

Effect of Play Context on Engagement in Preschool Children with Autism Spectrum Disorder: A Critical Review and Pilot Study

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This study reports a critical review and pilot study examining the effects of play context on engagement in preschool children with Autism Spectrum Disorder (ASD). Specifically, the aim of the review and pilot study is to compare gross motor and symbolic play contexts. For the critical review, studies evaluated included one case control study, one mixed group design, and one within groups design. Findings regarding context effects from the critical review were inconclusive. In the pilot study, participation data were gathered from parent-child dyads (n=71) involving preschool children with ASD. Results from the pilot study suggest that a gross motor play context may be more conducive to supporting children with ASD to engage with their caregivers than a symbolic play context.

Introduction

Autism Spectrum Disorder (ASD) is one of the most common developmental disabilities in Canada (National Epidemiological Database for the Study of Autism in Canada). Impaired sociability, rigidity, and perseveration, and impaired language and play have been identified as key characteristics of children with ASD (Rapin & Tuchman, 2008). Given its prevalence, understanding ASD is of great importance to Speech-Language Pathologists (SLPs), many of whom will work with a child with ASD at some point in their career. Existing research has shown that many preschool children with ASD have known deficits in joint attention skills (Charman, Baron-Cohen, Swettenham, Cox, Baird, & Drew, 1997; Wong & Kasari, 2012), symbolic play skills (Hobson, Lee, & Hobson, 2009; Wong & Kasari, 2012), and motor skill development (Lloyd, MacDonald, & Lord, 2013). Additionally, children with ASD have been found to be less engaged and make fewer communicative acts than same-aged peers (Wimporly, Hobson, & Nash, 2007). Nevertheless, very little research has examined the extent to which play context affects engagement for children with ASD.

Most preschool children's leisure time throughout a day is spent in play. As a result, it is often through play that children interact with their environment. This makes play a powerful tool for communication assessment and intervention (Dominguez, Ziviani, & Rodger, 2006). Different toys tend to evoke different kinds of play, specifically symbolic play and gross motor play. Toys typically used for symbolic play are toy food and utensils, till and toy money, toy house, and toy cars, whereas toys for gross motor play typically include balls, wedge mats, tunnels, and trampolines.

In order to use play most effectively in therapy, SLPs need to better understand how children with ASD play

and what shapes their interactions with others during play. More specifically, it would benefit intervention if SLPs had a good understanding of whether preschool children with ASD are more engaged in a symbolic play setting or in a gross motor play setting. Engagement, in this context, refers to engagement with a play partner in some form, whether just in observation of the partner's play or in interaction with the play partner and a shared object. Discovering which of these environments is more conducive to engagement could inform the context in which SLPs conduct therapy with children with ASD and shape recommendations about play context for parents of children with ASD.

Objectives

The primary objective of this review and accompanying pilot study is to answer the following question: In preschool children with ASD, does participation with caregivers in symbolic or gross motor play contexts result in more engagement?

Study 1: Critical Review

The purpose of Study 1 was to critically examine existing literature regarding play context and engagement in children with ASD.

Methods

Search Strategy

Online databases including PubMed, Google Scholar, and Scopus were searched using the following terms: [{"Autis*" OR "ASD") AND ("Joint Attention" OR "Engagement") AND ("Play") AND ("Gross Motor" OR "Active" OR "Physical" OR "Symbolic")}. Reference lists of previously searched articles were also used to obtain other relevant studies.

Selection Criteria

Studies included for review involved participants between 2 and 7 years of age with a formal diagnosis of ASD. All selected studies analyzed the behaviour and/or play object preferences of children with ASD in one or more play settings. Studies were excluded if focus was on child behaviours outside of the context of play.

Data Collection

Results of the literature search yielded three relevant articles: One case control study (Dominguez et al., 2006), one mixed group design (MacDonald & Hatfield, 2017), and one within groups design (Wimpory et al., 2006).

Results

Dominguez et al. (2006) completed a case-control study comparing the play behaviours and play object preferences of 24 children aged 3 to 7 years with ASD to that of 34 typically developing, age-matched peers. Video recordings (15 minutes) were made of each child engaged in unstructured play independently in a play setting with a variety of toys intended to evoke a variety of play types, such as sensorimotor, functional, and symbolic play. The outcome measure was counts of play behaviours and play object preferences occurring during 10 second intervals throughout the play period. Results revealed significantly more exploratory, sensorimotor, and relational play types, and more engagement with gross motor toys and toys representing figures or concepts presented in the popular media in the children with ASD than their typically developing peers.

Strengths of the study included detailed procedures sufficient for replication, an appropriate study design and statistical analysis, and high interrater agreement for scoring of play.

Overall, this study provides compelling evidence that children with ASD use less advanced play than their typically developing peers. This study was not a clear test of the context of play, as all toy types were in one room. Thus, this study provides somewhat suggestive evidence that children with ASD engage with both gross motor and symbolic toy types. The toys representing figures in the popular media may have been selected for play by the children with ASD because they are familiar to the children.

