Sociodemographic and Attitudinal Effects on Dialect Speakers' Articulation of the Standard Language: Evidence from German-Speaking Switzerland

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Abstract

In Switzerland, the way of speaking Standard German is subject to heated debates on the extent to which speakers phonetically mark their dialectal origin. However, there is little evidence of factors influencing the articulation of the standard language. This paper focuses on two variables (/ç/ and /k/) which may indicate the degree of dialect- vs. norm-oriented articulation of the standard. We analyzed data from 1,000 speakers from 125 localities using auditory coding and acoustic measures. Besides sociodemographic factors, our models suggested influences of language attitudes and political leaning: less favorable attitudes to the standard language and a right-leaning orientation were associated with higher rates of dialectal articulation of the standard. These findings contribute to our understanding of the links between attitudinal factors and speech, suggesting that phonetic features may be indexical of local dialect identities or political positioning.

Index Terms: Swiss Standard German, center of gravity, sociophonetics, attitudes, political leaning

1. Introduction

German is a prototypical example of a pluricentric language with multiple standard varieties that differ on a phonetic, lexical, and grammatical level [1]. German-speaking Switzerland (GsS) is an important center with its own legitimate standard, but its sociolinguistic situation is complicated by the special form of diglossia [2–4]. In GsS, dialects carry high prestige and speakers are primarily socialized in the local dialect, while Swiss Standard German (SStG) is acquired more formally at school or via the media [5, 6]. Consequently, speakers have an ambiguous relationship with the standard language [5, 7–12]. On the one hand, many speakers view the standard spoken in Germany as a benchmark for the 'right' pronunciation and feel inferior to their northern neighbors [11, 12]. On the other hand, Swiss people want to show their 'Swissness' and somebody who sounds too German-like may be labeled as snobbish or arrogant [11]. Overall, spoken SStG can be seen as a conventionalized mix of dialectal and non-dialectal (mainly phonetic, but also lexical and grammatical) variants and the debate revolves around the right degree of 'Swissness' on the continuum between a more 'German-like' (i.e. more norm-oriented) and more 'Swiss-like' (i.e. more dialect-oriented) [5, p. 103] pronunciation. This paper focuses on /ç/ and /k/ as two perceptually salient variables through which the degree of Swissness can be indexed (e.g. [8, 13, p. 176]), each including a dialect-oriented (DiaStG) and a norm-oriented (NormStG) variant (cf. Table 1).

Table 1: */ç/ after a front vowel and /k/ with their normative and dialectal phonetic realizations.*

Variable	NormStG	DiaStG
/ç/	Palatal [ç]	Velar [x]
/k/	Plosive [kʰ]	Affricate [k͡x]

Contrary to the prescriptive norm [14, pp. 102–103, cf. NormStG in Table 1], the phonetic realization of /ç/ and /k/ is subject to variation [8, 15–20]. Previous findings suggest that this variation is not primarily language-internally motivated, but guided by a series of situational, social, and individual factors. For example, regional effects were documented by [17] based on nine speakers from three regions. While high rates of palatal [ç] were reported throughout the sample, speakers from the urban North produced more normative [kʰ] (71%) compared to Eastern (53%) and Midland speakers (46%) [17, p. 60]. In [8], whose corpus contained controlled interactions and read speech of 57 young educated speakers, both variables were almost exclusively realized normatively. [18] found much lower NormStG rates in their corpus of police phone calls (64% [kʰ], 47% [ç]), based on which they concluded that the communicative orientation (i.e. the degree of formality) must play a role. However, this result could also be due to the speakers' sociodemographic background, in which the samples differed substantially. Support for this interpretation was presented in a recent study by [19, cf. also 20]. Based on a sample of 16 speakers, they found no effects of communicative orientation, but did find effects of education and gender: education explained most variation in /k/, with speakers with a vocational background using a higher proportion of affricates; gender was the most robust predictor of variation in /ç/, with men producing more velar variants.

