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Fathers of Youth with Autism Spectrum Disorder: A Systematic Review of the Impact of Fathers' Involvement on Youth, Families, and Intervention

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Abstract
Literature in developmental psychology suggests that mothers and fathers both play unique and important roles in their children's development. However, research investigating the unique contributions and psychological functioning of fathers of youth with developmental disabilities, and the role that fathers play in effective intervention, remains limited. Whereas evidence suggests that parent-mediated interventions for children with autism spectrum disorder (ASD) can lead to increased engagement from parents, and reduced stress and psychopathology commonly experienced by parents of youth with ASD, these interventions often do not specifically address potential benefits of paternal involvement. This systematic review aimed to understand how often/how commonly research on children with ASD examines the father's role within the family, how often fathers are targeted directly during intervention efforts, and the impact of increased paternal involvement. This review suggests that fathers of children with ASD are not often included in research on children with ASD, in either their general involvement or in their inclusion in intervention. While studies generally suggest that these fathers may be less involved than mothers in childrearing practices, having both parents highly involved may improve the overall family system across many levels, and fathers may be equally as effective as mothers in implementing intervention strategies. Overall, this review suggests that while often overlooked, fathers of youth with ASD make important contributions to children with ASD and the larger family and should be included in future research on children with ASD.

Keywords ASD · Family systems · Fathers · Parent-mediated intervention · Paternal involvement

Introduction

Role of Fathers in Child Development

In the past, literature on child development has often focused on interactions between mothers and children, rather than interactions between fathers and children (Lamb 2010). However, given societal shifts in parenting responsibilities (LaRossa 1988), the father–child relationship has drawn increasing interest among researchers (e.g., Lamb 2010; McBride, Schoppe and Rane 2002). This research on paternal involvement suggests that greater father involvement is associated with a variety of positive outcomes for children (e.g., greater academic achievement, greater educational and economic attainment, higher self-esteem and emotional well-being, fewer delinquent behaviors; Deutsch et al. 2001; Flouri and Buchanan 2004; Harris et al. 1998; Nord and West 2001).

Greater paternal involvement and stronger co-parenting relationships may be especially important among parents who are navigating the development of children with complex neurodevelopmental disorders, such as autism spectrum disorder (ASD). ASD is characterized by persistent and pervasive difficulties with social communication and social interaction, as well as circumscribed and repetitive behaviors, interests or activities (American Psychiatric Association [APA] 2013). Children with ASD can also experience a variety of symptoms such as self-injurious behaviors or intellectual and/or language impairment, and approximately seventy percent of children with ASD meet criteria for at least one comorbid psychiatric disorder (APA 2013; Simonoff et al. 2008). Given these broad symptoms

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and the complexity of the disorder, parents of children with ASD have been found to experience greater stress (Baker-Ericzen et al. 2005; Brobst et al. 2008), lower marital satisfaction (Brobst et al. 2008; Gau et al. 2012), and greater caregiving demands (Baker-Ericzen et al. 2005; Sawyer et al. 2010) compared to parents of typically-developing (TD) children or children with other disabilities. However, results from studies examining paternal involvement in caregiving responsibilities for children with ASD (e.g., Ogston-Nobile 2015) have mirrored those found in similar studies of parents with TD children (e.g., greater relationship satisfaction and lower parenting stress were observed when parenting demands were distributed equally among parents; Nangle et al. 2003). Given these findings, it is essential that researchers who examine ASD-specific interventions are familiar with the important role that fathers play in a child's development.

Role of Fathers in ASD-Specific Interventions

Whereas attention has been given to paternal involvement within the context of typical child development, recent reviews indicate that fathers are underrepresented in empirical investigations of child psychopathology (Cassano et al. 2006; Phares et al. 2005) and developmental disabilities (Flippin and Crais 2011). This underrepresentation is alarming considering recommendations that fathers become more involved in early intervention and therapeutic efforts (e.g., parent-mediated intervention, parent-training-based interventions) and research that has found an increase in positive outcomes when both parents are involved (Lundahl et al. 2008; May et al. 2013).

Some literature suggests that investigations of paternal involvement in ASD-specific interventions may be even more sparse than investigations of paternal involvement in interventions for children with other developmental disabilities or diagnoses (Braunstein et al. 2013). A 2011 systematic review by Flippin and Crais of parent-implemented communication intervention studies for ASD identified only three studies that specified fathers as being involved in parent-training. However, to our knowledge, no such review exists specifically regarding the examination of father's involvement in childrearing beyond early intervention for children with ASD. Unfortunately, it remains unknown at this time if research on the involvement of fathers of TD children generalizes to fathers of children with ASD. It is particularly important to examine these constructs in families of children with ASD considering the increased burden associated with raising children with ASD (Gau et al. 2012) and the aforementioned benefits present when both parents are highly involved in a child's life (Lundahl et al. 2008; May et al. 2013).

Patterns and Outcomes of Paternal Involvement in Families of Youth with ASD

The need to consider paternal involvement in ASD is underscored by research showing discrepancies in level of involvement for mothers and fathers of children with ASD. For example, one study estimates that fathers spent approximately 26% less time compared to mothers on childcare for their child or adolescent with ASD (Hartley et al. 2014). Some hypothesize that these discrepancies may occur because, like mothers, fathers of children with ASD experience notable stress (e.g., Falk et al. 2014), and that for fathers specifically, parenting stress may hinder attempts to care for and socialize with their children (Fagan et al. 2007). Moreover, because interventions, appointments, and meetings about children often take place during daytime hours, fathers with professional commitments may have limited availability to take part in their child's services and interventions, which may, in part, lead to increased stress (Rivard et al. 2014).

Although fathers of children with developmental disabilities may be less involved than fathers of TD children (Bristol et al. 1988), an increase in involvement among this group may be especially impactful. As previously discussed, parents of children with ASD report experiencing greater parenting stress and burden, and a greater number of difficulties within their marital relationships when compared to other parents (Walsh and O'Leary 2013; Risdal and Singer 2004). Given that parents of children with ASD may experience strain in their parental roles because of the increased time and effort required in parenting a child with ASD (Brobst et al. 2008), greater paternal involvement and strong co-parenting relationships may be even more important as this can help to reduce childcare (and other) burdens and systemically reduce marital dissatisfaction for mothers and fathers alike. In a study examining the relationships between marital satisfaction, parenting stress, and caregiving responsibilities (e.g., arranging/planning for a child's ASD services; making childcare arrangements; assuring child's routine hygiene needs are met) among parents of children with ASD (Ogston-Nobile 2015), it was found that both mothers and fathers reported greater marital satisfaction and lower parenting stress when general caregiving responsibilities were distributed equally.

Similarly, parental involvement in interventions for ASD is strongly associated with child and parent treatment-related outcomes (Makrygianni and Reed 2010; Matson et al. 2012). Although the overall literature on parental involvement in interventions for ASD is relatively limited (Steiner et al. 2012), the gap in the literature focused on understanding father-specific parent-training interventions

for children with ASD may be even more pronounced. Fathers and mothers differ in both their parental behavior, and the ways in which they interact with children; these differences have important implications for parent-training-based interventions for this population (Flippin and Crais 2011). For instance, compared to mothers, fathers may be more directive and respond less consistently to child-directed attempts to play, while more frequently engaging in parallel play with their children (Elder and Goodman 1996). These differences may be particularly important within the context of play- and communication-based interventions considering the social-communication difficulties faced by children with ASD (Flippin and Crais 2011).

