

Beyond Surface Production: Covert Contrast and Cue Re-weighting in the Longitudinal Acquisition of L2 Korean Stops

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Introduction and Theoretical Framework: Acquiring novel phonological contrasts is a primary challenge in second language (L2) acquisition. A classic example of such a challenge is the Korean three-way laryngeal contrast in initial stops. This difficulty arises because the Korean contrast is cued by multiple acoustic cues, principally VOT and the fundamental frequency (f0) of the following vowel [1, 2]. Learners whose L1, such as French, relies on a two-way voicing distinction must not only establish new phonetic categories but also learn to re-weight acoustic cues. Previous research reveals that French learners rely heavily on VOT to identify aspirated stops while using f0 to distinguish lenis from fortis stops in perception [3]. Production studies of English, Mandarin, and Spanish learners show considerable variation, with some successfully producing three categories using both VOT and f0, while others merge categories with varying degrees of overlap [4, 5]. However, most previous production studies merely compared learners' performance to native Korean speakers without examining developmental trajectories. This longitudinal study addresses this gap by tracking the emergence of "covert contrast" [6]. Documented in abundance in L1 acquisition [7], covert contrast suggests that learners may possess underlying phonological knowledge before mastering the phonetic implementation required for native-like production. We interpret our findings through the Second Language Linguistic Perception (L2LP) model [8], which predicts four developmental stages: (1) inability to identify the contrast, (2) reliance on L1 cues, (3) inappropriate use of L2 cues, and (4) native-like cue usage [9].

Methodology: Twenty-one French students in their first year of Korean studies participated in monthly word-reading tasks over eight months, producing stop-initial words containing /t/, /t^h/, and /t^{*}/. To assess the developmental shift in cue usage, Linear Discriminant Analysis (LDA) was employed to calculate the relative weighting of these cues for three contrast pairs: aspirated-fortis, fortis-lenis, and lenis-aspirated.

Results: The longitudinal data revealed systematic phonological restructuring that partially confirms Escudero's developmental stages (see Table 1):

- Initial State (Session 1): Learners exhibited heavy L1 transfer, relying almost exclusively on VOT to distinguish all contrast pairs. This resulted in the merging of Korean categories that require f0 differentiation.
- Intermediate Stage - Covert Contrast (Session 3): An intermediate covert contrast stage emerged as learners began utilizing f0 complementarily with VOT to distinguish the fortis-lenis contrast. While not fully target-like, this statistically significant use of f0 marked a "covert" distinction, demonstrating that learners' interlanguage system had evolved beyond their initial L1-based state.
- Advanced Stage (Session 8): Learners achieved native-like cue weighting for aspirated-fortis (VOT) and fortis-lenis pairs (VOT & f0). However, the lenis-aspirated contrast remained non-native-like; learners continued relying predominantly on VOT, whereas native Korean speakers weigh f0 more heavily for this specific pair.

Conclusion: These findings make three contributions. First, they provide robust instrumental evidence for covert contrast as a systematic stage in L2 phonological development, extending L1 acquisition findings into the L2 domain. Second, they demonstrate that acquiring complex contrasts is a gradual, multi-stage process involving progressive integration and re-weighting of multiple cues, rather than a direct jump from incorrect to correct production. Finally, this study highlights the necessity of instrumental analysis for revealing the hidden

structure of interlanguage phonology, capturing emergent contrasts that remain invisible to impressionistic transcription.

Table 1. LDA coefficients for VOT and f0 for each contrast pair across session for French-speaking learners of L2 Korean (the most reliable cue is indicated in bold).

Session	Aspirated vs Fortis		Fortis vs Lenis		Lenis vs Aspirated	
	VOT	f0	VOT	f0	VOT	f0
Session 1	1.54	0.25	0.81	0.00	1.23	0.57
Session 3	1.37	0.30	0.38	1.14	0.89	0.61
Session 6	1.15	0.06	0.57	0.87	1.00	0.34
Session 8	1.31	0.44	0.71	0.98	1.01	0.34

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