There is a clear research gap regarding how attitudinal factors may affect the articulation of SStG. While [8] integrated an attitudinal questionnaire, no clear effects were identified. [8] further speculated that a speaker's political orientation may play a role but did not further pursue this empirically. Indeed, several studies have shown how political identity may be reflected in phonetic features. For example, [21] showed that the second vowel in 'Iraq' was realized predominantly as [æ] by US Republicans, while Democrats used more [a]. [22] suggested that Labour Party members of the UK parliament used a higher CAT vowel than Scottish National Party members. In the Swiss context, [5, p. 107] outlined how right-wing politicians may cultivate DiaStG as a means of distancing themselves from their German neighbors and to signal patriotism.

In sum, while previous work has revealed interesting insights and reflections on variation in SStG, the existing studies have several drawbacks:

- Outdated corpora ([8, 17] date back to the early 1990s)
- Auditory coding only, no acoustic measurements
- Small, regionally restricted, and/or homogeneous samples
- Very particular linguistic contexts (e.g. police emergency calls [18] or banking terminology [17])
- Lack of metadata on the participants

The current study seeks to bridge these research gaps by investigating sociophonetic variation in /k/ and /ç/ on a large scale. In a sample of 1,000 speakers from 125 localities, we aim to expand the findings on regional, educational, age-, and gender-related variation, and to add insights on language attitudes, language use, and political orientation. Further, because the findings of the present study are based on a combination of auditory coding and acoustic measurements, they are likely to be more robust than those of prior research.

Based on previous findings, we hypothesize that young, female, urban, and academic speakers are more likely to use the normative variants (i.e. [ç] and [kʰ]). Further, we speculate that politically right-leaning speakers and those with less favorable attitudes towards StG and a stronger dialect orientation will speak in a more dialectal manner (i.e. [x] and [k͡x]).

2. Methods

2.1. Participants

This study is based on data from the SDATS project [23], comprising a total of 1,000 speakers from 125 localities across GsS, evenly balanced by age and gender (four older (60+) and four younger speakers (20–35) per locality, with two female and two male speakers in each age group). The participants grew up and lived in their locality for most of their lives. All participants were competent users of both the local dialect and SStG. Sample sizes vary across the statistical models due to missing data (n=923–940; due to participants not volunteering their political orientation or measurement errors caused by background noise).

2.2. Material

To investigate variation in /k/ and /ç/, four items drawn from a constructed read text in StG were used. Table 2 presents the text excerpt with the four target items highlighted in bold, and the words in which they occur in italics.

Table 2: *Excerpt of the read text.*

Original text	English Translation
Die direkte Demokratie in der Schweiz fordert viel **Kompromissbereitschaft**. Eine gute Diskussionskultur ist deshalb *unerlässlich* im Bundeshaus in Bern. Die *Politik**er*** der verschiedenen Parteien müssen *sich* immer wieder in Geduld üben (…).	Direct democracy in Switzerland demands a great deal of willingness to compromise. A good discussion culture is therefore essential in the Federal Parliament in Bern. The politicians of the various parties need to be constantly patient (...).

Besides a balanced selection of two items per variable, the phonetic environment of /k/ was varied (word-initial vs. -medial) to control for potential effects.

2.3. Procedures

2.3.1. Data collection

Data collection took place from 2020 to 2021. The reading task was part of 2–3h oral interviews, 76.2% of which were conducted remotely via video conferencing and smartphone recordings due to the COVID-19 pandemic [24]. The reading task was completed towards the end of the interview when participants were familiarized with the elicitation environment. The participants were instructed via a written-text prompt to read the text out loud in Standard German, and no further instructions were provided. Metadata on sociodemographic factors, language biographies, attitudes, and political leaning were gathered as part of a subsequent ~45min. online questionnaire.

