

Dynamic Synchronous Gestures Assist Word Learning in Low Functioning ASD Children Aged 5-7 Years

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Abstract

Using eye-tracking technology, we looked at the effect of a speaker's gestures on word learning in Autism Spectrum Disorder (ASD) children 5-8 years old and typically developing children (TD) 2-6 years old. When the speaker statically held an object as it was named, the ASD children performed similarly to two-year-old children. However, with a dynamic gesture, the ASD children performed as well as children 4-6 years old. These results suggest that ASD children can benefit from the stimulus-driven attention provided by the dynamic gesture.

Introduction

- Previous research (Rader & Zukow-Goldring, 2010, 2012) found that infants 9-15 months of age benefit from a speaker's use of a dynamic gesture synchronous with speech (show gesture) when learning object words. In our current research we examined the extent to which this benefit exists in TD and ASD children.

- *Hypothesis:* The dynamic show gesture will aid word learning for the ASD children more than for the TD children.

Methods

- *Participants:* We tested 36 TD and 6 ASD children. The TD children were divided into three age groups: 10 children aged 24-31 months, 15 aged 32-48 months, and 11 aged 49-77 months. The ASD children were 69-98 months of age.
- *Measures:* The measurement used was a ratio consisting of correct looks over total looks during a test of word learning. Therefore, a higher ratio represents attention to the correct object when the word is spoken.
- *Procedure:* The children viewed a video showing a speaker introducing two novel objects using either a static or dynamic show gesture. After the speaker introduced the two objects using nonce words, word learning was assessed. A Mangold Eye Tracking System was used to collect eye gaze data. Set up is shown in Figure 1.



Figure 1

Correct Looks Ratio During Test of Word Learning

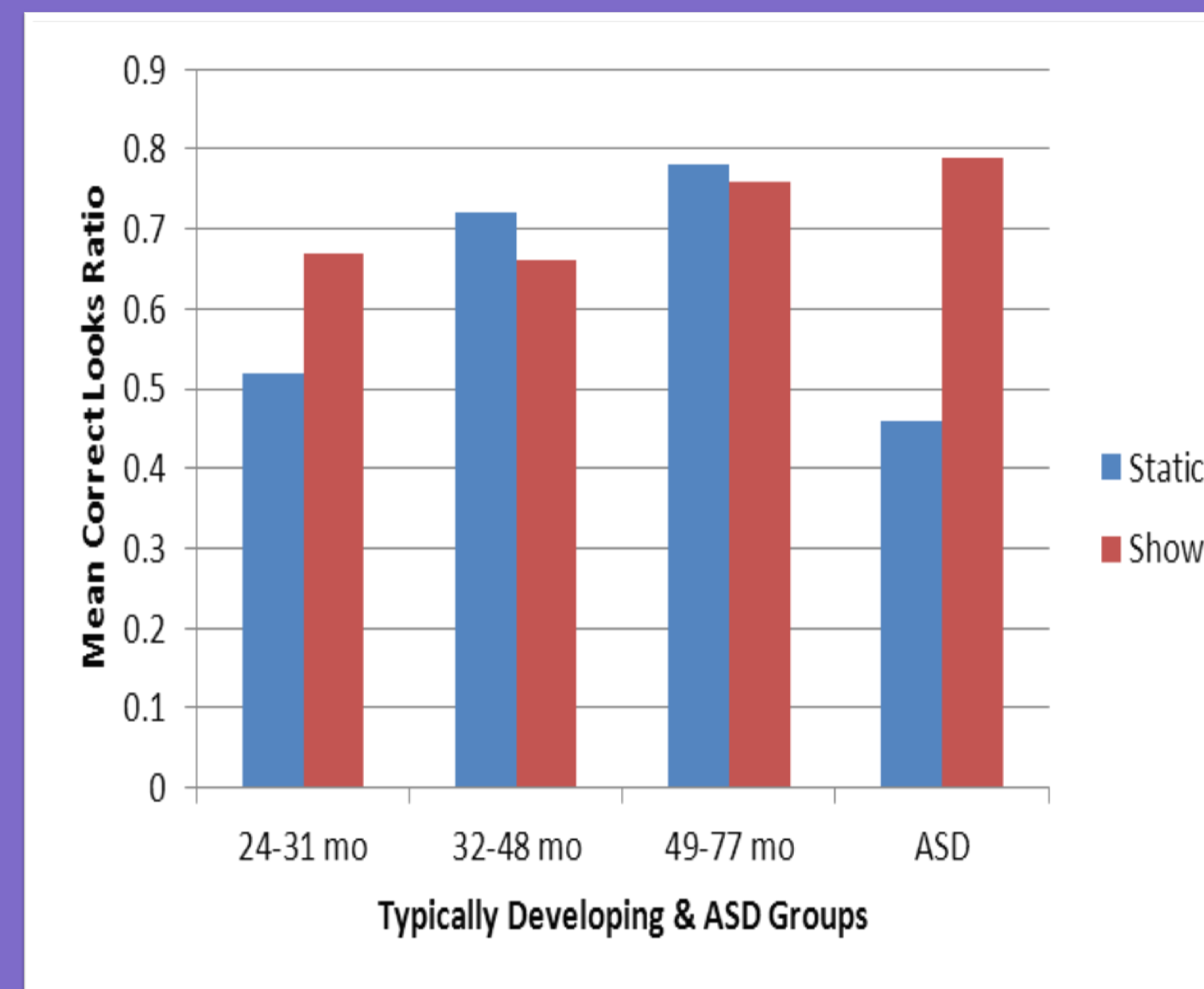


Figure 2

Results

We evaluated word learning by creating a ratio of correct looks over the total number of looks to the two objects. An ANOVA with the four Groups as a between-subjects factor and Gesture as a within-subjects factor found a Gesture by Group interaction, $F(3,38) = 2.45, p = .079$; not all age groups responded differently to the two Gesture conditions. Comparing the youngest age group with the ASD group across Gesture, we found that both these groups benefitted from the dynamic condition, $F(1,14) = 7.0, p = .019$. Comparing the oldest two age groups with the ASD group, we see a significant interaction such that the Gesture condition made no difference for the two older groups of typically developing children, but did for the ASD children, $F(2,29) = 3.19, p = .056$ (See Figure 2).

Conclusions

- With a dynamic show gesture, the ASD children's word learning was as good as that of the oldest typically developing children, while it was similar to the youngest age group for the static gesture condition.
- These results suggest that word learning for ASD children could be aided by use of show gestures in a way that is true for much younger children.
- It may be the case that the motion in the show gesture produces stimulus-driven attention that assists the ASD children in attending at the critical time when they view the object and hear its word.

References

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