SOCIOLINGUISTIC FACTORS PREDICTING SOUND CHANGE IN SWISS GERMAN

Adrian Leemann[1], Carina Steiner[1,2], Beat Siebenhaar[3], Péter Jeszenszky[4]

[1]University of Bern, [2]University of Zurich, [3]University of Leipzig, [4]Independent researcher
adrian.leemann@unibe.ch, carina.steiner@unibe.ch, siebenhaar@uni-leipzig.de, pjeszenszky@gmail.com

ABSTRACT

Swiss German dialects have changed substantially over the past few centuries. Previous literature provides ample evidence of sound change. However, most previous studies are limited either in the number of localities or variables, or in the sociolinguistic metadata obtained from participants. In the present contribution we provide a large-scale analysis of sound change, examining ten phonetic variables from 1000 speakers who come from 125 representative localities in German-speaking Switzerland. Factors such as age, mobility, and dialect identity appear to be the driving forces behind sound change, which is further patterned regionally and constrained by between-item variation. We discuss reasons for the sound change observed.

Keywords: sound change, Swiss German, sociophonetics, sociolinguistics

1. INTRODUCTION

Switzerland has played a leading role in dialect documentation. Most noteworthy is the world-renowned Linguistic Atlas of German-speaking Switzerland [1, henceforth SDS], documenting Swiss German (SwG) dialects in the middle of the 20th century. In recent decades, a series of studies have observed that this documentation is no longer up to date and have given potential sociolinguistic reasons for sound change in progress.

In the domain of consonants, for example, Schifferle [2] reports that the areal distribution of aspirated plosives has expanded since the creation of the SDS, which is explained by speakers converging towards Standard German in word-initial plosives. Several studies have further examined the diffusion of /l/-vocalization. This feature, which was originally most likely Bernese, has been spreading particularly towards Southwest and Central Switzerland [3–5]. Causes for this wave-like diffusion are manifold: /l/-vocalization may have become a local identity marker since it leads to a stronger distinction from Standard German [6]; at the same time, speakers have highly positive associations with Bern German, which is likely to support diffusion of this feature [7].

In the domain of vowels, Leemann and Kolly [8] show that regional distributions of Old Upper German <iu> have changed dramatically compared to the SDS [1]: the Zürich variant [tyːf] appears to have spread hierarchically towards Central Switzerland and the Southwest. Leemann and Kolly [8] argue that commuters between Central Switzerland and Zurich, as well as between the Southwest and Zurich, are likely to have brought about diffusion: the Zurich variant was first adopted in larger hubs like Zug and Schwyz and, from there, diffused to smaller neighboring towns and valleys. In addition to these studies which focused more on a multi-locality, geolinguistic dimension, studies such as Eckhardt; Fleischer and Schmid; Hofer; Russ; and Siebenhaar [9–13] have also focused on change in multiple variables, but only in one specific locality.

The studies presented so far either focus on large-scale, multi-locality analyses of change in one or a few variables or else they revolve around single-locality studies that examine multiple variables concurrently but lack geolinguistic scale. What is currently missing is a combination of a large-scale multi-locality approach with an examination of multiple variables. Further – and perhaps most importantly – none of the above-mentioned studies collected a large amount of sociolinguistic metadata from their participants, which prevented a thorough analysis of sociolinguistic factors (potentially) predicting sound change. The present study attempts to fill these gaps.

In a large-scale survey involving 1000 participants from across 125 representative localities, the current study investigates sound change by examining ten exemplary phonetic variables (five consonants and five vowels). The 1000 participants provided an unprecedented amount of metadata (such as personality traits, dialect identity, political leaning, specific education backgrounds, mobility behavior etc.) that enable an explanation of sociolinguistic factors affecting sound change. Given the previous literature, we expected sound change to have occurred, particularly in central Switzerland and the Southeast, and we expected dialect identity (i.e., orientation towards the local vernacular) to play a change-impeding role (cf. Werlen [7]).

