

# Resisting Contact-Induced Sound Change in Heritage Swiss German

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## 1. Introduction

Language contact is a fascinating area of research that is increasingly gaining attention in the literature. In this paper, we focus on the phonological singleton-geminate distinction in a small Swiss German language island in Kidron, Ohio, which has sustained significant and prolonged contact with English. Wenger's (1969) dissertation noted that Kidron Swiss German (hereafter KSG) lacked phonetic voicing in its stop series. Rather, the language utilized a lenis-fortis (i.e. singleton-geminate) distinction to differentiate phonologically "voiced" and "voiceless" consonants, a feature inherited from KSG's base dialect, Bernese Swiss German.

The phonetic-phonological status of this distinction is the topic of discussion in this paper. Since its most recent recording by Wenger in the late 1960s, there have been substantial sociolinguistic shifts in the community that have altered the language. The goal of this paper is to determine the phonetic realization of the inherited fortis-lenis plosives in this variety of Swiss German and to see whether the geminate-singleton contrast is maintained or shows signs of having undergone a contact-induced sound change to approximate the English counterpart.

We will begin with a brief overview of the population of Swiss Germans in Kidron, OH, making note of their historic and contemporary linguistic situation. Following this discussion, we will explain the linguistic phenomena at hand here, as well as provide an overview of the experiments employed to test these phenomena. Discussion of the results of these experiments will follow, before finally moving on to review some potential implications of this study on the field of contact linguistics, and specifically for the study of heritage and immigrant languages.

## 2. Background

### 2.1. Sociolinguistic background

Swiss emigrants from the Tramelan region in the Swiss Canton of Bern began arriving in Ohio in 1819. Despite a mere four families making the initial journey, over 1200 Tramelan Swiss Germans eventually followed, starting a sixty-year period of Swiss immigration to Ohio. The early immigrants to Kidron were Mennonites and established a church upon their arrival bearing the name of the local mountain in their homeland (Sonnenberg) (Wenger 1969). With the founding of the Sonnenberg Church and the deep-seeded religious beliefs of the Swiss Germans in Kidron, the immigrants founded a tight-knit community, which at the time could be considered a "closed ethno-religious community" (Wenger 1969: 13). This had a profound impact on the community's language use. In fact, the use of Swiss German during the early 20th century was used as a key sociolinguistic means of distinguishing the Swiss Mennonites from the community at large, which was (and continues to be) primarily English-speaking, alongside significant numbers of Pennsylvania Dutch-speaking Amish. As late as the late 1960s, many Swiss children had better command of Swiss than

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English, with many first encountering English in the public schools (Wenger 1969). Today, however, the linguistic situation has changed drastically. Many of these speakers have moved away, married outside of the community (i.e. to non-Swiss German speakers), and specialized in jobs that required the use of English. As a result, KSG speakers have shifted to English and are nowadays not only fully fluent in English but indeed English-dominant. The shift has similarly been noted in other North American heritage (German) communities (Bousquette, *forthc.*).

## 2.2. *Theoretical background*

The obstruent series in Swiss German (as spoken in Switzerland) lacks phonetic voicing contrasts. These consonants are instead differentiated on the basis of a fortis-lenis opposition (Kraehenmann 2001: 111). Because neither voicing nor aspiration provide reliable phonetic cues for determining a consonant's phonological status, the notions of articulatory strength and closure duration have been used to characterize the fortis-lenis distinction in Swiss German consonants. As fortis consonants have longer closure durations than the relatively shorter 'lenis' consonants in Swiss German, the difference may therefore be viewed as one of a geminate-singleton distinction (e.g. Kraehenmann 2001: 125). While this distinction persists in Swiss German, it is unclear whether such a geminate-singleton contrast has been maintained among the heritage KSG speakers in Ohio, given the extensive linguistic contact with English (which lacks such a contrast) (e.g. Fleischer & Schmid 2006, Fulop 1994, Kraehenmann 2001). The focus of this study is the phonetic realization of the inherited fortis-lenis plosives in KSG and whether they maintain the distinction in the phonological system or have undergone phonetic attrition to converge with their English counterparts.

Kraehenmann & Lahiri (2008) found that this length contrast for obstruents can be found in all phonological positions (i.e. word-initially, -medially, and -finally) in Thurgovian Swiss German. Additionally, the differences in duration are the only reliable phonetic cues that signal an obstruents phonological fortis-lenis status. Similarly, Fleischer & Schmid (2006) confirmed Zurich Swiss Germans lack of voiced obstruents, with obstruents contrasting by closure duration instead. Contrary to the phonetic realization of obstruents in Swiss German, English plosives employ the feature [SPREAD GLOTTIS] to distinguish between phonologically 'voiceless' and 'voiced' plosives (e.g. orthographic <t> and <d>, respectively). In a context of widespread bilingualism and contact between two such systems, it would not be surprising to find the effects of contact-induced change in the heritage language.

