Relations Between Basic Indices of Attention to Social Events and Language in Children with Autism Spectrum Disorders and Typically Developing Children

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Background

Basic attention and intersensory processing skills are foundations for typical social-communicative development (Bahrick & Lickliter, 2002, 2012) and children with autism spectrum disorders (ASD) show impairments in these skills (Bebko et al., 2006; Bahrick & Todd, 2012). The Multisensory Attention Assessment Protocol (MAAP; Bahrick et al., 2011) assesses four basic indices of attention (disengagement, orienting, maintenance, intersensory processing) to audiovisual events. It distinguishes between typically developing (TD) children and children with ASD in attention maintenance and disengagement to look to social events, as well as in intersensory processing (matching synchronous auditory and visual stimulation). Further, the MAAP can identify a subgroup of children with ASD who fail to disengage from a competing central stimulus (ASD-FTD) and who show enhanced attention deficits and symptom severity (Bahrick et al., 2012).

Objectives

We investigated relations between basic attention indices (MAAP) and language functioning (Mullen Scales of Early Learning; MSEL; Mullen, 1995) in ASD and TD children. Given that intersensory processing and attention to faces are critical for learning language (Bahrick & Lickliter, 2012; Bahrick & Todd, 2012) we expected that indices of attention to social events would predict concurrent language functioning, as indexed by the MSEL receptive and expressive language scales, in TD and ASD children. Further, we predicted that ASD-FTD children (who show pronounced impairments in attention and increased symptom severity) would show more impaired language functioning than ASDs and TDs who show no failures to disengage.

Methods

Children with ASD (N = 21; M = 4.23 years, SD = .86), who passed ADOS cutoffs, and TD children (N = 21; M = 2.47, SD = .50), matched on Mullen nonverbal adjusted age (ASD: M = 2.61, SD = 1.29; TD: M = 2.98, SD = .85) participated. In the MAAP, trials of a 3s central visual event were immediately followed by two side-by-side peripheral events (10s), one moving in synchrony with its natural soundtrack (see Figure 1). Peripheral events were either social (two women speaking) or nonsocial (two objects striking a surface). Disengagement (latency to shift to a peripheral event with the competing central event on), orienting (latency to shift to a peripheral event with the central event off), intersensory processing (proportion of looking to sound-synchronous event), and attention maintenance (proportion of trial looking to peripheral events) were calculated.

Figure 1. Still images of dynamic social and nonsocial events.

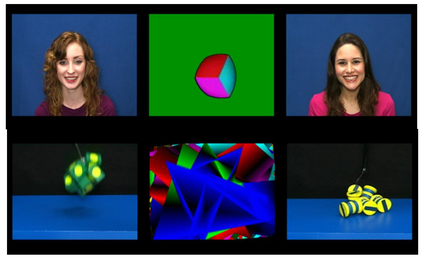


Figure 2. Scatterplots reflecting relations between the four indices assessed by the MAAP (maintenance, intersensory, disengagement, orienting) and MSEL receptive (blue lines) and expressive (red lines) raw scores for TD children (solid lines) and children with ASD (dashed lines).