2. METHODS

2.1. Materials

Ten items were investigated in the current study: five exemplary vowels and five exemplary consonants. Table 1 shows the variables: type, variable, and the item elicited containing the variable in question, written in Standard German (NB: participants recorded their dialectal variant, cf. Section 2.3 Procedures).

Type	Variable	Standard German
Vowel	MHG <u>	*Rücken* 'back' (ana.)
Vowel	OUG <iu>	*tief* 'deep'
Vowel	MHG <æ>	*Käse* 'cheese'
Vowel	Rounding of MHG <e>	*Apfel* 'apple'
Vowel	MHG <e>	*Bett* 'bed'
Consonant	MHG -nt	*Hund* 'dog'
Consonant	/n/ before fricative	*Zins* 'interest (fin.)'
Consonant	Gemination of MHG <nn>	*Tanne* 'fir'
Consonant	Germ. <-k>	*Kind* 'child'
Consonant	MHG <-hs>	*Sechs* 'six'

Table 1: Ten variables of the current study (MHG = Middle High German, OUG = Old Upper German, Germ. = Germanic).

2.2. Speakers

A total of 1000 speakers from the SDATS database [14] – a contemporary database of Swiss German compiled during the COVID-19 pandemic in 2020–2021 – were investigated. Participants came from 125 localities across German-speaking Switzerland. Eight participants per locality took part in the survey: four females and four males. Two age cohorts were included: 500 speakers aged 60 and over and 500 speakers aged 20–35 years old. Eight larger dialect regions were established: Bern, Central Switzerland, Fribourg Valais and Ticino, Grisons, Northeastern Switzerland, Northwestern Switzerland, Zurich, and Aargau (cf. Hotzenköcherle [15]).

2.3. Procedures

2.3.1. Data collection

Due to the COVID-19 pandemic, data was mostly collected remotely via smartphones and Zoom (76.2% was collected remotely, cf. [14]). Participants were connected with the investigator via Zoom while recording answers to prompts viewed on a custom-built app on their smartphones [16]. The investigator, in real time, checked the quality of the uploaded audio files. Most items were elicited via picture prompts (e.g., *Rücken* 'back', *Käse* 'cheese', *Apfel* 'apple' etc.), a few were elicited via text prompts (e.g., 'What is the opposite of high? – *tief*, 'deep'). Following the ~2h supervised recording session, participants filled in a metadata questionnaire online, without supervision, providing information on their mobility behavior [17] and dialect identity (an index was calculated on the basis of five questions that capture the participant's degree of local affinity), dialect background, social networks, education, Big Five personality questionnaire [18] etc. Completing this questionnaire took another ~45min. Participants were compensated with 100 CHF in total.

2.3.2. Data coding and modeling

Data was coded auditorily by five human annotators and compared to the historic SDS [1]. In case of uncertainty, codings were double-checked between the annotators. Change was binary coded for each variable (0 vs. 1), and – in a second step – proportional mean change was calculated (e.g., change in five out of ten items results in a mean change of 0.5). Linear regressions were used to model the effects of sociodemographic (e.g., age: older (60+) vs. younger (18-35) cohort), regional (e.g., eight larger regions mentioned earlier), attitudinal (e.g., local orientation), and personality-related factors (e.g., Big Five personality traits) on sound change. Mixed models [19] with all of the above-mentioned predictors as fixed effects and random intercepts for speakers and item did not converge. Between-item variation was instead examined by comparing the raw relative change across all items in both age cohorts (cf. Section 3.4 below).

3. RESULTS

The full model output is displayed in Table 2.

