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Cross-linguistic influence and obstruent sequence perception in spoken and whispered speech

To what extent do linguistic repertoire and phonation mode (i.e. whispered or modal speech) influence multilingual perception of obstruent sequences? Preliminary evidence suggests that language-specific phonotactic probabilities interfere with consonant sequence perception in an L2/L3 (Kilpatrick et al., 2019) and that whispered postpones lexical access via wait-and-see processing (Hendrickson & Ernest, 2022). The acoustics of vowels and consonants production in modal speech have been thoroughly studied, as has phonation on the spectral characteristics of voiceless consonants (Jovičić & Šarić, 2008; Żygis et al., 2017). Yet, gaps exist in the literature regarding the perception of consonant sequences in whispered speech and its interaction with multilingualism.

Our ongoing study aims to lessen these gaps by assessing multilingual perception of obstruent sequences across phonation modes and diverse linguistic repertoires. Participants groups consisted of two pairs: (1) L1 Polish, L2 English, L3 Norwegian and L1 Polish, L2 English, as well as (2) L1 Azerbaijani, L2 Farsi, L3 English and L1 Farsi, L2 English. Our experiment uses an auditory lexical matching task to collect data from 20 participants per language group. Stimuli consisted of two-word phrases containing two- to three-consonant sequences across word boundaries for each language. Sonorant and mixed sequences will also be included as control items. Stimuli lists (n=64; see table 1) will be randomized and presented to participants auditorily. Participants will have to match audio to lexical items presented visually in psychoPy.

We hypothesize improved accuracy and response times for modal speech sequences compared to whispered ones. We predict no differences in perception of modal obstruent sequences across language groups. We predict that L1 Polish groups will have the highest accuracy and shortest response times for obstruent sequences in the whispered condition due to the disproportionately high frequency of voiceless obstruent sequences in Polish. Accordingly, response times will be slower for multilingual groups than for the bilingual groups. We also predict that there will be no effect of L3 on L1 or L2 perception accuracy, regardless of phonation mode.Linear and generalized linear mixed effects modeling will assess perception accuracy and response times of obstruent sequences for each language, language group, and phonation mode. Consequent analyses will look at the effects of sequence length (two-consonant, three-consonant), sequence type, and language-specific phonotactic probability of each sequence as factors.

This investigation extends the literature on consonant sequence perception by multilingual speakers of understudied languages, it examines the effects of phonation mode to two- and three-consonant sequences, and it evaluates the impact of cross-linguistic influence (CLI) on speech perception due to language-specific phonotactic probabilities.

(431 Words)

Keywords: Multilingualism, whispered speech, obstruent sequences, perception, CLI

References

Hendrickson, K., & Ernest, D. (2022). The recognition of whispered speech in real-time. *Ear and Hearing, 43*(2), 554-562.

Jovičić, S. T., & Šarić, Z. (2008). Acoustic analysis of consonants in whispered speech. *Journal of voice, 22*(3), 263-274.

Kilpatrick, A. J., Bundgaard-Nielsen, R. L., & Baker, B. J. (2019). Japanese co-occurrence restrictions influence second language perception. *Applied Psycholinguistics, 40*(2), 585-611.

Żygis, M., Pape, D., Koenig, L. L., Jaskuła, M., & Jesus, L. M. (2017). Segmental cues to intonation of statements and polar questions in whispered, semi-whispered and normal speech modes. *Journal of Phonetics, 63*, 53-74.

Tables:

Sequence Length	**Consonant sequence**	**Language**				
		Azerbaijani	*English*	*Farsi*	*Norwegian*	*Polish*
CC	*s_s*	ru**s s**alati	glas**s s**and	ta**s s**iah	Agne**s s**over	kwa**s s**ądu
	s_S	pi**s sh**arbat	ga**s sh**ortage	da**s sh**omal	Ali**ce sj**elden	lo**s sz**afy
	S_s	be**sh s**ahar	wa**sh s**ocks	tape**sh s**aat	alle**rs s**å	widzi**sz s**owę
	t_p	saki**t p**eri	tha**t p**erson	too**t p**olo	ka**tt p**røver	pięćse**t p**asków
CCC	*st_d*	ma**st d**edeler	la**st_d**ay	ra**st d**ast	ø**st D**elhi	wzro**st d**omu

Table 1. Samples of two-word sequences by language and consonant sequence for use in the lexical matching task.