2.3.2. Coding

The data were coded auditorily (=binary categorization [kʰ] vs. [k͡x]; [ç] vs. [x]) and measured acoustically. First, all audio files were edited to prepare them for further (automatic) processing, including the removal of start and end beeps, irrelevant interactions, word repetitions, or stumbles. Second, the files were forced-aligned via WebMAUS [25]. Chains containing the target items were manually corrected and labeled auditorily in Praat [26], as illustrated in Figure 1.
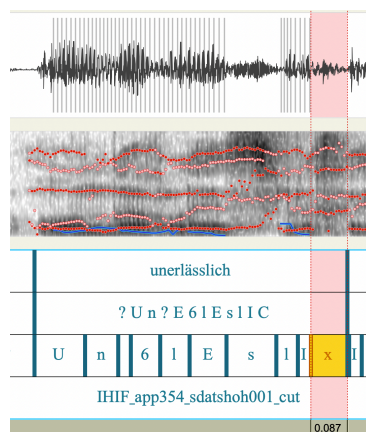

Figure 1: *Labeling of the fricative in 'unerlässlich'.*

The labeling and auditory coding were conducted by six coders who were randomly assigned data bins; problematic cases were cross-checked by a second coder. Finally, center of gravity (CoG) measurements were extracted from the labeled targets band-pass filtered at 1–16 kHz. In the final dataset, invalid answers (e.g. wrong target) were cleaned (n=16) and CoG outliers >8 kHz were excluded (n=86; caused by acoustic disturbances, dentures, etc.).

2.3.3. Statistical modeling

Data analysis was conducted in R [27]. After descriptive statistics and examining the relation between CoG and auditory coding, /k/ and /ç/ realizations were analyzed both via linear mixed-effects modeling with CoG as the outcome variable and logistic mixed-effects modeling with the binary categorized target variant as the outcome variable. All models contained random intercepts for speaker. The following predictors were entered as fixed effects:

- Word (*sich/unerlässlich*; *Kompromissbereitschaft/Politiker*)
- Age cohort (older (60+), younger (20–35))
- Region (8 clusters based on [28])
- Education (academic, vocational)
- Gender (female, male)
- Dialect Standard Profile (DSP, z-scored; negative=standard-oriented; positive=dialect-oriented)
- Political leaning (z-scored; negative=left-leaning; 0=center; positive=right-leaning)

The Dialect Standard Profile (DSP) was designed as an index for dialect- vs. standard-orientation, following the principles of the Bilingual Language Profile (BLP [29, 30]), an established language-dominance index for bilinguals. Analogous to the BLP, the DSP represents a continuum between standard and dialect orientation, based on a ratio of the varieties used (e.g. when speaking with friends or family or when watching TV), as well as attitudes towards both standard and dialect (example item: 'Standard German is a foreign language to me.'). The more sensitive issue of political stance was optionally elicited via a seven-point Likert scale ranging from left-wing to right-wing political leaning.

Interactions between fixed effects were tested and retained if they reached p<.01. A detailed analysis report along with the datasets can be downloaded from https://osf.io/ez8tu/.

3. Results

In this section, we first focus on the outcome variables (3.1), before presenting the four mixed-effects models (3.2). Due to space constraints, the effects are summarized in Table 3 (for detailed model outputs, interested readers are referred to the analysis report, cf. link in 2.3.3.).

3.1. The outcome variable: realization of /k/ and /ç/ and acoustic vs. auditory coding

Based on the auditory binary categorization, the majority of speakers (66.3%) consistently realized all variables either in the NormStG or the DiaStG manner; 31.2% were consistent in at least one of the two variables, while only 2.5% varied freely between norm- and dialect-oriented variants.