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	0.143302	0.045820	3.127	0.001816	**
Age_Cohortyounger	0.082343	0.023444	3.512	0.000465	***
GenderM	-0.006309	0.007026	-0.898	0.369426	
Edu_4levelsSecondary voc. education	0.026500	0.013915	1.904	0.057149	.
Edu_4levelsTertiary voc. education	0.022728	0.019281	1.179	0.238783	
Edu_4levelsUniversity degree	0.004225	0.016071	0.263	0.792659	
LMI_D	0.042870	0.007733	5.544	3.81e-08	***
RegionBern	0.007603	0.019687	0.386	0.699425	
RegionCentral Switzerland	0.010811	0.020438	0.529	0.596954	
RegionFribourg, Valais, Ticino	0.031973	0.021058	1.518	0.129260	
RegionGrisons	0.047078	0.024515	1.920	0.055108	.
RegionNortheastern Switzerland	-0.023503	0.019647	-1.196	0.231903	
RegionNorthwestern Switzerland	-0.007559	0.023829	-0.317	0.751154	
RegionZurich	-0.060790	0.026329	-2.309	0.021159	*
Aff_identity	-0.008365	0.003872	-2.160	0.030986	*
extra	0.010322	0.008151	1.266	0.205735	
gewiss	0.001656	0.008731	0.190	0.849563	
offen	-0.014745	0.008219	-1.794	0.073125	.
Age_Cohortyounger:RegionBern	-0.050643	0.027799	-1.822	0.068799	.
Age_Cohortyounger:RegionCentral Switzerland	-0.036989	0.028956	-1.277	0.201755	
Age_Cohortyounger:RegionFribourg, Valais, Ticino	-0.058250	0.029794	-1.955	0.050861	.
Age_Cohortyounger:RegionGrisons	0.029430	0.034932	0.842	0.399734	
Age_Cohortyounger:RegionNortheastern Switzerland	-0.032148	0.027747	-1.159	0.246911	
Age_Cohortyounger:RegionNorthwestern Switzerland	-0.060514	0.033738	-1.794	0.073182	.
Age_Cohortyounger:RegionZurich	-0.075509	0.037211	-2.029	0.042706	*
Edu_4levelsSecondary voc. education:LMI_D	-0.028664	0.009517	-3.012	0.002663	**
Edu_4levelsTertiary voc. education:LMI_D	-0.026351	0.013102	-2.011	0.044571	*
Edu_4levelsUniversity degree:LMI_D	-0.026203	0.010634	-2.464	0.013905	*

Table 2: Full model output (model prompt: lm(mean change ~ Age Cohort + Gender + Education + Mobility + Region + Identity + Extraversion + Conscientiousness + Openness + Age Cohort:Region + Education:Mobility).

The linear regression revealed significant effects of age, region, mobility, and identity, as well as interactions between age*region and education*mobility. In what follows, we present results for each of the significant effects along with their interactions.

3.1 Age*region

Figure 1 is a bar chart of change by age (younger cohort: dark blue, older cohort: light blue) and region.

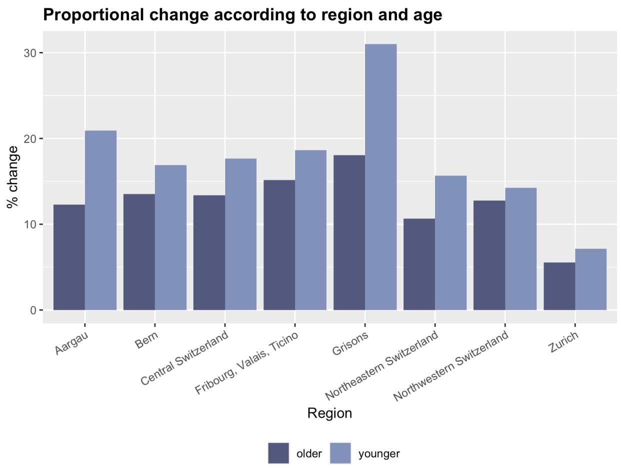

Figure 1: Bar chart of change by region crossed by age cohort.

