**Multilingual perception of retroflexes**

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This study juxtaposes cross-linguistic similarity with discrimination of retroflexes by multilinguals. The degree of perceived cross-linguistic similarity between the learner’s L1 and L2 has been shown to mediate discrimination of L2 sounds (Cebrian 2022, Flege and Bohn 2021), but so far it has not been tested from a multilingual perspective.

In world languages, retroflexes occur infrequently (Maddieson 1984). Norwegian has a series of coronal consonants which are distinguished by retroflexion: alveolar /t, d, s, l, n/ and retroflex /ʈ, ɖ, ʃ, ɭ, ɳ/, whereas American English only has /ɽ/ and Polish sibilants and stops have a controversial retroflex status -- cues to retroflexion are argued to exist in /ʂ/, /ʐ/, /t͡ʂ/ and /d͡ʐ/ and cues to allophonic retroflexion – for /t/ and /d/ (Żygis 2005; Żygis, Pape & Jesus, 2012).

A subtractive language group design (Westergaard et al. 2023) was employed, with an experimental group consisting of 33 L1 Polish, L2, English and L3 Norwegian listeners and two control groups: 35 bilingual L1 Polish and L2 English listeners naïve with respect to Norwegian and 13 native Norwegian listeners with L2 English (all classroom setting learners). In an oddity categorial discrimination task 180 triads contained both Norwegian retroflexes (i.e., /ʈ ɖ ʂ ɭ ɳ/) and non-retroflexes (i.e., /t d s l n/) in inter-vocalic position. In the cross-linguistic (dis-)similarity task, participants rated (dis-)similarity between Norwegian and English/Polish retroflexes and non-retroflexes in 160 diads, on a scale from 1 to 7.

The data from rated (dis-)similarity task were analyzed using a mixed-effects ordinal logistic regression, which confirmed the proposed hierarchy based on matching or non-matching retroflexion and place and manner of articulation in the case of both similarity ratings and reaction times.

Binomial regression model of accuracy scores across groups showed that trilinguals were more accurate than natives and natives were more accurate than naïve bilinguals. Ceiling discrimination of /ʂ/-/s/ was obtained for both groups with L1 Polish, but not for Norwegians. Phonemic vs. allophonic status of retroflexes in Polish surfaced in Norwegian retroflex perception by trilinguals, and for naïve bilinguals the pattern was mirrored in lower accuracy ranges. Low discrimination rates for /ɭ/-/l/ in all groups can be attributed to low frequency of occurrence and the ongoing neutralization (Kristoffersen 2000).

Perceived cross-linguistic similarity has been shown to mediate discrimination also in the case of multilinguals, and additional evidence for retroflexes in Polish and gradiance in perceptual salience have been demonstrated.

**Keywords:** phonological acquisition, speech perception, retroflexes, multilinguals, bilinguals

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