

# Gaze Patterns to a Speaker's Face in Typically Developing and ASD Children

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ASD Participant

## ABSTRACT:

To study attention to a speaker in typically developing (TD) children and children with autism (ASD), we tested TD children in three age groups and one group of ASD children. The younger TD children and the ASD children spent less time looking at the speaker than the older TD children. ASD children also spent less time looking at the eyes than the mouth compared to age-similar TD children. These results reveal differences between age-similar TD children and in children with ASD in selective attention to a speaker's face. The ASD looking pattern was most like that of TD toddlers.



TD participant in testing room

## INTRODUCTION:

It has been reported that individuals with Autistic Spectrum Disorder (ASD) are less likely to direct their attention to the eyes of someone who is speaking (e.g., Joseph & Tanaka, 2002; Klin et al., 2010). It has also been suggested that gaze patterns while looking at a speaker can be used diagnostically for ASD. However, research by Rader and Zukow-Goldring (2010) found that typically developing infants 9-15 months of age spend more time looking at the mouth of a speaker than the eyes. Thus, it is important to determine the ways in which children with ASD differ from TD children with respect to attention to a speaker, specifically to features of a speaker's face.



Fig. 1

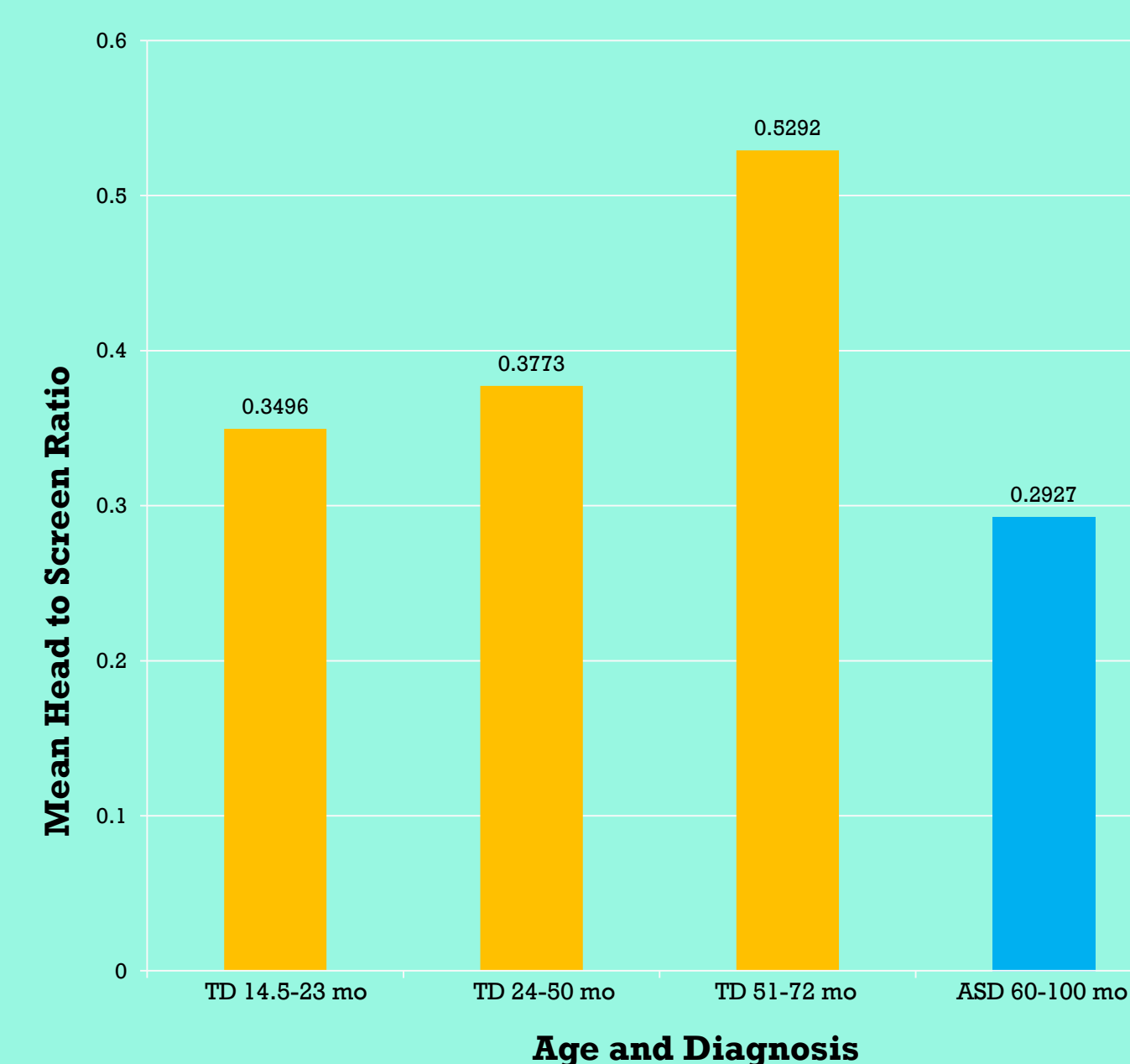


Fig. 2

## RESULTS:

To analyze eye gaze we constructed "areas of interest" for the face, eyes, nose, and mouth. Using a one-way ANOVA we analyzed differences in the three groups for the proportion of time spent looking at the speaker's face in comparison to anywhere else. The ANOVA found a significant effect of group,  $F(3,35) = 2.813, p = .053$ ; the LSD comparison showed that younger children ( $p = .058$ ) and the ASD children ( $p = .007$ ) looked less at the speaker's face than the older group of TD children (Fig. 2). A significant main effect of age group was found for the amount of time spent looking at the eyes as opposed to the mouth  $F(3,35) = 3.326, p = .031$ ; the LSD comparison showed that younger children 14.5-23 mo ( $p = .011$ ), 24-50 mo ( $p = .015$ ) and ASD children ( $p = .007$ ) looked more at the mouth than the eyes compared to the older TD children (Fig. 3). The ASD group differed from the TD group most similar in age (51-72 mo) but did not differ significantly from the two youngest groups.

