The effect of linguistic experience on the role of prosodic cues in categorizing Singlish

Yin Lin Tan[1,2], Ting Lin[1], and Meghan Sumner[1]

[1]Department of Linguistics, Stanford University (USA), [2]Department of English, Linguistics, and Theater Studies, National University of Singapore (Singapore)

Studies have shown that linguistic experience affects dialect recognition [1], but its effect on the role of prosody in recognizing dialects is understudied. The present study thus investigates the prosodic cues used to categorize speech as Singlish, a colloquial variety of English used in Singapore, and how experience with Singlish affects these categorizations. We argue that linguistic experience allows listeners to make finer-grained categorizations of Singlish by leveraging more prosodic cues, but common social meanings still allow those without experience to make systematic, though coarser-grained, categorizations.

Experiment 1 utilized a speeded forced-choice task comprising six blocks of 20 trials each. The stimuli were 40 natural-speech audio clips from ten Singaporean talkers. In each trial, Singaporean listeners ('SG', n=132) heard two random clips and selected which clip sounded "More Singlish" in 2 seconds. Each clip was one intonation phrase, 1.4-2.6 seconds long, syntactically and lexically similar to standard English, and controlled for semantic content. A follow-up questionnaire collected information about listeners' sociolinguistic backgrounds and language attitudes. Experiment 2 was identical to Experiment 1 but recruited American listeners ('AM', n=137) with no Singlish experience and no in-person interactions with Singaporeans. They were told that Singlish is a type of English spoken in Singapore with friends; this allows us to interpret categorizations as being minimally made based on formality, since Singlish is associated with the social meaning of casualness [2].

Results showed that the proportion of "More Singlish" responses varied smoothly for both groups, but SG made finer-grained categorizations (Fig 1; Fig 2). A by-group Singlish score (predicted probability of "More Singlish" response) was generated for each clip using Markov chains; we then ran a linear mixed-effects regression model with log-transformed reaction time (RT) as dependent variable, fixed effect of Singlish score, random intercepts of clip and speaker, and by-participant random slope for Singlish score. Both groups were faster to categorize clips with higher Singlish scores as "More Singlish" (SG: β=-4.58, p=.005, Fig 3; AM: β =-4.24, p=.025, Fig 4), demonstrating typicality effects found in categorization [3], but SG (M=5.87, SD=0.95) were overall faster than AM (M=6.14, SD=0.73); t(26218)=-26.7, p<.001.

Based on listeners' questionnaire responses, four acoustic measures were identified: articulation rate (syllables per second), pitch variance (SD of each vowel's mean semitone), pitch Pairwise Variability Index (PVI; comparisons of adjacent vowels' maximum semitones), and durational PVI (comparisons of adjacent vowels' durations). For each group, we ran a logistic mixed-effects regression model with participant response as the dependent variable, the four measures and their relevant interactions as fixed effects, and random intercepts of clip, speaker, and participant. Pitch variance (β=-0.20, p=.023), pitch PVI (β=0.19, p=.037), and articulation rate (β=0.21, p=.043) were significant for SG, but only articulation rate (β=0.18, p=.021) was significant for AM. The findings demonstrate that SG associated Singlish with faster articulation rate, more local pitch variability, and less global pitch variability, but AM associated Singlish only with faster articulation rate.

