

Attention to Social and Nonsocial Events in Children with Autism Spectrum Disorders: The Role of Stimulus Variability

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Background

Autism spectrum disorders (ASDs) are characterized by impaired social-communicative functioning and decreased preferences for social events (Dawson et al., 1998, 2002). Because social events differ from nonsocial events along various dimensions, the basis for enhanced preferences for nonsocial over social events in ASD is unclear. For example, social events typically involve more stimulation, contingent feedback, and affective content, as well as greater complexity, variability, and unpredictability than nonsocial events. The present study assessed whether visual preferences for nonsocial over social events typically displayed by children with ASDs could be modified by manipulating event variability, predictability, and complexity (hereafter referred to as event “variability”).

Objectives

The goal of the present study was to assess visual interest in social and nonsocial events characterized by high, moderate, and low variability in children with ASDs and typical development (TD). If higher levels of variability that typically characterize social events are aversive to children with ASDs and contribute to social orienting impairments, then as event variability decreases, children with ASDs should show: (1) increased interest in social events (interactions between event type and variability), and (2) looking preferences that are increasingly similar to those of TD children (interactions between diagnostic group and variability). TD children, in contrast, should show no interactions between event type and variability.

Methods

Participants included 13 children with ASDs and 13 TD children, all 1.5- to 5-year-old males, approximately matched on nonverbal mental age (NVMA; Mullen, 1995; ASD 31.1 months; TD: 35.2 months). Children viewed six films with synchronous soundtracks: three social events (women speaking) and three nonsocial events (dynamic, multicolor, oscilloscopic images with music) across 12 trials (two of each event type). The social and nonsocial events were designed to depict low, moderate, and high levels of event variability and to be approximately matched for variability across event type (see Figure 1). Variability levels were created by manipulating various stimulus characteristics including pitch range, degree of motion, complexity of rhythmic pattern, and length, and number of repetitions of the pattern while keeping overall amount of stimulation (syllables and notes per minute) constant. Videos were played one at a time and trials were child-controlled (defined by a 2 s look away or a 30 s maximum trial length). The dependent variables indexing interest were total looking time to each video in seconds (TLT), looking time to each video expressed as a proportion of the child's looking time to all videos (PTLT), and number of disengagements per minute from each video.

