L2-ENGLISH RESUSCITATES L1-GERMAN: THE CASE OF POST-VOCALIC /r/

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ABSTRACT

The paper reports findings of a production experiment investigating the realisation of post-vocalic /r/ produced by native (L1) speakers of English and German and late second language (L2) learners of two varieties of English; one rhotic variety spoken in Belfast and one non-rhotic variety spoken in Oxford. The study aims to explore whether there is a difference in the realisation of post-vocalic /r/ produced by native speakers of a German non-rhotic variety spoken in Berlin as a result of exposure to a rhotic or non-rhotic variety of English. Results of an auditory and acoustic analysis of post-vocalic /r/ in the speakers' L1 German and L2 English suggest that exposure to a rhotic L2 variety of English revitalises the post-vocalic /r/ realisation in L1 German whereas exposure to non-rhotic L2-English does not interfere with non-rhotic L1 German. However, this effect cannot be generalised since the phonetic context seem to affect the interference phenomenon.

Keywords: L2 acquisition, (non)-rhoticity, bi-directional transfer, multicompetence

1. INTRODUCTION

1.1. Transfer and interference

Transfer and interference phenomena (distinguished in the present paper on the basis of Kellerman and Sharwood Smith's [13] differentiation between incorporation of elements from one language into the other referring to the former and overall cross-linguistic influence referring to the latter) are not a novelty in the field of second language acquisition (SLA). Previous research studying the production and perception of two (or more) languages has provided us with convincing evidence that specific characteristics of a L2 can be explained on the basis of influencing L1 characteristics in adult language acquisition (also referred to as late or sequential language acquisition). However the reverse, i.e. the influence of L2 characteristics on L1 [18], has largely been neglected. Bi-directionality of interference on the other hand has nearly exclusively been addressed in studies investigating child language acquisition (also referred to as early or simultaneous language acquisition). Only recently research has begun to investigate cross-linguistic transfer and interference going beyond the influence of the L1 characteristics on L2 also in sequential SLA. L2 influence on L1 has by now been attested for almost all areas of linguistic competence (morphosyntax, pragmatics and rhetoric, the lexicon and semantics; for an overview see [19]); but is best documented for the phonological level. Studies indicating that late acquired L2 phonology does have effects on L1 exist since the 1970s [8, 29] but are predominantly concerned with stop voice onset time (VOT; an acoustic cue known to sufficiently distinguish between various languages) [2, 4, 9, 10, 11, 14, 15, 30]. This 'limited' focus on one particular phenomenon has undoubtedly its advantages since it makes cross-linguistic data available, providing conclusive evidence that L2 characteristics, even if acquired post puberty, can systematically influence matured phonological systems of L1. The systematic of these phenomena seems to indicate that the alternations observable in L1 are not the result of L1 attrition and encourage further research. Some other studies of a few isolated phenomena such as intonation and some allophonic realization of other phonemes have added further support to the claim that the phonetic/phonological L1 system can be accessed and altered after L1 maturation [1, 17, 23]. These findings challenge the idea of monolingual native competence and defective competence or incomplete acquisition of multilingual minds – at least on the level of phonology – in favour of an approach that envisage language on the basis of a dynamic multi-competence model, e.g. [3, 5, 6, 7].

1.2. Post-vocalic /r/

The wide variability of possible articulatory properties of /r/ in a number of languages esp. across Europe and in varieties of English spoken for example in the UK, Australia, and America has been subject of a long standing debate. The rhotic /r/ has been described as vowel- or glide-like sound but also as a sonorant- and fricative-like sound realized in different places of the vocal tract. This variability makes it difficult for the field to provide a coherent account for /r/ as uniformly behaving segment. A current consensus only exists regarding the necessity for integrated methodologies,

i.e. acoustics, articulatory and auditory techniques in the analysis of the /r/ allophony and its phonological status [21]. Across (at least) Germanic European languages seems to be a general tendencies to feature both, rhotic and non-rhotic accents (see e.g. [24, 25, 28] for German; [12, 27], for English; and [21, 22, 26] for Dutch).

The present paper utilizes this distinction to investigate whether exposure of native speakers of a non-rhotic variety of German to a rhotic or non-rhotic variety of L2 English influences the phonetic realization of post-vocalic /r/ in their L1. German as spoken in Berlin and English as spoken in Oxford (OxE) belong to the non-rhotic accents of German and English, respectively, whereas Belfast English (BfE) is a rhotic variety of English [16, 20, 27]. In conclusion the study is based on two assumptions: (i) there is a verifiable distinction between rhotic and non-rhotic varieties in German and English, (ii) L2 learners acquire phonetic articulatory and acoustic characteristics of their ambient variety.

2. METHODS

20 native Berlin German L2 speakers of English with a comparable length of residence (5-8 years) in either Oxford or Belfast, between 23 and 43 years of age (average 31) and a comparable level of education were recorded (10 female and 10 male speakers per variety, table 1).

