Sociophonetics of the velarized lateral in the Viennese dialect

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ABSTRACT

The alveolar lateral of the Viennese dialect undergoes several allophonic processes, among these, vocalization and velarization are the most prominent ones. In the current contribution, we will concentrate on the sociolinguistic aspects which disturb the complementary distribution of the alveolar and the velarized lateral and give rise to a possible reversal of the velarization process which started around 1900 due to contact with Czech immigrants.
We investigate the realization of the alveolar and the velarized lateral in a corpus of spontaneous speech of 11 Viennese dialect speakers. F2 of the lateral is measured to describe the effect of the parameters phoneme context, syllable stress, word position and gender on the lateral realization. Results show that the velarized lateral is mainly produced between back vowels and in wordfinal position. Male speakers produce the velarized lateral also in stressed position, while female speakers, if at all, produce it in the unstressed word-final position.

Keywords: laterals, gender, Viennese dialect, sociophonetic variation, velarization

1. INTRODUCTION

Many languages featuring an alveolar lateral phoneme often surface a velarized variant in specific word positions or phonetic contexts [9, 21, 13]. The main difference between these two lateral allophones is that the back cavity is lengthened in velarized laterals, resulting from a more fronted tongue tip/blade position and a more retracted tongue dorsum. Consequently, F2 is lowered as compared to the alveolar lateral and is thus the most reliable indicator for the articulatory difference between alveolar and velarized laterals [3]. In velarized laterals F2 generally comprises a range from approximately 900 Hz – 1200 Hz, whereas in alveolar laterals F2 ranges from approximately 1300 Hz – 1400 Hz for male speakers, (– 1500 Hz for female speakers) [20, 18]. Velarization of an alveolar lateral can manifest intrinsically with a difference of F2 < 300 Hz, or extrinsically with a difference of F2 > 400 Hz (see [20] for a cross-linguistic analysis and a detailed discussion). Especially in coda-position, laterals tend to be velarized or even vocalized [24, 2, 22]. Complementary distribution of alveolar and velarized laterals was described for example for Italian [13], Catalan [21], Czech [23], and most extensively for English [24, 9]. Traditional English phonology , see, e.g. [7] assumes that this difference is categorical, however [21] argues that this is rather a gradual than a binary distinction, due to a gradual two-component tongue movement in which the apical gesture is associated to the initial position whereas the dorsal gesture associated is to the coda position. This representation is also supported by cross-linguistic acoustic analyses [20] of laterals which constantly show gradual transitions between alveolar and velarized laterals.
In the phonological system of the Viennese dialect, the lateral (as the lateral in the Middle Bavarian dialects and in German in general) is described as a voiced alveolar approximant [25]. This lateral underlies several phonological processes. Syllable-finally and before consonants the lateral is vocalized, resulting in [e̯]. Additionally, front vowels before laterals are rounded and the vocalized lateral is absorbed in this case. The process of vocalization is attested since the 13th century [10]. At the turn of the 19th century, as a consequence of contact with Czech migrants, speakers of the Viennese dialect started to velarize the lateral in certain positions. It was produced word-initially, after alveolar obstruents, between back vowels, and word-finally in diminutives.
Therefore, in the Viennese dialect the velarized lateral is not restricted to the syllable-final position, as observed in other languages or language varieties that feature an alveolar and a velarized lateral, but is also produced in the prominent word-initial position [15]. Furthermore, the velarized lateral is not only regionally restricted but also socially, since it is primarily produced by persons with low educational backgrounds. The occurrence of the velarized lateral in a prosodically prominent position (word-initially) and its usage within a definite group of speakers (less well educated) makes it a social marker subjected to stereotyping and subsequent negative evaluation. Conversely, the velarized lateral is expected from all Viennese dialect speakers [16, 17].
In the present study we want to analyse the acoustic realization of the alveolar and the velarized laterals in the Viennese dialect. The aims of our study are two-fold: Firstly, it addresses the question of whether a

graduality is involved in the process of velarization, as has been observed for quite some languages [20] or whether the two variants are categorically distinct. Secondly, it investigates whether the negative evaluation of the velarized lateral gives rise to variations that challenge the distribution of the alveolar and the velarized lateral. In this respect, it is of interest whether the breakup follows certain principles, both internally and externally. Thus, we expect the velarized lateral to be avoided in the prominent word-initial position as opposed to the word-final position. Sociolinguistically, we expect female speakers to more readily replace the velarized lateral by the alveolar one, since they are leaders in the elimination of stigmatized forms [12: 213].

