

# THE AWFULLY ELUSIVE GERMAN LANGUAGE: IN SEARCH OF A PROPERTY THEORY OF MID AND BACK CONTINUANTS

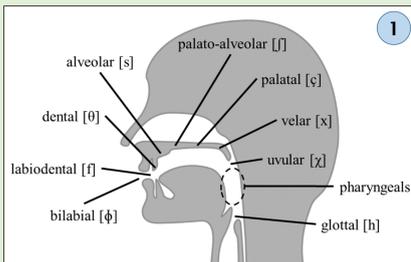
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## Introduction

German mid and back continuants [s f ʒ ç x χ R h] are well-known in German  
 ► especially Dorsal Fricative Assimilation (DFA) of [ç x χ] [14]  
 ► also ban against \*Coda-[h] [1]  
 L2 German is prominent in the United States [3]  
 ► representation & perception of these German sounds is of interest to L2 phonology



Research comparing mid/back fricatives within and between languages is uncommon, and arises from diverse approaches:  
 ► phonetic [2, 9, 12]  
 ► psycholinguistic [8, 13]  
 ► neurolinguistic [10]  
 ► German NSs are sensitive to violations of DFA in auditory stimuli [10, 13]  
 [h] + back fricatives often omitted  
 Theories of /h/ vary:  
 (a) No phonological Place [1]  
 (b) Pharyngeal primary place [6]  
 (c) either or both (with implications for all back continuants) [7]

The special characteristics of nine voiceless fricatives (adapted from Stevens, 1960, p. 45)

Sounds	Articulation Group	Relative Intensity	Spectrum Length	Distinction between Members of the Group
f	FRONT (Labial & dental)	LOW	LONG (5000-6000 cycles)	lowest "centre of gravity"
s	MID (pre-velar)	HIGH	SHORT (3000-4000 cycles)	highest bottom limit, high top limit of frequency
ç				intermediate "centre of gravity"
x	BACK	MEDIUM	MEDIUM (4000-5500 cycles) with "formant-like" structure	highest bottom limit of frequency, intermediate bottom limit of frequency
χ				intermediate top limit of frequency, lowest top limit of frequency
h				lowest limit of frequency

## Materials & Method

**Do Early L2 Learners learn the rules that govern where novel speech sounds can appear in the L2? How do they compare to NSs of German?**

**Phoneme Detection Task:** When you hear a T sound, press the Space Bar ASAP  
**384 Auditory Stimuli:** Nonwords recorded by phonetically trained German NS (female)  
**CV\_t context (32)**  
 16 Licit: V\_t\_ with [ç x] → 8 × Vçt\_ (e.g., [glaxt]) + 8 × Vxt\_ (e.g., [glæxt])  
 16 Illicit: V\_t\_ with [ç x] → 8 × Vçt\_ (e.g., [glæçt]) + 8 × Vxt\_ (e.g., [glæxt])  
**[h]-conditions (16, balanced for vowels [a ε])**  
 8 Licit: Onset-[h] → 8 × hV...t (e.g., [hamt], [helkt])  
 8 Illicit: \*Coda-[h] → 8 × Vht\_ (e.g., [glaht], [gleht])  
**Participants**