Table 1: Speaker Groups and Labels.

Group	Label	
	male	female
L2 Oxford English speakers	L2_Om	L2_Of
L2 Belfast English speakers	L2_Bm	L2_Bf
L1 Berlin German speakers	CT_Gm	CT_Gf
L1 Oxford English speakers	CT_Om	CT_Of
L1 Belfast English speakers	CT_Bm	CT_Bf

Native speakers of OxE and BfE as well as native speakers of Berlin German were recorded as matched controls. For each control group we recorded five female and five male monolingual speakers.All subjects were recorded in a quiet room using a Sennheiser MD421 II (located roughly 20 cm from the speakers' mouth) directly onto a Toshiba PC Laptop. The sound files were digitized at 44 kHz, 16 bits, mono format.

All subjects read the same designed text containing 15 test tokens (five per condition, as illustrated in table 2). The L2 speakers read a comparable text in the two languages, the control speakers the English or German version, according to their native language. A reading task was chosen in order to control for comparable location and emphasis of the test tokens within the utterance. Monosyllabic words were used to control for lexical stress placement.

Table 2: Condition and phonetic realization of test-tokens.

	English		German	
	example	realization	example	realization
suffix-er	bitter	[ɚ] [ə]	bitter	[ɐ]
[a:]+r	bar	[aɹ], [a:]	Bar	[aʁˑ], [a:]
[a:]+rC	arm/art	[aɹC],[a:C]	Arm/Art	[aʁˑC], [a:C]

Initially the English data (indicated by final E in the label) were analysed by comparing data obtained from the L2 speakers (L2_BmE, L2_OmE, L2_BfE, L2_OfE) with those obtained from the monolingual native English control speakers (CT_BmE; CT_BfE and CT_OmE; CT_OfE). The comparison aimed to confirm rhoticity for BfE and non-rhoticity for OxE and to investigate whether characteristics of post-vocalic /r/ have been acquired by the L2. In order to investigate an influence of L2 rhoticity on non-rhotic L1 realisation we compared obtained formant measurements of F1, F2 and F3 within the German corpus, comparing data obtained for the L2 speakers (L2_BmG, L2_OmG, L2_BfG, L2_OfG) with the monolingual native German control speakers (CT_GmG; CT_GfG; whereby the final G in the label indicates that the analysis relates to the recordings in German).

Acoustic measurements were manually taken at four points in the vowel + r sequence: in the steady vowel portion (steady V), at the beginning (trans_B) and the end of the transition (trans_E) and in the end of the sequence where rhoticity would be expected if acoustically verifiable. The English and German data for each token condition were submitted to individual ANOVAs with subject groups and gender as between-subject variable and Bonferroni corrections for multiple comparisons.

3. RESULTS

A comparison between L2 and native speakers of the English varieties spoken in Oxford and Belfast confirmed the two assumptions on which the study rests, i.e. formant analysis confirmed that monolingual L1 as well as L2 speakers of OxE and BfE differ in the realization of vowel+/r/ sequences. No interaction with gender was found so that further illustrations summarize data of male and female subjects. The differences were highly significant (-er F2: $F_{(3:42)}$=12.4; p<.05, F3: $F_{(3:42)}$ =15.4; p<.05; -ar F2: $F_{(3:42)}$ =14.1; p<.05, F3: $F_{(3:42)}$ =23.1; p<.05; -ar+C F2: $F_{(3:42)}$ =17.7; p<.05, F3: $F_{(3:42)}$ = 29; p<.05). L1 and L2 speakers of BfE realized test tokens with both falling F3 and rising F2, except for suffix -er where

throughout the entire sequence a significantly higher F2 was found in BfE realizations. F2 has been suggested to be the more reliable acoustic correlate of post-alveolar /r approximant, whereas F3 is understood as acoustic correlate of rhoticity more generally [12]. The findings of the present analysis indicate that L2 speakers of BfE produce similar rhotic sequences as native speakers of the same variety, whereas L2 speaker of OxE produce /r/-less sequences as their native English controls. These similarities were found across all conditions, i.e. in suffix -er, [a:r] and [a:r]+C (figure 1 illustrates the findings for [a:r]+C sequences).

Figure 1: [a:r]+C sequences in English utterances.

