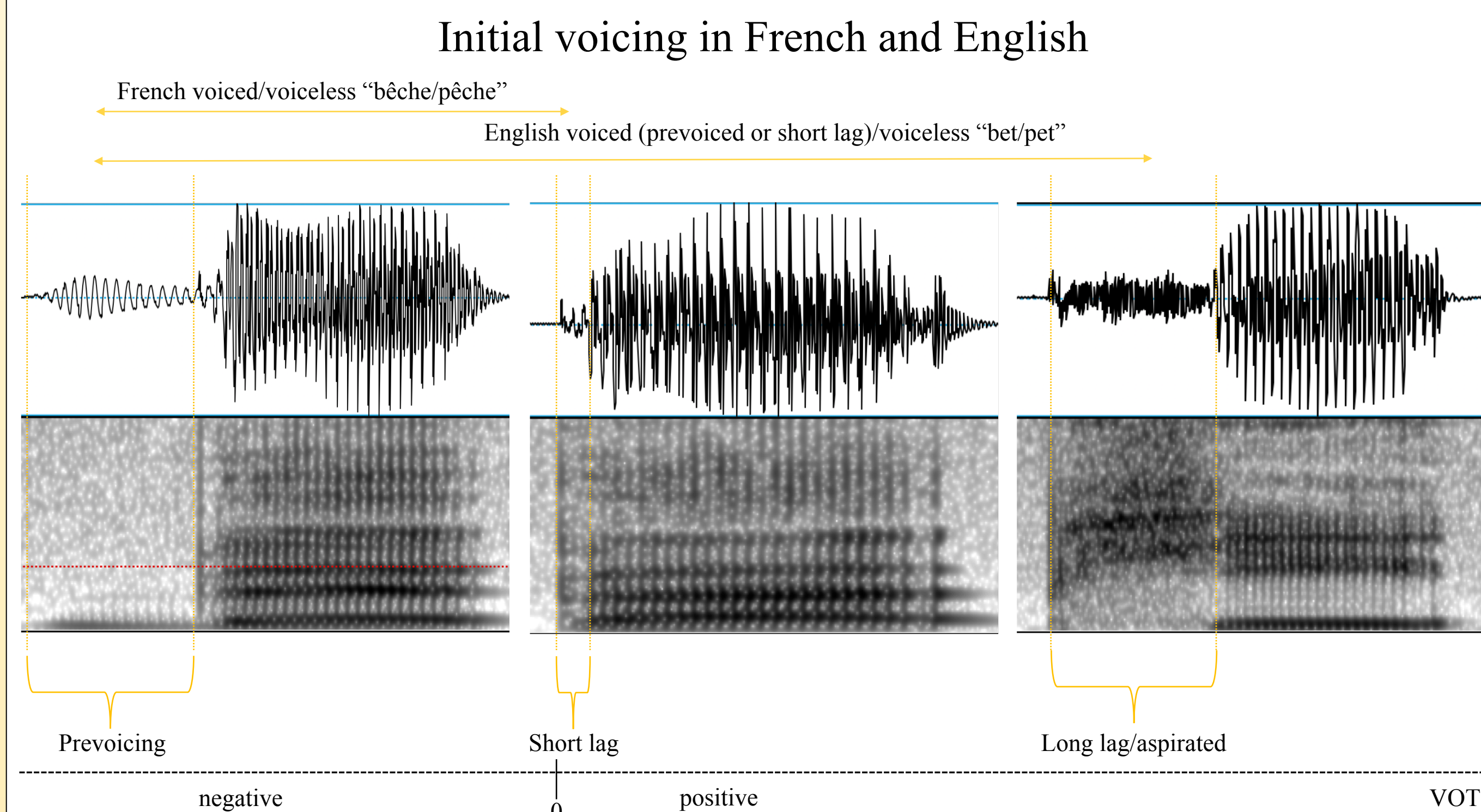


Voice Onset Time and onset f0 as correlates of voicing in American learners of French

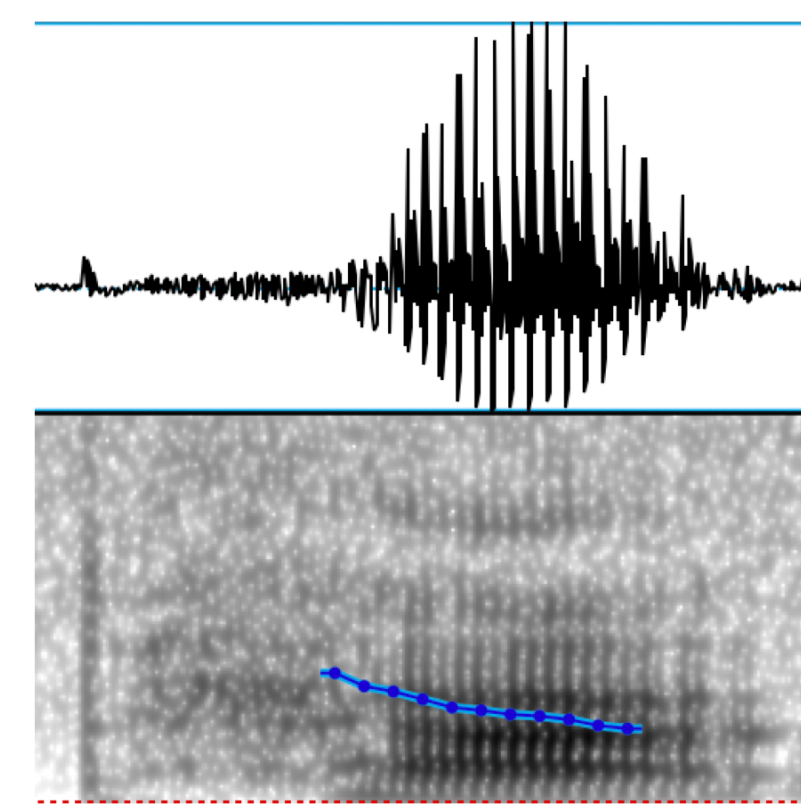
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Purdue University

175th Meeting of the Acoustical Society of America

BACKGROUND



Onset f0- fundamental frequency (f0) at the onset of the vowel following a stop consonant



	[+voice]	[-voice]
English	Short lag/prevoiced	Long lag
French	Prevoiced	Short lag
	Lower f0	Higher f0

- VOT and onset f0 both contribute to the production and perception of voicing (House & Fairbanks, 1953; Abramson & Lisker, 1965)
- Languages use acoustic cues differently to express phonological voicing, so an L2 learner must acquire a novel use of these cues
- Chang (2013) suggests that beginner learners might experience back transfer (L2->L1) in a complete immersion environment