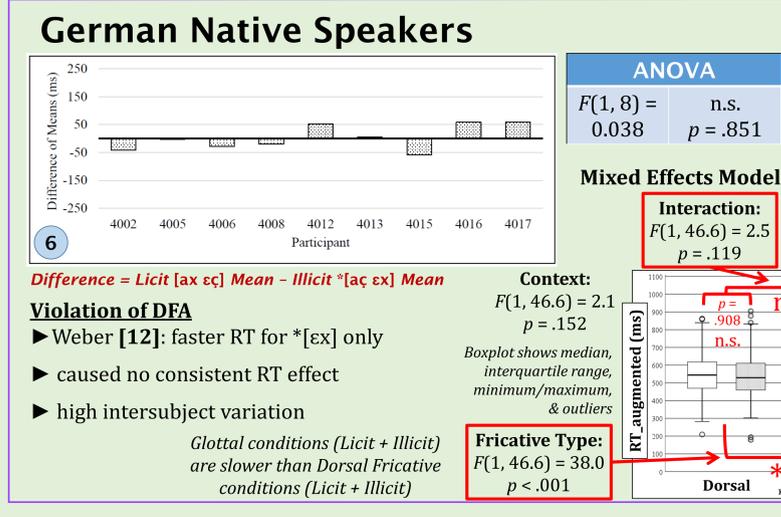
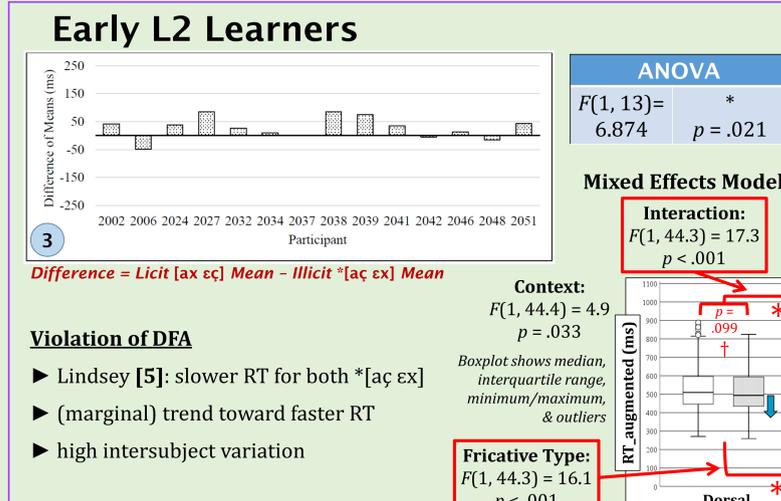
	L2 (2 <sup>nd</sup> sem)	German NSs
Age	18-23yo	20-29yo
Location	U.S. Midwest	Stuttgart

**Fillers** without [t] anywhere (192, balanced)  
**Dependent Variables:** Reaction Time (augmented)  
 Accuracy (5-Hit minimum threshold) → N = 14 (L2), N = 9 (NS)

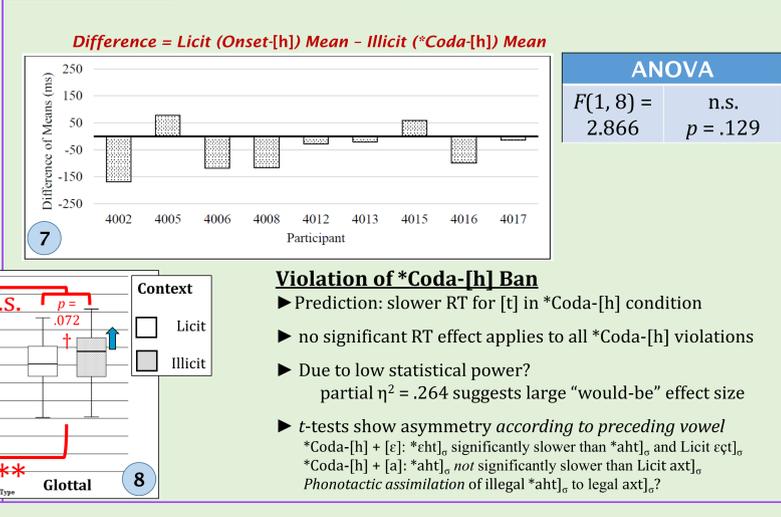
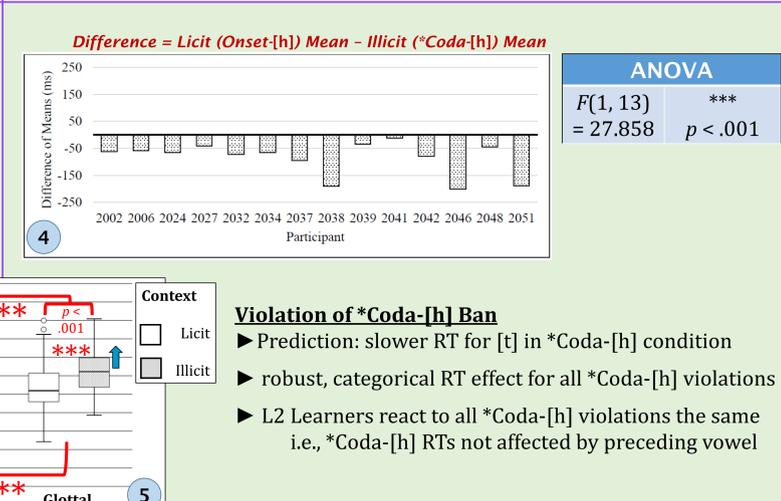
## References

