

Investigating Parent Sex Differences in Interactions with Children with Autism Spectrum Disorder

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Abstract

This study includes a critical review and an empirical study investigating the differences in interaction behaviours between children with ASD and their mothers versus fathers during play. The critical review evaluated five nonrandomized clinical trials, which measured the parent and child's verbal behaviours. Results were inconclusive as to whether a difference exists between mother and father interactions. The empirical study examined children's ($n=15$) engagement states with their mothers versus fathers in two play contexts. Findings revealed an absence of differences between the mother-child and father-child interactions in either play context.

Introduction

A distinguishing characteristic of Autism Spectrum Disorder (ASD) is a persistent deficit in social communication and social interaction across multiple contexts (American Psychiatric Association, 2013). Therefore, social communication is typically a main goal targeted in intervention for children with ASD and thus remains an important topic for research. Parents have a large impact on their child's language development through their shared communication interactions. For example, children with ASD who have more verbally responsive parents are more likely to have stronger language skills than those with less verbally responsive parents (Flippin & Watson, 2015). By gaining a better understanding of the nature of parent-child interactions having a positive impact on communication development in ASD, it may be possible to devise more efficient intervention strategies.

Historically, research involving parents and their children have typically focused on the mother-child interactions as they are thought to spend the majority of time with the child (Karaaslan, 2016). However, in our modern society it is becoming increasingly important to include fathers in studies as they have been shown to have a positive influence on intervention outcomes when they are involved in parent training (Lundahl, Tollefson, Risser, & Lovejoy, 2008). Studies have shown to date that mothers and fathers typically exhibit different interaction behaviours and communication strategies with their child with ASD (Karaaslan, 2016; El-Goroury & Romanczyk, 1999; Konstantareas, Mandel & Homatidis, 1988; Elder et al., 2011; Flippin & Watson, 2015). In addition, children with ASD have been shown to engage

differently with their mothers than their fathers (El-Goroury & Romanczyk, 1999; Flippin & Watson, 2015). By developing a better understanding of the differences between mothers and fathers in interacting with their child with ASD, clinicians may be able to provide parent-tailored evidence-informed coaching that maximizes on the parents' strengths and the child's behavioural tendencies.

Study 1: Critical Review

Objective

The objective of Study 1 was to critically examine the impact of parent sex on the interactive behaviours exhibited during interactions between parent and child with ASD.

Methods

Search Strategy

Online databases (PsycINFO, PubMed, Google Scholar, SCOPUS, ERIC, CINAHL) were searched using the following terms: [(“autis*”) OR (“ASD”) AND (“parent”) OR (“caregiver”) OR (“mother”) OR (“father”) OR (“sex”) OR (“sex”) AND (“language”) OR (“speech”) OR (“communicat*”) OR (“engag*”) OR (“joint attention”)]. Reference lists of select articles were also used to obtain other relevant articles.

Selection Criteria

Studies included for review were required to include mothers, fathers and their child with ASD. The studies were required to measure interactive behaviours exhibited from each parent during the

parent-child interaction to examine behavioural differences between the mothers and fathers.

Data Collection

Five research articles were identified that met the aforementioned criteria. Four of the studies used non-randomized between groups clinical trials, and one study used a non-randomized mixed groups clinical trial.

Results

Flippin and Watson (2015) conducted a non-randomized between groups clinical trial study to examine the association of mothers' and fathers' verbal behaviours to child language skills during interactions between the parent and child with ASD. Specifically, the differences in behaviours analyzed between the mothers and fathers included 1) the types of leads used by the children 2) the verbal responsiveness of the parents and 3) the relationship between the child's language skills and the parent's verbal responsiveness. Participants included 16 (40 - 69 months) children with ASD and their biological mother and father who have been residing with the child continuously since birth. ASD was diagnosed with a gold standard measure and other severe sensory or motor impairments, or identified metabolic, genetic, or progressive neurological disorders were ruled out. Outcome measures included gold standard tests of child language. Mothers and fathers were individually video recorded in a naturalistic play setting with their child for 15-minute sessions. Toys were selected for the child based on age and sex. Researchers coded the video by identifying types of child leads (look, touch, or no lead) and presence of parent verbal responsiveness.

