Child-adult leading and responding in LENA recordings:
quantitative measures that predict autism and other group differences

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Motivating questions
- Are child and adult interaction timings different in typical development vs. autism?
- Reduced initiation of conversation is a diagnostic criterion (APA, 2000). Warren et al. (2003) found differences in LENA recordings of the conversation level. We extend this by investigating finer-grained interaction dynamics.
- What is the relationship between child vocalization acoustics and adult responsiveness?
- Shulman et al. (2000) and Oller et al. (2005) have shown differences in the acoustics of vocalizations by children with autism. Speech delay is a diagnostic criterion for ASD (APA, 2000).
- Gros-Louis et al. (2006) and Goldstein & Schwade (2008) argue that adult feedback and turn-taking are key to phonological development in young children.

Is there a social feedback loop that is diminished in autism?

Data
- From the LENA Foundation’s Autism and Normative Databases (Warren, Gilkerson, Oller, Xu, Yapanal, & Gray, 2010).
- 298 x 12+ hour recordings (5,256+ hours total).
- Longitudinal: 16- to 48-month-olds
- 26 children with autism, 72 typical
- Matching on age and mother’s education
- Note: Overlap and “faint” segments are ignored (nontrivial assumptions; might differ across groups). Only segments with at least some speech-related.

Two measures of leading and responding
(Warlaumont, Oller, Dale, Richards, Gilkerson, Xu, 2010)

1. Response Time
- Lower in autism, \( \beta = -.35, p < .001 \)
- Higher with education, \( \beta = .30, p < .001 \)
- Higher with age, \( \beta = -2.90, p < .001 \)

2. Diagonal cross-recurrence profile
- Differences found in autism:
  - Lower overall level of interaction.
  - Lower with age, \( \beta = -.09, p < .001 \)
  - Lower with education, \( \beta = -.35, p < .001 \)

Conclusions
- We use LENA for fine-grained analysis of interaction dynamics.
- Differences found in autism:
  - Lower overall level of interaction.
  - The child does less leading and adult responses take longer and/or are fewer.
  - Child produces less speech-related material.
- For both groups, the quantity of speech-related utterance predicts adult response time.
- Results suggest autism may diminish a healthy feedback loop involving child vocal maturation and adult contingent response.

Acknowledgements

- Special thanks to the LENA Foundation, Jeff Richards, Jill Gilkerson, Dongxin Xu, and Kim Coulter
- Funded by a U.S. Dept. of Energy Computational Science Graduate Fellowship, DE-FG02-97ER25308, and a University of Memphis Institute for Intelligent Systems Student Travel Award.

References

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