The relation between acoustic and auditory coding is shown in Figure 2. Although there was considerable variation, CoG measurements could be clearly mapped onto palatal [ç] vs. velar [x] and plosive [kʰ] vs. affricate [k͡x] categorizations.
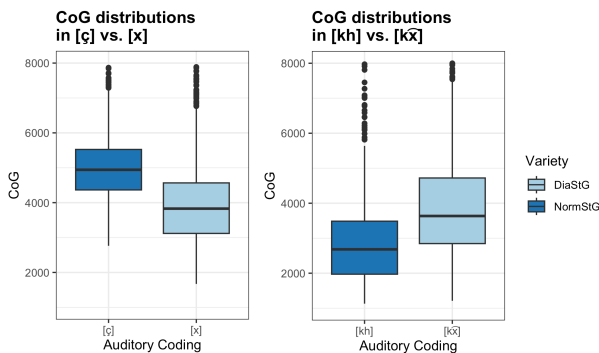

Figure 2: *Acoustic measurements mapped onto binary auditory categorizations.*

3.2. The predictors: results from mixed-effects models

Table 3 summarizes the fixed effects of all four models; each dot refers to a significant effect and dots connected via a dashed line represent an interaction.

Table 3: *Effect summary.* ● = p<.05; ●---● = interaction. *Aud = models with auditory outcome; CoG = models with acoustic outcome.*

	/k/		/ç/	
	1a (Aud)	**1b (CoG)**	**2a (Aud)**	**2b (CoG)**
Word	●	● ● ●	●	●
Age	●	●		●
Region	●	●	●	●
Education	●	●	●	●
Gender	●		●	●
DSP	●	●	●	●
Pol. leaning	●	●	●	

3.2.1. Previously investigated factors

As indicated by the multiple interactions in Table 3, /k/ was sensitive to the phonetic environment. In terms of age, we found that the younger cohort tended to use norm-oriented variants more frequently, although this was not significant across all models. The speakers' regional origin also played a role, with the Northwestern speakers being more likely to use plosive [kʰ] and palatal [ç] compared to speakers from the alpine Southern regions, who were more inclined towards the dialectal variants [x] and [k͡x]. Furthermore, education affected the phonetic realization of both variables, with speakers with an academic background being more likely to use norm-oriented variants. However, in model 1b, this only counted for word-initial /k/, and in model 2a, education interacted with gender: While only subtle differences for female speakers were revealed, male speakers with a vocational orientation were much more likely to use velar [x] compared to their academically oriented peers.

3.2.2. Attitudes and political leaning

Concerning attitudinal factors measured by the DSP, all models suggested the same effects: the stronger the dialect orientation in terms of attitudes and use, the more likely the speakers were to use the dialectal variants. More specifically, the auditory models suggested that speakers with higher DSP scores were more likely to realize <ch> as [x] (2.6(±0.5), z=5.4, p<.001) and <k> as [k͡x] (1.1(±0.2), z=5.3, p<.001), which was supported by the acoustic models for /ç/ (-77.6(±36.6), t=2.1, p=.03; cf. Figure 2 for clarification of the negative effect direction) and for /k/ (163.06(±38.8), t=4.2, p<0.001).

A similar, albeit less robust, picture arose concerning political leaning: All models yielded similar results, with left-leaning speakers tending more towards the NormStG variants than right-leaning speakers, who were more likely to use the DiaStG variants. Whereas this effect was robust in both /k/ models (1.0(±0.2), z=4.6, p<0.001; 171.1(±39.7), t=4.3, p<.001) and model 2a (2.1(±0.4), z=4.9, p<.001), it was not supported in the acoustic model 2b (-24.6(±37.3), t=-0.7, p=.51).

4. Discussion

This section starts with a discussion of the main results on sociophonetic variation in /k/ and /ç/ (4.1.). Following this, the potential benefits of CoG measurements are discussed (4.2.) before the study's main limitations are outlined (4.3.).

4.1. Sociodemographic and attitudinal factors explaining variation in /k/ and /ç/

The present study offers intriguing results which expand our understanding of previously investigated factors constraining variation in /k/ and /ç/ on a much larger scale.

Focusing on the outcome variable, our results indicated lower NormStG rates than expected compared to previous findings (cf. Section 1). This might be explained by the fact that the short Standard German read speech task occurred in the context of a longer dialect interview: since the participants were primarily selected as local dialect speakers, they may have anticipated (consciously or unconsciously) that a certain 'Swissness' was expected of them, introducing a potential bias towards a dialect-oriented articulation.