Despite these indications that fathers may be less involved in the care of children with ASD, another area of research suggests that fathers of children with disabilities desire to become more involved in their children's lives (Meadan et al. 2013) and believe that being involved with their child's education is important (League and Ford 1996). Consequently, these fathers report interest in forming meaningful relationships with their child's educational programs (Hadadian and Merbler 1995a). Given fathers' reported desire for increased involvement and the potential benefits associated with this inclusion, it is important for researchers and clinicians to develop a better understanding of how often interventions address paternal involvement, the general nature of paternal involvement (e.g., frequency, quality), and if/how this involvement benefits the child with ASD and overall family.

Current Study

Whereas multiple reviews indicate that fathers are underrepresented in investigations of child psychopathology (Cassano et al. 2006; Phares et al. 2005), this underrepresentation appears even more evident in studies examining paternal involvement among parents of children with ASD (Flippin and Crais 2011). However, given the greater caregiving demands, higher levels of stress, and lower levels of marital satisfaction (Baker-Ericzen et al. 2005; Brobst et al. 2008; Gau et al. 2012) reported by parents of children with ASD compared to parents of TD children or children with other disabilities, research examining the role of fathers in both general caregiving responsibilities and ASD-specific interventions is particularly important. Our aims for the current study were twofold. First, we sought to better understand the limited literature on fathers by examining the ways that research on children with ASD examine the father's role within the family, both within the context of their general involvement in caregiving and their specific involvement in intervention efforts for children with ASD. Second, given the limited scope of the literature on paternal involvement/intervention with this population, this review also aimed to identify any benefits achieved by including fathers, as well as mothers, in interventions for children with ASD and reflect on the current understandings of the role that fathers of children with ASD take in caring for, parenting, and supporting children with ASD.

Method

The current study was conducted in accordance with the guidelines set forth by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher et al. 2009) reporting checklist.

Article Search and Selection

The current study examined articles published in peer-reviewed journals published up to and including 2016. Articles were collected through three psychology-focused journal databases: PubMed, PsycINFO, and Web of Science. Three groups of keywords were used interchangeably in separate searches of articles related to involvement and articles related to intervention. All possible combinations for the searches included one of the following keywords related to autism: "autism", "ASD", or "developmental disabilities"; one of the following keywords related to fathers: "father", "fathers", and "paternal"; and one of the following keywords related to either involvement or intervention: "involvement", "parenting", "intervention", or "therapy". All possible combinations using each different keyword within each of the three sets was used (i.e., autism + father + therapy was one search, as was ASD + father + therapy). In total, these search terms yielded 539 articles for the involvement search (see Fig. 1) and 649 articles for the intervention search (see Fig. 1). Article titles and abstracts were then screened by two researchers (the first and second authors); articles that did not meet the inclusion criteria listed below were dismissed. Also, any articles related to other diagnoses or about biological topics (e.g., paternal genetic links) were excluded at this stage.

Inclusion Criteria—Abstract Review

During the title/abstract review stage of the intervention search, articles were screened out unless they met all of the following criteria: (1) Fathers were specifically involved in the intervention or were discussed as part of the intervention; (2) The sample included children with ASD or differentiated children with ASD from children with other developmental concerns; (3a) the children or fathers were engaged in psychological, pharmacological, medical, or other (e.g., Speech, Occupational) evidence-based therapies typically prescribed for individuals with ASD. For the involvement

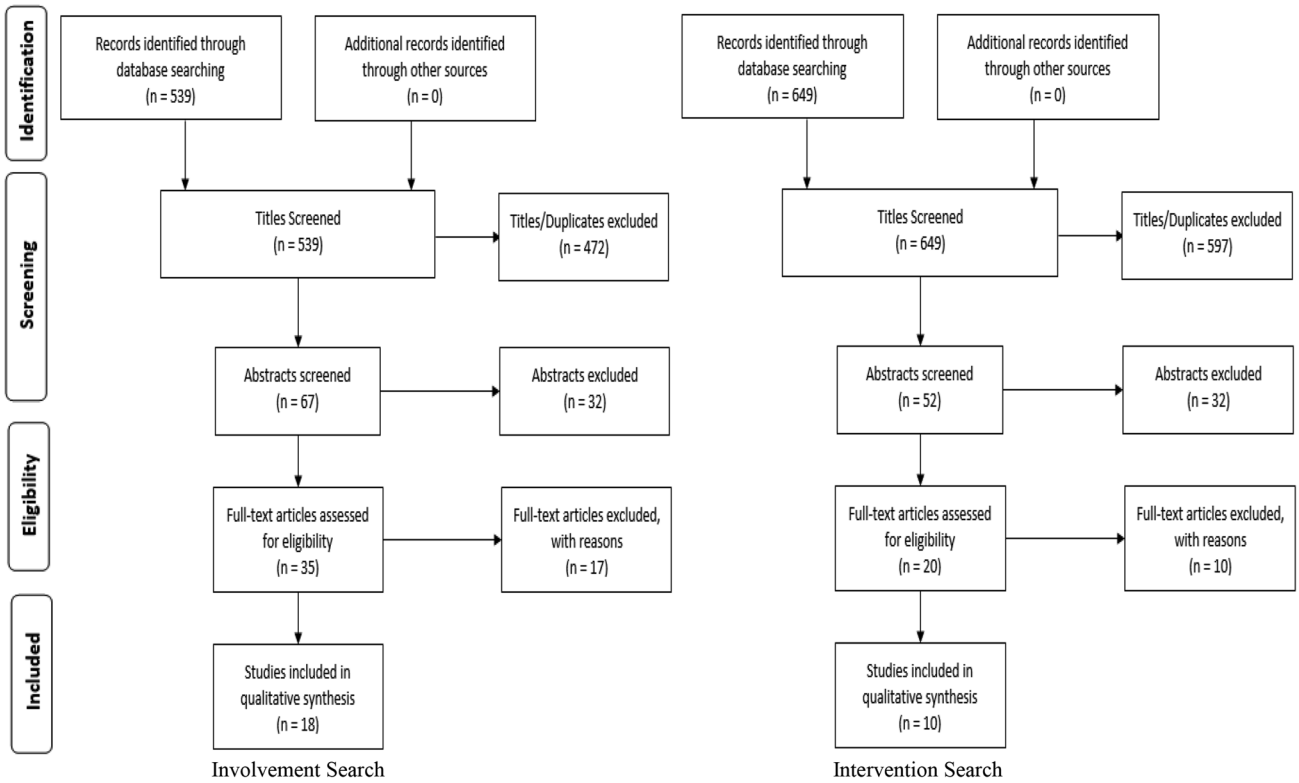

Fig. 1 PRISMA diagram for involvement article search and intervention article search

search, articles were screened out unless they met the former two criteria, in addition to a new third criterion: (3b) the outcome measures within the study captured some aspect of the fathers' involvement in caregiving, experience of caregiving, role in the family, or impact upon the family (outside the context of an intervention study).

Inclusion Criteria—Article Review

The following inclusion criteria were further utilized for potential involvement and intervention studies.

Peer Reviewed, Empirical Articles

First, all studies described original, empirical research and were published in a peer-reviewed journal. Case studies, editorial pieces, meta-analyses, or other systematic reviews were not included in the current review. Case studies were excluded because the primary aim of our review was to assess the frequency and extent to which research studies are designed to include a focus on fathers of children with ASD. Therefore, we aimed to include research on peer-reviewed, empirically designed studies that captured paternal involvement within the context of research on parents of children with ASD, rather than on instances in clinical practice. Meta-analyses were not included so as to avoid doubly including the results from articles that were featured within said meta-analyses.

