Relations between Social Motivation and Gaze Behavior in Autistic and Non-Autistic Adolescents

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INTRODUCTION

•Autistic individuals experience challenges in their social interactions.
•One factor that may underlie these challenges is social motivation[1], which may also be related to variations in gaze-to-face behaviors, such as eye contact.
•Perspectives on this relation consist of mixed views, as research evidence for the relation between social motivation and gaze-to-face behaviors is mixed[2].

Objective: Test for correlation between gaze-to-face duration and social motivation in N-AUT (Non-autistic)-N-AUT, AUT (Autistic)-N-AUT and AUT-AUT dyads.

Hypothesis: There will be a significant positive correlation between gaze-to-face duration and levels of social motivation.

METHODS

Group	N-AUT-N-AUT	AUT-N-AUT	AUT-AUT
Sample Size (individuals)	*n* = 37	*n* = 24	*n* = 6
Gender	16 males 23 females	22 males 2 females	6 males

Partner Visit

- Participants paired into N-AUT-N-AUT, AUT-N-AUT, and AUT-AUT dyads.
- Participants are 11-15 years old.
- Dyads are same gender and within 1 year of age of each other.

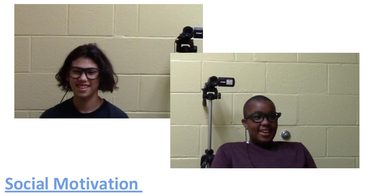
Structure:

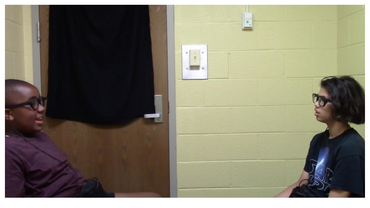
- 20-minute semi-structured social interaction includes 8-minute vacation planning task.
- Individual activities:
  - Surveys and social motivation task

Gaze-to-Face Duration

Eye-Tracking

- Participants wear eye-tracking glasses that assess gaze-to-face behavior.
- Use Pupil Cloud an online eye-tracking platform to quantify fixations to face.

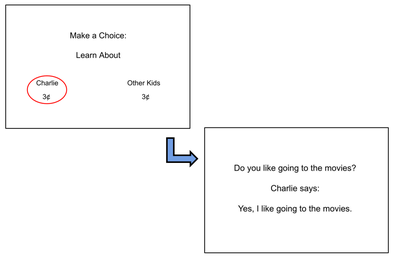




Social Motivation

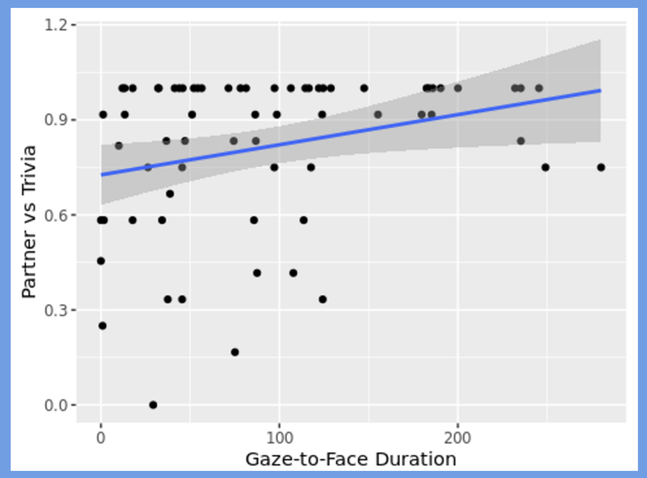
Social Motivation Task

- Prior to task, participants completed surveys about likes and dislikes.
- Participants completed the task by making choices each trial to learn about their partner, other kids, or trivia.
- Different choice combinations can earn different amounts of money.
- All choice proportions were calculated from trials when the monetary reward was equal for both options: "Partner vs Trivia," "Other Kids vs Trivia," and "Partner vs Other Kids."



RESULTS

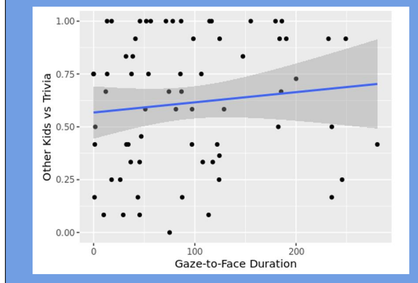
Longer gaze-to-face duration correlates with increased motivation to learn more about partner over trivia.



Gaze-to-Face Duration & Partner over Trivia: $r(65) = 0.28$, $p = 0.02$

*Results are consistent when controlling for group (AUT, N-AUT)

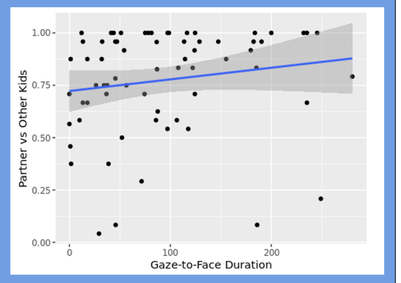
No significant correlation in participants' choice to learn about other kids over trivia and their partner over other kids with gaze-to-face duration.



Other Kids vs Trivia

r(65) = 0.11 , *p* = 0.36

Weaker correlation between participants' choice of other kids over trivia may demonstrate that it is not a valid measure of social motivation.



Partner vs Other Kids

r(65) = 0.16 , *p* = 0.19

Non-significant correlation may indicate invalid measurement of social motivation. Choosing to learn about both their partner and other kids could show a level of social motivation.

CONCLUSIONS

- An increase in gaze-to-face duration is significantly correlated with an increase in social motivation, measured by having an increased interest in learning about their partner over learning trivia facts.
- This research provides novel insight, as previous research studies have not looked at social motivation related to gaze-to-face behavior in a real-world setting[3].

DISCUSSION

Limitations

- Only looked at the vacation task part of the partner visit.
- The interaction was not entirely natural, participants given structured prompts, which may have influenced behavior.
- Not able to measure mutual eye contact using eye-tracking software.

Future Directions:

- Look at other parts of the partner visit (video-watching, getting to know each other tasks) to assess if gaze-to-face behavior still correlates with preferences in the social motivation task.
- Utilize different ways to measure social motivation, such as the post-interaction survey, which asks about the quality of their interaction and how much they enjoyed it.
- Analyze set of choices from the social motivation task with differing levels of monetary values as opposed to even values.
- Assess how social motivation task proportion and gaze-to-face duration vary across different dyad types or between different gendered dyads.

References: [1] Chevallier, C., Kohls, G., Troiani, V., Brodkin, E. S., & Schultz, R. T. (2012). The Social Motivation Theory of Autism. *Trends in Cognitive Sciences*, *16*(4), 231–239. https://doi.org/10.1016/j.tics.2012.02.007. [2] Jaswal VK, Akhtar N. (2019) Being versus appearing socially uninterested: Challenging assumptions about social motivation in autism. Behavioral and Brain Sciences 42, e82: 1–73. doi:10.1017/ S0140525X18001826. [3] Laskowitz, S., Griffin, J. W., Geier, C. F., & Scherf, K. S. (2022, March 29). Cracking the code of live human social interactions in autism: A review of the eye-tracking literature. PMLR. https://proceedings.mlr.press/v173/laskowitz22a

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