Appropriate statistical analyses revealed that during play sessions with their mothers compared to fathers, children used more leads, and mothers used a higher frequency and proportion of verbal responses. Frequency of responsive verbal behaviours was positively correlated with children's language scores. Although, this relationship was not significant for mothers (only) when nonverbal skills were taken into account.

Strengths of this study included detailed methods, counterbalancing of parent interaction order, and blinding of coders. Weaknesses included a small sample size and possible limitations in generalization given that the sample demographic statistics were not representative of the typical North American family.

Overall, this study provides suggestive evidence that mothers are more verbally responsive to their children with ASD than fathers, and children with ASD initiate more leads to their mothers.

Karaaslan (2016) conducted a nonrandomized between groups clinical trial investigating interactional behaviour differences between mothers and fathers with their child with ASD or Down syndrome (DS), or which only the former is relevant to the present review. Participants included 11 Turkish children with DS and 16 with ASD (40-68 months), and their mother and father. Each parent was recorded individually while engaged in typical play with their child using the provided developmentally appropriate toys for 20 minutes. Videos were scored by two independent coders using two appropriate observational scales measuring responsiveness, affect, directiveness, attention, and initiation. The coders achieved high interrater reliability.

Appropriate statistical analyses revealed that mothers scored significantly above fathers on the responsiveness and affect factors, both of which were positively correlated with children's engagement. In addition, mothers had an overall higher score on interaction style and engagement. Mothers' and fathers' interaction styles were mildly correlated, suggesting a possible influence of the child on the parents' interaction style. This aligns with the finding that the parents' level of responsiveness was positively correlated with the child's level of engagement with their parents. Specific to parents with children with ASD, mothers were more directive than fathers, which did not appear to be an effective interactive strategy for engaging the child.

Strengths of this study included outlining clear hypotheses and an appropriate design. The participant eligibility criteria and methods were well specified, and sufficient for replication. Limitations of the study included the sample size, and no reporting of blinding. Finally, the videos were recorded at a single point in time and place, so the likely variability that arises from different times and settings was not accounted for.

Overall, this study provides suggestive evidence that mothers are more responsive possibly through increased engagement. However, mothers were also found to be more directive.

Elder, Valcante, Groce, Yarandi, and Carlton (2002) used a nonrandomized mixed groups clinical trial to examine the differences in turn taking

behaviours of mothers and fathers with their children with ASD across home and clinic contexts. Participants included 22 children (38 to 88 months) with ASD, and their fathers and mothers ($n = 66$). Researchers used gold standard measures to confirm the presence of ASD in each of the children. Each parent-child dyad was video recorded for 25 minutes playing with toys together in two settings: a clinic play-room and the child's home. The toys remained consistent for each dyad. Parents were instructed to play as they typically do with their child. Researchers coded the videos by noting the frequencies of the following 9 behaviours: father/mother initiations, father/mother responses, child vocalizations, child stereotypes, child intelligible words, father/mother initiated turns completed, and child initiated turns completed.

Appropriate statistical analyses revealed that there were no significant differences between mothers and fathers in their frequencies of initiating and responding during the interactions with their children. However, there were a wide variety of initiating and responding rates between individuals of the same sex, as well as between parents of the same family. There were no statistically significant differences found between the child's interaction with each parent or between clinic and home settings.

Strengths of this study included using specific selection criteria, confirming diagnoses with valid and reliable instruments, and using a representative sample. Also, the order of play settings for each parent-child dyad were counterbalanced. Limitations of the study included lack of sufficient detail in the methods section. Also, it was not specified whether the coders were blind to the purposes and hypotheses of the study. Finally, the parent behaviour categories used for coding were broad, which could account for the observation of wide variability but no statistical significance. Overall, this study is suggestive that some behaviours that occur during the parent and child with ASD interactions can vary widely. However, there was no significant difference in interaction behaviours between mothers and fathers.