Inclusion of Fathers of Children with ASD

To ensure that results were specifically applicable to children with ASD, any studies that combined developmental disabilities without differentiation when reporting results were not included. Further, to ensure that the results of the study specifically pertained to fathers, fathers must have been specifically mentioned in the Method and Results sections. If fathers were not distinguished from mothers (e.g., grouped together as 'couples' or 'parents'), gender differences must have been discussed in the Results section for a study to be included.

Measurement of Father Involvement

For involvement studies, some aspect of fathers' involvement must have been part of the variables of interest in the study as described in the Measures section of the manuscript. The measure(s) used must have captured some aspect of child-rearing (e.g., perceptions of being a parent, role/responsibilities as a parent) or parent–child interaction (e.g., quality/frequency of father–child play). As with the previously described criteria, the measure(s)

must have been administered to fathers and results must have described findings regarding how fathers performed on the measure/assessment.

For articles considered for the intervention category, participants' (either the fathers or children with ASD) engagement in a psychological, pharmacological, medical, or other evidence-based interventions commonly prescribed for children with ASD was verified during the full article review. Fathers could have been involved directly (e.g., were trained to implement home-based interventions) or indirectly (e.g., in a supportive role to help either the mother or children adhere to treatment procedures). If the father was involved indirectly, or was included in the intervention along with mothers, the impact of the fathers' involvement in the intervention must have been described in the "Results" section.

Results

Involvement Studies

Overall, 18 studies were identified that examined some aspect of father involvement in raising children with ASD (Tables 1 and 2). Of these studies, seventeen studies measured father involvement outside the context of an intervention study, while one study measured father involvement within the context of an intervention study. Inter-rater reliability was calculated at the title, abstract, and article stage of the process, and assessed whether both researchers agreed that a study should or should not be included. Each researcher identified if a title, abstract, or article met criteria and should be included in the next or final stage. In cases of disagreement between researchers, the researchers discussed their reasoning for inclusion or dismissal and made a decision together. Inter-rater reliability was calculated using Cohen's Kappa based on the number of abstracts or articles the researchers agreed upon before resolving those that were disagreed upon. Cohen's Kappa for the involvement studies each indicated Substantial agreement (Kappa = .60 to .77; Viera and Garrett 2005). Seventeen studies (94%) directly included fathers as participants in the study, whereas one study only measured mothers' perceptions of the fathers' involvement. Among these studies, sample sizes were relatively small with only four studies having more than 50 fathers in their samples. Eight studies included fewer than 20 fathers. Only five studies included fathers of TD children to serve as comparison groups. Only one study compared fathers' involvement with TD siblings to fathers' involvement with their children with ASD.

Sample Demographics of Involvement Studies

Child Age

The majority of the included studies targeted fathers of children with ASD younger than 8 years old. Only two studies had a mean age over 8 years (Hartley et al. 2011; Konstantareas and Homatidis 1992), and only three studies had a child age range that extended over age 14 years (Hartley et al. 2011; Johnson and Simpson 2013; Konstantareas and Homatidis 1992). Thus, relatively little is known about the experiences and involvement of fathers of adolescents and adults with ASD.

Child Gender

Male children with ASD predominated the samples of the reviewed studies. The Centers for Disease Control and Prevention (CDC) reports that males are four times more likely than females to be diagnosed with ASD (Baio et al. 2018), and this ratio is largely consistent with samples in studies that reported the gender composition of the children involved. Four studies had samples ranging from 70 to 75% male children, whereas three studies had samples ranging from 76 to 85% male children. Three studies had samples that were greater than 85% male children, whereas no studies reported samples of less than 70% male children. Six studies did not report child gender.

Race/Ethnicity

Overall 10 of the 18 articles in the involvement category included race/ethnicity information about the sample. The majority of these studies indicated that their sample was largely Caucasian (Bendixen et al. 2011; Flippin and Watson 2015; Hartley et al. 2011; Johnson and Simpson 2013; Meadan et al. 2015) or was entirely Caucasian (Robinson et al. 2015; Vacca 2013). Burkett et al. (2017) included only African-American families in their sample, while Laxman et al. (2015) examined race (Caucasian versus a different race) as a moderator in their study.

Methods of Involvement Studies

Each of the 18 involvement papers broadly fit into one of three categories: (1) Examination of fathers' experiences (six studies), (2) direct assessment of fathers' involvement (eight studies), and (3) examination of the relationship between the father and the mother as parents (four studies). Measurement methods included direct qualitative

Table 1 Participant demographics

Source	*N* of children (male:female)	Child age range and/or mean (in years)	Child diagnosis	Control group?	*N* of parents (mothers:fathers)
Intervention					
Bendixen et al. (2011)	19 (18:1)	3–8; *M* = 4.41	Autism	No	38 (1:1)
Donaldson et al. (2011)	NR	3–8	Autism	No	10 (0:10)
Elder et al. (2003)	4 (3:1)	3–7	Autism	No	8 (1:1)
Elder et al. (2011)	18 (17:1)	3–7; *M* = 4.41	Autistic Disorder	WL	36 (1:1)
Elfert & Mirenda (2015)	NR	3–15; *M* = 7.06	ASD	WL	12 (0:12)
Harris (1986)	30 (11:4)	NR	Autism	No	57 (10:9)
Heitzman-Powell et al. (2014)	NR	NR	Autism	No	7 (NR)
Seung et al. (2006)	8 (3:1)	4–7	Autism	No	16 (1:1)
Sofronoff & Farbotko (2002)	NR	6–12; *M* = 8.25	Asperger syndrome	WL	89 (45:44)
van Steensel & Bögels (2015)	79 (58:21)	7–18; *M* = 11.76	14 Autism; 16 Asperger Syndrome; 50 PDD-NOS	WL; ANX	135 (78:57)
Involvement					
Bendixen et al. (2011)	19 (18:1)	3–8; *M* = 4.41	Autism	No	38 (1:1)
Burkett et al. (2016)	8 (NR)	NR	ASD	No	13 (8:5)
Cheuk & Lashewicz (2016)	33 (28:5)	2–13	ASD	No	28 (0:28)
Cohen et al. (2013)	14 (5:2)	1.5; *M* = 1.5	Autistic Disorder	TD	28 (1:1)
Flippin & Watson (2014)	16 (3:1)	3.33–5.75; *M* = 4.44	ASD	No	32 (1:1)
Hartley et al. (2011)	91 (64:27)	11–46; *M* = 18.76	ASD	No	182 (1:1)
Johnson & Simpson (2013)	261 (200:53)	2–24; *M* = 7.8	ASD	No	261 (261:0)[a]
Kayfitz, Gragg, & Orr (2010)	23 (19:4)	5–11; *M* = 7.39	ASD	No	46 (1:1)
Konstantareas (1992)	7:9	40–151 mos.; *M* = *98.1* mos.	16 ASD, 16 ID, 16 TD	No	96 (1:1)
Laxman et al. (2015)	50 (NR)	9 mos. (Time 1) and 4 yr. (Time 2)	ASD	TD/OD	100 (1:1)
May et al. (2015)	NR	<13	ASD	No	152 (80:72)
Meadan, Stoner, & Agnell (2015)	7 (7:0)	4–8	ASD	No	7 (0:7)
Ostfeld-Etzion et al. (2016)	39 (34:5)	3–6; *M* = 5.28	ASD	TD	78 (1:1)
Ozturk, Riccadonna, & Venuti (2014)	NR	*M* = 7.29	ASD	No	99 (50:49)
Pisula & Kossakowska (2010)	26 (19:7)	3.5–7; *M* = 5.12	Autism	TD	52 (1:1)
Robinson et al. (2015)	8 (3:1)	11–19	Asperger's syndrome	No	13 (8:5)
Shave & Lashewicz (2016)	NR	2–12	ASD	No	28 (0:28)
Vacca (2013)	NR	NR	ASD	No	8 (0:8)

M Mean, *NR* not reported, *WL* waitlist, *ANX* anxiety disorders, *PDD-NOS* pervasive developmental disorder-not otherwise specified, *DD* developmental delay, *ID* intellectual disability, *TD* typically developing, *OD* other type of disability

[a]Mothers reported their perceptions about the involvement of their spouses

interviews, self-report via surveys or diaries, and direct observation of fathers.