## METHODS:

We tested 8 children who have a diagnosis of ASD and who are enrolled in a local public school. The ASD group had 7 boys and 1 girl 60-100 mo ( $M = 81.35$ ). We also tested 31 TD children, 17 boys and 14 girls. These children were divided into three age groups: 14.5-23 mo, 24-50 mo, and 51-72 mo. The children were seated two feet from a computer screen, on which appeared a speaker against a simple cartoon background (Fig. 1). The speaker introduced two novel objects with nonce names (*tano* and *gepi*). Eye gaze was captured using an eye-tracking system provided by the Mangold Co.

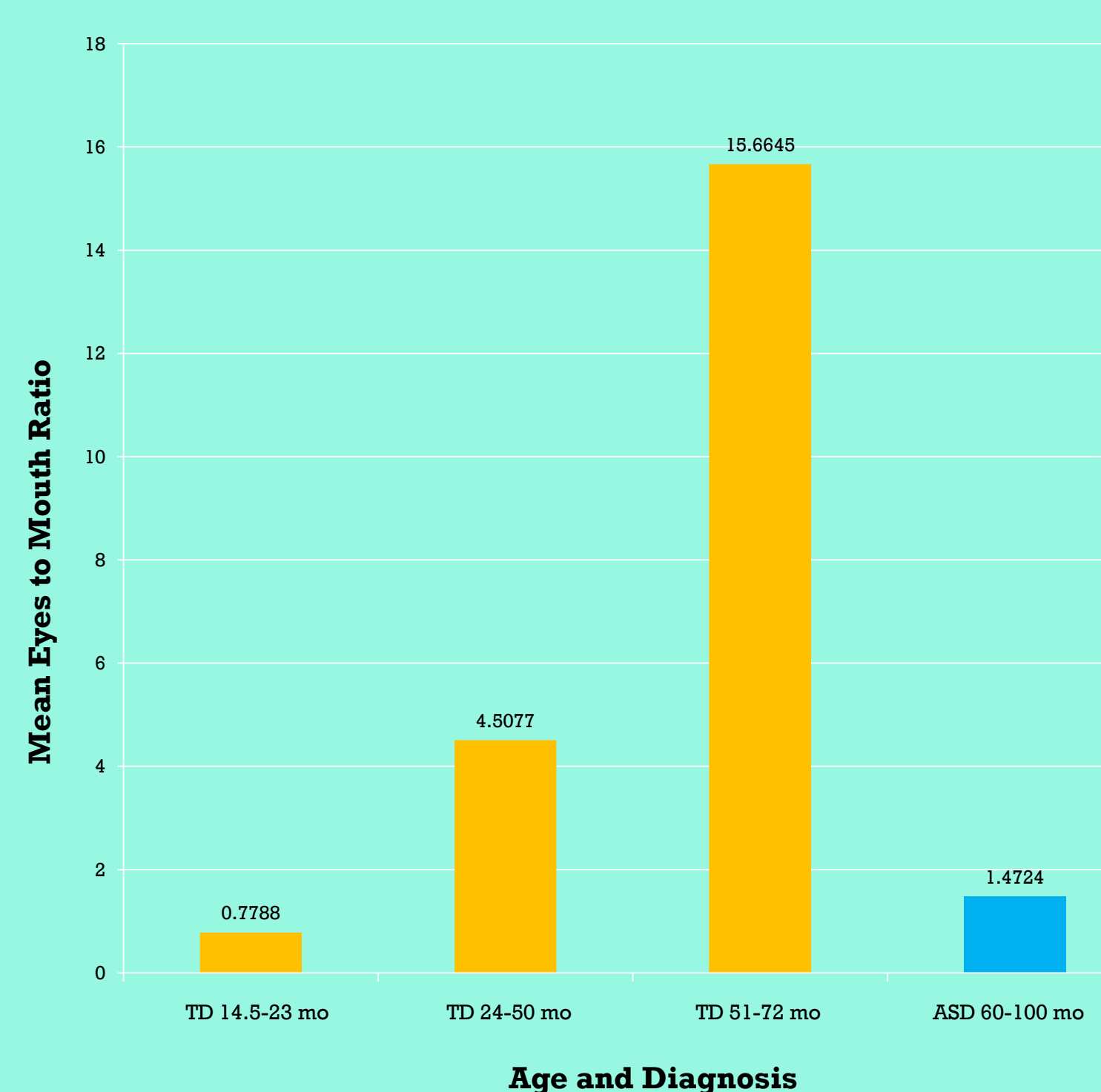


Fig. 3



ASD participant

## DISCUSSION:

The children with autism, who were 60-100 mo of age, attended to a speaker presented in a video on a computer monitor most like children 14.5-23 months of age. They differed from children similar in age (51-72 months) in spending less of their time looking at the speaker's face; more of their attention was on objects present in the video. They also differed from this group in the relative time spent attending to the eyes as compared to the mouth. These results show that ASD children's attention to a speaker's features is significantly delayed developmentally.

## References:

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- Rader, N. & Zukow-Goldring, P. (2010). How the hands control attention during early word learning. *Gesture*, 10:2-3, 202-221.