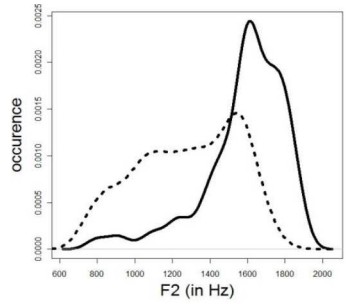
2. METHODS

2.1. Data and extraction of the acoustic parameters

The analysis of the present study is based on recordings of spontaneous speech of the Viennese dialect. The material was elicited by means of semi-structured interviews (in each case 20-30 minutes) which were conducted with 11 speakers (6 women, 5 men, all over 45 years).

Initially, the recordings were transcribed orthographically. Then the voiced laterals were manually segmented. In order to determine the boundaries of the laterals, we observed changes in the waveform. In addition, we defined the lateral segment as the segment having lower spectral energy compared to the surrounding vowels showing higher spectral energy, or as the segment with pronounced formant structure as compared to the stronger friction of surrounding consonants. Additionally, the boundaries were checked auditively. In a next step, a semi-automatic measurement and extraction of acoustic parameters was carried out: (1) F2 was measured by means of LPC, then manually verified and, if implausible, manually corrected, (2) duration of the lateral segment was measured. Additionally, the following parameters were annotated: (3) vowel context, (4) lateral position within the word, (5) syllable stress, (6) speaker gender.

Figure 1: Distribution of F2 of all realized laterals (continuous line: female speakers; dotted line: male speakers)



2.2. Statistics

The advantage of spontaneous speech, which is in the case of the present study a realistic picture of the actual variation of the lateral segments, is at the same time accompanied by disadvantages, because spontaneous speech leads to an imbalanced dataset.

For that reason it was not possible to conduct a full factorial model of F2 with regard to word position, syllable stress, vowel surrounding, and gender. The calculation of mixed effects models had to be restricted. Word position and syllable stress were not balanced in each combination and consequently merged into one single factor (but analysed as a function of each other), because they are related in the Viennese dialect: mostly, the word initial syllable is stressed and those following are unstressed. The vowel context was not balanced either, so that the calculation of the interactions of this parameter was problematic. Therefore, two models were estimated with gender and either word position/syllable stress or vowel context as fixed effects as well as the remaining variable as a random factor. By doing so, the main effects of word position, syllable stress and vowel contexts, and also possible interactions between word position and syllable stress could still be tested in post-hoc-tests if significant main effects were observed. The models were built with the lme4-toolbox in R [1]. F2 values were averaged separately per speaker, for each of the analysed combination of parameters. Type III ANOVA [11] was applied for tests of significance, and post-hoc tests were carried out [8]. P-values were Bonferroni-corrected.

Because of the data restrictions for the linear mixed effects models, a global approach on the lateral variation over all laterals, by investigating the percentage of perceptually velarized and alveolar laterals in the respective conditions will be embedded in our analysis (see also [20, 18], velarized laterals: F2 < 1300 Hz, alveolar laterals: F2 > 1400 Hz). The coefficient of variation was also calculated for the two lateral variants in the respective conditions.

3. RESULTS

3.1. Global distribution of F2-values of all laterals

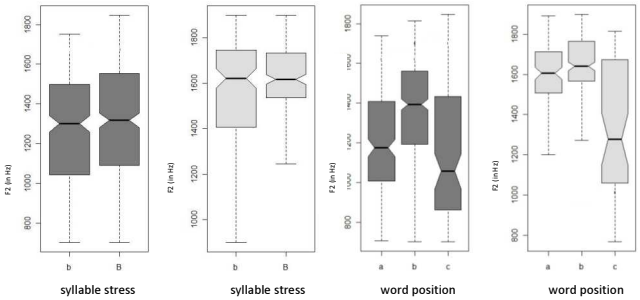
Figure 1 shows that the distribution of the F2 values of the laterals in the Viennese dialect is not

categorical, both in the realizations of female and in the realizations of male speakers we find a gradual pacing from alveolar to velarized laterals. The figure also shows that women realize less velarized laterals than men. A closer look on the perception-based classification into velarized and alveolar laterals shows that men realize half of their laterals with an F2 below 1300 Hz, whereas in the women's realizations, velarized laterals represent only 10% of all laterals.