This study shows that categorizations of Singlish were gradient and associated with typicality, but finer-grained for listeners with linguistic experience and coarser-grained for those without. The former were also faster at categorizing and leveraged more prosodic cues. Local and global pitch variability were associated with Singlish for SG, but articulation rate was relevant for both SG and AM, which points to the correlation between casualness and speaking rate [4]. Furthermore, the feature of local pitch variability aligns with the notion of the Accentual Phrase in Singapore English, which is marked with aL and Ha [5]. This study demonstrates that while listeners without experience can leverage prosody when categorizing a dialect, only those with experience can draw on prosodic cues across multiple localities (i.e., more local but less global pitch variability), thus underscoring the role of prosody in dialect recognition and highlighting the interaction between linguistic experience and prosody.
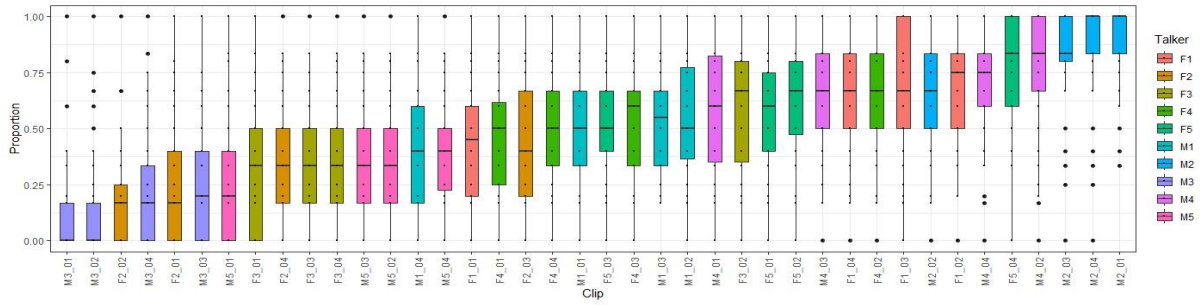
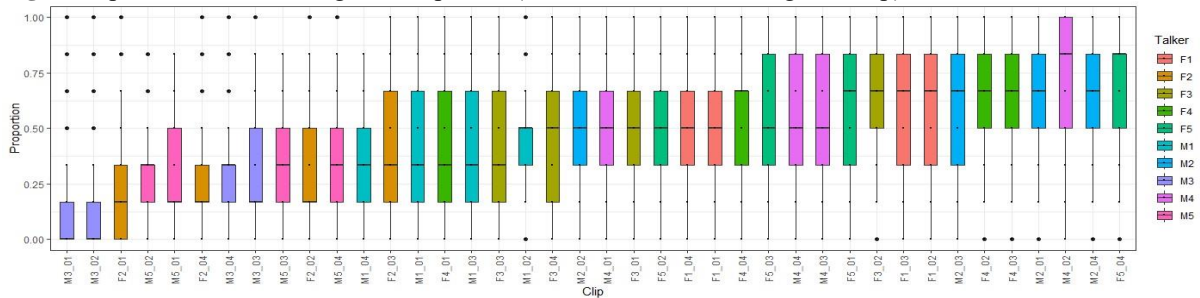**Fig 1.** Proportion of "More Singlish" responses (chosen as the "More Singlish" clip) for SG.

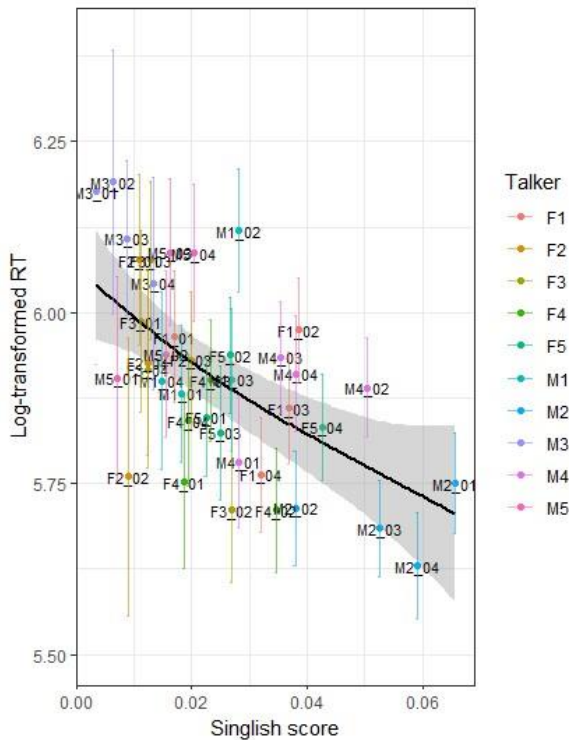**Fig 2.** Proportion of "More Singlish" responses for AM.

Fig 3. Effect of Singlish score on RT for "More Singlish" responses for SG.
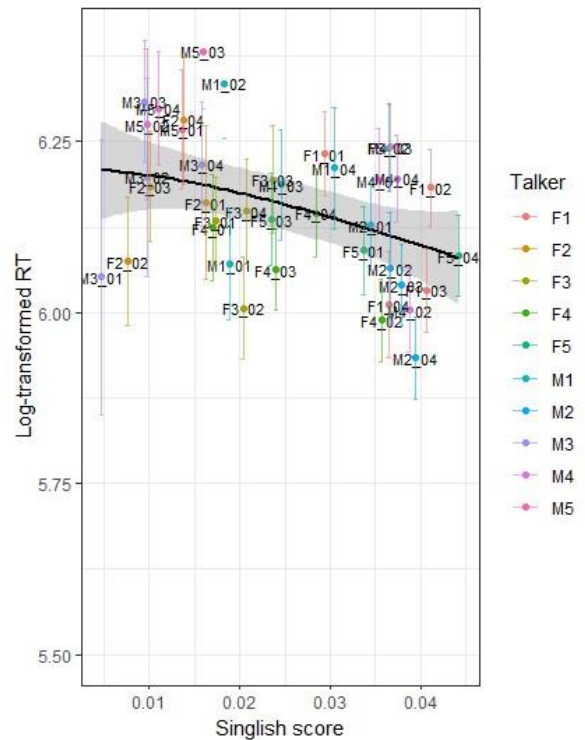

Fig 4. Effect of Singlish score on RT for "More Singlish" responses for AM.

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