Crosslinguistically, singleton-geminate contrasts are most prevalent in intervocalic environments than in other phonological positions (despite the data from Kraehenmann & Lahiri 2008). This typological tendency for intervocalic geminates has been noted by Thurgood 1993 and Dmitrieva 2012 among others. Additionally, the difference between singleton and geminate consonants is frequently emphasized (i.e. increased) intervocalically (Kraehenmann 2001). Consequently, this study restricts its focus to fortis-lenis consonants in intervocalic position, as this is the phonological environment in which consonant length contrast (i.e. singleton vs. geminate) is most likely to occur (or be maintained). Given that the base phonological systems of SG and English differ with respect to the fortis-lenis consonants, the case of KSG may serve to highlight contact-induced language change vis-à-vis phonetic vs. phonological realizations. Many linguists have noted that languages phonologies are susceptible to contact-induced changes. Fischer, Gabriel Kireva (2014), for example, argue that Judeo-Spanish, in its contact with Bulgarian, instantiates a clear example of language contact leading to phonological convergence. They even go so far as to also suggest that "Judeo-Spanish speakers of today [may] dispose of only one single phonological system, namely the Bulgarian one, as a result of complete convergence on the phonological level" (Fischer, Gabriel & Kireva 2014: 101). To a less extreme extent, Preecha (2005) has also noted that areal linguistic contact has significantly affected the phonological systems of various varieties of Kuai-Kui, with the systems partially converging with those of neighboring languages, such as Thai and Lao.

Others, however, have noted that phonology is not categorically affected in contact situations. Putnam, Kupisch & Pascual y Cabo (2018) suggest that phonologies in contact situations may actually be quite stable, with the socioculturally dominant language instead exercising phonetic influences

over the original variety rather than proper phonological influences. While this accepts contact-induced sound changes, it posits that the contact may be at a phonetic (i.e. sub-phonemic) level and therefore leave the phonological system of the affected language intact. Tse's (2016) investigation of Toronto heritage Cantonese supports this analysis, showing that despite phonetic differences in the sound systems of heritage Cantonese seen between two different generations of speakers, the underlying phonological systems remain unchanged. The findings presented in this support the latter argument, showing that the phonological system of KSG is rather stable (i.e. the phonological contrast of singleton-geminate consonants is maintained), despite clear phonetic influence from English.

### 3. Methodology

#### 3.1. Participants

We interviewed a total of 24 KSG heritage speakers in Kidron, OH. In this paper, we present findings from six of them. The KSG participants for this study are rather advanced in age, reflecting the fact that the language is spoken by its last remaining speakers. The youngest participant in this study was born in 1953 (=64 years old), and the oldest was born in 1928 (=89 years old). Of the participants whose data is part of this paper's analysis, the average age was 81 years old. Four of these participants were men. Each participant was raised in a KSG household, only fully acquiring English after going to grade school in local English-language public schools. As previously mentioned, all KSG speakers are KSG-English bilinguals and are English-dominant. Participants also reported having relatively few opportunities to use KSG in their everyday lives, further supporting the dominance of English. The six participants selected for inclusion in this study demonstrated the highest proficiency in KSG in that they had no systemic word-retrieval issues and were generally more fluent.

#### 3.2. Materials

We conducted three experiments as part of this study. The first experiment was designed to assess the state of participants' English phonology, looking specifically at their production of intervocalic consonants in English. Participants were given a word list with 24 written English words. Each of the six phonemic stops in English (i.e. /p t k b d g/) were represented in the list in initial, medial (which are tapped in American English), and final positions (e.g. tab, matter, wallet). There were six filler items, which contained no target segments (e.g. thing, cheese). Of the target sounds investigated, equal numbers of phonologically voiced and voiceless segments were represented in each phonological condition (i.e. word-initially, -medially, and -finally). Syllable-level stress and the quality of the preceding and following vowels were, however, not controlled for.

The second experiment consisted of a picture naming task. The experiment was designed to elicit intervocalic stops in KSG, where the singleton-geminate distinction is most prominent. Participants were shown 26 colored pictures printed on white 8.5"x11" paper. Each sheet contained a total of four images, one in each corner with the exception of one sheet, which contained only two pictures. Pictures were chosen whose KSG translations were most likely to yield intervocalic consonants (specifically intervocalic singletons or geminates). Two such examples are a picture of a rat 'Ratte' /rat:ə/ and a picture of bike wheels 'Räder' /rɛ:tɐ/.

