ACCOMMODATION TO PASSIVE EXPOSURE IN THE L2

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ABSTRACT

Speakers reliably exhibit phonetic accommodation to more closely resemble their interlocutors. The aim of this study is to determine whether accommodation extends to passive exposure to media, specifically for L2 speakers. We hypothesized that L2 speakers would accommodate and produce more native-like tokens as a result of this exposure.

L2 English speakers (L1 German) recorded themselves reading a wordlist and answering open-ended questions, then watched an episode of an English-language television show before recording themselves again. Recordings were analyzed for phonetic features characteristic of phonetic transfer by German learners of English.

Results show that speakers consistently exhibited more native-like formant values of the TRAP vowel after exposure, consistent with the hypothesis. However, phonetic correlates of word-final consonant voicing were not consistently affected. These findings suggest that some L1 transfer effects are attenuated after passive exposure to native speech, with implications for phonetic representation and L2 acquisition.

Keywords: accommodation, L2 acquisition

1. INTRODUCTION

1.1. Approaches to accommodation

Generally, accommodation effects have been mainly investigated in a native speaker setting and results have either been interpreted in a sociolinguistic framework or with a psycholinguistic approach. The former is based on the Communication Accommodation Theory [1, 2] that characterizes assimilation as a sociolinguistic process where speakers highlight common ground (convergence) or distance (divergence) themselves from interlocutors, often linked to issues like social identity. In contrast, the "interactive alignment" account suggests that assimilation is instead automatic in nature and mainly a result of priming [3]. Another approach to explain frequency, recency and social effects of accommodation is Exemplar Theory, in which utterances are stored with phonetic and social information, ready to be selected and reproduced [4].

1.2. L2 accommodation

Most previous studies on accommodation effects in L2 speech have focused on an interactive type of exposure, e.g. in the form of a conversation partner or map tasks [5, 6, 7, 8, 9, 10, 11]. However, similar results have been found even in cases of passive media exposure [12], which [13] discusses with reference to exemplar models. Such models can account for passive exposure effects since exemplars can be stored and made available for a faithful reproduction irrespective of their source. This type of accommodation is of particular interest for L2 learners, as travel and in-person access to native speakers are not required to consume music, television, films, and newer media.

1.3. German and English Phonology

Linguistically, there are two phonological differences between the languages that we focus on in this study and that are likely to be transferred from L1 German to L2 English. First, one highly regular phonological process in German is the devoicing of voiced word-final obstruents [14]. English, on the other hand, not only preserves the voiced-voiceless contrast lexically but also phonologically. Second, German lacks the English phoneme /æ/ (the TRAP vowel) in its inventory and speakers are likely to substitute a close native equivalent, like /ɛ/ instead

2. METHOD

2.1. Participants

Nine native German speakers, four women and five men, between the age of 23 and 29 participated in the study. All speakers stated that they consume media in English regularly and all except one studied or had studied English literature and linguistics at university.

2.2. Material and procedure

Speakers conducted the experiment on their own at home following written instructions that were given beforehand in English. The experiment consisted of three parts: in the first participants had to introduce themselves and read a word list, in the second part speakers had to watch episode nine of the second season of the TV show *Friends*, the third part was again a recording of the same wordlist as in part one and questions about the plot of the episode. The wordlist consisted of 100 words, of which 60 words ending in voiced plosives: 20 in /g/, 20 in /b/ and 20 in /d/. A total of 29 items contained the the TRAP vowel /æ/ followed by a range of consonants [1] .

The questions, especially for after exposure, were designed to elicit certain items from the episode like <cab> and <dad>, containing target sounds.

2.3. Data analysis

Recordings were manually transcribed, then force-aligned using the Montreal Forced aligner [15] as implemented by DARLA [16].

Measurements were taken using a Praat [17] script based on [18] as well as [19]. For vowel measurements, these included recording the first and second formants from the middle third of each vowel; for word-final stops, these included duration of the preceding vowel, closure duration, and burst duration. Additionally, word-final stops were manually annotated for the presence of voicing in the closure. The selection of these phonetic correlates of voicing were based on [20] and [21].

3. RESULTS

3.1. TRAP vowel

Results confirmed the predictions made for the TRAP vowel: participants exhibited significantly higher F1 after exposure (with no difference for the ninth). As shown in Fig. 1, participants also produced higher F1 in the wordlist reading task as compared to the free-response questions, which is consistent with more careful speech in reading. The higher F1 corresponds to a lower vowel, more distinct from the neighboring DRESS vowel.