METHODS

Participants:

- Learners
- 23 native speakers of Mid-Western English learning French at Purdue University
 - 201 Level French (3rd semester) or above
- Control (Shultz, 2011)
- 33 monolingual native speakers of Mid-Western English

Task:

- Words on screen
- Three randomized blocks
- Presentation: 2 seconds
- ISI 0.5 seconds

Measurements:

- VOT (initial stops)
- Onset f0 (measured at the beginning of the vowel)

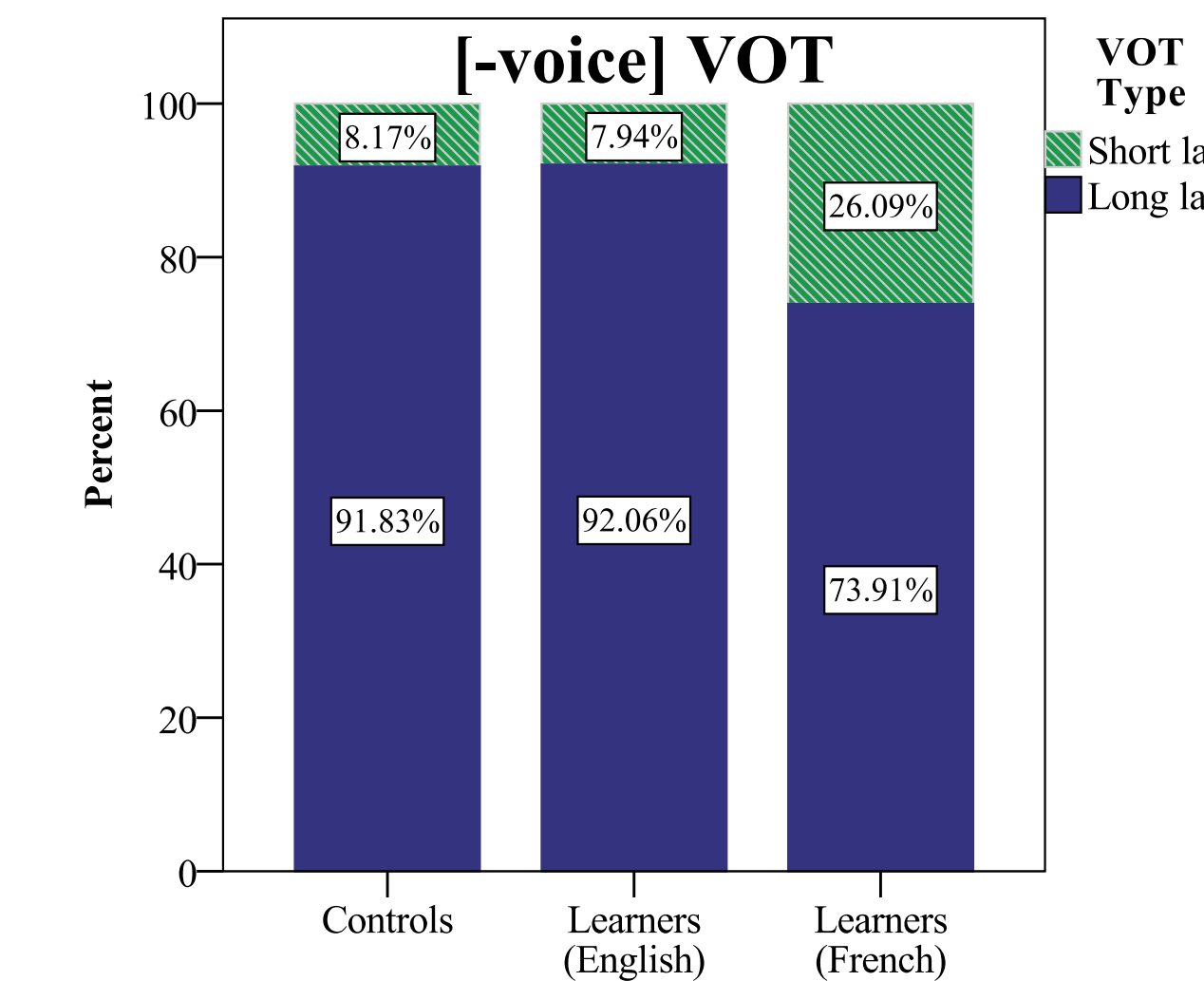
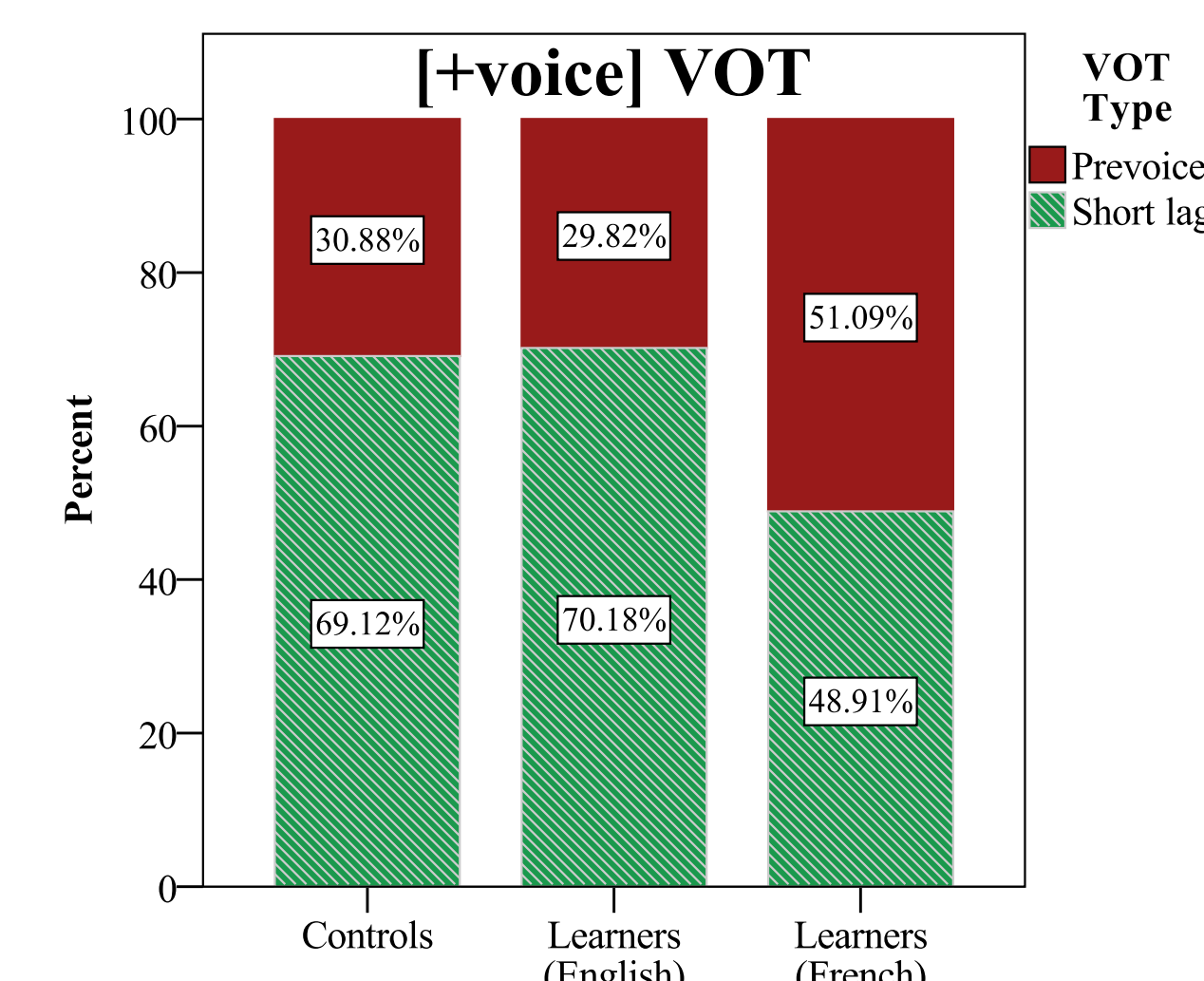
Stimuli:

- Four French, voiced/voiceless, bilabial stop minimal pairs with vowels /i/, /e/ and /a/ (bêche/pêche)
- Four English, voiced/voiceless, bilabial stop minimal pairs with vowels /i/ /ɪ/, /e/ and /a/ (bet/pet)
- Eight distractor minimal pairs were also displayed

MOTIVATIONS

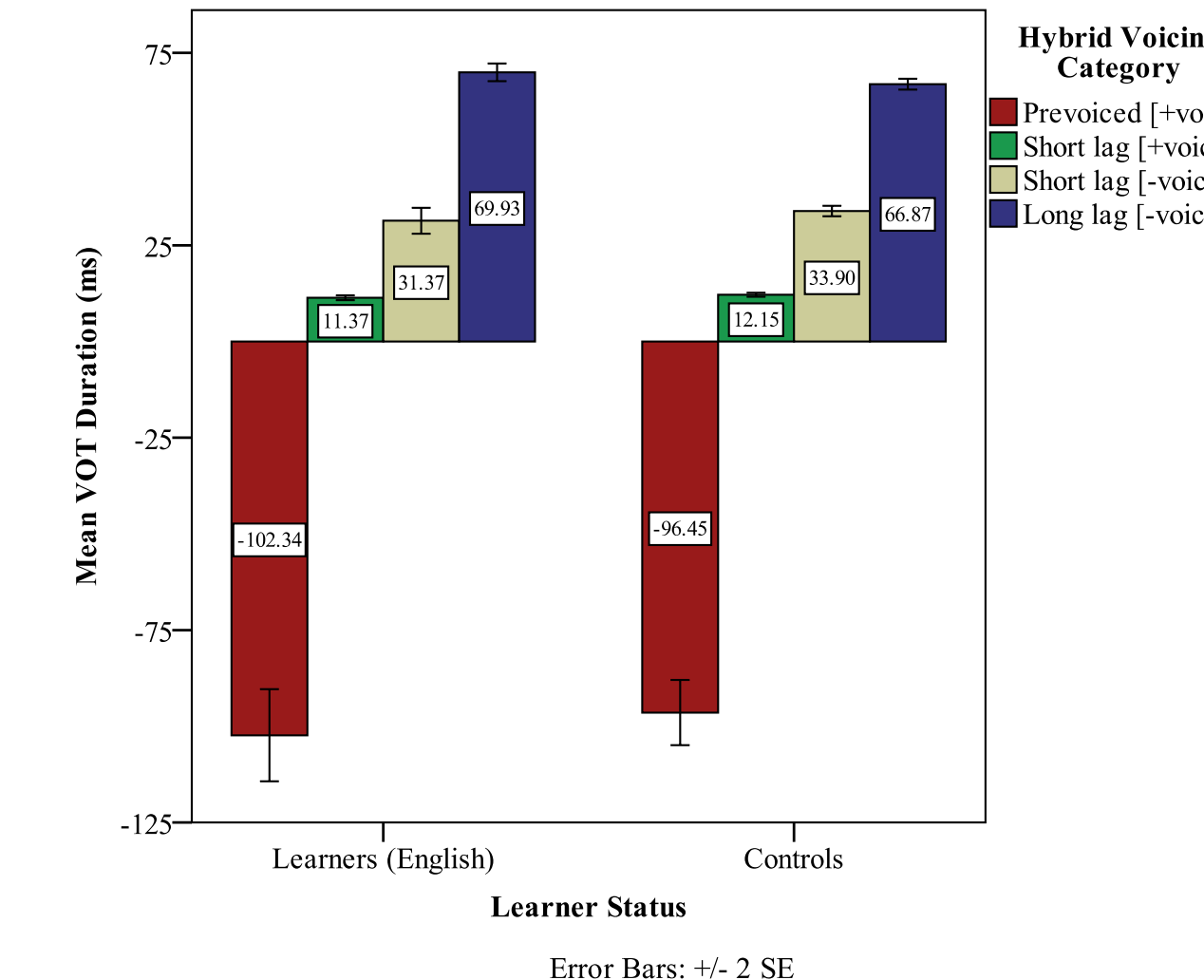
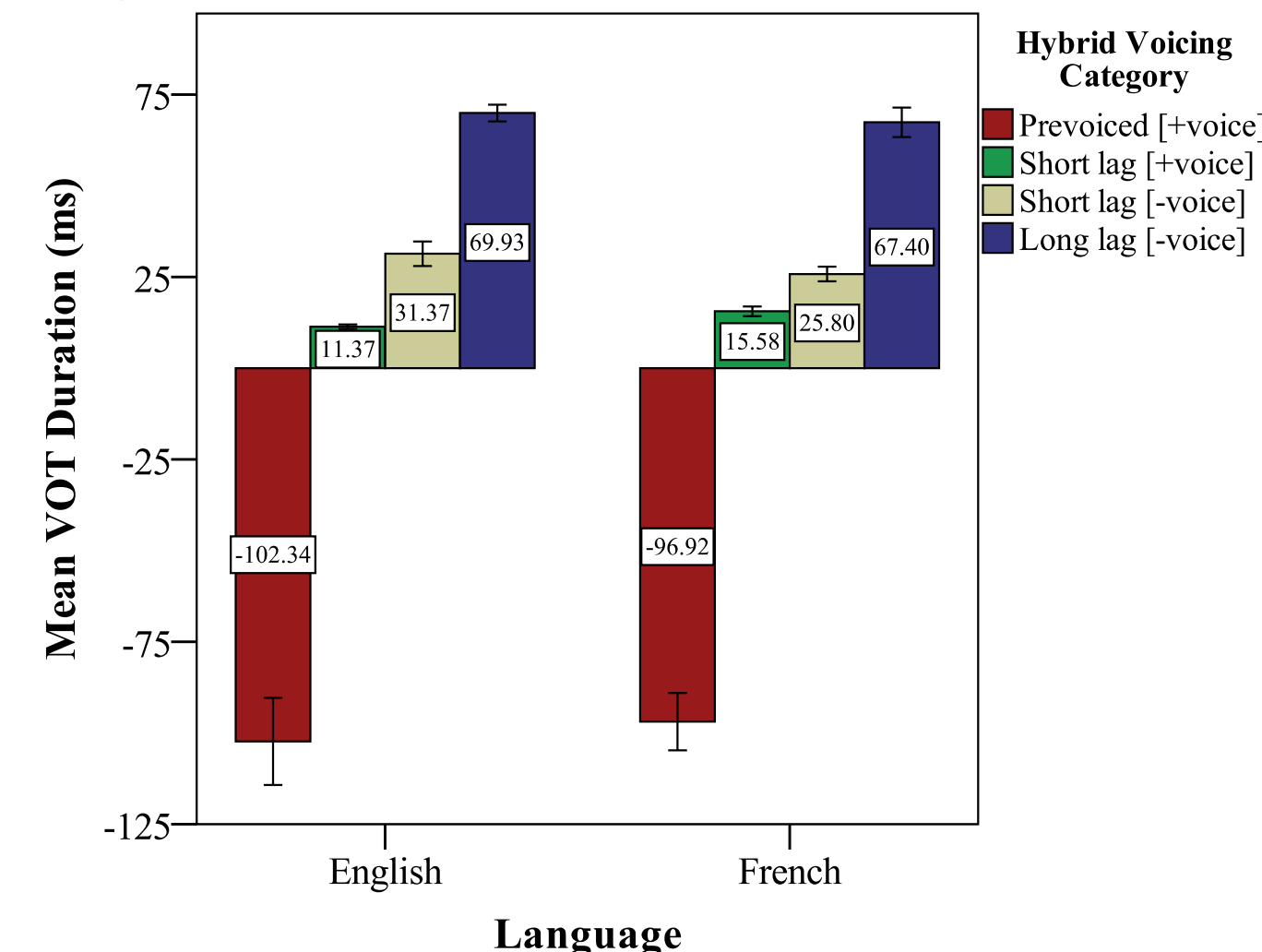
- Although the primary cue, VOT, has been studied quite extensively in L2 speech (Flege & Eefting, 1988; Flege 1991; Birdsong et al. 2007), there is a gap in the literature regarding secondary cues like onset f0
- Since onset f0 has been shown to aid in distinction between [+voice] and [-voice], an understanding of these cues in L2 acquisition is important

