The underlying mechanism behind pragmatic deficits in children with autism: how fillers are related to social visual experience

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The underlying mechanism behind pragmatic deficits in children with autism: how pragmatic difficulties are related to social visual experience

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BACKGROUND

Children with Autism Spectrum Disorder (autism) typically have deficits in pragmatic language skills. These deficits often include monotone voice, avoiding eye contact, and not understanding social cues. Most of what we know about pragmatic language skills in adolescents with autism is based off standardized assessments and questionnaires. To improve interventions for pragmatic language, we first need to better understand communication processes within the contexts they occur. Examining visual experience from the first-person perspective using egocentric vision may help us understand the underlying cause of pragmatic difficulties.

OBJECTIVES

- Demonstrate feasibility of collecting egocentric video data with adolescents with autism.
- Develop coding system for processing egocentric video.
- Examine the interrelationship between pragmatic skills and visual experience in real time.

METHODS

Participants
- Participants in the Purdue Summer Friends Camp
- Diagnosis of Autism Spectrum Disorder
- IQ in average range

Procedures:
- Data collection during the Purdue Summer Friends Camp
- Activity: Conversation game
  - Conversation topic prompts on Jenga blocks
  - Notes sheet prompts for responses
- Sessions were filmed using a head-mounted camera

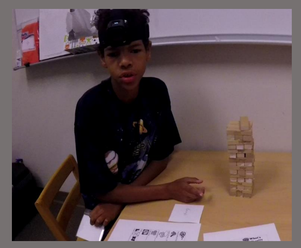
Measures
- Children's Communication Checklist (CCC)
  - Parent questionnaire of communication skills observed at home
- Visual Experience Codes (See Table 1 and Figure 2)

Figure 1: Equipment GoPro Hero5

Table 1: Individual Participant Characteristics

Child	Sex	Age	IQ	ADOS	CCC
106	F	10	105	9	68
108	M	12	101	9	54
109	M	11	100	3	48
107	M	13	89	9	64

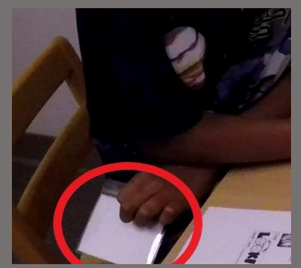
Figure 2: Coding Examples



Hand, body, face, eye, nonactivity object

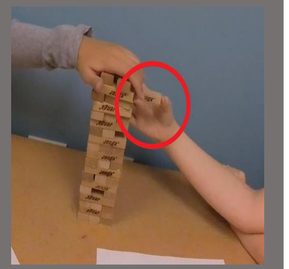
Hand, body

Self view: hand, activity object



Nonactivity object

Body, face



Child view: hand, activity object

Table 2: Reliability (Kappa) of coders 1 and 2 with gold standard coder

Coder	Eyes	Face	Hands	Body	Object Activity	Object Non-activity
1	.76	.71	.57	.36	.86	.97
2	.94	.94	.89	.97	.79	.78

RESULTS

Repeated measures correlations between eyes and body (r = .86), hands (r = .99), objects related to the activity (r = .98) and objects not related to the activity (r = .69) were all significant ($p < .05$)

Figure 3: Repeated measures correlations between percent of time in visual field for eyes and other codes of peers.

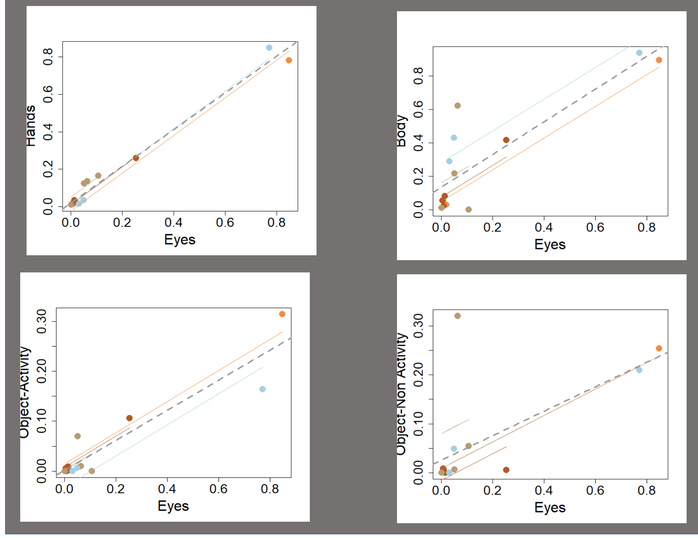
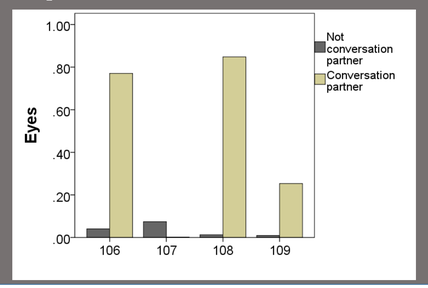


Figure 4: Percent of time of eyes in the visual field for conversation partner and other peers.



CONCLUSIONS

The study demonstrated the feasibility of collecting egocentric video data from children with autism. This data can be coded reliably to capture important aspects of the visual environment during peer-to-peer social interactions. Codes of the peers in the visual environment (e.g. eyes, face) were highly correlated; however visual analysis of the data indicates variability within and across participants. These results indicate that measures of visual experience are feasible to collect and may help capture individual differences in real-time during interactions. Future directions include examining the relationship between measures of visual experience and pragmatic skills.