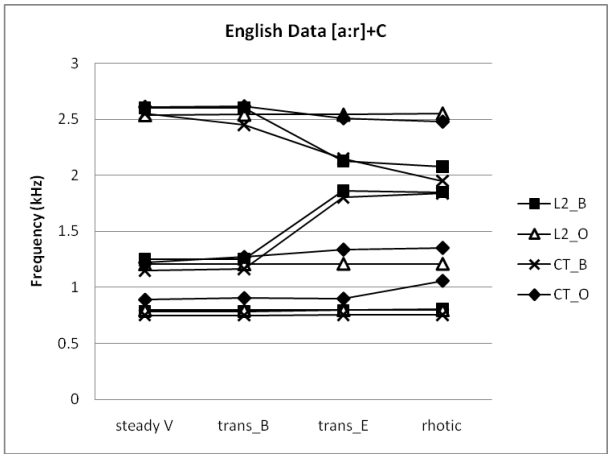
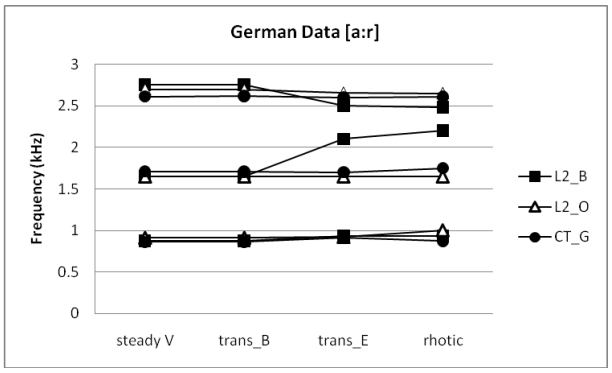


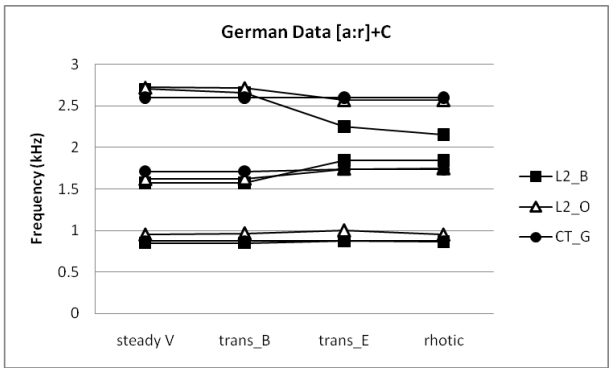
Figure 2: [a:r] sequences in German utterances.



The results of the German data are less straightforward. In the suffix -er condition no significant differences were found between the L2 subject groups (L2_B and L2_O) and their native German controls (CT_G). Across all speakers a relatively stable realization of a central vowel quality, generally transcribed as [ɐ], was found, with a formant configuration similar to the neutral central Schwa. The German controls however, produce the suffix with a comparably higher F1 which gives the vowel a lower quality. In [a:r] and [a:r]+C sequences significant difference were found between the L2 speakers of BfE on the one hand and the L2 speakers of OxE and the Berlin German controls on the other ([a:r] F2: $F_{(3:42)} = 3.23$; $p<.05$ and F3: $F_{(3:42)} = 9.41$; $p<.05$). Whilst the latter realise a steady vowel quality of an [a] across all four points there are movements in F3 and F2 measurements obtained for the L2 speakers of BfE towards the end of the sequence. F3 values (slighlty) decrease and F2 values considerably increase as illustrated in figure 2.

Figure 3 illustrates the findings for [a:r]+C sequences in the German data. Significant differences were found for F2 only (F2: $F_{(3:42)} = 11.3$; $p<.05$). For all three groups of speakers an increase in F2 but only in measurements obtained for L2 speakers of BfE a drop in F3 was found. In addition the increase in F2 is largest for the L2_B group. However, it seems to be worth noting that there is a relatively large variation within the L2 speakers group of BfE regarding the F3 measurements. In some speaker's realisations a comparably steep drop in F3 – as expected for post-alveolar but not uvual approximants – was found. But in the majority the most dominant feature was a relatively large increase of F2.

Figure 3: [a:r]+C sequences in German utterances.



4. DISCUSSION AND CONCLUSION

The findings of the study suggest that L2 speakers do not only acquire specific characteristics of the variety they are exposed to but also integrate phonetic properties of the L2 into their native language as previously suggested [6, 17, 23]. What seems to be of particular interest and needs further attention is the fact that the strategies of these implementations of L2 characteristics seem to differ. Inter-speaker variability suggests that some speakers integrate an L2 variant into the L1 system (decrease of F3 as a feature of post-alveolar approximant as realised in BfE) whereas others seem to rather revitalise the L1 version of post-vocalic /r/ (an increase in F2 as a feature of uvular approximants as realised in rhotic varieties of German). To what extent these differences obtained for either F2 or F3 or their combination are perceptually related to rhoticity

remains open [12, 21]. Perception experiments are currently carried out in order to confirm the auditory significance of the obtained formant constellations considering factors such as listener's experience with rhoticity as suggested in [12]. The study however, seems to tie up with a line of research that has far-reaching implications for theories of language acquisition. It challenges the notion of monolingual native speaker competence and its separation from an intermediate state of language acquisition (i.e. interlanguage) as proposed by the generative framework of linguistics in favour of a theory of multi-competence. Such a more flexible framework views mono-, bi- or multilingual speakers and hearers as individuals with varying, unique, and complete linguistic systems [5, 6].

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