VOT RESULTS



- Learners (English) and Controls are using the same percentage of VOT types
- Learners (French) are using more prevoicing than in English but are not exclusively using target-like VOT

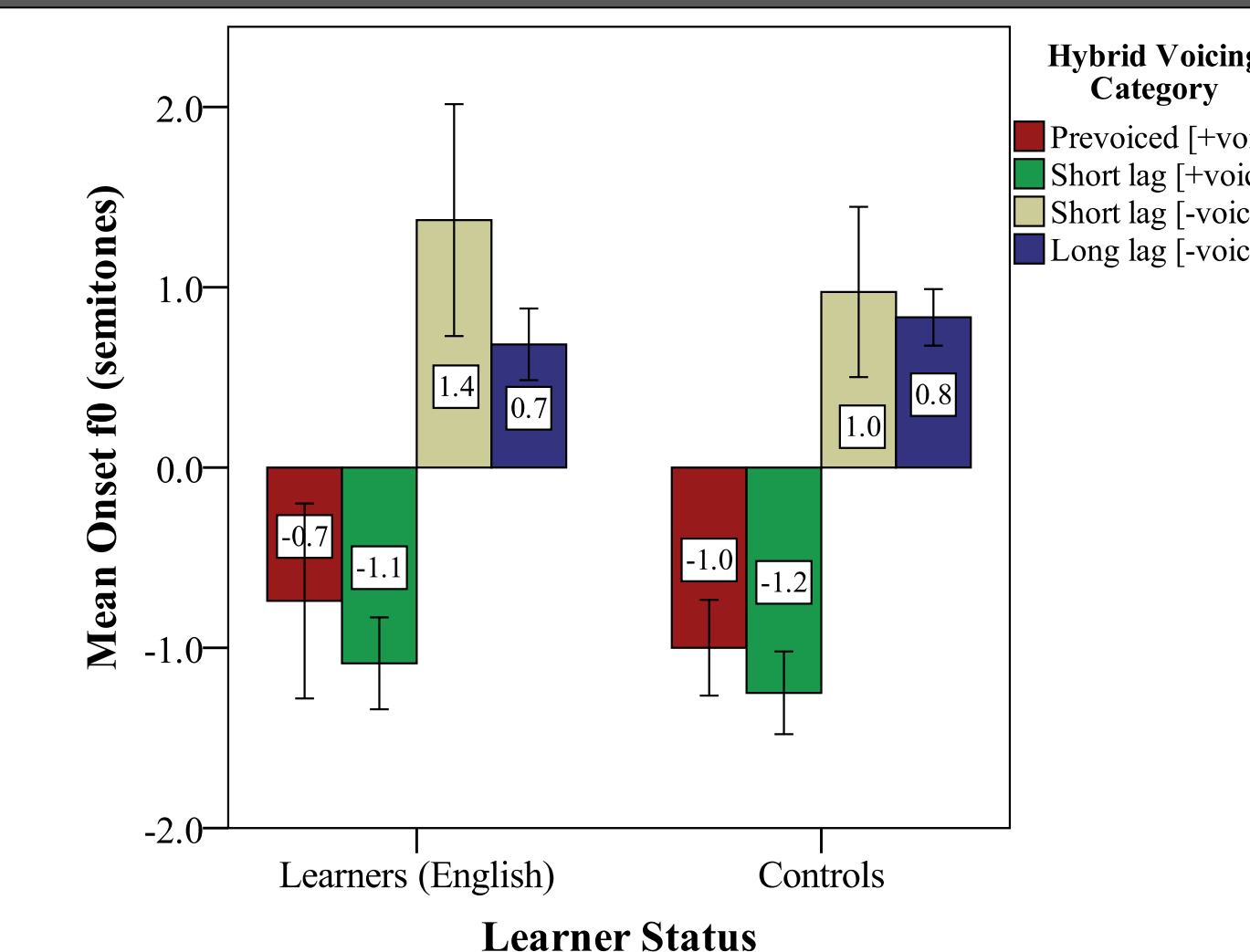
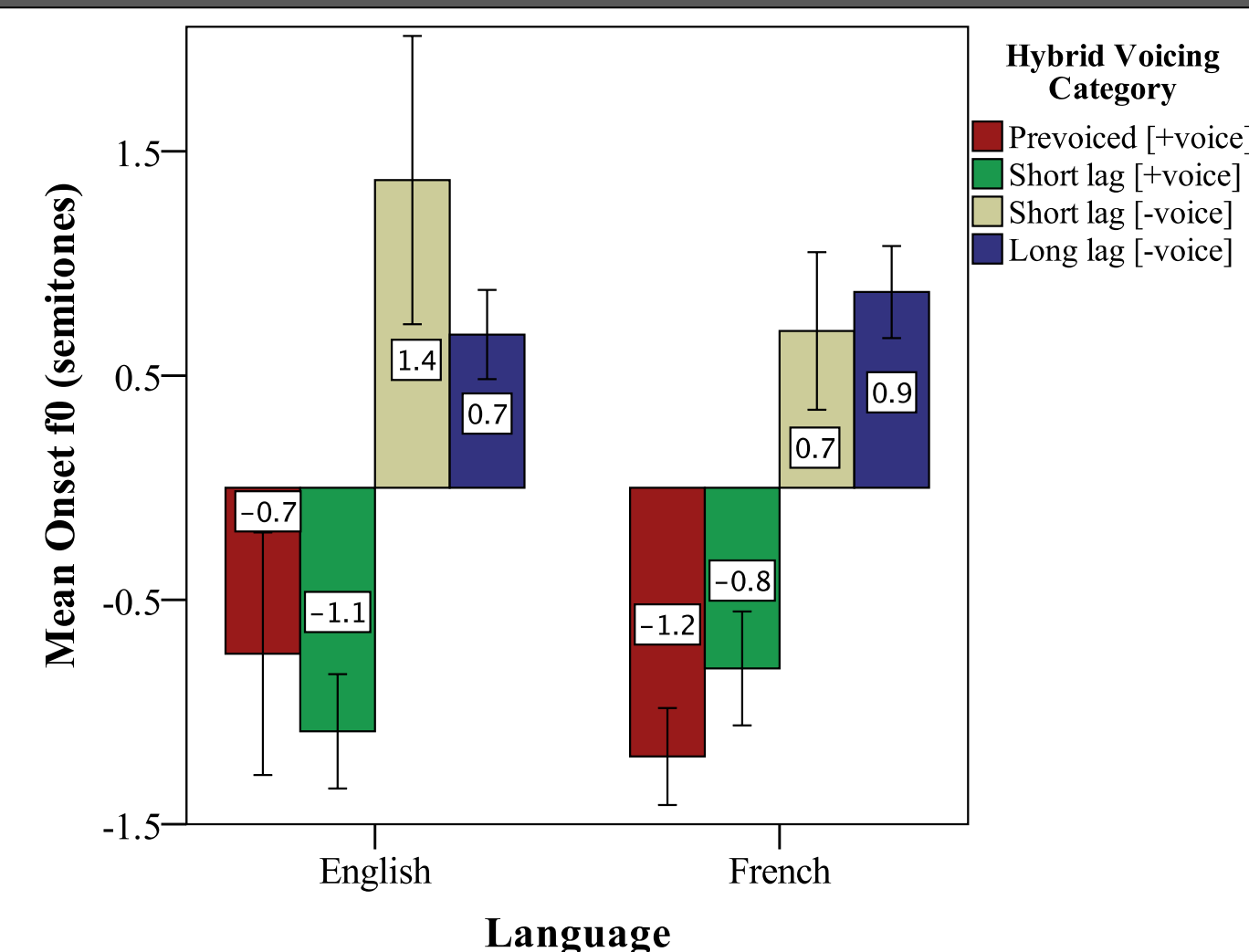
- Learners (English) and Controls are using the same percentage of VOT types
- Learners (French) are using more short lag but are not exclusively using target-like VOT



- Main effect of Hybrid voicing (p < 0.001)
- Interaction between Language and Hybrid voicing (p=0.05)
- [+voice] short lags were produced with different VOT across languages (p<0.001)

- Main effect of Hybrid voicing (p < 0.001)
- Interaction between Language and Hybrid voicing (p<0.05)
- [-voice] long lags were produced with different VOT across languages (p<0.05)