The distribution of F2 in the male's realizations is broader than the distribution of the female speakers. This difference is confirmed by the results of the linear mixed effects models ($p<0.001$).

Figure 2: Influence of syllable stress on F2 of the laterals (left: male speakers, right: female speakers; b: unstressed, B: stressed).

Figure 3: Influence of word position on F2 of the laterals (left: male speakers, right: female speakers; a: word-initially, b: word-medially, c: word-finally).

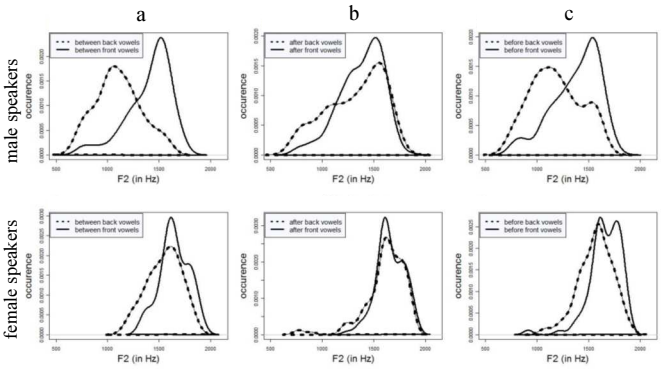


3.2. Influence of word position and syllable stress

The results of the linear mixed effects models show, that the main effect of word position and syllable stress is significant ($p<0.001$), but the interaction with gender is not significant ($p=0.13$). In Figure 2, the global distribution of all laterals depending on syllable stress is shown. Laterals of male speakers have a higher F2 at the stressed position than at the unstressed position. This tendency is confirmed by the post-hoc analysis: the effect of stress shows significantly higher F2 values for stressed than for unstressed laterals, at least at word medial and word final position ($p<0.001$).

In Figure 3, the global influence of word position on F2 of the lateral is illustrated. Men pronounce word initial and word final laterals more velarized than word medial laterals. In the women's realizations, word initial laterals do indeed have a lower F2 than word medial laterals, but mean F2 is still in the area of alveolar laterals. The linear mixed effects model shows in a post-hoc analysis that the higher values of F2 of the laterals in word medial position are significant, independently from gender (the difference with word initial laterals: $p<0.001$ and with word final laterals: $p=0.027$). Deeper analyses which take syllable stress into account show that the significant difference between word medial and word final laterals can only be shown for unstressed laterals ($p<0.001$). Concerning the laterals in stressed syllables, the differences between word initial laterals and word final laterals ($p<0.001$) as well as word medial laterals ($p=0.0017$) are significant, with lower F2 values for initial laterals. The coefficient of variability is always higher for velarized laterals than for alveolar laterals.

Figure 4: Influence of vowel context on F2 of the laterals (first line: male speakers, second line: female speakers; a: synchronous context, b: after respective vowel, c: before respective vowel; continuous line: front vowels, dashed line: back vowels)



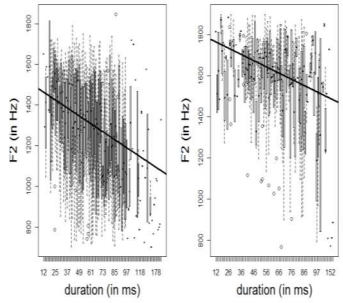
3.3. Influence of vowel surrounding

In a next step, the vowel context is investigated concerning its influence on F2 of the lateral. Thereby the vowels preceding and/or following the laterals were classified as back or front vowels. The linear mixed effects models show that the main effect of vowel context is significant ($p<0.001$), and again, the interaction with gender is not significant ($p=0.13$). As visible in Figure 4, the laterals of the male speakers (first line) show a relatively bimodal distribution, especially in synchronous vowel contexts and preceding the respective vowels: between back vowels and also just before back vowels (independently from the preceding vowels), laterals are produced with a lower F2. Female speakers only show slight shiftings of F2 in the synchronous condition, also with a lower F2 in laterals between or preceding back vowels. Nevertheless, across gender, the aforementioned vowel contexts show significant differences between the laterals in back and front vowel conditions (respectively: $p<0.001$). The described tendency can be found in both lateral variants and again, the coefficient of variability is higher for velarized than for alveolar laterals.