MacDonald et al. (2017) completed a mixed design study comparing behaviours and dyad connectedness in parent-child play sessions of 9 children with ASD and 9 typically developing peers (2-7 years old). Two parent-child play sessions (traditional social-play-based setting; motor-behaviour-based setting) of 10 minutes were

recorded and analyzed by two coders. The outcome measure was a published scale for coding: (1) child engagement of parent, (2) child sustained attention, (3) child negativity toward parent, and (4) mutuality/connectedness. Results revealed significantly lower engagement, sustained attention, and level of connectedness/mutuality with their parent in the motor-behaviour-based play setting for the children with ASD as compared to their typically developing peers. Within the social-play-based setting, children with ASD performed more similarly to their peers, however their level of engagement remained significantly lower than that of their typically developing peers.

Strengths of the study include detailed methods. Weaknesses include the small sample size, and the use of parametric statistical analysis with such a small data set.

Overall, this study provides suggestive evidence that children with ASD have less engagement with their parent or caregiver than their typically developing peers in both motor- and social-based play settings, although fewer group differences were observed in the latter.

Wimpory et al. (2007) completed a within groups design study to examine how adult activity, communicative role, and scaffolding impact the number of Episodes of Social Engagement (ESEs) in 22 children aged 2 to 4 years with ASD. Children were observed in one- to two-hour play sessions with trained and experienced clinicians within a playroom containing toys suited for both symbolic and gross motor play. Researchers coded the clinician's specific activity before ESEs, which were moments when the child looked at the adult's face and showed some other communicative behaviour (e.g., facial expression, gesture, action, or vocalization). Results revealed significantly more child engagement when the adult play partner provided physical or musical active input, combined with scaffolding and imitation of the child's communicative behaviour and inclusion of social routines in play.

Strengths of the study included detailed procedures sufficient for replication. Weaknesses included the small sample size, and the use of parametric statistical analysis for some of the data with such a small data set.

Overall, this study provides suggestive evidence that children with ASD are more engaged in play when their play partner provides active input, while scaffolding and imitating the child's play behaviours, and creating social routines in the play.

Discussion

The current research provides mixed evidence for specific play context effects on engagement in children with ASD. In one study, children with ASD were engaged with both gross motor and symbolic toy types (Dominguez et al., 2006). In another study, more engagement was reported for children with ASD in gross motor play (Wimpory et al., 2007), however fewer group differences were noted in a symbolic play context by MacDonald et al. (2017). It is clear that further research with a more systematic approach at analyzing play context in facilitating engagement in children with ASD is warranted.

Study 2: Pilot Study

The purpose of Study 2 was to examine engagement of preschool children with ASD in gross motor and symbolic play contexts. Following definitions outlined by Adamson and colleagues (2010), engagement included the child's interaction with objects in the environment, their caregiver, or both (joint attention). Joint attention included play that was supported by the parent but did not involve looks to the parent (supported joint attention), or play that involved looks to both the parent and the object (coordinated joint attention). Instances of supported and coordinated joint attention could be further differentiated by whether or not language was involved in the interaction (symbol-infused).

Methods

The current study uses a set of pre-treatment data from a larger, randomized control trial (Casenhiser, Shanker, & Stieben, 2013) analyzing 71 parent-child videotaped interactions. All child participants had a diagnosis of ASD, and were between the ages of 25 and 57 months (5 females, 66 males). The original videotaped interactions consisted of fifteen minutes of access to symbolic toys, five minutes of access to tactile toys, and five minutes of access to gross motor toys. Symbolic toys provided included: Toy food, a shopping cart, cash register, toy house, toy cars, and puppets. Gross motor toys included: a crash mat, trampoline, exercise ball and a spinning desk chair. For the purpose of this study, we elected to examine the first five minutes of the parent-child interaction with the symbolic toys and the gross motor toys. Adamson and colleagues' (2010) engagement coding system was used to code the children's engagement. These engagement codes were collapsed into three engagement states (see Table 1). Time-tagged video coding of the children's engagement states was conducted using Datavyu software.

Table 1. Engagement state descriptions

Engagement State	Description
Not engaged with parent	The child is engaged with an object only or is unengaged.
Parent only engagement	The child is engaged with the parent only, excluding objects.
Joint attention	The child is engaged in supported joint attention, coordinated joint attention, symbol-infused supported joint attention, or symbol-infused coordinated joint attention.

Results

Figure 1 displays mean proportion of time spent in each engagement state. Examination of the distribution of the data for each engagement state revealed that joint attention in the gross motor play context, not engaged with parent in the symbolic play context, and joint attention in the symbolic play context were normally distributed. The remaining engagement states in their respective play contexts were not normally distributed. Thus, *t*-tests were chosen for statistical analysis because they are robust to violations of normality (Cohen, 1990).

