Learning words with lexical tone:
Is manipulation of attentional focus beneficial?
Wenyi Ling & Theres Grüter  (University of Hawai‘i at Mānoa)

Method
- Laboratory-based auditory novel word learning experiment
  (method inspired by Quam & Creel, 2017)
- Learning materials (novel words):

<table>
<thead>
<tr>
<th>Tone-focus group (n=31)</th>
<th>Vowel-focus group (n=31)</th>
<th>Control group (n=28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pa1 Pa2 Pa3 Sa1 Sa2 Sa3</td>
<td>Pa1 Pa2 Pa3 Si1 Si2 Si3</td>
<td>Pa1 Pu2 Pu3 Su1 Su2 Su3</td>
</tr>
</tbody>
</table>

Procedure
1. Background questionnaire
2. Pitch perception contour test (Wong & Per喜爱重音，2007)
3. Training session (3 training groups)
4. Word recognition test session
5. Word production test session (analysis in progress)

Training session
- Participants randomly assigned to one of 3 training groups
- Same instruction for all three groups: You will see objects and hear them named. Repeat the words and try to learn them. You will be tested later.
- Words presented in triads with different cue-contrastiveness in different training groups

Control group (n=28)
Vowel-focus group (n=31)
Tone-focus group (n=31)

Fig1. Examples of triads in 3 training groups:
- Each triad presented 6 times
- Self-paced, participants clicked spacebar to move on

Test session
- All three groups took the same 2-alternative forced-choice task
- 90 trials presented pseudo-randomly

Summary & Conclusions
- Unexpectedly, drawing attentional focus to a specific cue in training did not benefit word learning.
- Instead, focus on a specific cue hurt the use of other (non-focused) cues, and led to lower overall success in word learning.
- Results are consistent with Zhao et al.’s (2011) hypothesis that “the recognition of Chinese monosyllabic words might rely more on global similarity of the whole syllable structure or syllable-based holistic processing rather than phonemic segment-based processing” (p. 1761).
- Thus, the results from the current experiment might indicate that vocabulary learning in a tonal language is better supported through syllable-based holistic training than by locating attentional focus on a specific phonemic cue.

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References:

Motivation
- No study has investigated the effectiveness of cue-contrastive training in word learning in a controlled experimental setting.
- Contribute towards better connecting vocabulary teaching practices with word learning theories.

Participants
- 90 self-identified native English speakers
  - Age: M = 22 years (18-47)
  - No knowledge of tonal languages
  - No professional music experience

Participants randomly assigned to one of 3 training groups:
- Each triad presented 6 times
- Self-paced, participants clicked spacebar to move on

Fig2. Examples of different trial types:
- Tone-pair trial (18)
- Vowel-pair trial (18)

Baseline trials
Consonant-pair trials
Tone-pair trials
Vowel-pair trials

Results
- Pitch perception contour test: groups did not differ significantly
- Forced choice task: (method inspired by Quam & Creel, 2017)

Analysis: Generalized linear mixed-effect regression (glmer)
Accuracy = Training_Group + Trial_Type + (1 | Participant) + (1 | Stimulus) + family=bimomial(link="logit")
Predictors simple-coded (Training Group, ref=Control group; Trial Type, ref=baseline)

Fig3. Overall accuracy by training group and trial type (error bars = 95% CI)

Fig4. Overall accuracy by training group and trial type (error bars = 95% CI)

Separate models for each trial type
Accuracy = Training_Group * Trial_Type + (1 | Participant) + (1 | Stimulus) + family=bimomial(link="logit")
Training Group simple-coded (ref=Control group)

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<tbody>
<tr>
<td>B = .53 p = .02 **</td>
<td>B = .85 p = .002 **</td>
<td>B = .90 p = .006 **</td>
</tr>
<tr>
<td>Vowel-focus group</td>
<td>B = .53 p = .23</td>
<td>B = .46 p = .14</td>
</tr>
<tr>
<td>B = .53 p = .03 *</td>
<td>B = .06 p = .86</td>
<td></td>
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Focus on tone in training did not lead to more accurate use of tonal cues, but to less accurate use of non-focused cues.

Click to mouse click
Mouse click accuracy

Click to mouse click
Mouse click accuracy

Click to mouse click
Mouse click accuracy

Click to mouse click
Mouse click accuracy