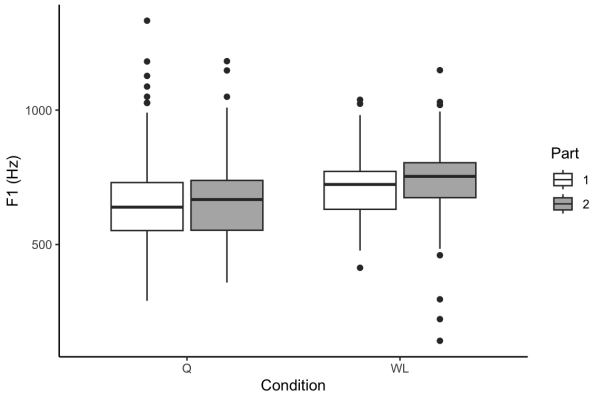

Figure 1: F1 of TRAP vowel by condition (Question-answer, Word List) before and after exposure

In contrast, no effect was observed for F2, which is unsurprising given that both TRAP and DRESS are generally similar front vowels. This can be seen in Fig. 2.

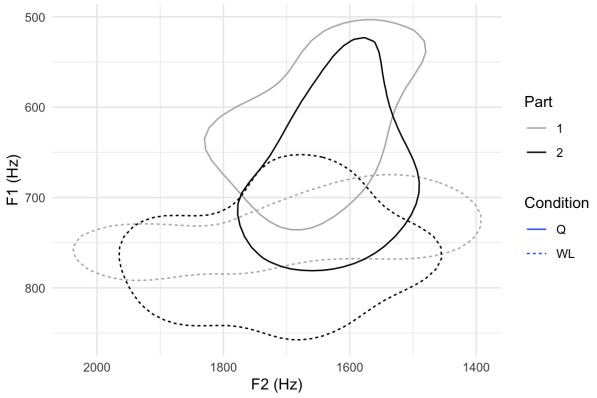

Figure 2: F1/F2 plot of TRAP, indicating pre-exposure values in grey and post-exposure values in black. Lines contain the middle 50% of tokens in each Part*Condition group

To test the significance of the observed differences of these observations, we fit linear mixed-effects models to z-scored F1 and F2 data. A baseline model included a random effects of lexical item and fixed effects of speaker, condition (wordlist/questions), and speech rate. This was compared to a second model with an additional effect of the exposure ("Part"), which significantly improved fit over the baseline model. Additional models that included interactions between Part and Condition or Part and Speaker did not further improve fit. The model comparison using ANOVA is summarized in Table 1.

Model	AIC	BIC	logLik
F1∼Base	2666.7	2732.6	-1320.3
F1∼Base+Part	2661.0	2731.9	-1316.5
F2∼Base	2841.9	2907.8	-1408.0
F2∼Base+Part	2842.8	2913.8	-1407.4

Table 1: Comparison of models predicting TRAP F1 and F2, with and without an effect of Part (before/after exposure)

3.2. Consonant voicing measures

3.2.1. Word-final burst and closure durations

We predicted that speakers would produce word-final stops with shorter closure and burst durations after exposure. Results show that burst durations did not change after exposure, but that there was closure durations were affected. Specifically, closure durations slightly decreased in the wordlist-reading task, but *increased* in the question-answer condition (free speech). This is shown in Fig. 3.

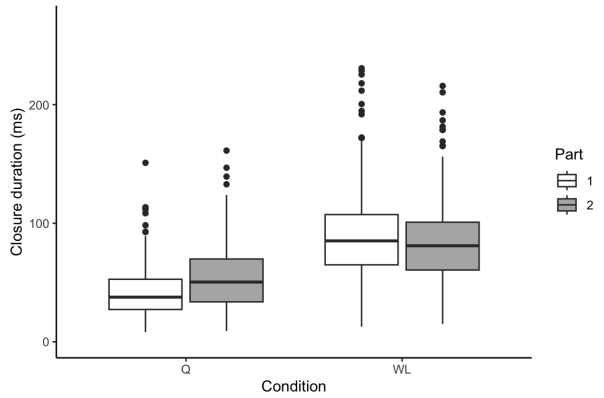

Figure 3: Closure duration of word-final stops by condition (Question-answer, Word List) before and after exposure

This result was substantiated through comparison of linear mixed-effects models with ANOVA, presented in Table 2. A baseline model included a random effects of lexical item and fixed effects of participant, Condition (wordlist/questions), and speech rate. This was compared to a second model with an additional effect of the exposure ("Part"), and a third model with an interaction of Part and Condition. This interaction effect was not expected, and we interpret this at least partially as a task effect.

3.2.2. Voicing in closure

There was overall no significant change in the rate at which speakers produced word-final /b d g/ tokens

Model	AIC	BIC	logLik
Burst duration			
BD∼Base	3222.5	3298.2	-1596.3
BD∼Base+Part	3222.9	3302.6	-1595.0
BD∼Base*Part	3223.4	3309.2	-1594.7
Closure duration			
CD∼Base	2588.9	2664.5	-1279.4
CD∼Base+Part	2584.4	2665.1	-1276.2
CD∼Base*Part	2580.6	2666.3	-1273.3

Table 2: Comparison of models predicting burst and closure duration in word-final voiced stops.)

with voicing during the closure (74.0% before, 77.3% after, $\chi^2(1, N = 1105) = 1.57$, $p = .21$). Responses varied by speaker, as shown in Fig. 4, but no consistent effect was observed.