On average, participants experienced significantly greater unengagement behaviours and object engagement behaviours in the symbolic play context ($M=0.42$, $SE=0.03$) than in the gross motor play context ($M=0.35$, $SE=0.03$), $t(70) = -2.65$, $p < 0.05$. Furthermore, on average, participants experienced significantly greater parent only engagement in the gross motor play context ($M=0.14$, $SE=0.02$) than in the symbolic play context ($M=0.06$, $SE=0.01$), $t(70) = 4.12$, $p < 0.05$. There was no significant difference in joint attention between the gross motor and symbolic play contexts ($p > 0.05$).

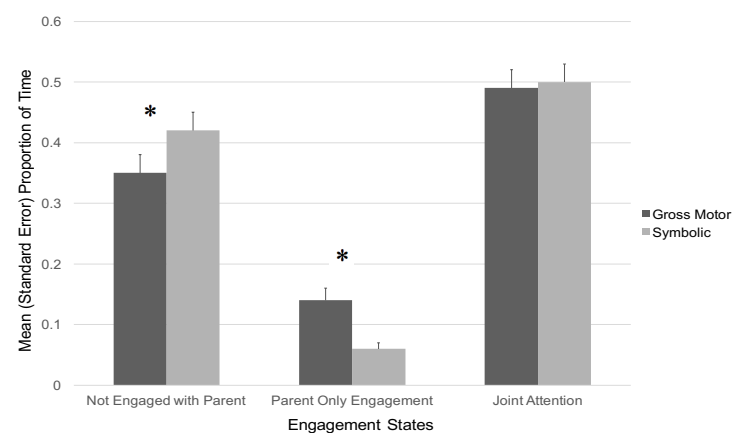


Figure 1. Proportion of time spent in each engagement state (Note: * indicates significance levels of $p < 0.05$)

Discussion

Findings from this empirical study revealed that the context in which children with ASD play could impact their engagement state. Children were significantly less engaged with their parent in the symbolic play setting than in the gross motor play setting. Additionally, children had significantly more parent only engagement in the gross motor play setting, meaning they spent more of their time in the gross motor play context engaged with their parent than in the symbolic play context. Both statements suggest that when targeting engagement with children with ASD in therapy, a gross motor play context might be more conducive to supporting a child to socially reference and engage with his/her play partner than a symbolic play context.

General Discussion

The purpose of this critical review and accompanying pilot study was to determine if play context impacts engagement with caregivers for preschool children with ASD. Previous literature examined in the critical review revealed mixed findings for play context effects. Most previous studies failed to separate play contexts, making interpretation of play context effects on engagement difficult.

Results of the pilot study revealed that a gross motor play setting may be a better intervention context for preschool children with ASD when targeting engagement. Within a gross motor play setting, children with ASD were more engaged with their parent. Previous literature examined in the critical review revealed that children with ASD use less advanced forms of play than their typically developing peers, such as exploratory, sensorimotor, and relational play types (Dominguez, Ziviani, & Rodger, 2006). Perhaps children are more unengaged in a symbolic play setting because this context requires more advanced forms of play than children with ASD know how to use, such as functional and symbolic play types. Furthermore, research has shown that children with ASD have more rigid play and manipulate toys in stereotypical ways (Wong & Kasari, 2012). They also have more repetitive play behaviours (Honey, Leekam, Turner, & McConachie, 2007). It could be that children with ASD are less engaged with their caregivers in a symbolic play context because they are more focused on the smaller, detailed toys typically presented in this setting, leading to stereotypical, repetitive play rather than play that involves their caregivers, as seen more in a gross motor play context.

Results of the pilot study also revealed that joint attention across both play contexts was not significantly different, which could mean either setting would support joint attention intervention. In future research, a further analysis could be run comparing play context effects on the more specific types of joint attention (i.e., supported joint attention and coordinated joint attention) to determine if children with ASD spend a significantly greater proportion of time in these specific engagement states in a gross motor or symbolic play context. It would also be beneficial to analyze the behaviours of the caregivers in play across both settings to determine if caregiver behaviour significantly differs in different play settings, as this could help explain child engagement behaviours within each context.

The present work was limited both in terms of the sparsity of available published research for critical review and the use of data available from an existing database for the pilot study. Future research examining play context in the interactions of parents and their children with ASD is warranted. In particular, future research could involve a prospective randomized control trial comparing engagement of children with ASD to that of their typically developing peers across different play contexts.

Clinical Implications

Intervention with children with ASD could be more efficient if SLPs understood how best to set up their therapy room to elicit child engagement. SLPs may want to consider incorporating gross motor play into some or most of their intervention for preschoolers with ASD, as this study suggests these children are more engaged with their play partner in a gross motor play context. Thus, SLPs may consider selecting toys such as exercise balls, trampolines, tunnels, and wedge mats when targeting engagement, rather than symbolic toys such as toy food and utensils, toy money, and toy cars.

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