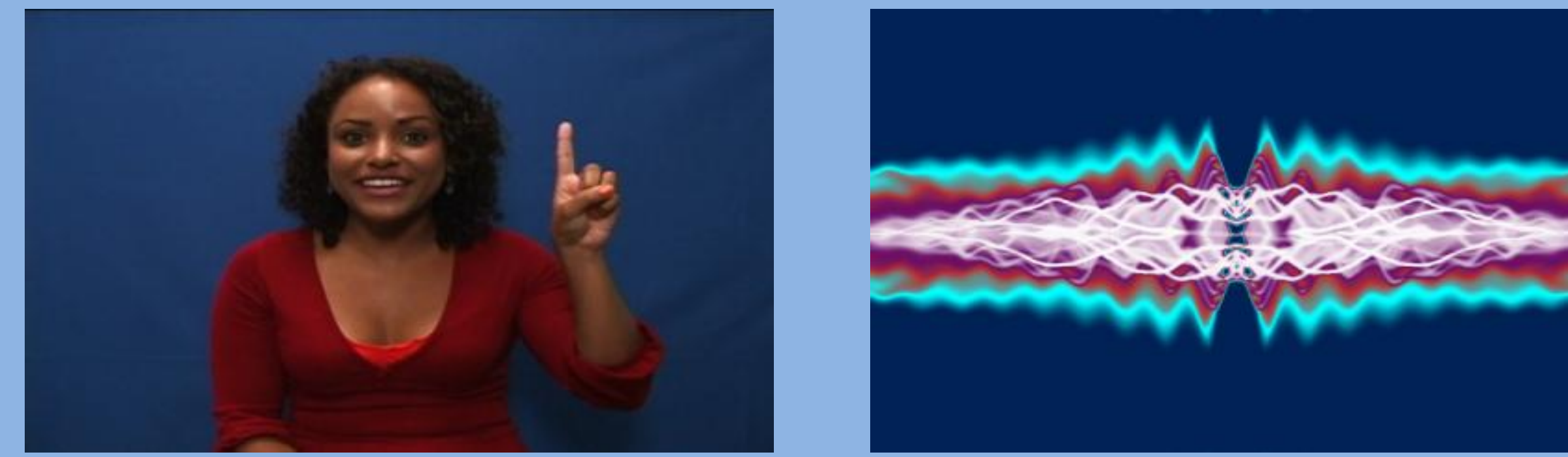
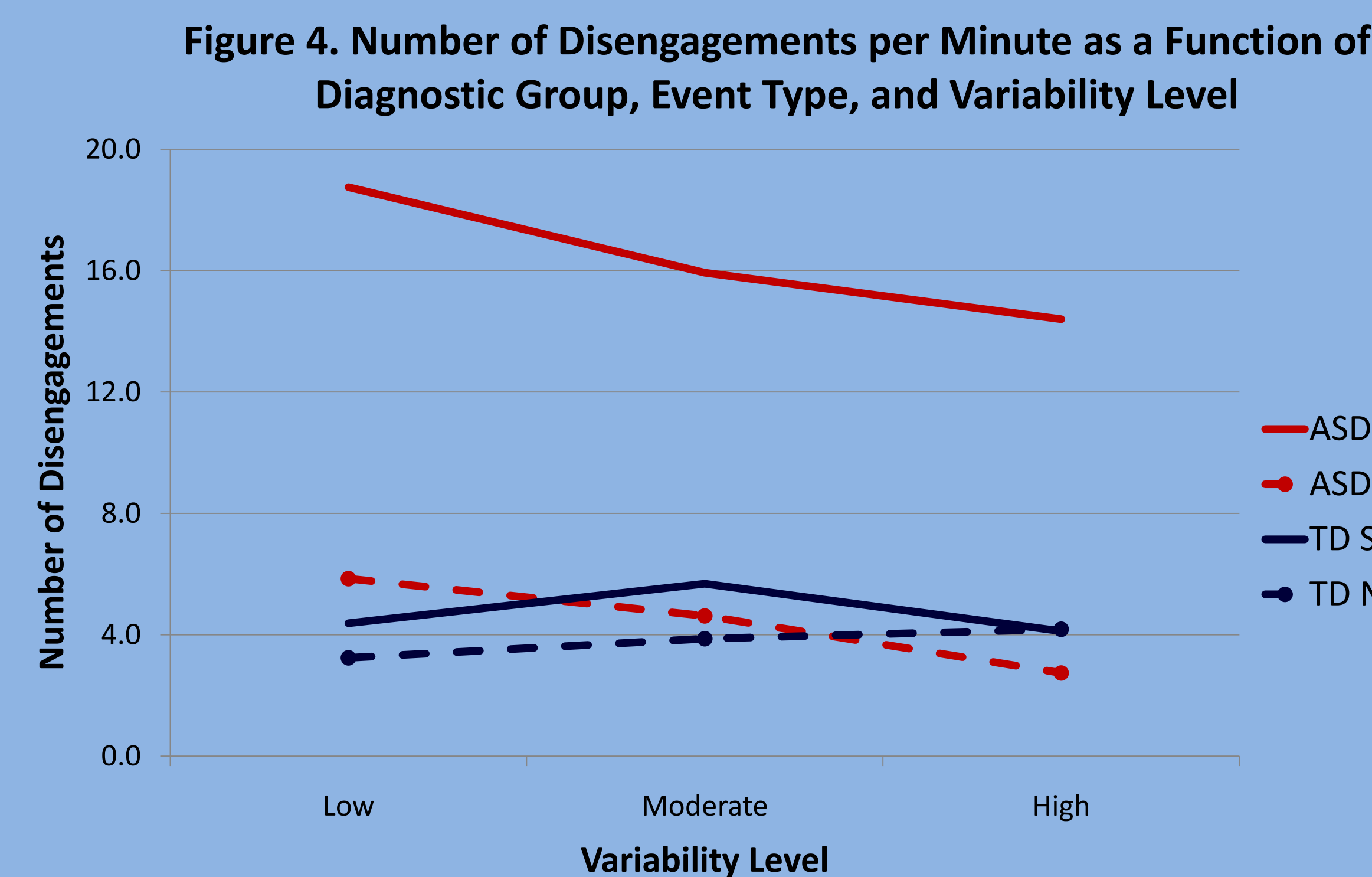
