

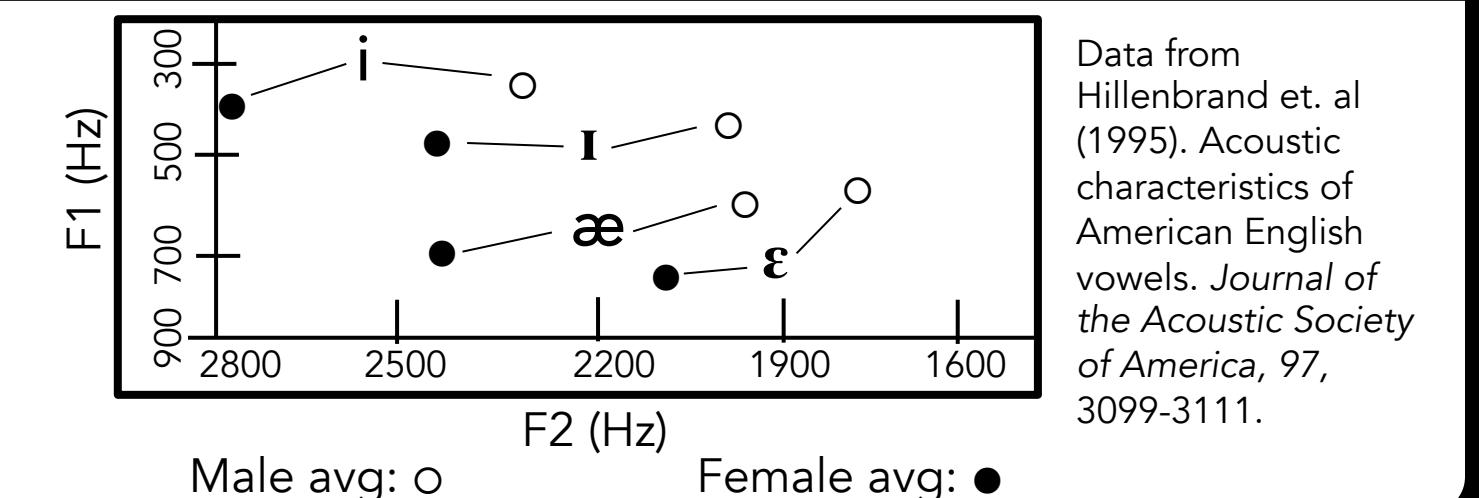
Production and Perception of English Vowels by Second Language Learners

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Introduction

Acoustic Correlates: Phonetic measurements that change in a speaker's production to distinguish phonemes from each other. Vowel duration and formant frequencies were examined in this study.

Formant Frequencies: Acoustic data which describes height (F1) and backness (F2) of vowel sounds. Average F1 and F2 values for (native) English vowels /i/, /ɪ/, /ɛ/, /æ/ are shown to the right.



Purpose

Production-Perception: Although many language learning models theorize a positive relationship between an L2 learner's production and perception abilities, the details of the relationship are not clear.

Purpose: This study aims to understand the relationship between the production and perception abilities of L2 learners by examining **acoustic correlates** of vowel contrasts. That is, can acoustic correlates more accurately describe the relationship compared to traditional methods?

Hypothesis: The L2 learners who employ the same acoustic correlates (**duration, F1, F2**) of the target vowels as native speakers will perceive the vowels more accurately compared to the L2 learners who implement the vowels with non-native-like cues.

Methods – Production & Perception

Contrasting Vowel Pairs: /i/ - /ɪ/ /ɛ/ - /æ/
(beat – bit) (bet – bat)

