

Patterns of Interactional Prosody

in Youth with and without Autism

--- An Exploration ---



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Motivation

Research on ASD prosody has focused mostly on its emotional and linguistic functions [1].

How does **interactional** prosody differ between youth with ASD and NT peers?

Analysis Framework

Prosodic constructions [3,4], which relate:

- Form: temporal configurations of multiple features: pitch, intensity, lengthening, reduction, voicing properties, etc.
- Function: aspects of turn taking, speech acts, stance taking, etc.

Data

Dialogs between adolescents and a confederate, in a picture difference spotting task [2].

20 age-matched ASD and NT youth, ages 9 – 15, totaling 155 minutes of dialog

Methods

1. Automatic analysis to discover the constructions (Principal Component Analysis over 212 features computed across 400K+ samples from each population).
2. Mixed-methods analysis [4,5] to interpret the constructions.
3. Quantitative and qualitative analysis of differences between NT and ASD constructions, in function and form.
4. Additional structured observations to explore differences.

Results

Top 7 NT Constructions' Functions

- 1 [noise exclusion]
- 2 holding the floor, etc.
- 3 topic transition vs topic keeping
- 4 marking stress
- 5 topic-comment vs repair
- 6 turn yield vs hold
- 7 marking agreement vs disagreement

Top 7 ASD Constructions' Functions

- 1 holding the floor
- 2 contrast or correction
- 3 topic transition vs topic keeping
- 4 new vs old information
- 5 turn end vs turn start
- 6 disfluent vs planned
- 7 factual vs emotional

A. As the blue lines suggest, there were no consistent lacks, i.e., no evidence for a specific deficit in any specific function consistently across ASD speakers' prosody. (contrary to expectation)

B. Less variance explained by the top 8 ASD dimensions (33%, vs NT 44%)

-> ASD prosody follows standard patterns less. This likely reflects

- High individual variation within the ASD, and
- Prosodic feature appearing seeming "at random" (vs NT generally seemingly controlled)

C. ASD speakers' prosodic expressions were often different in form.

- for example, marking contrast with atypically strong prosody on the word being contrasted (very high pitch, high articulatory precision, late pitch peak (relative to the syllable center), and often without the typical previous or following region of narrow pitch range.

D. Some prosodic forms were more frequent in ASD

- Frustrated sighs
- Fillers and time-buying lengthenings

Implications for Clinicians

Interactional prosody can also be impaired.

It may be appropriate to focus interventions on these aspects.

Implications for Research

A possible new focus for interventions.

A possible road to better assessment instruments [6].➔

A new way to analyze data.



Future Plans

Quantify the strength and generality of the observed tendencies.

Further seek ASD-NT prosodic differences, using more data and finer-grained features.

Develop techniques to accurately model *individual* prosodic repertoires and differences.

References

- [1] Autism and speech, language, and emotion: a survey. Marchi, Erik, *et al.* 2018.
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- [3] Stepped intonation contours, a new field of complexity. Niebuhr, Oliver. in *Tackling the complexity in speech* (2015): 39-74.
- [4] *Prosodic patterns in English conversation*. Ward, Nigel. Cambridge University Press, 2019.
- [5] Non-native differences in prosodic construction use. Ward, Nigel and Paola Gallardo. *Dialogue & Discourse* 8.1 (2017): 1-30.
- [6] Ward, Nigel., Prosody Assessment Checklist, 2021 <http://www.cs.utep.edu/nigel/english-prosody/assessment.docx>

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