Direct Qualitative Interviews

The most common methods of assessing fathers were direct qualitative interviews (Burkett et al. 2017; Cheuk and Lashewicz 2016; Meadan et al. 2015; Robinson et al. 2015; Shave and Lashewicz 2016; Vacca 2013). Five of the interview studies considered fathers' experiences about being a parent of a child with ASD and their self-reported roles and/or responsibilities. Burkett et al. (2017) reported qualitative themes related to respect, religious faith and responsibility, and the care of their child in African-American single-mother families and two-parent family homes.

Self-report

Quantitative survey studies were also commonly used to assess fathers (Hartley et al. 2011; Kayfitz et al. 2010;

Table 2 Study outcomes involving fathers

Source	Intervention type	Role of father	Measures	Child outcomes	Parent outcomes
Intervention					
Bendixen et al. (2011)	In-Home Parent Training with Fathers	Fathers trained by 2nd author; Fathers then trained mothers; Fathers directly engaged in play sessions with child	Family Adaptability and Cohesion Scales II; Parenting Stress Index-Short Form	–	No changes in fathers' FACES-II Adaptability or Cohesion at posttest, though a significant decrease in PSI-SF Total score Significant decrease in mothers' PSI-SF Total, Parental Distress, and Difficult Child scores at posttest Significant differences in FACES-II Adaptability between fathers and mothers at pre- and post-test
Donaldson et al. (2011)	Father Directed In-Home Training (FDIT)	Interviewee	Questions regarding father's thoughts about training and their view of their parent–child relationship	–	Direct benefits of FDIT including an increase in communication and learning how to help their child learn Indirect benefits included the quality time spent with child (i.e., increased father involvement)
Elder et al. (2003)	In-Home Parent Training with Fathers	Direct play sessions with child	Direct observation of parent and child behavior	–	Expectant waiting difficult for fathers to learn, but response frequency increased in 3 out of 4 father-child dyads Initially difficult, but fathers reported feeling more empowered to assume direct care roles after training
Elder et al. (2011)	In-Home Parent Training with Fathers	PI trained fathers; Fathers were then instructed to train mothers; Fathers directly engaged in play sessions with child	Direct observation of parent and child behavior	Increases in child initiation and non-speech vocalizations	Increases in frequency of imitation with animation, expectant waiting, and commenting on child by father Mothers significantly increased in imitation with animation, expectant waiting, and following child's lead
Elfert & Mirenda (2015)	8-week Support Group	Attended sessions	BDI-II; DAS; LOT-R; PSI; WCQ	–	No significant changes in father report pre to post across measures Decrease in Self-Controlling subscale on WCQ from posttest to follow up
Harris (1986)	4-7 year follow-up on an intensive 10-week workshop	Attended sessions	Three questionnaires: Workshop ratings, use of behavioral procedures, and current optimism regarding the child	–	No differences between mothers and fathers in frequency of using behavioral strategies to manage or teach Link found between mothers' and fathers' use of strategies; if mothers did not use the strategies or if they encountered problems, fathers reported similar experience/difficulty No difference between mothers and fathers in assessment of workshop; generally high satisfaction

Table 2 (continued)

Source	Intervention type	Role of father	Measures	Child outcomes	Parent outcomes
Heitzman-Powell et al. (2014)	OASIS Training Program via Telemedicine	Participated in web-based sessions	Problem Behavior Recording (PBR) form; Incidental Teaching Checklist; Parent skill assessment of ABA strategies; Parent knowledge assessment of autism and ABA strategies	–	Increase in knowledge and performance of ABA strategies pre- to post-intervention Cost savings: $M = 2263$ miles not driven, per family High satisfaction with training tutorials and coaching sessions
Seung et al. (2006)	In-Home Parent Training with Fathers	PI trained fathers; Fathers were then instructed to train mothers; Fathers directly engaged in play sessions with child	Direct observation of parent and child behavior	Increase use of single and different words by children	Decrease in ratio of parent–child utterances Increase in imitation by parents Fathers and mothers did not differ in their ability to learn skills
Sofronoff & Farbotko (2002)	Parent Management Training (PMT)	Attended individual sessions or one day workshop	ECBI; Parental self-efficacy in the management of Asperger syndrome questionnaire	Fewer behavior problems in children	Increased self-efficacy compared to control group at 4 wk. and 3 mo. follow-up Parents in control group exhibited a decrease in their levels of self-efficacy Significantly greater increase in self-efficacy for mothers compared fathers
van Steensel & Bögels (2015)	Individual and Family CBT for Anxiety	Both parents attended therapy sessions	ADIS-C/P; CBCL; CSBQ; EQ-5D; SCARED-71	CBT more effective for children with ASD than waitlist 61% of children with ASD were free of primary anxiety disorder	–
Involvement					
Bendixen et al. (2011)[a]	–	Direct report on questionnaires	FACES-II; PSI-SF	–	No changes in fathers FACES-II Adaptability or Cohesion at posttest, though a significant decrease in PSI-SF Total score Significant decrease in mothers' PSI-SF Total, Parental Distress, and Difficult Child scores at posttest Significant differences in FACES-II Adaptability between fathers and mothers at pre- and post-test
Burkett et al. (2016)	–	Directly interviewed	Field observations; interview	–	Respect from Others and Faith in God emerged as qualitative themes Mothers provided watchful care of their child with ASD while fathers provided protective care

Table 2 (continued)

Source	Intervention type	Role of father	Measures	Child outcomes	Parent outcomes
Cheuk & Lashewicz (2016)	–	Directly interviewed	Interview	–	Fathers were attentive to their children's development and expressed gratitude for their child's capabilities, but also sometimes reported jealousy toward fathers of TD children
Cohen et al. (2013)	–	Direct interaction during home videos	Coded parent–child interaction during home videos	–	Prior to autism diagnosis, fathers of infants diagnosed with ASD spoke to their infants more often than fathers of TD infants Mothers and fathers did not differ in number of responses they induced in their infant, but in type of response
Flippin & Watson (2014)	–	Direct interaction during parent–child play sessions	Coded parent–child interaction	Children initiated more leads with mothers than fathers during play	Fathers were less responsive than mothers to child verbal responses
Hartley et al. (2011)	–	Direct report on questionnaires	Burden Interview; MSQFOP; Positive Affect Index; VABS	–	No difference in parenting burden between mothers and fathers Martial satisfaction inversely related to parenting burden Mothers reported more feelings of closeness to child than fathers Fathers of an adult with ASD felt a closer relationship with their son or daughter than fathers of an adolescent son or daughter Child health related to paternal burden more strongly than maternal burden
Johnson & Simpson (2013)	–	Mothers reported on fathers	FFFS; PSS:A	–	Compared to married mothers, unmarried mothers with no participating partner had higher stress related to work demands and child care and more discrepancy in family functioning expectations
Kayfitz et al. (2010)	–	Direct report on questionnaires	PCS; PSI	–	Mothers reported significantly more positive experiences than fathers Father report of positive experiences negatively correlated with maternal stress

