Examining individual differences using the mispronunciation paradigm
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Overview:
Many eye-tracking studies with young children focus on group differences. We are interested in developing measures of individual differences of aspects of phonological knowledge to assess a longitudinal study of interactions between phonological development and vocabulary growth. This study was designed to develop an individual measure of the robustness of speech perception.

Participants:
36 children included, (14 female, 12 male)
39 children excluded
Age mean: 57 months, range: (36-46)
Standardized Expressive Vocabulary Test (EVT) mean: 129 range: 106-149

Methodology:
1. eye tracking task presented to children as “watching a movie.”
2. images presented on screen, one known object one unfamiliar object.
3. position counterbalanced (L-R).
4. Images calibrated before each block.
5. Preliminary analysis: Linear Regression
6. Random Linear Slope (Growth Rate)

Images matched for height (113 pixels), animacy, complexity, interstimulus.
Placed on 600 x 800 px. gray box.
Centered on vertical axis, 100 px. from screen edge, 520 px. from each other.

Research Questions:
1. Are children expected to look to familiar object for RW trials, to novel object for NW?
2. What is the looking pattern for MP trials?
3. Do they treat similarly to RW, NW, or in between?
4. What are possible child-specific measures of perceptual performance?

Analysis 1: Area Under the Curve
Area under the curve (AUC) was calculated for each child using the proportion of looking to familiar object over time.

Analysis 2: Growth Curve Modeling using a Hierarchical Linear Model (HLM)
1. AUC-ratio used as a dependent measure, combining all three trial types into a single score for each child.
2. However, does not directly account for changes in eye gaze patterns as they unfold over time.
3. Preliminary analysis: Linear Regression
4. AUC ratio: 0.38
5. Numberator = AUC for RW relative to MP
6. Larger numerator indicates child treated RW more like a NW.
7. Denominator = AUC for RW relative to NW
8. Larger denominator indicates child reliably treated RW and NW as predicted.

Summary:
- We offered two proposals to use eye tracking data gathered using Tobii to explore the relationship between perceptual performance and expressive vocabulary size.
- Perceptual performance on RW and NW trials are as predicted.
- Children looked to familiar object in RW trials and to novel object in NW trials.
- This study is most interested in performance on MP trials, and this is most variable.

Future Directions:
- Recruiting children with a larger range of EVT scores and SES background.
- Designing a longitudinal study using this experimental paradigm.
- Inclusion of additional predictors of language development (e.g., receptive vocabulary, language production).
- Exploring the possibility of using information about pupil dilation as a measure of cognitive effort.
- Participant exclusion criteria.

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