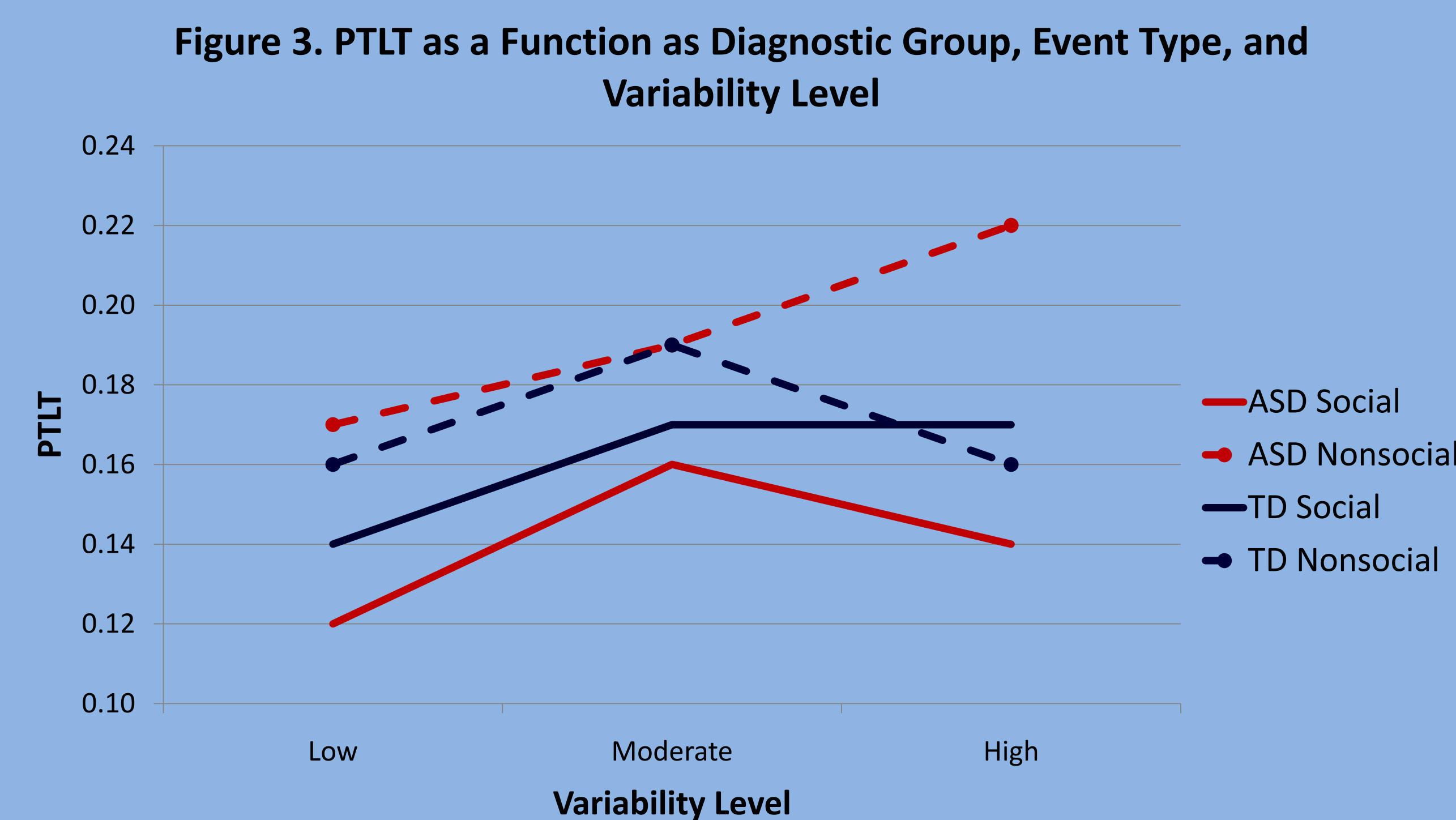
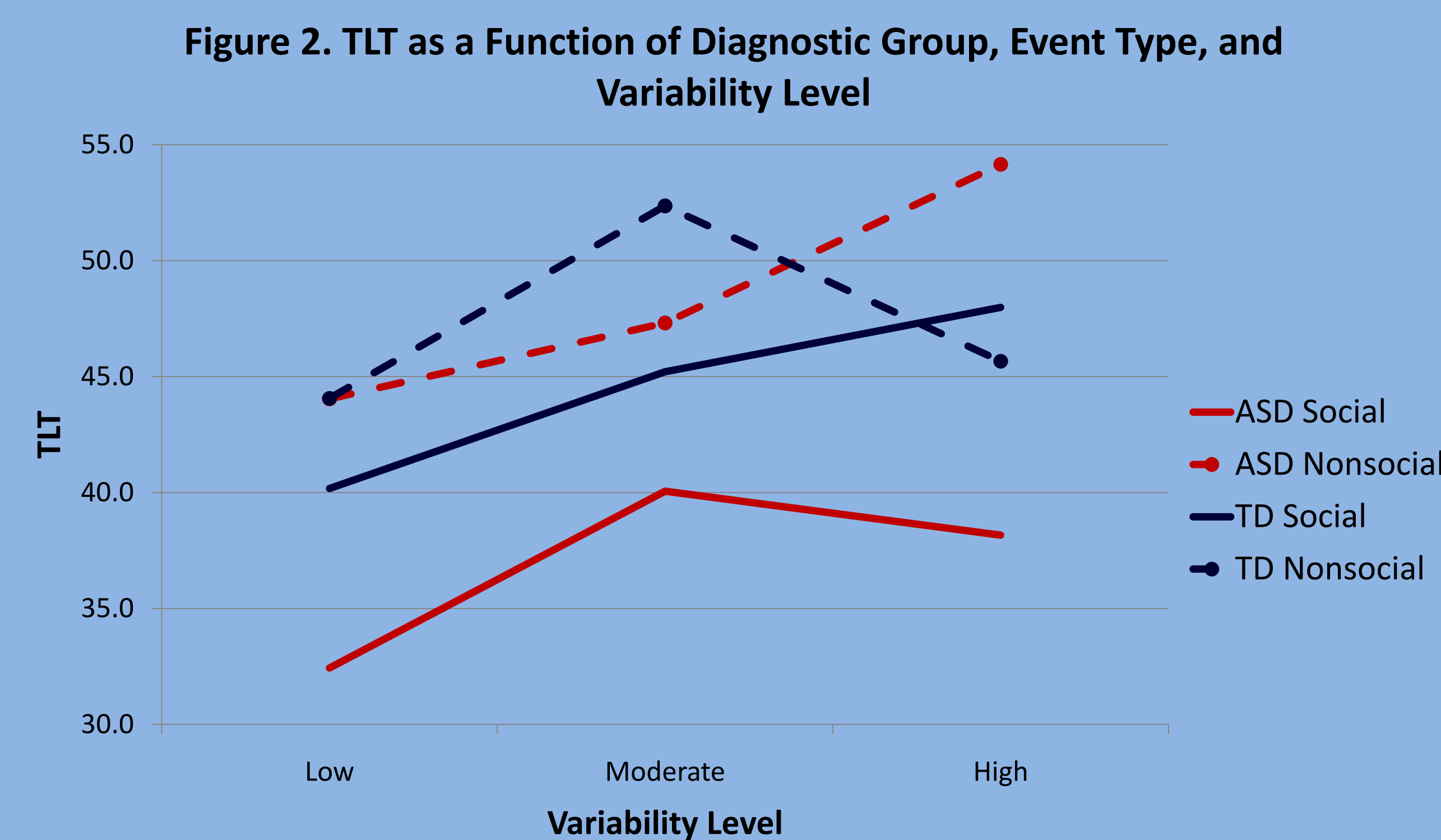


