

German stress cues in French and Spanish speech segmentation

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We investigated whether first language (L1) prosodic experience shapes how adults segment an unfamiliar language when lexical stress conflicts with statistical cues. Spanish and French differ in the status of word stress: Spanish has lexically contrastive, predominantly trochaic stress, whereas French lacks lexical stress and relies on phrase final prominence [1, 2]. We tested whether these differences affect how listeners resolve conflicts between German-like lexical stress and transitional probabilities (TPs) in an artificial language.

Thirty native speakers of Spanish and 29 native speakers of French listened to a 3-min continuous speech stream in an artificial language built from eight CV syllables combined into eight overlapping bisyllabic “words.” In the stream, bisyllabic trochaic words (stress initial, TP = 0.33) systematically straddled bisyllabic statistical words (stress-final, TPs = 1.0), creating a conflict between stress-based (trochaic) and statistics-based segmentations. The stream was recorded by a native German speaker. In a subsequent test phase, participants heard isolated items from three conditions (trochaic words, statistical words, and nonwords that never occurred in the familiarization stream) presented in random order while their pupil responses were recorded as an index for familiarity [3] and then indicated for each item whether they recognized it from the familiarization phase.

Behaviorally, both groups showed higher word acceptance rates for trochaic than for nonwords ($p < .001$) and statistical items ($p < .001$), with no main effect of L1 or L1-by-condition interaction ($ps > .05$). Cluster based permutation analyses of baseline-corrected pupil size change, however, showed larger dilations for trochaic than for statistical items and nonwords across the trial window ($ps < .001$), and these effects interacted with L1: Spanish listeners exhibited markedly greater pupil responses to trochaic items relative to statistical items and nonwords than did French listeners.

Together, the results indicate that when lexical stress and TPs conflict in foreign speech, adult listeners from both L1 backgrounds predominantly rely on stress-based segmentation at the overt decision level, while their underlying processing dynamics differ in ways that are consistent with their native prosodic systems. Cross linguistic influence in foreign language segmentation thus emerges not only in behavioural preferences, but also in implicit processing, and appears to be shaped by the status of lexical stress in the L1.

References

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Figures and Tables

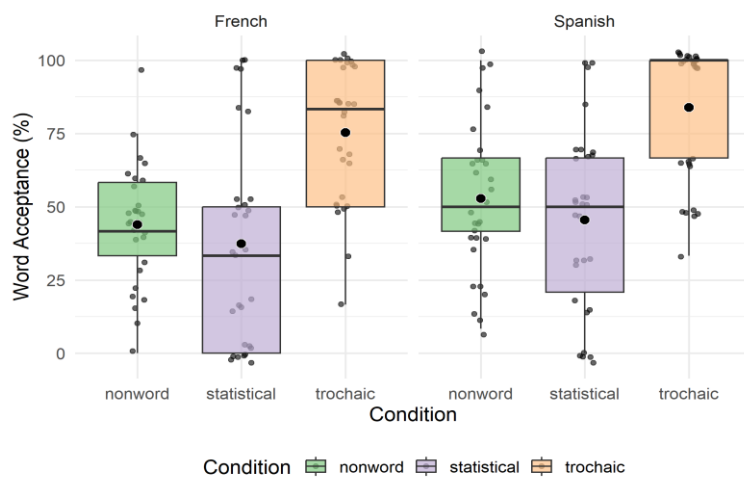


Figure 1: Word acceptance rates (%).

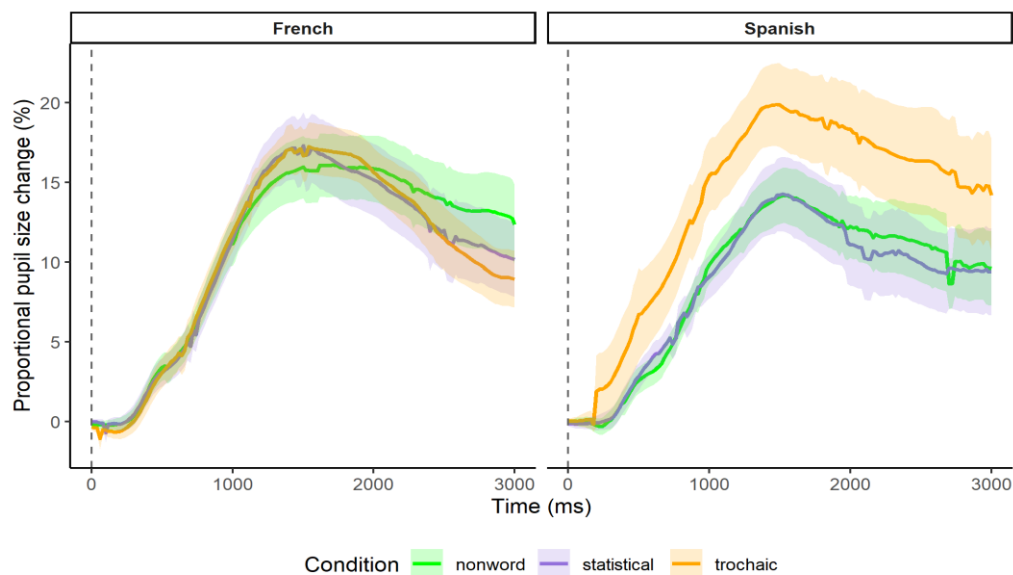


Figure 2: Mean proportional pupil size change (%) over time.