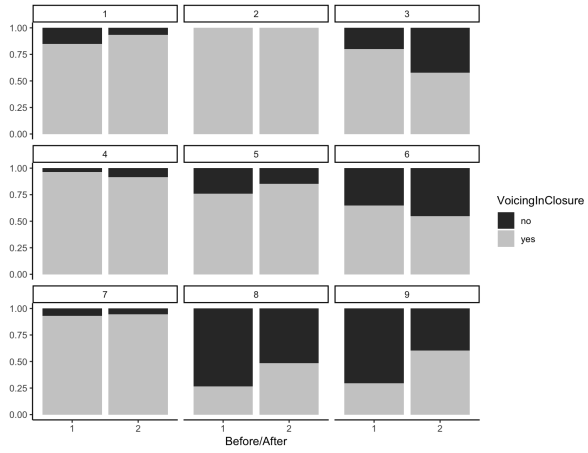

Figure 4: Voicing in closure before and after exposure, by speaker.

3.2.3. Duration of preceding vowel

We predicted that participants would produce longer vowels preceding word-final phonologically-voiced stops after exposure. Results appear to show that preceding vowels were longer after exposure in the question-response condition, but not in the wordlist-reading task. This is shown in Fig. 5.

However, this effect is not supported by a comparison of linear mixed-effects models with ANOVA, presented in Table 3. A baseline model included a random effects of lexical item and fixed effects of participant, Condition (wordlist/questions), and speech rate. This was compared to a second model with an additional effect of the exposure ("Part"), and a third model with an interaction of Part and Condition. Despite the increased AIC and BIC in the interaction

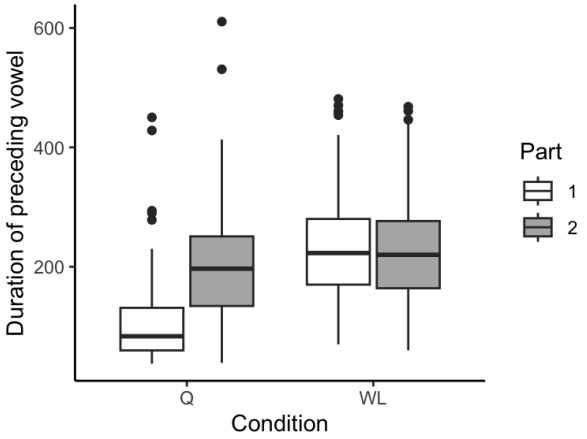

Figure 5: Duration of vowels preceding word-final voiced stops, by condition (Question-answer, Word List) before and after exposure

model, we still find the differences in means to be noteworthy. The lack of improvement in the interaction model may result from the fact that lexical items were not not often repeated in the question-answer condition, particularly in Part 1.

Model	AIC	BIC	logLik
Vdur∼Base	1475.6	1636.3	-703.81
Vdur∼Base+Part	1475.0	1640.3	-702.48
Vdur∼Base*Part	1475.2	1645.3	-701.59

Table 3: Comparison of models predicting duration of vowels preceding word-final voiced stops)

4. CONCLUSION

This study has investigated the effect of passive exposure on non-native phonetic performance with L1 German/ L2 English speakers. The exposure did not impact variables to the same degree. Our first hypothesis was confirmed and speakers produced more native like /æ/ tokens but results for the second hypothesis regarding final devoicing were mixed and further influenced by the type of condition. After exposure, preceding vowel duration was not increased in the wordlist, and may not have increased in the question-answer condition. The lack of increase in the wordlist may also be explained by a ceiling effect since realizations in the wordlist condition were longer–more native-like–from the beginning. Preceding vowel durations over 0.2 seconds are associated with voicing, so there was little to no accommodation possible [20, 22]. The observation that participants produced more native-like tokens from the beginning only in the wordlist could reflect the more formal nature of the condition and increased attention to speech, usually leading to the production of more prestigious forms [23]. The lack of uniformity in the results indicates that there are not only frequency and recency effects at play as exemplar models would suggest, but that such effects vary by the type of feature.

A variety of factors influence how difficult it is to acquire features in the L2 [24], and this study extends such findings to accommodation. Shifting realization of the TRAP vowel is an example of a relatively simple case, being a change in one phonetic parameter (F1). In contrast, the final plosive voicing involves a combination of phonetic cues, a neutralizing phonological process, and typological markedness [25]. The present study provides evidence for structural constraints in short-term passive accommodation mirroring those in long-term L2 acquisition.

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