Table 2 (continued)

Source	Intervention type	Role of father	Measures	Child outcomes	Parent outcomes
Konstantareas & Homatidis (1992)	–	Direct report	Each parent independently reported # of minutes directly involved with child	–	Mothers reported being involved longer than fathers across all groups Fathers of children with ASD less involved than fathers of children with ID Both mothers and fathers reported activities as less fun compared to parents of TD children
Laxman et al. (2015)	–	Direct report on questionnaires	Center for Epidemiological Studies- Depression Scale; Direct report of engagement with activities	–	In ASD group, greater father literacy and responsive caring when children were 9 mos. old related to lower maternal depression when children were 4 yrs. old Paternal involvement not associated with maternal depression in fathers of TD children or children with another type of disability
May et al. (2015)	–	Direct report on questionnaires	APQ; PAM; PSI	–	Coparenting quality was a correlate of parenting stress in mothers and fathers Coparenting quality mediated relation between parents' perceived parenting ability and parenting stress
Meadan et al. (2015)	–	Direct report	FQOL; Interview	–	Fathers reported they were satisfied or very satisfied on 23/25 statements on the FQOL Fathers identified their ability to adapt and remain a family unit as essential
Ostfeld-Etzion et al. (2016)	–	Direct interaction with child	Child and parent behavior micro-coded; Children's Behavior Questionnaire	–	No difference in ASD and TD groups in parental disciplinary style Fathers demonstrated less directive support and were less actively involved than mothers, but no differences in harsh control or over involvement
Ozturk et al. (2014)	–	Direct report on questionnaires	PSI; PSQ; SCL-90-R; SPPR	–	No differences in perception of parental role Mothers higher in Social Exchange scale on Parental Style Questionnaire

Table 2 (continued)

Source	Intervention type	Role of father	Measures	Child outcomes	Parent outcomes
Pisula & Kossakowska (2010)	–	Direct report on questionnaires	SOC-29; WCQ	–	Sense of coherence, meaningfulness, and manageability were lower and escape-avoidance coping was used more often by parents of children with ASD than TD No differences in sense of coherence between mothers and fathers
Robinson et al. (2015)	–	Direct report	Interview	–	Mother and fathers perceived great difficulty gaining the help and support needed. Many reported receiving inaccurate diagnoses. Only one family reported a relatively straightforward path to an ASD diagnosis for their child Mothers and fathers reported the importance of balancing expectations and parental roles; often mothers were primary caregivers and fathers were supportive.
Shave & Lashewicz (2016)	–	Direct report	Interview	–	Fathers were responsive and reported revising and redefining expectations following diagnosis Valued recreational support involving their child Were open to mentoring those in the early or new stage of diagnosis
Vacca (2013)	–	Direct report	Interview	–	After initial surprise of diagnosis, fathers reported relief because of early intervention opportunities Fathers reported feeling that everything needed to be done correctly for their child to be successful

ABA Applied behavior analysis, *ADIS-C/P* anxiety disorders interview schedule-child and parent, *APQ* Autism: parenting questionnaire, *BDI-II* beck depression inventory-II, *CBCL* child behavior checklist, *CSBQ* children's social behavior questionnaire, *CES-D* Center for Epidemiological Studies-Depression, *DAS* Dyadic Adjustment Scale, *ECBI* eyberg child behaviour inventory, *EQ-5D* EuroQol 5-D, *FACES-II* Family Adaptability and Cohesion Evaluation Scales II, *FFFS* feetham family functioning survey, *FQOL* Family Quality of Life Scale, *LOT-R* life orientation test-revised, *MSQFOP* marital satisfaction questionnaire for older persons, *PAIR* personal assessment of intimacy in relationships, *PAM* parental alliance measure, *PI* principle investigator, *PCS* positive contributions survey, *PSI* parental stress index-short form, *PSQ* parental style questionnaire, *PSS:A* Parenting Stress Scale: Autism, *SCARED-71* screen for child anxiety related emotional disorders-71, *SCL-90-R* the symptom checklist-90-revised, *SOC-29* sense of coherence-29, *SPPR* the self-perceptions of the parental role, *VABS* Vineland Adaptive Behavior Scale, *WCQ* ways of coping questionnaire, *TD* typically developing

[a]Bendixen et al. (2011) meet criteria for inclusion into both the involvement and intervention searches

Laxman et al. 2015; May et al. 2015; Pisula and Kossakowska 2010). Most survey studies included perspectives from both mothers and fathers who each self-reported their own experiences. However, one study asked mothers to report on fathers (Johnson and Simpson 2013). Konstantareas and Homatidis (1992) asked fathers to keep a diary of each time they were involved in parenting their child and record how long they spent parenting in each instance.

Direct Observation of Fathers

Only four studies directly observed fathers' behaviors when interacting with the child or the family (Bendixen et al. 2011; Cohen et al. 2013; Flippin and Watson 2015; Ostfeld-Etzion et al. 2016).

Outcomes of Involvement Studies

Fathers' Experiences

One pattern evident across several of the articles was a focus on understanding fathers' experiences as a parent of a child with ASD, primarily via qualitative interviews. According to Cheuk and Lashewicz (2016) and Shave and Lashewicz (2016), fathers commonly reported altered expectations in their role as parents after their child received a diagnosis. For instance, many fathers reported being more aware of their child's development and feeling that there was greater need for them to be involved in daily childcare routines (Cheuk and Lashewicz 2016). Commonly, when fathers' perceptions were examined, their experiences of parenting a child with ASD did not appear to be drastically different from that of mothers. For instance, fathers may experience similar levels of burden as mothers, though their levels of burden may be more related to the child's physical health compared to mothers' (Hartley et al. 2011). Similarly, Ozturk et al. (2014) did not find differences in mothers' and fathers' perceptions of the amount of stress they experience as parents.

Direct Measurement of Fathers' Involvement

Among the 18 involvement studies reviewed, eight directly measured fathers' involvement. Five of these nine studies assessed fathers' self-reported perceptions of their own involvement. Fathers in Shave and Lashewicz's (2016) study reported difficulty finding the balance between traditional masculine roles and roles as caregivers in the household. This was also evident in Vacca (2013), where a higher percentage of fathers identified their primary role as financial provider rather than as caregiver. Encouragingly, however, 75% of fathers within the same study identified themselves as a caregiver and reported assuming this role to some degree (Vacca 2013). Moreover, fathers in the study by Shave and Lashewicz (2016) reported a desire to be involved in their child's life and help give their partners respite from childcare.

Only one study investigated longitudinal outcomes related to fathers' involvement. Laxman et al. (2015) examined how paternal involvement when their child was 9 months old related to maternal depression when the child was 4 years old. In areas such as literacy involvement (i.e., fathers' engagement in reading or other language activities with their child) and responsive caregiving (i.e., non-routine caregiving needs), greater paternal involvement was related to fewer depressive symptoms in mothers at follow-up, but only among families of children with ASD and not among families of TD children (Laxman et al. 2015).