3.4. Influence of duration

The longer the duration is, the lower is F2 of the lateral (male speakers: $r(771)= -.34$, $p<0.001$, female

Figure 5: Correlation between duration and F2 of the laterals.



speakers: r(386)= -.34, p<0.001). Moreover, the mean duration of velarized and alveolar laterals is significantly different in the realization of both gender (respectively p<0.001), velarized laterals have a longer duration than alveolar laterals. Taking word position into account, results demonstrate that this difference holds especially for the word medial (male speakers: p<0.001, female speakers: p=0.017) and the word final position (male speakers: p<0.001, female speakers: p=0.04).

4. DISCUSSION AND CONCLUSIONS

The results presented in the previous section indicate that the lateral in the Viennese dialect is subjected to extrinsically motivated allophonic processes. Depending on the context, laterals are preferably realized as velarized or as alveolar laterals, as exemplified by the mean F2 difference of these lateral variants exceeding 300 Hz. This F2 difference can hardly be explained by coarticulatory processes. However, the acoustic analysis revealed a gradual pacing from one lateral to the other, a fact that has also been observed by articulatory analyses on lateral velarization [24, 2]. In addition, these authors provide articulatory reasons for lateral velarization in word-final position. Our results corroborate this view: only word-finally both male and female speakers velarize the lateral. In all other positions women hardly ever produce velarized laterals. For the time being, it cannot be decided whether this is a consequence of articulatory implementations or a consequence of the fact that word-final laterals occur in unstressed position and thus are less salient for perception. The latter argument is of special interest for phonological theory, since in our study laterals in unstressed positions are more readily velarized.

Contrary to the findings of [24, 2], we could always find a bigger variation in the F2 values of the velarized laterals than in the F2 values of the alveolar laterals. This result may be due to the fact that the velarized lateral is a dialect marker which speakers tend to avoid. To complete the picture, female speakers who hardly ever use the velarized lateral avoid this variant especially in the perceptually salient word-initial position. Thus, from the results obtained from the pronunciation behaviour of female speakers, we can infer that the breakup of a phonological distribution that involves a non-prestigious variant starts in the most prominent stressed position. The fact that women more readily avoid non-standard variants and are more prone to use variants of the standard variety is nothing new; it has been stated in many variationist studies, is formulated in [12], and has been called a sociolinguistic verity by [4]. Likewise, a range of explanations to this fact has been offered, see, inter alia, [5, 19, 14] for extensive overviews. [6] argue for a more dynamic conception of gender by integrating the performative aspect of indexing gender. In addition, speakers are expected or think they are expected to act in a certain way. Consequently, it is conceivable that the formal lab situation induced a more standard pronunciation from side of the female participants. However, apart from the fact that the interviewer herself spoke a dialect within the same recording session, though not the Viennese dialect, the speakers were also asked to transform a text into the Viennese dialect, see [16, 17] for a detailed report on this analysis. However, even when asked to transform a text into the dialect, the female speakers produced alveolar laterals as opposed to the male speakers who consistently produced the velarized variant wherever the conditions for velarization were met. Does this result indicate that the notion of "Viennese dialect" triggers something different for women than for men? To answer this question we have to find out whether female Viennese dialect speakers, as defined in our study, are aware of their avoiding the velarized lateral. Therefore, in a first step perception tests have to be performed in order to specify the threshold for perceived velarization. Based on the results of the perception test the degree of awareness of velarized lateral production can be analysed by means of self-assessment and external assessment tests. The results will give intriguing insights into socially determined cognitive aspects of language variation.

Once again, women are leading a sound change, namely the abandonment of a highly stigmatized variant. Some preliminary analyses of young speakers of the lower social classes reveal that the velarized lateral is hardly used any more. In future studies, we will have a closer look at the variation within young speakers of the Viennese dialect and whether a follow-up hypothesis that the velarized lateral is abandoned altogether can be proved. Also, the analysis of historical recordings will provide us with more detailed information about the emergence and the distribution of the velarized lateral.

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