Figure 1. Static images depicting the dynamic social (left) and nonsocial (right) events of low variability.



Results

A 2 x 2 x 3 repeated measures ANOVA with diagnostic group (ASD vs. TD) as the between subjects factor and event type (social vs. nonsocial) and variability level (high, moderate, low) as repeated measures factors was conducted for each measure. For the looking time measures (TLT and PTLT), the results indicated main effects of variability and event type ($ps < .05$), but no main effect of diagnostic group (see Figures 2 and 3). The main effect of variability revealed greater interest in events of high and moderate variability than low variability across the children with ASDs and TD children ($ps < .05$). Surprisingly, these main effects were not qualified by any interactions with diagnostic group or event type for either measure ($ps > .10$). The main effects of event type indicated that, overall, the children showed greater interest in the nonsocial than the social events ($ps < .05$). However, post hoc comparisons revealed that this effect was carried by the children with ASDs, who showed significantly greater looking to the nonsocial than the social events ($ps < .05$), whereas TD children showed no preferences for one event type over the other. Results for the disengagement per minute measure converged with those of the looking time measures. There was a main effect of diagnostic group, so that the children with ASDs had more disengagements per minute than the TD children, but this was qualified by a diagnostic group by event type interaction ($p < .05$) indicating that the children with ASDs had significantly more disengagements per minute from the social, but not nonsocial, events than the TD children (see Figure 4). These effects did not interact with variability.

Conclusions

Regardless of the level of stimulus variability, predictability, or complexity, children with ASDs showed significantly less interest and more disengagements away from social events as compared with nonsocial events, whereas TD children showed no differential interest or disengagement rate. These findings support previous research demonstrating social orienting deficits and enhanced preferences for nonsocial events in children with ASDs. Furthermore, regardless of diagnostic group, the children showed greater interest in events of moderate and high variability than in events of low variability. Together, these findings suggest that the reduced interest in social events of children with ASDs may be robust despite manipulations of variability, complexity, and predictability, at least by 3 years of age.

References

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