The final experiment involved guided free speech elicitation. In contrast to Experiments 1 and 2, this task focused on more naturalistic speech production, and served as a key benchmark for assessing participants' overall fluency in KSG. For this final task, participants were asked to narrate the picture book *Frog, Where Are You?* by Mercer Mayer. The book consists of 29 pictures telling the story of a boy and his dog, looking for the boy's lost frog. This task is especially useful in gathering naturalistic (i.e. spontaneous) speech, with focus shifted away from the highly structured picture naming task to allow for natural circumlocutions and production commensurate with participants' abilities regardless of their ability to name specific, predetermined items. Despite the pictorial representation of a predetermined set of items in the picture book, speakers are free to mention (or not mention) each item as they deem appropriate.

Each participant interview was recorded with a Zoom recorder located approximately 12” from the speaker on the table at which the participant was seated. The recorded files were uploaded to a laptop afterwards, where they were transcribed in Elan and acoustically analyzed in Praat. Recordings in Praat were analyzed for voice-onset-time (VOT) differences in the phonologically voiced and voiceless consonants in intervocalic position (i.e. singleton-geminate consonants) as well as for overall closure duration (CD).

### 3.3. Procedure

The experiment consisted of four tasks: a sociolinguistic interview (i.e. background questionnaire), an English word list, a KSG picture naming task, and a naturalistic oral production task (*Frog, Where Are You?*). Sociolinguistic interviews were conducted in English to ascertain basic demographic information (e.g. date of birth, place of birth, etc.) as well as to get a deeper understanding of participants’ personal histories, including their language use growing up, church affiliation, occupation, etc. Following the sociolinguistic interviews, participants were asked to take part in the three aforementioned tasks, beginning with Task 1. With the exception of the first task, participants were allowed to complete the tasks together if they so wished. For many participants, this helped them feel more comfortable, thus allowing them to produce more naturalistic KSG. These groups were typically restricted to two individuals, although a single group of three did complete the tasks.

Task 1 (English word list) was completed in English. Participants were given the word list to familiarize themselves with the words first. After the familiarization phase, participants were asked to read each word aloud twice, pausing between each iteration. After this short task, participants moved on to the second task (picture naming task). In the picture naming task, participants were given the small packet of 26 pictures and asked to provide the KSG names for each thing. For some of the pictures, multiple answers were possible, and participants were encouraged to provide as much information as they could. One picture, for example, depicted a boy on a ladder washing a window, generally yielding multiple responses per participant, including full sentences (e.g. ‘The boy is washing the window’) or isolated words (e.g. ‘boy’ or ‘ladder’). If a participant could not provide a KSG term for a picture, they were instructed to simply move on to the next image. Participants were also encouraged to ask for clarification, in case any of the images were unclear to them.

As previously mentioned, in the third task participants were asked to narrate the story from the picture book *Frog, Where Are You?* (Mayer 1969). The participants were instructed to first familiarize themselves with the story. After this brief familiarization phase, participants were prompted to flip through the book and express the story in KSG. Participants were told to provide as much or as little information as they could. As in Task 2, some participants elected to complete this task in pairs, working together to tell the story and supplying additional information when their partner did or could not.

## 4. Results

Results from the English of the KSG speakers are in line with values otherwise expected for General American English. This is shown in three measurements. In their production of English words, KSG speakers did not produce negative VOTs for phonologically voiced stops. This mirrors other accounts of the English stop series, which show that English does not pre-voice phonologically “voiced” stops (e.g. Caramazza et al.1973, Neary & Rochet 1994) (see Table 1). Secondly, of the intervocalic stops produced, phonologically voiceless segments had longer closure durations than the phonologically voiced segments (see Table 2). Dmitrieva (2012) notes that American English speakers can detect a durational difference of about 20-25ms. This represents the Just Noticeable Difference (JND). Among all tokens collected from Task 1, voiceless and voiced stops in intervocalic position differed on average by only 23ms, suggesting that closure duration does not play a significant role in the disambiguation of phonological voicing contrasts. Finally, the KSG speakers neutralized the contrast between phonologically voiced and voiceless alveolar stops intervocalically, such that ‘matter’ and ‘madder’ both surface with the alveolar tap (as expected) (see Table 3 below). This supports the

conclusion that the English of the KSG speakers is fully native-like in this aspect of their consonantal phonology.