El-Ghoroury and Romanczyk (1999) conducted a nonrandomized between groups clinical trial investigating the differences in behaviour of mothers, fathers, and siblings towards children with ASD. However, for the purposes of this review, the differences between mothers and fathers will solely be reviewed. Participants included 9 families which all comprised of a mother, child (38 – 86 months), and sibling. A father was included in 6 of these families ($n = 33$). Most of the children did not have

an ASD diagnosis due to age, however, researchers confirmed the presence of ASD in all the children using a gold standard measure. Published instruments were used to assess the child's receptive language, vocabulary, intellectual ability, and life skills and adaptive behaviour. Each family member was asked to play with the child with ASD individually over three visits to their home with toys from the family's collection. These sessions were videotaped and scored for specific verbal and motor behaviours from the family member and social behaviours from the child.

Appropriate statistical analyses revealed that mothers exhibited more statements than fathers, which was the sole statistically significant difference between mothers and fathers. In addition, the single statistically significant difference of the children's behaviours revealed that children with ASD used more vocal-verbal initiations towards fathers than mothers. Vocal-verbal initiations are characterized by any vocalization or verbalization initiated by the child to the family member. Researchers also found that most of the mothers and some fathers reached ceiling of social behaviours during the interactions. This observation could have limited the children's opportunities to initiate in the interaction.

Strengths of this study included detailed method and blinding and interrater reliability of coders. Weaknesses included a small number of participant families, which did not all include a father. They were recruited from a single school, without indication of socioeconomic status. Also, the toys available for each child were inconsistent. There was only one recording for each dyad, and 14% of data were incomplete or unavailable. Overall, this study provides equivocal results that mothers verbalizing more statements is the only difference in behaviours between mothers and fathers when interacting with their children with ASD.

Konstantareas and Homatidis (1988) investigated the differences in verbal communication characteristics between mothers and fathers with their children with ASD during play sessions using a non-randomized between groups clinical trial. The effect of the children's level of functioning on these differences was also investigated. Participants included 12 children with ASD, and their mothers and fathers. Children were divided in half into two groups: higher functioning (40 – 151 months) and lower functioning (48 – 130 months), which was divided based on expressive and receptive language skills. Each mother-child and father-child dyad was videotaped for 15 minutes in a clinic room with

living room style furniture, toys, and educational materials. All utterances were then transcribed, and parents' utterances were coded into 14 functional categories.

Appropriate statistical analyses revealed that mothers of lower functioning children used shorter mean length of utterances (MLUs) and provided more prompts to elicit language than mothers of higher functioning children or fathers, who provided prompts regardless of level of functioning. Therefore, it could be inferred that mothers of children with ASD are more likely to adapt their language to their child's needs. With both functioning groups, mothers used more general statements and prompts than fathers. Also, fathers used more direct directives than mothers to both functioning group levels, which are characterized by directing the child to speak or respond motorically. Finally, the total number of utterances spoken did not significantly differ between mothers and fathers, demonstrating a similar interest in engagement with their child.

Strengths of this study included well-formulated research questions and an appropriate design, grouping participant by level of functioning, and coding of a range of relevant functional language categories. Weaknesses of the current study include a small sample size with non-specified selection criteria, and no reporting of blinding. Demographic information was not given; therefore, it is unknown whether the sample was representative of the population.

Overall, this study provides suggestive evidence that mothers are more likely to adapt their language to their child's needs and use more language stimulating strategies than fathers. As well, fathers are more likely to use more language impeding utterances than mothers.

Discussion

Overall, this critical review reveals that mixed findings exist. Some studies show significant differences between mothers and fathers in which the mothers exhibit an increased frequency of a favourable behaviour for supporting language development. This included mothers who were more verbally responsive to their children (Flippin & Watson, 2015; Karaaslan, 2016) and mothers who adapted their level of language to their child's level of functioning (Konstantreas et al., 1988). Other studies found little or no significant differences

between mothers and fathers (Elder et al., 2002; El-Ghoroury et al., 1999).

As all of the studies were limited by their small sample sizes (range $n=6-22$), strong clinical implications were not able to be determined. Also, most studies were completed in a single context, which does not account for possible variation that occurs between contexts. In addition, each of the studies measured different parent behaviour variables, which could have contributed to the mixed findings.