Regarding sociodemographic factors, our findings largely confirmed the hypotheses. In terms of region, while the results regarding /k/-affrication point in the same direction as in [17], /ç/ was more variable. Southern and rural regions exhibited the highest rates of velar [x], suggesting that these speakers may prefer the dialectal variant as an indexical feature of their local rootedness. Regarding age, our sample is not quite comparable to previous studies, given the considerably larger gap between the age cohorts. Nevertheless, our results reflect the subtle age-related differences reported in [8], showing that the older generation used more dialect-oriented variants than the younger one. Finally, we found the same gender trends as in [19, 20], and the education effect reported only for /k/ in [19] emerged in both variables in the current study. Interestingly, our models revealed that speakers with an apprenticeship were similar to those with tertiary vocational education, both preferring the dialectal variants, while those with a grammar school or university degree were more inclined to use the norm-oriented variants. Hence, it might not merely be the level of education, but the educational orientation that constrains this variation.

Regarding attitudes, while previous studies only offered speculation, the DSP yielded empirical proof of an effect of language use and attitudes on Swiss speakers' articulation of the standard language. Participants with favorable attitudes towards the standard used more norm-oriented variants, while higher dialect scores on the DSP were associated with a more dialectal articulation. With regard to the special diglossic situation, this suggests that speakers with a stronger dialect orientation may evaluate the DiaStG variant as the more prestigious one, resulting in a conscious effort to align SStG articulation to the dialectal phonological norms, and – by doing so – indexing their Swissness.

Political stance also predicted the articulation of SStG, albeit not as robustly as the DSP did. Our models showed that it is not only politicians who make use of linguistic features to signal regional attachment and, therefore, in their case, closeness to their voters, as discussed in [5, 8]. In addition, the realization of /k/ and /ç/ may be indexical of speakers' political leaning more generally, with right-leaning speakers possibly distancing themselves from the normative standard and making more use of dialectal features as a means of patriotic positioning.

4.2. Acoustic vs. auditory coding

The present study was the first to add CoG measurements to auditory coding to investigate variation in /k/ and /ç/. Our study has shown that CoG may capture the distinction between velar and palatal realization of /ç/, as well as plosive vs. affricated /k/. At the same time, the measurements were highly variable, and the models suggested similar, yet not completely overlapping, effects. The high variability and the diverging results may be attributed to acoustic disturbances such as background noise or variation across microphones (cf. e.g. [31] for issues related to recording quality of smartphones). The human ear, in turn, can distinguish these variants relatively straightforwardly. Interestingly, our coding procedure revealed that co-articulatory phenomena might be even more important for this distinction than isolated phones. Overall, while CoG has proven useful, it should not be relied upon on its own, and it might be promising to test measurements with studio recordings and examine co-articulatory phenomena to gain a more comprehensive picture.

4.3. Limitations

The major limitations of this study are related to the low number of variables studied and the few tokens per speaker. Future studies will need to prove whether our findings hold true across further variables such as vowel quality or VOT in bilabial and alveolar plosives. In addition, while the DSP is based on a multitude of questionnaire items, political leaning was elicited in a single item, which only serves as a vague indicator. Our findings thus need to be verified in a more detailed assessment of the construct.

5. Conclusions

With the above restrictions in mind, our study has expanded on insights into the complex factors that shape variation in the articulation of the standard language in a special sociolinguistic situation, yielding generalizable results due to a controlled sample of 1,000 speakers. While we extended previous findings on macrosocial factors (i.e. age, gender, education, region), this is the first study to show attitudinal influences on the articulation of SStG, which may enrich our understanding of the links between language attitudes and speech, suggesting that dialectal or normative orientations may manifest phonetically. Further, our study offered promising insights into the connection between political leaning and language use, which need to be investigated in more depth in future work.

6. Acknowledgements

7. References

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