Data from both Tasks 2 and 3 suggest that the phonetic manifestations of the phonological contrast in the stop series are different for the speakers' KSG as opposed to their English. As with their English consonants, the lenis consonants (i.e. phonologically voiced) in KSG lack negative VOTs, which was expected. However, on the two other measurements previously mentioned (neutralization of alveolar stop contrasts intervocalically and closure duration), KSG consonants remain distinct. Intervocalically, alveolar stops are not neutralized in KSG, and they maintain their standard stop articulation features. In KSG, the difference between the average closure durations of lenis and fortis intervocalic stops is 25ms (as indicated in Table 2). Therefore, the difference between phonologically lenis and fortis consonants is greater in KSG than English. For alveolar stops in intervocalic position, this contrast is amplified. Here, the closure duration difference between English /t/ and /d/ is 13ms (where they are phonetically realized as [r]). This difference is also at the lower limit of Dmitrieva's (2012) posited JND for speakers of American English. For KSG, there is a difference of 51ms between lenis and fortis closure durations, well above the JND. Additionally, differences in voice onset times in this condition are negligible (as seen in Table 3).

Table 1: Voice onset time (in ms).

	Thurgovian Swiss German	Kidron Swiss German	American English
Fortis	24	31	30
Lenis	25	15	18

Table 2: Closure duration (in ms).

	Thurgovian Swiss German	Kidron Swiss German	American English
Fortis	124	78	72
Lenis	61	53	49

Table 3: CD & VOT (in ms) of intervocalic alveolar stops in Kidron Swiss German and American English.

	Kidron Swiss German		American English	
	CD	VOT	CD	VOT
Fortis (/t/)	101	27	42	11
Lenis (/d/)	50	16	29	9

Based on these results, we can conclude that KSG speakers have maintained the phonological distinction between singletons and geminates for intervocalic stops. This is supported by the fact that the distinction between voiced and voiceless alveolar stops is not neutralized in KSG (as it is in English). In fact, for alveolar stops, the contrasting closure durations are amplified intervocalically in KSG. While the CD values for KSG are not as extreme as those observed in other Swiss German dialects, the distinction has been maintained beyond the JND, which cannot be confidently claimed for their American English counterparts (as expected).

## 5. Discussion

These results are a clear indication that the competing phonological systems in the KSG bilinguals have remained separate, despite their deviation from phonetic values that one might expect given previous research on Swiss German geminates in Europe. It appears, as pointed to by Putnam,

Kupisch & Pascual y Cabo (2018), that the phonology of KSG has undergone significant phonetic changes, while the phonological system has remained unchanged (at least in terms of contrasts in the consonant series). The differences in closure durations between lenis and fortis (i.e. singleton and geminate) consonants persist in KSG, but with diminished phonetic salience compared to those found in Modern (European) Swiss German (see Kraehenmann 2001, Fleischer & Schmid 2006). Based on evidence from our participants, it appears that stop closure durations in KSG have approximated their American English counterparts as a result of the sustained and intense contact between the two languages, while remaining phonologically distinct.

It should be noted that there is a great deal of variation among speakers, both in terms of phonetic production of these stops and in terms of overall fluency in the heritage language. There also appear to be significant comprehension/production asymmetries in many of the study's participants. During data collection, there were numerous instances in which participants were able to understand another speaker, but had difficulty producing the language themselves. This has implications for the kinds of future research that can be conducted with this population and suggests that data elicitation methods focusing primarily on comprehension or perception may yield more positive results than those dependent on participant production alone.

There are still numerous avenues for future research, however. Because singleton/geminate contrasts are typologically most common in intervocalic environments, we chose to focus on this environment as it was most likely to be the environment in which such a contrast might be retained. However, previous studies have shown that Swiss German dialects exhibit this contrast in all phonological positions. With the establishment that KSG has maintained the distinction intervocalically, the next step is to see if that distinction has also been maintained in other phonological environments (i.e. word-initially and word-finally).

Previous research has also shown that it is not only stops in Swiss German dialects that manifest singleton-geminate variants, but also affricates and fricatives. Future studies of KSG will also need to ascertain whether closure duration is similarly contrastive in the variety for different manners of articulation. Finally, previous studies have also shown there to be effects on gemination as a result of the surrounding vowels (e.g. stressed-unstressed, long-short). This was not controlled for in this experiment, and similarly lends itself to future research.

## 6. Conclusion

The phonetic realization (i.e. singleton vs. geminate) of the phonological lenis/fortis distinction in the stop series in Swiss German has been maintained in the Kidron Swiss German variety. However, extensive contact with American English, has led to contact-induced change affecting the phonetic realization of intervocalic stops in KSG. KSG stops no longer exhibit closure duration differences at a roughly 1:2 ratio between lenis and fortis stops, as seen in European Swiss German varieties. Instead, KSG has minimized the phonetic distinction, while still maintaining the phonological distinction at a point above the JND for American English speakers. This distinction has not been transferred to the English produced by KSG speakers, further suggesting that the phonological systems of the two languages have remained separate in the face of intense language contact.

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