Most of the behaviours measured in the studies were language-based measurements such as the parent and child's verbal initiations and responses. As many children with ASD are non-verbal, it would be beneficial to examine engagement states. By coding for engagement states, researchers can gain information on the child's interactions with the parent, including when verbal language is not used. In addition, children with ASD's language has been shown to differ between play contexts (Binns, Casenhiser, Ceolin, Shanker & Cardy, 2017). Therefore, it would also be beneficial to examine the parent child interactions in different play contexts.

Study 2 – Empirical Study

Objectives

The objective of Study 2 was to examine if parent sex is related to differences in children with ASD's engagement states across play contexts.

Methods

The current study uses a set of data from a larger, randomized control trial (Casenhiser et al., 2013). Mother-child and father-child pre-treatment videotaped interactions were used in this analysis. All children were between the ages of 25 and 57 months and had a diagnosis of ASD. The original videotaped interactions consisted of fifteen minutes of access to symbolic 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 this analysis, we elected to examine the first five minutes of the parent-child interaction with the symbolic toy section and the gross motor toy section. Adamson, Bakeman, Russell, and Deckner's (2010) engagement coding system was

used to code the children's engagement states into 8 categories. Due to the small sample size, researchers collapsed the engagement states into 3 categories for analysis (see Table 1). Time-tagged second-by-second video coding of the children's engagement states was conducted using Datavyu software. Transcripts were double-coded by two researchers to ensure reliability. Mean inter-coder agreement was .91 (unweighted Cohen's Kappa). Discrepancies were addressed through discussion and final agreement between coders was 100%.

Table 1.
Brief Descriptions of Engagement States Used for Coding the Children's Engagement

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, or symbol infused supported or coordinated joint attention.

Results

Table 2 displays descriptive statistics for the children's mean proportion of time spent with each mother and father across play contexts. These differences were analyzed using a paired sample t test as they are robust to violations of normality (Cohen, 1990). The differences in child engagement between parents were statistically nonsignificant at $p > .05$ for either play context.

Discussion

No significant differences were found in children with ASD's engagement with mothers versus fathers in gross motor or symbolic play contexts. Therefore, although the critical review suggested that mothers may be more competent in providing verbal support, the current study suggests that fathers are as

competent as mothers in engaging their child with ASD in interactions. This is an important finding as fathers of children with disabilities have been shown to feel less competent in parenting than mothers (Kersh, Hedvat, Hauser-Cram, & Warfield, 2006) and have difficulty establishing a close emotional relationship with their child (Keller & Honig, 2004). In addition, fathers of children with ASD are more likely to assume the traditional gender role of financially providing for the family with less child rearing responsibilities (Gray, 2003). Therefore, fathers may not be spending as much time with their child with ASD, which may be leading to their feelings of incompetency. Overall, this finding could increase fathers' feelings of competency as they engage similarly with their child with ASD as mothers.

This study was limited by the small sample size. Due to the small sample size, the engagement state variables were collapsed into fewer categories, resulting in a less detailed analysis. The low statistical power could also have limited the significance of the results.

Clinical Implications and Future Directions

This finding could be used to empower both mothers and fathers to support their child's engagement. Fathers should be encouraged to be involved in their child with ASD's engagement development.

Possible future directions of research include replicating the study with a larger sample size and including typically developing children for comparison.

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Table 2.

Children's Mean Proportion of Time Spent in Each Play Context with Mothers vs. Fathers

Engagement States	Gross Motor Play Context			Symbolic Play Context		
	Mothers	Fathers	<i>t</i>	Mothers	Fathers	<i>t</i>
Not Engaged with Parent	.50 (.18)	.43 (.24)	.95	.49 (.24)	.46 (.26)	.35
Parent Only Engagement	.12 (.09)	.13 (.18)	.17	.07 (.08)	.05 (.05)	.40
Joint Attention	.38 (.16)	.44 (.27)	.87	.43 (.22)	.48 (.29)	.70

p > .05, all cases

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