Another topic examined was differences in the amount and type of involvement between mothers and fathers. Several studies suggest that fathers may play a more indirect role in their child's life (e.g., providing financial support to the family, helping with parental decisions), whereas mothers may be more involved in direct social exchanges with the child (e.g., comforting, smiling with the child; Ozturk et al. 2014). Similar results were found by Ostfeld-Etzion et al. (2016) in which fathers demonstrated less direct support and were less likely to be involved during videotaped interactions with their child compared to mothers. One other study suggested that fathers of children with ASD spend less time in caregiving tasks relative to parents of TD children (Konstantareas and Homatidis 1992). A similar theme has appeared in qualitative analyses as well: mothers report being the primary caregiver, with fathers supporting the mother through advocating with professionals, helping with decision making, and giving mothers a break from parenting (Robinson et al. 2015). Similarly, other research indicated potential qualitative differences in parent–child interactions. For example, fathers, compared to mothers, may use less parentese (i.e., "baby talk"), may speak less frequently to infants who later develop ASD (Cohen et al. 2013), and may be less verbally responsive to their children (Flippin and Watson 2015). Interestingly, however, Ostfeld-Etzion et al. (2016) found that patterns of involvement of fathers of children with ASD did not vary from fathers of TD children. Likewise, Pisula and Kossakowska (2010) found that fathers of TD children and fathers of children with ASD did not differ in amount of time spent on childcare. These two recent findings contradict the early literature that suggested fathers of children with ASD spend less time on childcare, potentially suggesting that paternal involvement in ASD has been increasing over time.

Father's Relationship with the Mother

Finally, some studies explored how father–child and mother–child relationships may affect the other parent,

including how paternal involvement or the quality of the father–child relationship may impact the mother. One study found that level of closeness between the father and child, but not the mother and child, may positively impact marital satisfaction (Hartley et al. 2011). Similarly, Kayfits et al.'s (2010) study found that fathers' reports of positive experiences as a parent of a child with ASD was negatively correlated with maternal distress.

Other studies have examined the potential impact of shared responsibilities between parents on mothers. In a study conducted by May et al. (2015), the quality of the co-parenting relationship was related to stress in both mothers and fathers. Moreover, marital status may influence levels of parenting burden faced by mothers of children with ASD—regardless of their level of involvement, married mothers reported reduced child- and work-related stress and reduced discrepancy between the amount of help they report needing and receiving from spouses and other family members (Johnson and Simpson 2013). Similarly, Burkett et al. (2017) found that single mothers more frequently reported having to turn to outside sources of support for help in contrast to two parent homes where responsibilities were shared between the two parents.

Intervention Studies

After review, ten articles were found to involve fathers in intervention with their children with ASD. Inter-rater reliability was calculated in the same manner as described above, with calculations completed at the abstract and article stages based on the initial number of studies agreed upon. Cohen's Kappa for the intervention studies ranged from Moderate (Kappa = .54) to Substantial agreement to (Kappa = .77; Viera and Garrett 2005). Five studies (50%) utilized an in-home training program with fathers. Among the ten studies, six compared fathers to mothers in some manner (Bendixen et al. 2011; Elder et al. 2011; Harris 1986; Heitzman-Powell et al. 2014; Seung et al. 2006; Sofronoff and Farbotko 2002), while two studies had control groups (Elder et al. 2011; Sofronoff and Farbotko 2002). Sample sizes in these studies were consistently small, with only two studies (Harris 1986; Sofronoff and Farbotko 2002) including more than 20 fathers.

Sample Demographics of Intervention Studies

Age

The majority of studies focused on younger children (ages 3–8 years, Table 1). One study had a wider age range from early childhood through adolescence (ages 3–15 years; Elfert and Mirenda 2015), whereas another study focused on middle childhood (ages 6–12 years; Sofronoff and Farbotko 2002). Lastly, one study had a mean age greater than 10 years and targeted middle childhood through young adulthood (ages 7–18 years; van Steensel and Bögels 2015). One follow-up study reported the ages of children at the start of treatment, but did not report the ages of the children during the follow-up data collection time point (Harris 1986).

Gender

Four studies reported gender of the children with ASD in their samples, which were largely male (75–95% percent male). Thus, gender ratios within these studies appear to be relatively consistent with the CDC's estimates of males being four times more likely than females to be diagnosed with ASD (Baio et al. 2018).

Race/ethnicity

Most studies that reported race did so for the fathers and children separately, without including information on the racial makeup of each individual dyad. Five of these studies reported the majority of their sample was Caucasian, ranging from 72 to 90%. Elder et al. (2003) aimed to examine single case design implementation of interventions across four different ethnic groups that included African-American, Asian-American, Anglo-American, and Latino families.

Measured outcomes of intervention studies

Nine of the ten intervention studies examined fathers who were directly involved in the intervention process, either as primary agents of intervention for their child or as participants in a support group or workshop. All nine of these studies provided quantitative results. Seven of the nine studies also included mothers. Donaldson et al. (2011) examined fathers' perceptions post-intervention through interviews, rather than directly measuring their implementation skills or child outcomes, and provided qualitative results.

Methods of Intervention Studies

In-home Intervention

Five of the ten studies utilized an in-home training program for fathers, making this the most common method of intervention across studies. Specifically, Elder et al. (2003, 2011), and Seung et al. (2006) taught fathers imitation with animation and expectant waiting. The researchers taught fathers the two skills separately; fathers then practiced during father-child play sessions, and received feedback using videotapes from their play sessions. Bendixen et al. (2011) focused on teaching fathers how to improve child social reciprocity and communication skills. In Elder et al. (2011) and

Bendixen et al. (2011), fathers were instructed on how to use these strategies during everyday interactions with their child, and how to train mothers to also use the strategies. Finally, Donaldson et al. (2011) followed up with parents post-training to gain an understanding of parents' relationships with their child and parents' thoughts about the training intervention.

Parent Groups and Workshops

Sofronoff and Farbotko (2002) compared a one-day workshop to six individual sessions aimed to improve self-efficacy in mothers and fathers of children with ASD in the management of behavior problems with a non-intervention control group. Harris (1986) conducted a follow-up study 4 to 7 years after a 10-week intensive workshop teaching mothers and fathers behavior modification and operant speech strategies. Lastly, Elfret and Mirenda (2015) focused only on fathers with ASD and conducted an 8-week support group where fathers could share experiences and feelings, and gain access to resources.

Telemedicine

Heitzman-Powell et al. (2014) also focused on mothers and fathers (fathers as the secondary trainee), but utilized a telemedicine approach. Specifically, the OASIS Training Program (Online and Applied System for Intervention Skills; Buzhardt and Heitzman-Powell 2005) was adapted to reach parents at a distance. The goal of the intervention was to increase knowledge and understanding of Applied Behavior Analysis (ABA) principles through web-based modules and supervised hands on training.

Family Intervention

van Steensel and Bögels (2015) took a family intervention approach and targeted anxiety in children with ASD. Specifically, they combined a version of a family and an individual CBT intervention that they called *Discussing + Doing = Daring* (Bodden et al. 2008), which included the parents and the child.

Treatment Fidelity of Intervention Studies

Of the nine studies that directly involved fathers in the intervention process, five provided some indication of treatment fidelity/adherence. Harris (1986) found that fathers used intervention strategies less than mothers at follow-up more than 4 years after initial training sessions. However, Seung et al. (2006) found no differences between mothers and fathers in implementing intervention strategies in their study. Elder et al. (2011) found that fathers implemented training procedures successfully as indicated by increases in their use of the skills taught in their training modules. Heitzman-Powell et al. (2014) and Elder et al. (2011) reported high treatment fidelity in fathers implementing techniques taught within their respective interventions, while Elfert and Mirenda (2015) reported high attendance to support group sessions. Elder et al. (2003) reported that some intervention techniques taught to fathers were successfully implemented, while other strategies were more difficult for fathers to learn and implement. Several studies did not comment on treatment fidelity or adherence (Bendixen et al. 2011; Donaldson et al. 2011; Sofronoff and Farbotko 2002).

