Children with Autism Treat Nonwords and Mispronunciations Differently
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BACKGROUND
We know very little about the lexical representations of children with ASD. In particular, we know little about their phonological representations.

• Toddlers with typical language development (TLD) are sensitive to mispronunciations of familiar words and treat them differently than both familiar and unfamiliar words (White & Morgan, 2008).
• There is some evidence that children with ASD have enhanced low-level perceptual skills, so they may be even more sensitive to mispronunciations.

Child-level factors and lexical processing
• Studies have consistently shown processing efficiency for familiar words is related to vocabulary size (Fernald et al., 2006; Law et al., 2016).
• Law and Edwards (2015) found vocabulary size also predicted children's sensitivity to mispronunciations and their looks to unfamiliar objects when hearing a nonword.
• Is a similar pattern observed for children with ASD?

Current Study
• Do children with ASD differentiate between nonwords and mispronunciations of familiar words?
• Is their performance related to nonverbal IQ?
• Is their performance related to language comprehension?

METHOD
Participants: 18 children with ASD. Additional 2 lacked sufficient eye-tracking data.

Standardized tests
• Nonverbal Ratio IQ: from Mullen Scales of Early Learning.

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
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<tbody>
<tr>
<td>56 (4)</td>
<td>49 – 62</td>
<td></td>
</tr>
<tr>
<td>Autism Severity</td>
<td>8 (2)</td>
<td>4 – 10</td>
</tr>
<tr>
<td>Nonverbal Ratio IQ</td>
<td>77 (27)</td>
<td>39 – 108</td>
</tr>
<tr>
<td>Aud. Comp. Standard Score</td>
<td>77 (24)</td>
<td>50 – 118</td>
</tr>
<tr>
<td>Expr. Comm. Standard Score</td>
<td>68 (16)</td>
<td>50 – 95</td>
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PROCEDURE
• Looking-while-listening task (Fernald, et al., 2008).
• Children saw an familiar object and an unfamiliar object.
• Children heard a correct production of a familiar word, a mispronunciation of a familiar word, or a nonword.
• Looks to each image were manually coded from video-recordings of participants.
• Two blocks of trials, administered over two visits.
• In a visit, children heard the familiar word and the nonword, or heard the mispronunciation. Children never heard a familiar word and its mispronunciation on same visit.

Block A
Real: “Find the shoes”
Novel: “Find the dazz”

Block B
MP: “Find the sooze”
(Block order randomized over visits)

GROWTH CURVE ANALYSIS
• Mixed effects logistic regression modeled the probability of looking at familiar object over the time course of the trial
• Predictors: orthogonal Time1, Time2 and Time3 values, experimental condition, child-level scores, and interactions.
• Outcome: log-odds looking to familiar vs. unfamiliar object
• Models allowed randomly varying Time effects by participant and participant-by-condition.

RESULTS
• Auditory comprehension and nonverbal IQ were highly correlated, r = .86, for n = 15 children with both scores.
• Comprehension did not relate to looking patterns, p = .52, over and above nonverbal IQ.
• On average, children looked to unfamiliar objects when they heard nonwords as much as they looked to familiar objects when they heard real words, p = .12.
• Nonverbal IQ moderated looking behavior in real and novel word conditions. An SD increase in IQ predicted an increase in proportion looks to familiar object by .1 for real words.
• Children with low IQ did not show an increase in looks to the familiar object after hearing real words.

CONCLUSIONS
• While eye-tracking tasks are considered to have low task demands and work well with very young listeners, we found that the children with ASD with low nonverbal IQ (< 70) did not show reliable looking behavior on this particular task.
• Children with ASD above this threshold reliably mapped nonwords to novel objects and real words to familiar objects.
• Like their TD peers, most children with ASD were sensitive to one-feature mispronunciations of familiar words, indicating that they have detailed phonological representations.
• Autism severity and other child-level measures were not associated with responses to mispronunciations within this sample.

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