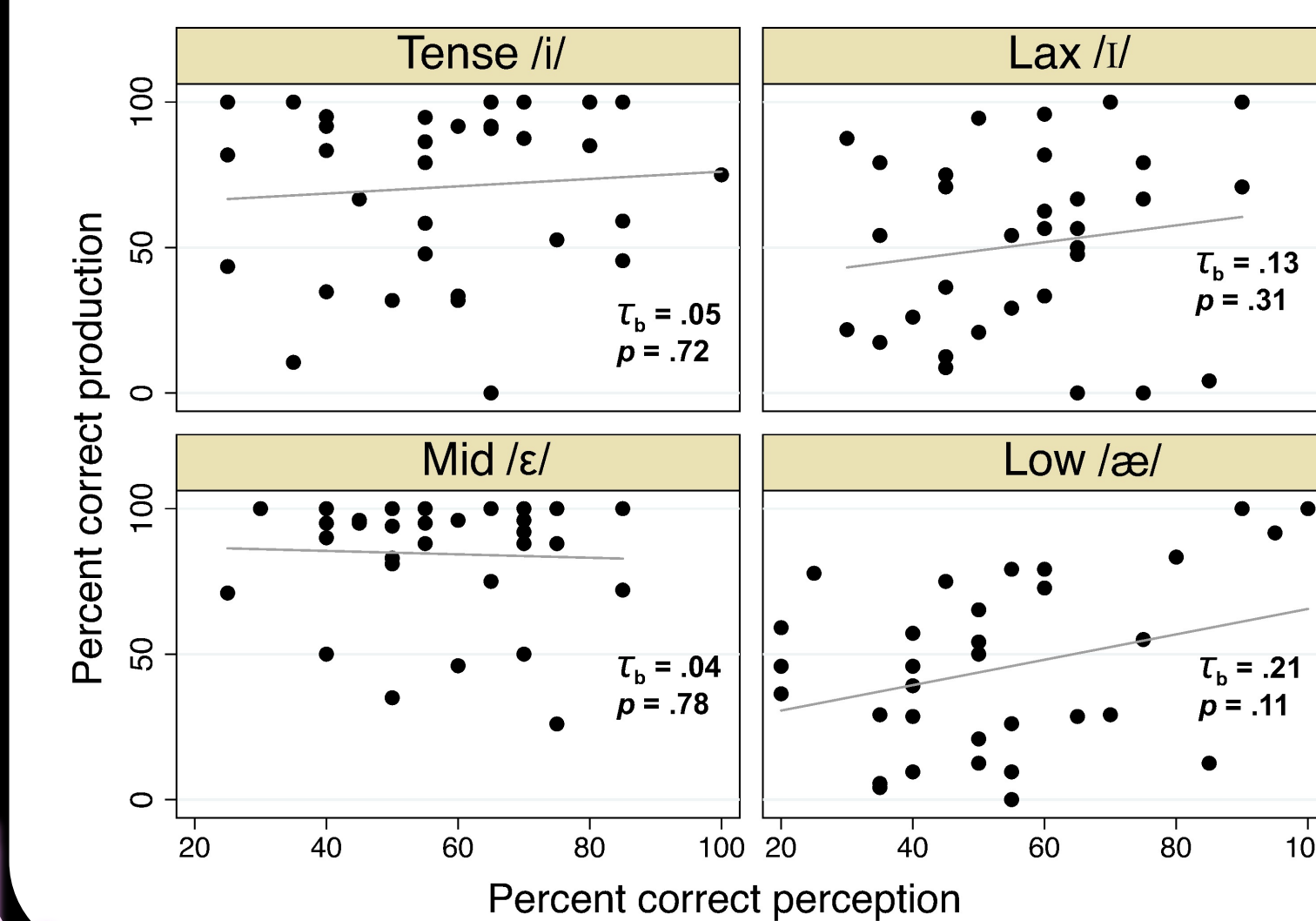
Participants: 29 native American English speakers as controls; 33 L2 learners with length of residence (LOR) in the U.S. between 1-12 months. L2 learners were native speakers of Korean (15), Portuguese (13), or Spanish (5). None of the three languages are known to have a **phonemic contrast** between the vowels in each pair.

Perception Task: Participants identified minimal word pairs spoken by a native speaker within a non-contextual carrier phrase.

Production Task: Participants read CVC words shown one at a time. Tokens were recorded for analysis.

Results – Analysis 1

Traditional method using native speaker judgment and a **global measure** for assessing **percent correct** per speaker per task. Tokens were “correct” if they matched the intended vowel sound.



Results – Analysis 2

Novel method for the analysis of production data using acoustic measures (**duration, F1, F2**). **Native-like** and non-native-like patterns of acoustic correlate implementation were the target of this analysis.

Native English Speakers

Number of participants exhibiting each pattern is shown in parentheses.