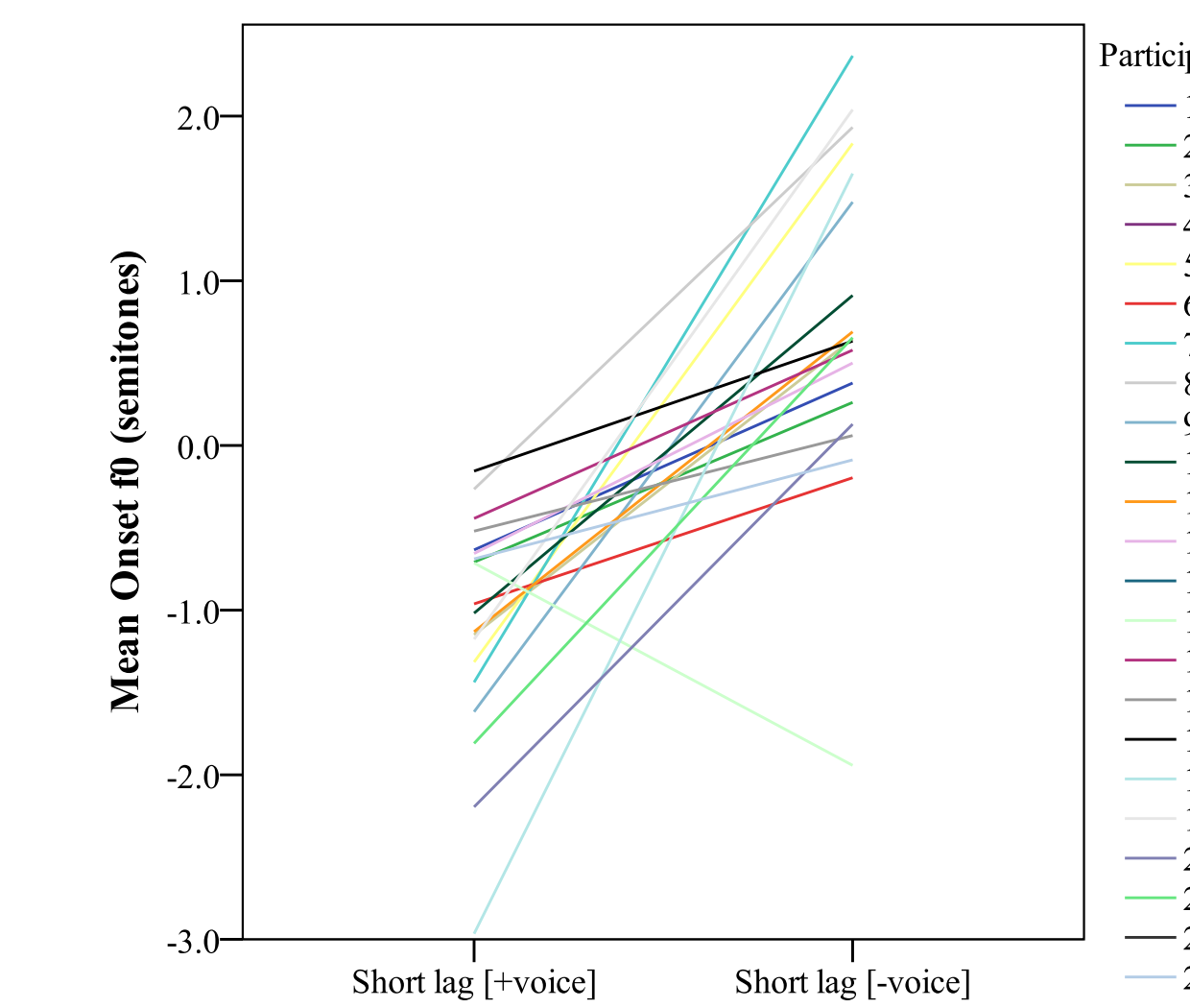
ONSET F0 RESULTS



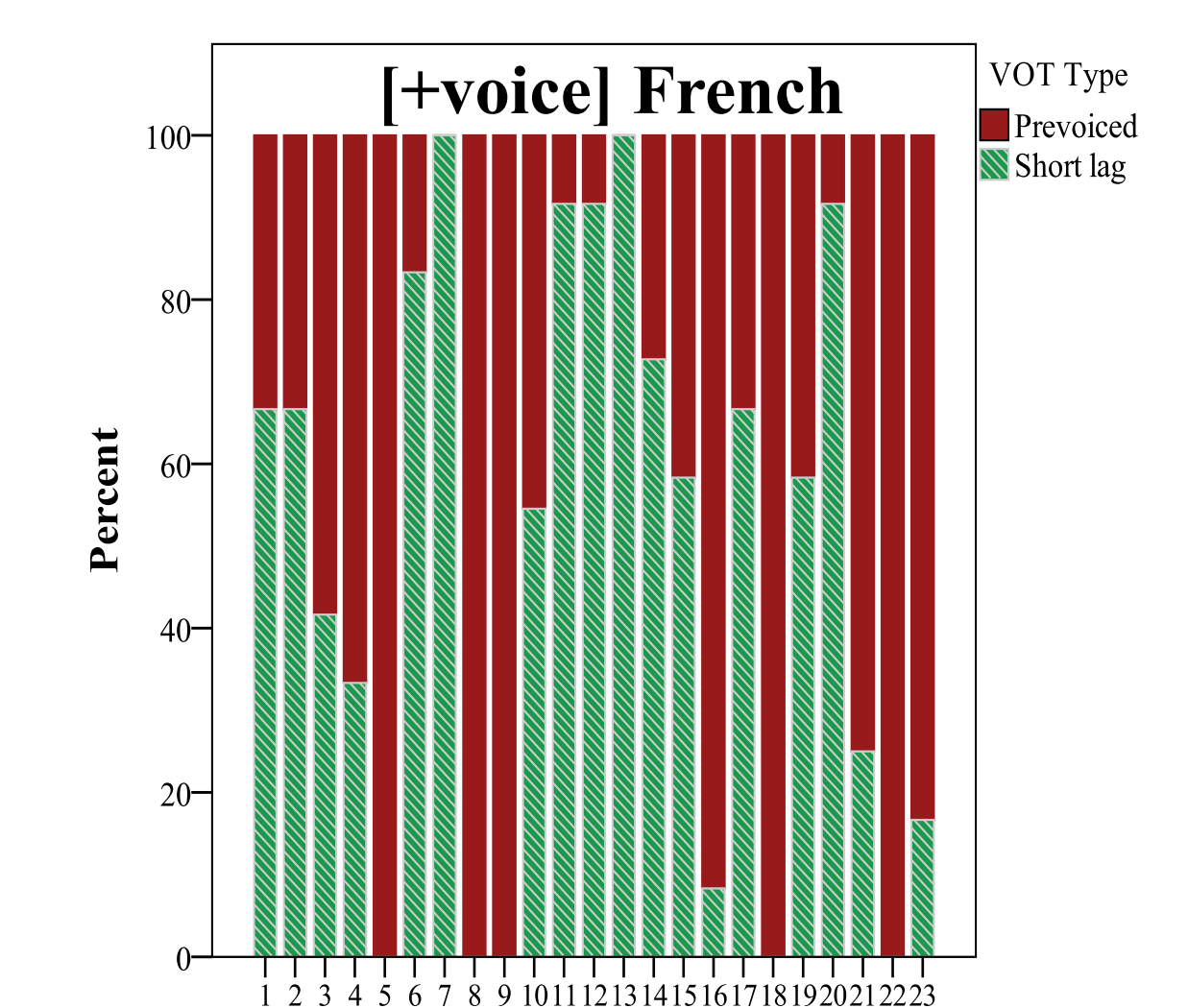
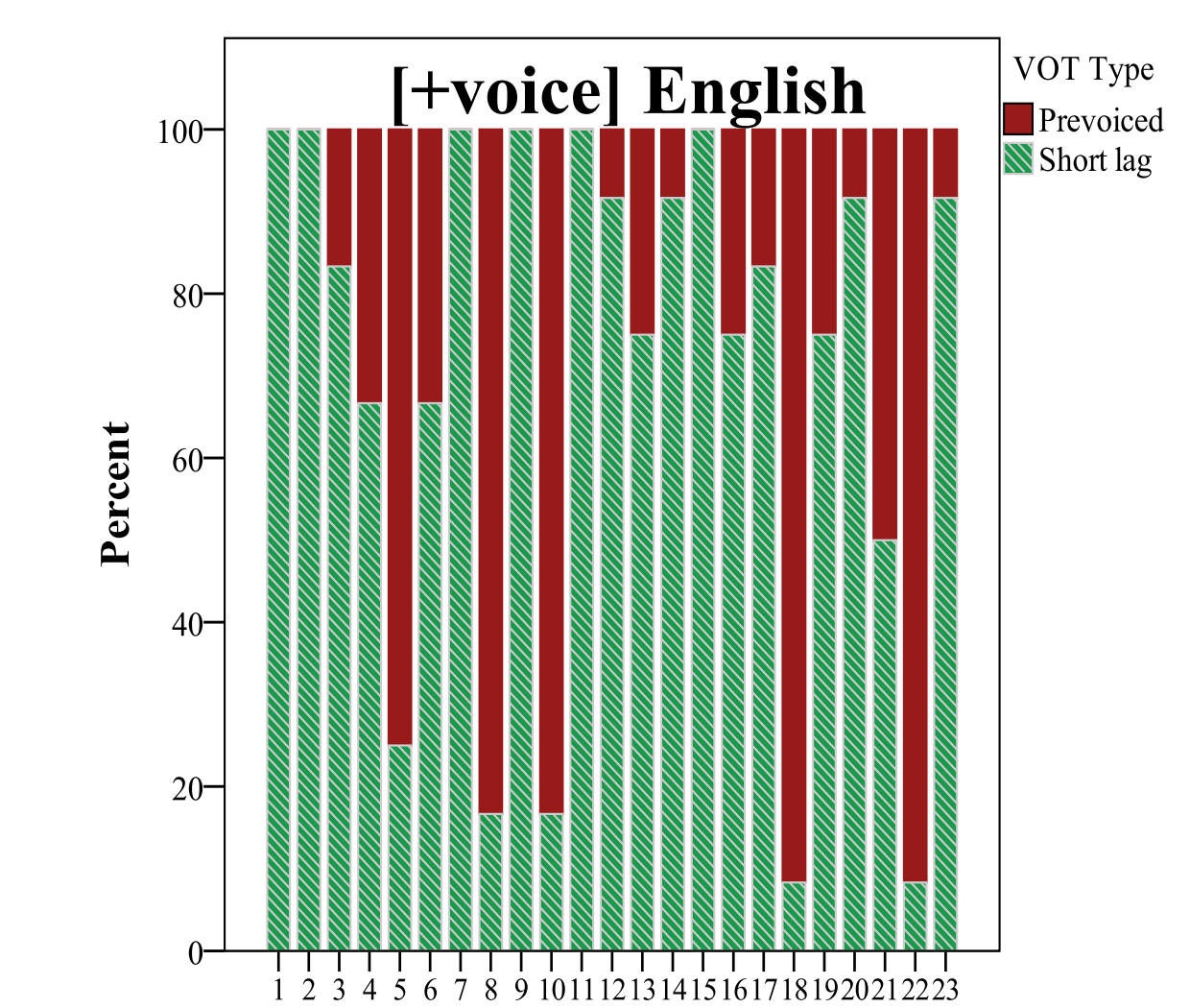
- Main effect of Hybrid voicing (p < 0.001)
- Marginal interaction between Language and Hybrid voicing (p=0.051)
- Phonological division was significant