Assessment of Outcomes of Intervention Studies

Frequency of Child Behaviors and Skills Used by Parents

Three of the five studies that used the in-home teaching method with fathers (Elder et al. 2003, 2011; Seung et al. 2006) assessed the frequency that fathers and mothers used the skills they were taught post-intervention (e.g., imitation and expectant waiting), as well as the frequency of desirable behaviors in the child following the intervention. Specifically, Seung et al. (2006) examined the ratio of parent–child utterances, the use of words by children, and the frequency that parents used imitation and expectant waiting. Elder et al. (2011) also examined a speech and language component, but assessed child initiation and non-speech vocalizations as well as the frequency that fathers commented on their child. Although Elder et al. (2003) assessed the frequency that fathers used the skills they were taught, the authors conducted a multiple baseline single subject study to examine the ability of fathers in four major ethnic groups to learn during in-home intervention. Sofronoff and Farbotko (2002) measured parental self-efficacy in the management of their child and the frequency of behavior problems in the children following the workshop or the individual sessions. Harris (1986) measured use of behavioral procedures by mothers and fathers four to seven years following the workshop the parents attended.

Parental Stress, Anxiety and Family Functioning

Bendixen et al. (2011) measured parental stress and family adaptation and cohesion pre- and post-intervention in mothers and fathers. Elfret and Mirenda (2015) assessed father stress and depression, quality of marital relationships, and coping skills following their support group, while van Steensel and Bögels (2015) measured child and parent anxiety and family functioning in the ASD and non-ASD groups.

Knowledge, Satisfaction, and Experiences

Harris (1986) measured use of behavioral procedures, parents' optimism regarding their child, and thoughts and perceptions about the workshop the parents attended. Another study, conducted by Heitzman-Powell et al. (2014), measured knowledge and performance of techniques pre- to post-intervention, satisfaction with the training, and the cost savings of conducting an intervention via telemedicine. Donaldson et al. (2011) interviewed participants about their perspectives and experiences, and identified themes suggestive of direct and indirect benefits of the in-home father intervention.

Impact of Fathers in Intervention Studies

A theme identified across studies that directly included fathers in intervention sessions was that fathers appear to be successful as primary intervention agents. As previously mentioned, these studies focused primarily on increasing fathers' engagement with their children and improving overall social interaction. Specifically, Elder et al. (2011) found increases pre- to post-intervention in paternal intervention skills and an increase in child verbal communication and imitation behavior when fathers implemented the intervention. Both Elder et al. (2003) and Bendixen et al. (2011) found that paternal outcomes varied across individuals, but were positive overall. For example, some fathers exhibited difficulty with certain skills (e.g., expectant waiting) more than others, but all fathers were able to increase child involvement (Elder et al. 2003). Bendixen et al. (2011) found that fathers were positively influenced by the intervention in the form of decreased stress, but the large differences in their initial stress made interpretation of intervention results difficult. Donaldson et al. (2011) indicated that in-home training impacted the fathers both directly (e.g., increased knowledge of how to interact with and increase communication with their child) and indirectly (e.g., more quality time spent with child). Unfortunately, the support group conducted by Elfret and Mirenda (2015) yielded no changes in depression, optimism, marital satisfaction, or coping skills from pre- to post-intervention. However, increases were observed from pre-intervention to the four-month follow-up in paternal self-control coping, the ability to regulate one's own feelings and actions. Elfret and Mirenda (2015) suggested this result may have been due to the fathers' increased ability to share their experiences about being a father of a child with ASD. In sum, results are mostly consistent across different types of interventions: fathers experienced positive effects and were successful in implementing treatment. This suggests that fathers not only have the ability to provide intervention techniques, but that they too may experience benefits from this involvement.

Impact on Mothers in Intervention Studies

Overall, studies that included mothers as secondary intervention agents, or alongside fathers as co-interventionists, observed positive effects on mothers. Fathers successfully trained mothers in intervention techniques while following instruction from a researcher, which resulted in increased mother–child interactions during play sessions (Elder et al. 2011; Seung et al. 2006). This suggests that it may be sufficient for one parent to learn the intervention and then teach the other parent when instructed and trained to do so. Moreover, paternal involvement resulted in decreased parental stress and increased family adaptability in mothers (Bendixen et al. 2011).

Comparisons Between Fathers and Mothers

When studies compared fathers and mothers, results demonstrated no drastic differences in the ability to learn intervention skills focused on social reciprocity and communication (Seung et al. 2006). However, some differences in parenting dynamics were observed. For example, Bendixen et al. (2011) found that while maternal adaptability increased when fathers were more involved in treatment, paternal adaptability remained the same. Additionally, both mothers and fathers reported a decrease in parental stress related to the increase in paternal involvement. Regarding child outcomes specifically, Elder et al. (2011) found similar child behaviors across mother and father play sessions, with increases in the child's social behavior frequency from pre- to post-intervention in interactions with either parent. Sofronoff and Farbotko (2002) found that mothers and fathers both reported decreases in child problem behaviors after receiving parent training. In this same study, maternal self-efficacy in managing their child increased, whereas paternal self-efficacy did not change at any point. As mothers are often the primary caregiver (e.g., Robinson et al. 2015), these results may be due, in part, to fewer opportunities for fathers to practice or implement these strategies. In a study by Heitzman-Powell et al. (2014), fathers were included as the secondary trainee during a telemedicine training program. Although these fathers exhibited slightly less improvement than mothers (i.e., the primary trainees), they successfully implemented the intervention and improved their ABA skills by 36.3 percentage points. This suggests that even if fathers are unable to be a primary interventionist, exposure to some, or part, of training may still be beneficial (Heitzman-Powell et al. 2014). The studies reviewed here provide evidence that fathers can be equally capable and successful when implementing intervention with their children with ASD.

Discussion

Summary of Findings

The current review aimed to understand the frequency and quality of paternal involvement in research on children with ASD. Regardless of whether studies measured paternal involvement in childrearing activities or clinical services, fathers are not often included in research on children with ASD. However, the few studies in this area suggest that one should take caution in any assumptions that fathers are disinterested in being involved. Specifically, some research suggests that fathers of children with ASD desire to be highly involved in their children's care (Meadan et al. 2015) and believe that being involved with their child's education is important (Potter 2016). It is noteworthy that this desire for and efforts toward increased involvement may be an evolving phenomenon, given that older literature suggested that fathers of children with ASD spent less time parenting relative to fathers of TD children (Konstantareas and Homatidis 1992). Although this gap appears to be closing according to more recent literature (Ostfeld-Etzion et al. 2016; Pisula and Kossakowska 2010), research maintains that fathers may continue to experience some difficulty reconciling the need to be involved as caregivers with preserving traditionally masculine roles (Shave and Lashewicz 2016). Moreover, while recent paternal involvement in caregiving is often high overall, fathers' involvement with their children tends to be more indirect and contain fewer parent–child social interactions, relative to mothers (Cohen et al. 2013; Flippin and Watson 2015; Ostfeld-Etzion et al. 2016; Ozturk et al. 2014).