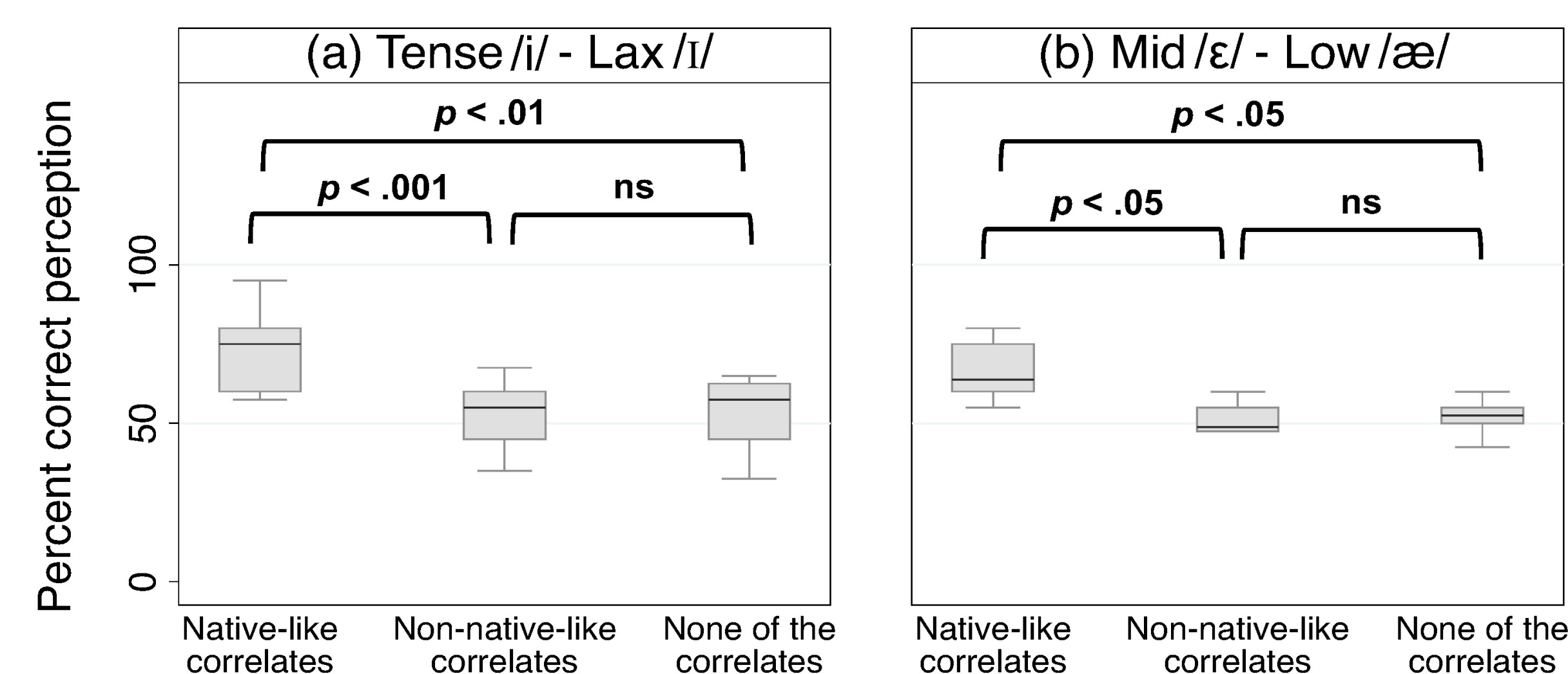
	/i/-/ɪ/			/ɛ/-/æ/		
	Duration, F1, F2 (26)	F1, F2 (3)		Duration, F1 (11)	Duration, F1, F2 (8)	Duration, F2 (7)
				Duration, F2 (2)		F1, F2 (1)

Acoustic Correlates from L2 Learners

Count of Korean (K), Portuguese (P), and Spanish (S) speakers grouped by their implementation of acoustic correlates.

	/i/-/ɪ/			/ɛ/-/æ/		
	K	P	S	K	P	S
Native-like	2	3	2	Native-like	0	1
Non native-like	7	5	3	Non native-like	3	1
None	6	5	0	None	12	11

Results – Analysis 2



Discussion & Conclusion

Results confirmed the hypothesis: While the first analysis using traditional methodology indicated no significant production-perception relationship, the novel approach showed a **significant relationship** characterized by native-likeness in acoustic correlates.

Considerations: Because of the variety of acoustic correlates emerging from native speakers, future studies may consider specifications to reduce dialectal variation in the controls.

Conclusion: Results show that L2 learners employing native-like acoustic correlates may show better perception aptitude when an appropriate measure is employed. The L2 production-perception relationship should continue to be studied with this in mind.