The younger cohort shows more change on average (18%) than the older cohort (13%). The figure further shows Zurich exhibiting the least change compared to the other regions. The figure also displays the interaction between age and region: for Grisons, for example, the change is particularly substantial in the younger cohort (31% vs. 18%), while for Fribourg, Valais, and Ticino the difference between the two age cohorts is much smaller (18% vs. 15%). To get a better idea of the regional effects, Figure 2 shows the regional distribution for the two age cohorts (older: top, younger: bottom).

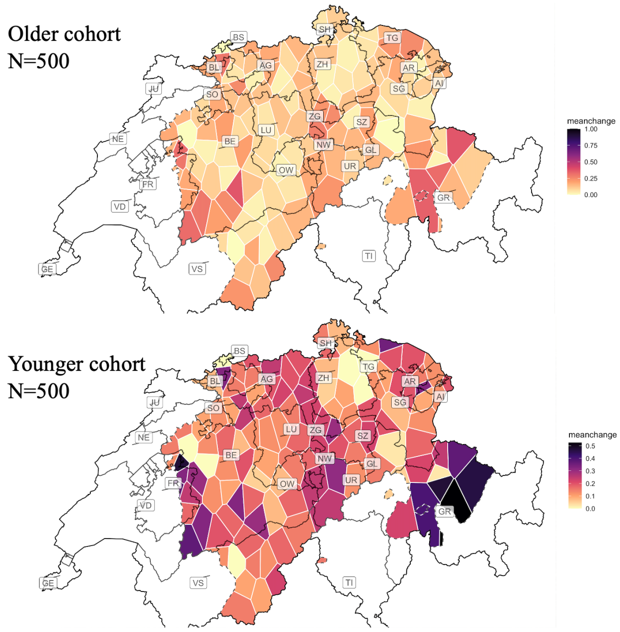

Figure 2: Regional variation of sound change across all ten items by age cohort: older (top), younger (bottom).

Both maps illustrate the least change for the canton of Zurich (ZH) and the most change for the canton of Grisons (GR). The change in Grisons is particularly pronounced in the younger cohort (hence the interaction age*region).

3.2 Mobility*education

The results further revealed that the more mobile the participant, the more likely they are to exhibit sound change (0.04(±0.008), t=5.5, p<0.001). This effect is constrained by the education level of the participant, however: the effect is much more pronounced if the participant's highest current degree is a (vocational) Baccalaureate; the effect is less pronounced for the other education degrees.

3.3 Dialect identity

There was also an effect of dialect identity. The higher the participants' score on the identity index (i.e., the more they exhibited local affinity), the less change they are likely to exhibit (-0.008(±0.004), t=-2.2, p=0.03). This means the more they identify with their local heritage, the more likely they are to exhibit little change.

3.4 Item

Finally, on a descriptive level, we explored change by item, crossed by age cohort; see the bar chart in Figure 3.

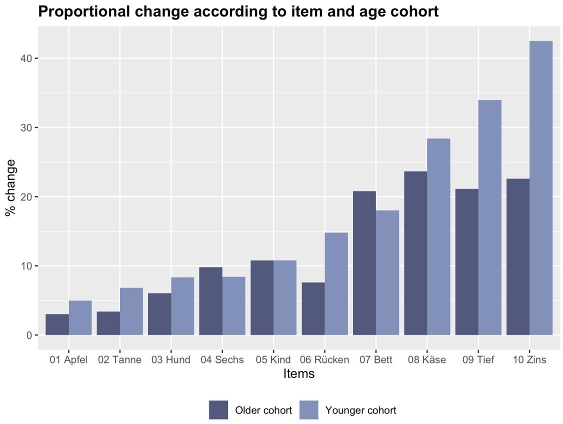

Figure 3: Bar chart of change by item crossed by age cohort.