- Main effect of Hybrid voicing (p < 0.001)
- No significant interactions found

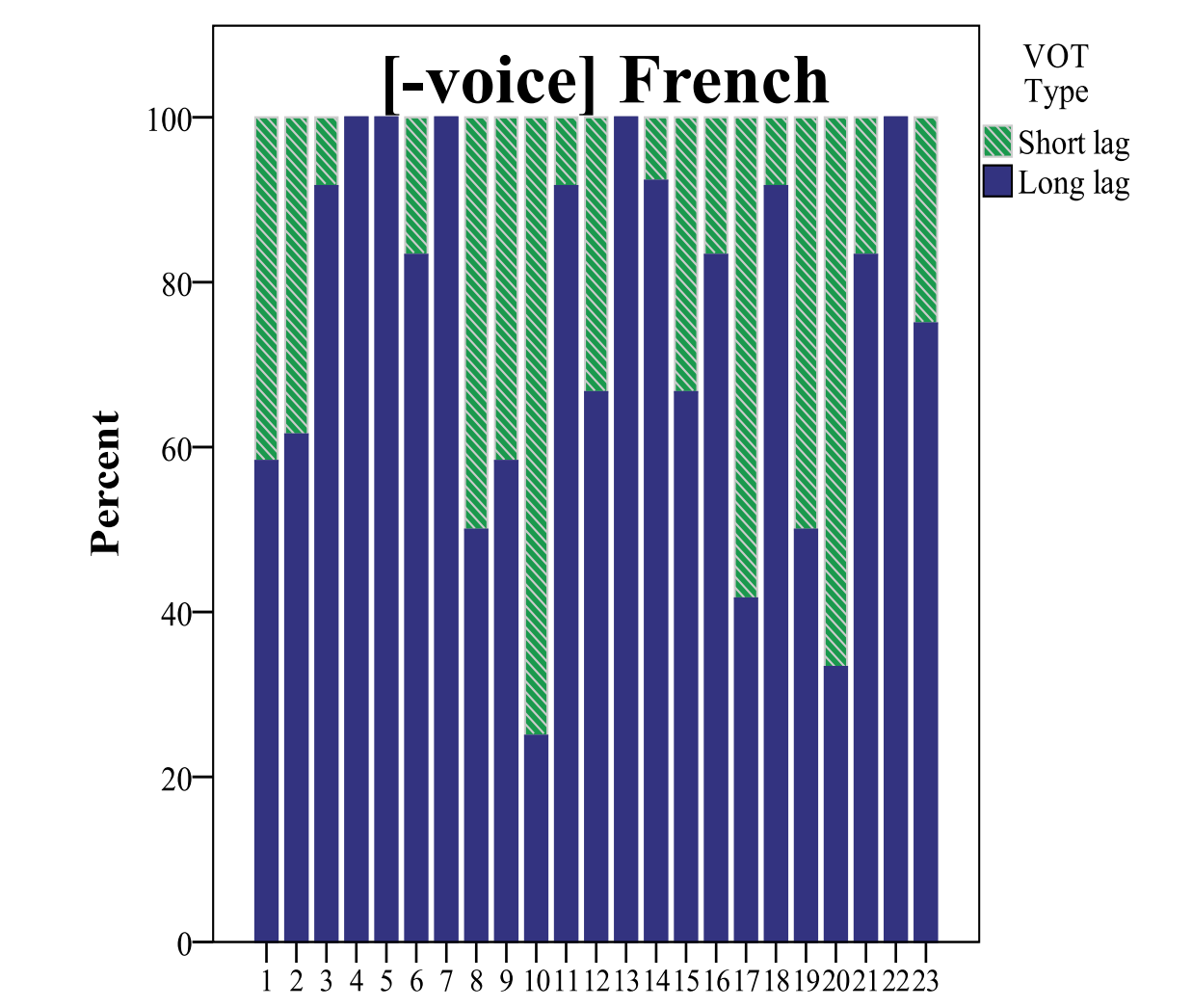
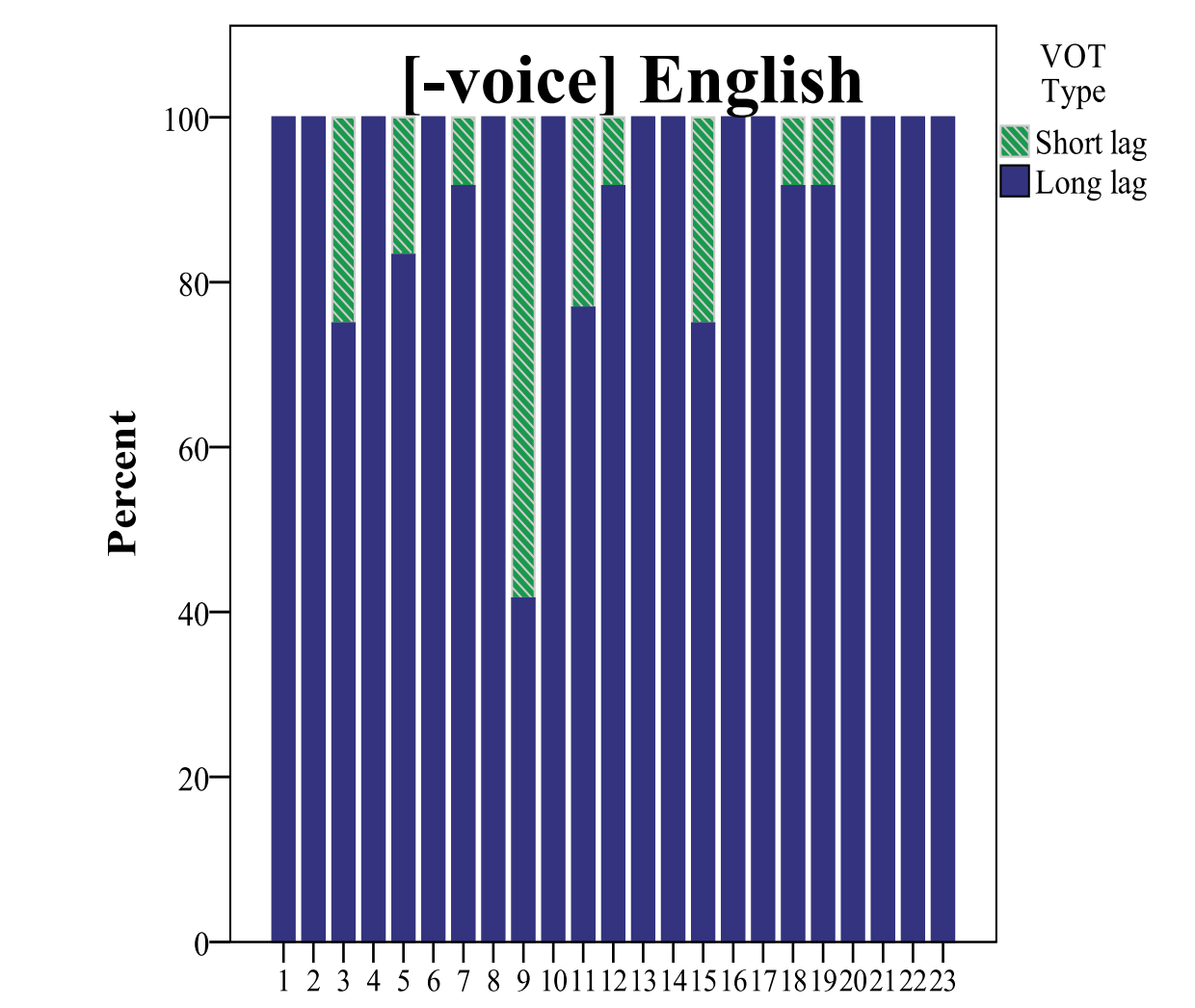
INDIVIDUAL TRENDS



- Each learner varies in their onset f0 production
- While some appear to be making very large changes from [+voice] to [-voice], others appear to make much more minor changes



- 16 learners (69.57%) produced more prevoicing in French, four (17.39%) produced less prevoicing, and three (13.04%) produced approximately the same amount of prevoicing
- Five learners completely prevoiced in their [+voice] French productions



- 14 learners (60.87%) produce more short lag in French, two (8.70%) produce fewer short lag, and seven (30.43%) produce approximately the same number of short lag
- No learner manages to produce only the target, short lag, in their French stops
- There is no correlation between success in [+voice] with success in [-voice]

DISCUSSION

- Despite French VOT duration being heavily influenced by English, onset f0 production in French was distributed as expected: lower onset f0 in [+voice] and higher onset f0 in [-voice]
- Learners were able to maintain the correct distribution of f0 values independently of VOT realization
- Individual results suggest the [-voice] VOT category in French was produced in a less target-like manner than the [+voice] VOT category
- No evidence of phonetic drift was found in these data, but there was evidence of a divergence effect in [-voice] long lag stops