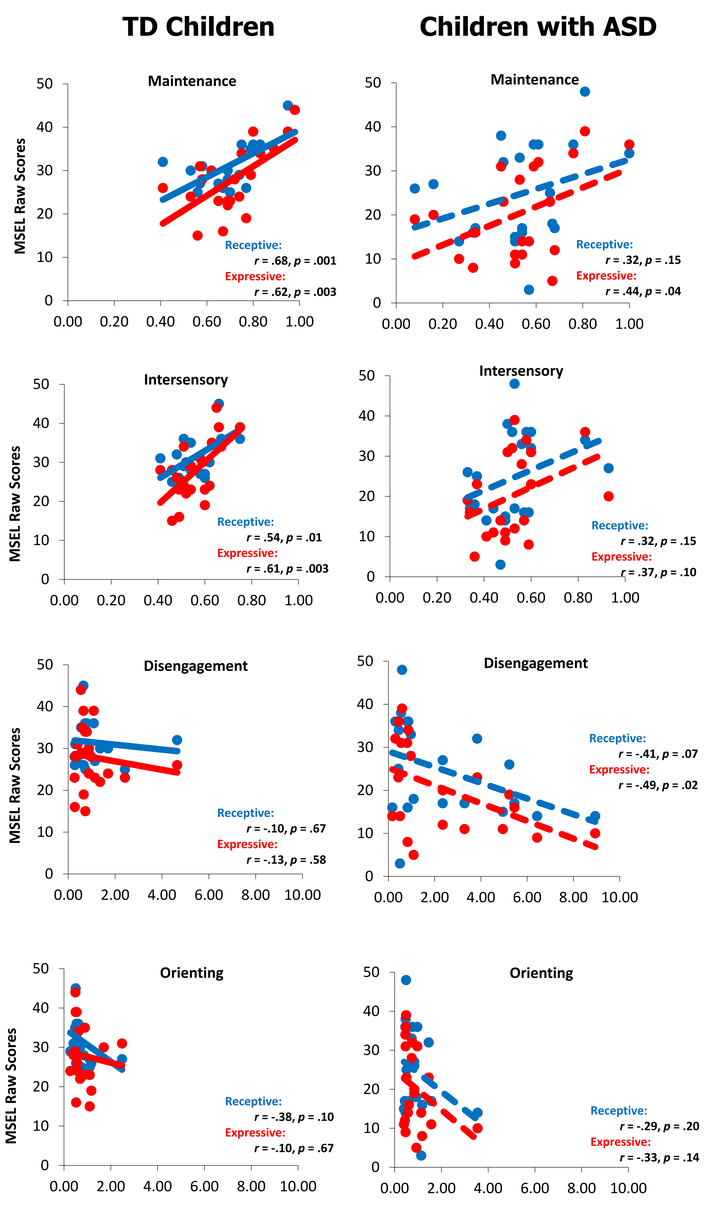
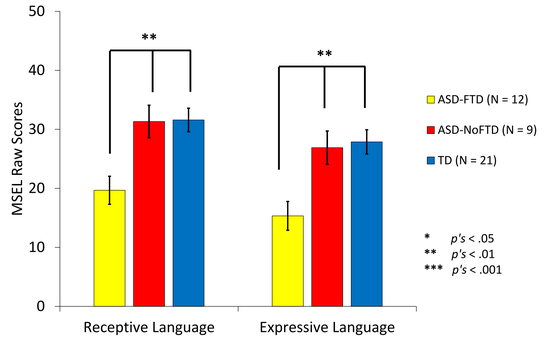


Figure 3. MSEL receptive and expressive language scores for children with ASD who failed to disengage (ASD-FTD), children with ASD who showed no failures to disengage (ASD-NoFTD), and TD-NoFTD children.



Results

For the entire sample together (N = 42), for social (but not nonsocial) events, faster latencies to disengage and orient, and higher intersensory processing and attention maintenance were associated with better MSEL receptive and expressive language raw scores (r's > .32, p's < .04). With the exception of a positive correlation between maintenance to social events and expressive language for TD children only, r = .46, p = .04, no other significant correlations between MAAP indices to nonsocial events and language outcomes emerged, r's < .37, p < .10. For TDs, attention maintenance and intersensory processing of social events predicted receptive and expressive language (see Figure 2, left column). For ASDs, attention maintenance and latency to disengage to social events predicted expressive language (see Figure 2, right column). Further, the ASD-FTD subgroup showed lower receptive and expressive Language scores than ASDs and TDs who showed no failures to disengage (see Figure 3).

Conclusions

Basic attention and intersensory processing of social, but not nonsocial, events assessed by the MAAP predicted concurrent receptive and expressive language for TD and ASD children. Further, a subgroup of children with ASD who failed to disengage to peripheral events and showed the greatest attention and intersensory processing impairments, showed more severe language impairments compared to TD and other ASD children. Findings demonstrate performance on the MAAP is predictive of social-communicative functioning, highlighting links between social attention and language. Further, this simple method can identify a subgroup of individuals with ASD who are most in need of intervention.

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