[1] Davis, S., & Cho, M.-H. (2003). The distribution of aspirated stops and /h/ in American English and Korean: an alignment approach with typological implications. *Linguistics*, 41, 607-652.  
 [2] Delattre, P. (1971). Pharyngeal features in the consonants of Arabic, German, Spanish, French, and American English. *Phonetics*, 23, 129-155.  
 [3] Ecke, P. (2011). The state of German in the United States: A statistical portrait and a call for teachers. *German as a Foreign Language*, 12(2), 55-83.  
 [4] Hall, T. A. (2014). Alveopalatalization in Central German as markedness reduction. *Transactions of the Philological Society*, 112, 143-166. doi: 10.1111/1467-968X.12002  
 [5] Lindsey, J. (2013). L2 acquisition of the context-dependent [ç]-[x] alternation in American English learners of German. Unpublished manuscript, Indiana University, Bloomington.  
 [6] Lombardi, L. (2002). Coronal epenthesis and markedness. *Phonology*, 19, 219-251.

## Results Dorsal Fricative Assimilation



## \*Coda-[h] Ban



## Conclusions

**Do Early L2 Learners learn the rules that govern where novel speech sounds can appear in the L2?**  
 Yes! But individual variation is high, and rules differ.  
**Do Early L2 Learners exhibit sensitivity to violations of German DFA?**  
 Yes! Some L2 Learners show slightly faster Reaction Times to violations of DFA  
 Early L2 Learners may not have automatized this yet [11]  
**Do Early L2 Learners overapply the \*Coda-[h] ban to the [h]-like [ç] and [x]?**  
 No.  
 Reaction Times to illegal \*Coda-[h] violations are robustly slower than typical  
 Legal [axt] and [εçt] do not show slower Reaction Times than typical  
**How do Early L2 Learners compare to NSs of German?**  
**Early L2 Learners seem more sensitive to illegal \*[aç ex] than NSs**  
 But why?  
 Is DFA boosted by prescriptive formal instruction?  
 How is NS perception of [ç] and [x] affected by dialect background, dialect exposure, or even other L2 exposure?  
 Is the subphonemic variation of [ç] and [x] less salient to NSs than L2 learners?  
**NS vs. Early L2 Learner Reaction Times patterns for \*Coda-[h] tell us:**  
 ► Early L2 learners accept German [ç] and [x] as both legal sounds and not /h/  
 ► NSs may phonotactically assimilate [h] to [x]/[ç] when vowel context favors it  
**German [ç x χ] interact with /h/ in perception for NSs and L2 Learners**

## Future Directions

**What is going on in German?**  
 Do NSs actually phonotactically assimilate illegal \*[ah] to legal [ax]?  
 How do German NSs perceive Dorsal Fricative Assimilation? How salient is it?  
 Why are DFA findings inconsistent? [5, 8, 10, 13] How much does dialect matter? [4]  
**Does "guttural" German have a guttural class? Pharyngeal Place?**  
 How do L1 English speakers perceive fricatives farther back than [ç] that are not [h]?  
 Do they have or need the phonological features to represent gutturals?  
 Traditionally, Germanic phonology ignores Pharyngeal Place [14]  
 Broader phonological theory suggests German should have [Pharyngeal] Place [2, 6, 7]  
 (cf. Semitic: Arabic, Hebrew, etc.; others, e.g., Coeur d'Alene, Chilcotin)

## Acknowledgements

This research was partially funded by a 2015 *Language Learning* Dissertation Grant and a Short-Term Research Grant from the Institut für Linguistik, Universität Stuttgart, Sonderforschungsbereich-72, Project A7: Cross-linguistic interactions in second language prosody, under Prof. Dr. Sabine Zerbian.  
 Additional thanks go to Jeff Holliday and all the members of the Second Language Psycholinguistics Lab at Indiana University.

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