Figure 3 reveals that the most change can be found in /n/ before a fricative as in *Zins* (42% young cohort, 22% old cohort), and the least change in rounding of MHG <e> as in *Apfel* ('apple') (5% vs. 3%). For most items, we find apparent-time change. This is not the case for the variables MHG <e> as in *Bett* ('bed') and MHG <-hs> as in *sechs* ('six'), however. In both of these variables, it is the older cohort that actually shows slightly more change compared to the SDS.

4. DISCUSSION

We will begin by discussing the main effects of age and region, before moving on to mobility, dialect identity, and item effects. An effect of age was expected. Younger speakers typically lead sound change. Going into the study, we predicted that most change would happen in the Southeast and in Central Switzerland (cf. Leemann and Kolly; Eckhardt; Fleischer and Schmid; Hofer; Russ; Siebenhaar [8–13]). Our prediction, based on the findings of previous studies, was accurate regarding change in the Southeast. Perhaps this is diffusion of the Chur (capital of that region) variant towards these localities – some of which, historically, happen to be localities where Walser (a historically Southwestern variety) dialects were spoken. This change has progressed particularly swiftly in the younger cohort. Change in this cohort may have been sped up by the fact that the Southeast has, to a large part, a bilingual population – Romansh and German. Romansh has been increasingly pushed aside by German influence, particularly for younger speakers, thus creating further linguistic instability in this cohort which may cause an acceleration of sound change.

Regarding mobility, we found that the more mobile the person (as quantified by their exposure to other dialects), the more sound change they exhibit. Mobility and the intensity of interactions as an explanatory force for language change have been shown in Jeszensky et al.; Hernández-Campoy; and Beaman [17, 20, 21]. The fact that this effect is particularly pronounced for participants with a (vocational) Baccalaureate (hence the interaction with education degree*mobility) may be because they are of the younger cohort.

Moving on to dialect identity, our results showed that strong regional association can impede sound change. This finding makes sense intuitively: the more locally attuned speakers are, the prouder they are of their dialect, and the more likely they are to retain phonetic features of that region. This has been shown previously by Beaman and Tomaschek [22], who examined the retention of traditional Swabian features in relation to how closely oriented towards Swabia the participants were (cf. also Steiner et al. [23] for a similar phenomenon in the morphosyntactic domain).

Finally, regarding the differences between items in relation to change, we can point out a couple of trends. The items with the most change are /n/ before a fricative (as in *Zins*, 'interest fin.') and OUG <iu> (as in *tief*, 'deep'). Regarding the former, there appears to be a convergence towards Standard German, with lots of speakers – particularly younger speakers – moving towards *Zins*. Looking at our data for OUG <iu>, the Zurich variant [tyːf] is spreading in virtually every direction, which has been previously reported by Leemann and Kolly [8]. We speculate that there may be lexical factors at play: the retention of the omission of /n/ before a fricative, for example, was already present at the time of the SDS [1]: words like *Gans* ('goose') already showed convergence towards the standard in the 1950s, whereas *Zins* barely did so. Nowadays, however, variants like [t͡seis] for *Zins* are gradually retreating, but at a much slower rate than similar n-less variants of *Gans* did. Regarding items with very little change, such as <nn> and rounding of MHG <e>, we can only speculate. The little change in MHG <nn> is somewhat surprising, given that the geminate realization has been largely abandoned in both Standard German and German dialects, even in the South (cf. BSA and SSA [24, 25]). The little change in the rounding of MHG <e> may again be due to lexical constraints, showing very little change in words like *Apfel* ('apple') but – so we speculate – demonstrating substantial change in words like *Löffel* ('spoon'), where most regions as well as Standard German use this rounded MHG <e> variant.

In the future, further phonetic variables (all Swiss German vowels, for example) will be analyzed and compared to historical data. This will be further placed into the context of change at other linguistic levels, such as lexis, syntax, and morphology – which will reveal stability or change in the phonetic domain in a much broader linguistic context.

5. ACKNOWLEDGMENTS

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