Compensation strategies in non-native English and German productions: Evidence for prosodic transfer and adjustment

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German and English speakers differ in how they realise nuclear pitch accents when there is limited sonorant material [1, 2]. English speakers tend to *compress* pitch movements for both falls and rises, i.e., the rate of f0 change increases with decreasing sonorant material. German speakers, however, *compress* rises but *truncate* falls, i.e., rate of f0 change remains stable as sonorant material decreases ([1, 2] for British English vs. Northern German, and Australian English vs. Southern German, respectively). In the present study, we examined whether compensation strategies transfer from native to non-native productions of English and German, i.e., English speakers speaking German and vice versa. This research is important as it may help non-native speakers find more ways to reduce foreign accent and increase intelligibility.

Twelve native Australian English speakers (5 females, M_{age}: 33.9 years, self-rated L2 proficiency (1-7 scale): 4.83) and 12 Southern German speakers (9 females, M_{age}: 25.5 years, self-rated L2 proficiency: 5.27) tested in their L1 in [2] were recorded in their L2 producing questions and declaratives, designed to elicit either a nuclear rising contour on the test word (e.g., Isn't that Mr *Sheafer*? Our new neighbour?), or a nuclear falling contour (e.g., That's Mr *Sheafer*! Our new neighbour!), respectively. Test items were four sets of three equivalent "surnames" in each language, with each surname in a set representing one step on a continuum that varied in scope for voicing (e.g., *Sheafer, Sheaf, Shift* for English, *Schiefer, Schief, Schiff* for German). Following [1, 2], "rate of f0 change" (RoCh), i.e., the f0 excursion (f0 max minus f0 min) in semitones (st) of a fall or rise divided by movement duration, was taken to indicate effects of voicing on f0 movement: Comparing across the continuum (longest to shortest step), a RoCh increase is indicative of compression, while a stable RoCh, of truncation. Compression is further assumed to be accompanied with a stable f0 excursion across steps, while truncation predicts a decrease in excursion from the longest to the shortest step. Figure 1 illustrates the average RoCh (st/ms, left panel) and f0 excursion (st, right panel) for **L2 productions**.

For RoCh, a linear mixed-effects regression model with *language* (English, German, spoken by L2 speakers), *contour* (falling vs. rising), and *step* (1, 2, 3) modelled as fixed factors and *subject* and *word type* as crossed random factors found no interaction between *contour* and *language* ($p=.11$), suggesting rises and falls were not realised differently between languages. **For L2 rises**, RoCh differed between individual steps (all $p<.01$). Specifically, RoCh increased as sonorant material decreased, indicating compression. Analyses of f0 excursion corroborated the use of compression in rises, with a stable f0 excursion for L2 English rises (all individual comparisons $p>.26$) and L2 German rises (all $p>0.28$, except step 1 vs. 3, $p=.03$). **For L2 falls**, RoCh differed between step 2 and 3 ($p<.001$), suggestive of compression between these steps, but, importantly, there was no difference between the shortest and the longest step (1 vs. 3, $p=.09$) nor between step 1 and 2 ($p=.20$), indicative of truncation overall. Truncation was also supported by f0 excursions, which decreased for each step of the continuum (all $ps<0.001$).

Overall, Southern German speakers compressed rises and truncated falls in English (mirroring behaviour in their L1 [2]). Australian English speakers compressed L2 rises as in their L1 in [2], but showed a tendency to truncate falls in German, which differed to the compression patterns found in their L1 in [2]. Therefore, our results paint a complex picture of both transfer and adjustment of compensation strategies from native to non-native productions. To account for this asymmetrical behaviour in prosodic transfer, we will discuss factors known to influence L2 productions, such as markedness (e.g., [3, 4]) and language proficiency (e.g., [5]), as well as a more general factor, such as articulatory effort (e.g., [6, 7]).

Left Panel: Rate of change (RoCh) in L2	Right panel: F0 excursion in L2

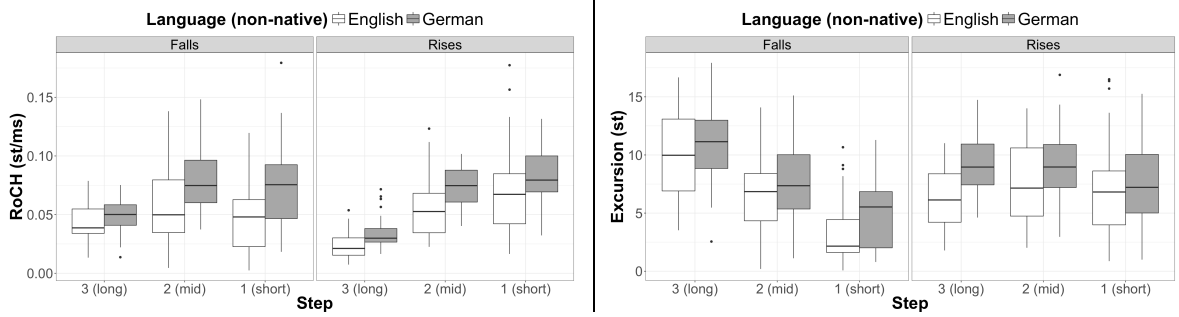

Figure 1. *Rate of Change (RoCh) in st/ms (left panel) and f0 excursion in st (right panel) in different steps for falls (left facet) and rises (right facet), split by language (non-native).*

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