Similarly, fathers may show a preference for more active, physical play activities with their children (e.g., Creighton et al. 2015; John et al. 2013), and the social-communication difficulties inherent in ASD may enhance such inclinations toward more physical play. As such, fathers may benefit from guidance on ways to harness these interactions to best promote social engagement and skill building. Moreover, specific assistance in this area may be particularly beneficial given the wealth of research on the broader autism phenotype and the findings that some parents of children with ASD (particularly fathers) may experience mild, subclinical traits of the disorder (e.g., mild impairments in social and communication skills; Gerdts and Bernier 2011; Murphy et al. 2000; Piven et al. 1997). Together, these findings highlight potentially important targets for efforts aimed at assisting fathers in tailoring their parental involvement when they have a child with ASD. When trained, fathers often are successful when implementing interventions meant to increase parent–child engagement and improve children's socio-communicative skills (Elder et al. 2003, 2011; Donaldson et al. 2011), and differences in outcomes when fathers were the recipients of parent training compared to mothers were relatively minor. Furthermore, involvement of fathers in general and/or in intervention likely has secondary positive impacts on mothers and on the mother–father relationship (e.g., Bendixen et al. 2011; Hartley et al. 2011). Thus, the literature reviewed here strongly supports efforts to assist fathers in their involvement in intervention and general caregiving.

Nevertheless, as alluded to above, this literature base remains limited. Many of the reviewed studies featured small samples and measured similarly related involvement outcomes. Moreover, the literature on fathers tends to measure paternal involvement with children with ASD when the children are around 3 years of age, and most of the attempts to engage fathers in interventions have been through the same parent-training paradigm (i.e., behavioral parent training). Additionally, none of the studies reviewed in this paper examined the potential for additive effects of paternal involvement. Fathers either trained mothers or mothers participated in the intervention alongside fathers. For example, Heitzman-Powell et al. (2014) included fathers as secondary trainees, but did not examine differences between intervention results when only mothers were included versus when mothers and fathers were involved in the intervention. Although Heitzman-Powell and company (2014) concluded that fathers benefited from intervention, no comparison group was included. As such, future research is needed to understand the extent to which fathers of children with ASD can provide approaches beyond those provided by mothers, and, as demonstrated in other areas of childhood psychopathology (Panter-Brick et al. 2014), attempts to include fathers in intervention must consider a range of interventions and different approaches.

Although somewhat preliminary, the limited literature on fathers of children with ASD suggests that improving paternal involvement in intervention is related to better outcomes for both father and child (Lundahl et al. 2008; May et al. 2013). Considering fathers' desires for increased involvement, it remains difficult to discern whether the limited paternal involvement in childrearing and interventions for children with ASD is due, at least in part, to the nature of the socially-driven roles commonly assumed by fathers or is a result of artificial barriers imposed (purposefully or not) by service providers and researchers in the field.

Barriers to Involvement

Despite the benefits of increasing paternal involvement, attempts to increase the involvement of fathers face many barriers. Although this issue may be changing with increased direct involvement of fathers during the child rearing

process, outdated gender-norms about mothers' roles as caregivers and fathers' roles as financial providers may preclude fathers from becoming involved with child rearing (Pleck and Masciadrelli 2004). The provider-caregiver balance that fathers often assume may present challenges to childrearing in general, and to scheduling research or intervention participation (Lamb 2010; Phares et al. 2006). Indeed, scheduling issues often arise when researchers and clinicians attempt to collect data from fathers (Fabiano 2007), and having time to connect with service providers is important for paternal involvement (Carpenter and Towers 2008). Other suggested barriers include a lack of interest in research topics and a lack of willingness to focus on skill deficits among fathers (Fabiano 2007). Fathers' individual characteristics may also be important. For example, Gavidia-Payne and Stoneman (1997) found that fathers who were less educated and less financially secure, and who used fewer coping strategies like seeking social support and turning to religion, were less likely to be involved in services for their children.

Other Theories for Paternal Absence from ASD Literature

Although there are valid barriers to paternal involvement in intervention, there are also investigator-driven barriers that preclude the inclusion of fathers in research with this population. For example, Fabiano (2007) noted that clinicians often rely solely on maternal report and do not ask for paternal report or paternal involvement in their work. One possible explanation for this tilt is that the majority of practitioners in related fields are women (e.g., 82% of social workers, 98% of school-based speech-language pathologists, and 97% of preschool and kindergarten teachers being females; American Speech-Language-Hearing Association 2018; Bureau of Labor Statistics, U.S. Department of Labor, 2016–2018), and some have suggested that female early interventionists may be more comfortable working with mothers (Lazar et al. 1991). However, a more recent study indicates this trend may be changing and service providers are including fathers in therapy more equally (Duhig et al. 2002). Lamb (2010) suggested that professionals historically ignore fathers' roles and continue to do so out of habit. Many professionals hold the assumption that fathers are more difficult to assess as they attend therapy sessions less frequently and that mothers are more available (Duhig et al. 2002; Phares 1992). This assumption may reduce the likelihood of practitioners communicating with fathers, and the quality of communication with practitioners may affect paternal involvement (Carpenter and Towers 2008). Some studies have found fathers of children with ASD to be dissatisfied with the amount of communication they receive from professionals and schools regarding their children (League and Ford 1996). While scheduling is a valid and understandable challenge, many fathers with schedules that precluded their involvement in school meetings report desires to be present in meetings related to their children's education (Carpenter and Towers 2008; Turbiville and Marquis 2001).

Ways to Overcome Barriers

All in all, these findings suggest that while barriers to paternal involvement exist, clinicians may not be doing all that they can to circumvent these barriers. Indeed, Fagan and Iglesias (1999) found that twice as many fathers became involved when specifically solicited for interventions compared to those not specifically solicited (52% vs. 27%, respectively). According to Fagan et al. (2007), when a formal paternal component of an intervention is implemented, fathers' participation in program activities increases significantly. However, Flippin and Crais (2011) warn that the aim of procuring paternal involvement must focus on avoiding misperceptions from fathers that they are to take over the responsibility from mothers, but rather to simply include fathers and encourage co-parenting. Within the context of intervention, mothers' and fathers' needs and interests may be quite different (Hadadian and Merbler 1995b). For instance, Turbiville and Marquis (2001) found that fathers prefer to be involved in their children's education through activities that include all family members and are less likely to participate when activities were offered to men only (e.g., men's support group). Palm and Fagan (2008) suggest that professionals should seek to more thoroughly understand the needs of fathers when designing appropriate and meaningful opportunities for paternal involvement within interventions, given that increased attention to fathers' specific needs could enhance both their involvement with their children and the interventions for their children (Meadan et al. 2013).

Conclusions

Current research suggests that fathers of children with ASD are less likely to be involved in parenting and intervention strategies compared to mothers and compared to fathers of children with other disabilities. However, studies examining fathers of children with ASD have found that fathers were able to implement behavioral management and other intervention approaches, suggesting the possibility of an added benefit of having a second parent present during parent training. Additionally, having both parents highly involved may improve the overall family system across many levels, and fathers could be trained to be equally as effective as mothers, which may provide unique benefits to children with ASD. Although these findings are encouraging, the limited nature of this literature suggests that further research must be done prior to drawing conclusions about the effects of the level

of paternal involvement on children with ASD and their families.

It is also important to consider the barriers that fathers experience that may be related to limited or decreased paternal involvement. While some studies suggest that fathers experience frustration due to these barriers, researchers have also found that many fathers may wish to increase their levels of involvement. Although often unaddressed, methods for increasing father involvement do exist (e.g., direct solicitation of fathers for participation). As such, it is imperative that the field include fathers in ASD intervention research. Specifically, research is needed to examine the effectiveness of including (1) both parents and (2) fathers individually, as well as more thorough investigations of the family unit as a whole. Family-systems approaches have been examined in ASD previously (e.g., Tudor et al. 2018), and the continued use of these frameworks may yield research that better clarifies the role, impact, and functioning of fathers of children with ASD.

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Compliance with Ethical Standard

Conflict of interest The authors declare that there is no conflict of interest regarding the publication of this article.

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