way interaction ($F[2,52] = 3.5$, $p < 0.05$). Tukey-tests confirmed that GR and ZH speakers differed significantly in low vowels in old ($z = 3.7$, $p < 0.05$), but not in new words.

Figure 5: Difference in distance (*ddspk*) according to vowel height and word type, averaged per speaker



4. DISCUSSION

This study has shown that speakers of two Swiss German dialects pronounced the same words in a slightly different way after having been exposed to each other's dialect in a dialogue. The results therefore show that previous findings based on shadowing tasks ([1], [7]) can be extended to describe more natural types of speech exposure.

However, and unexpectedly so, speakers of Zurich German and speakers of Grison German showed asymmetrical behaviour: ZH speakers pronounced short vowels more similarly to their interaction partner's pronunciations after participating in a dialogue, but GR speakers showed a tendency to diverge. This asymmetry was most marked in low vowels in words that were part of the diapix tasks and had therefore been produced and/or heard several times within the dialogue. This different behaviour of GR and ZH speakers suggests that accommodation is not a purely automatic, but a phonetically and socially selective process (cf. [2]).

The interaction between vowel height and word type suggests that the lexeme rather than the phoneme is the unit for which speakers accommodate to each other, in line with other studies [12, 24]. The low vowels AE, A and @ showed the greatest phonetic distance between the dialects in the pre-dialogue productions, suggesting that phonetic distance favours accommodation (in line with [2, 21]). Moreover, contrary to Kim et al.'s [15] findings, linguistic distance between the dialects was not an inhibitory factor for phonetic convergence in this study.

The finding that GR speakers converged for low vowels in new words, but diverged for low vowels in old words is not straightforward. It is possible that the parallel occurrence of some of the target words in the diapix and in the picture naming task drew the speakers' attention to the phonetic differences between each others' dialects and, depending on their attitudes towards their own and to the other dialect, reacted differently. In particular, GR speakers accentuated their own particular dialect features (diverging) whereas ZH speakers levelled them, converging towards the other's dialect. Crucially, in the sociolinguistic questionnaire filled out previously to the dialogue, ZH participants rated GR German as more likeable than vice-versa.

Our findings of selective and asymmetrical accommodation are in line with the tendency within Swiss German dialects to level some regional features while keeping others [4]. The interaction between vowel quality, phonetic distance and dialectal differences and their role in phonetic accommodation need to be further studied in order to understand the dynamics and stability of certain dialect features.

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