

**A systematic review of play-based interventions targeting the social communication skills of children with Autism Spectrum Disorder in educational contexts**

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Children with Autism Spectrum Disorder (ASD) experience social communication difficulties which can be compounded by increased social demands and expectations of the school environment. Play offers a unique context for social communication development in educational settings. This systematic review aimed to synthesize play-based interventions for the social communication skills of children with ASD in educational contexts and identified nine studies. Overall, studies in this review provided a promising evidence-base for supporting social communication skills in children with ASD within educational contexts. The review also highlighted gaps in research on play-based interventions for the social communication skills of children with ASD within naturalistic educational settings.

**Keywords:** Play, Social Communication, Education Settings, Autism Spectrum Disorders

Social communication skills are a complex set of skills highlighted as difficult for children with Autism Spectrum Disorder (ASD) (Balasubramanian et al. 2019; Howlin 2000; Laugeson and Elingsen 2014). Social communication is an ‘umbrella term’, as described by Kossyvakis (2018, p.7), for both: (1) *social interaction*, defined as the reciprocal exchange of information (Dijkstra 2015; Shores 1987) as well as relational components including relationships and friendships (Burk 1996; Winstead and Derlegav 1986) acceptance and belonging (Duck and Montgomery 1991; Goffman 1963), and isolation and loneliness (Laursen and Harup 2002; Samp 2009), and; (2) *communication*, defined as an interactive process in which information, is exchanged between partners through multiple means such as body language, speech, facial expressions and gestures (Gould 2009; Mehta 1985; Nilsen 1957; Rogoff 1990; Schlosser et al. 2003). This inherent overlap between social interaction and communication is very much reflected within the literature (Conn 2016; Fuller and Kaiser 2019; Wetherby 2006; Wetherby et al. 2007) and has been adopted within the latest diagnostic criteria for ASD (DSM-V) (American Psychiatric Association 2013). As a result, this review will adopt an all-encompassing approach to social communication and include studies which target any aspect of social communication, in line with the above criteria.

Despite heterogeneity of ASD, challenges in social communication are experienced by all children across the spectrum (Anderson et al. 2014; Balasubramanian et al. 2019; Tager-Flusberg et al. 2001 APA 2013) throughout all stages of life (Plimley et al. 2007;

Prizant and Fields-Meyer 2019; Tomaino et al. 2014; Volkmar et al. 2014) in areas including social-emotional reciprocity, non-verbal communication and in the development and understanding of relationships (APA 2013). Differences are apparent from early infancy and include difficulties initiating (Franchini et al. 2018; Mundy et al. 2016; Sasson and Touchstone 2014) and responding to joint attention (Chawarska et al. 2016 ;Sullivan et al. 2007) as well as differences in understanding non-verbal communication including eye contact (Muzammal and Jones 2017; Zwaigenbaum et al. 2013), imitation (Orstein-Davis and Carter 2014; Rogers and Williams 2006), body language, gestures and facial expression (Chawarska et al. 2014; Wetherby 2006; Wetherby et al. 2004). Such differences often become more obvious among school-age children with ASD due to increased social demands (Bauminger-Zviely 2014; Einfeld et al. 2018; Loveland and Tuanali-Kotoski 2005) in particular surrounding peer relations and include reduced levels of peer interactions (Bauminger-Zviely 2014; Hansen et al. 2014; Wetherby et al., 2006) as well as quality (Bauminger et al. 2008; Kasari et al. 2011; Petrina et al. 2014) and quantity (Bauminger and Kasari 2000; Kuo et al. 2013) of friendships and peer relationships.

As a result of these social communication challenges, children with ASD often remain on the periphery of classroom social networks (Chamberlain et al. 2007; Kasari et al. 2011; Rotheram-Fuller et al. 2010). Difficulties persist throughout the school years and extend into adolescence as children with ASD attempt to navigate the complex social world and subtle social cues of the hidden curriculum (Jordan 2019; Myles and Simpson 2001). These include differences forming and maintaining friendships (Bauminger and Shulman 2003; Locke et al. 2010; Shea and Mesibov 2005) and, in turn, associated loneliness (Bauminger and Kasari 2000; Deckers, et al. 2017; Lasgaard et al. 2009), bullying and victimisation (Cappadocia et al. 2012; Symes and Humphrey 2012; Van Roekel et al. 2010). Although schools may be regarded as the prime context for relationships to flourish (Blatchford et al. 2015; Blatchford and Baines 2010; Juvonen 2018), without sufficient support, such settings may in fact further isolate children with ASD.

Evidence of greater risk of increased social difficulties as children with ASD progress through formal schooling (Bauminger-Zviely 2014) highlights the need for intervening early to support social communication development among children with ASD (Fuller and Kaiser 2019; Koegel et al. 2014) Additionally, increasing numbers of children with ASD are accessing inclusive education (National Council for Special Education 2016; European Agency for Special Needs and Inclusive Education 2018) and spend the majority of their time in educational contexts (Callahan, et al. 2008; Parsons et al. 2013). As a result, research now

emphasises the importance of enhancing social communication skills of children with ASD within naturalistic educational settings (Boyd et al. 2019; Goldberg et al. 2019; Sutton et al. 2019) which may also support generalization (Carruthers et al. 2020; Ostmeier and Scarpa 2012; Rao et al. 2008) and maintenance effects (Bellini et al. 2007; Neely et al. 2016; Rogers 2000). Highly controlled clinical interventions may fail to capture authentic interactions within children's everyday environment (Loveland 2001; Loveland and Tunali-Kotoski 2005) whereas a shift towards practice-based research (Barry et al. 2020; Boyd et al. 2019; Locke et al. 2019; Surhheinrich et al. 2019) within a new 'era of translational research' (Boyd et al. 2019, pp.595) in real-world educational contexts allows for naturalistic peer interactions (Hume and Campbell 2019; Kent et al. 2020b; Wolfberg 2003) and in turn, may close the research to practice gap (Kasari and Smith 2013; Guldberg 2017; Wood et al. 2015) and increase application to real-world settings (Locke et al. 2015; 2019; Watkins et al. 2019a; Weisz et al. 2004).

Play is a central aspect of social communication within the everyday classroom environment. It has been identified as the primary medium of social interaction in early childhood (Boucher 1999; Coehlo et al. 2017; Harper et al. 2008) as well as a key context for the development of social communication skills (Barnett 2018; Beazidou and Bots 2014; Hirsh-Pasek et al. 2009). Despite its centrality in early childhood, play is a multifaceted construct (Eberle 2014; Sutton-Smith 2001) which has been construed in different ways including objective criteria such as active engagement and open-endedness (Christie and Johnson 1983; Garvey 1990; Rubin et al. 1983; Wolfberg 1995; 1999) as well as subjective qualities described as playfulness (Barnett 1990; Bundy 1997; Eberle 2014; Youell 2008). Types of play include object play, symbolic or pretend play and games with rules (Piaget 1952; Whitebread 2012; Whitebread et al. 2017) as well as modern play types including digital play (Marsh et al. 2016). Others describe play in terms of social interaction with another, be it a peer, sibling or adult (Parten 1932; Vygotsky 1978). Finally, play can also be defined in terms of the extent to which an adult is involved: for example, as free (no adult involvement), guided (adult is involved but child leads the play) or structured (adult directs the play interaction) (Rubin et al., 1978; Weisberg et al., 2016; Wood, 2014). There has been increasing emphasis on the importance of guided play in educational contexts in order to support learning and development (Weisberg et al. 2013; 2016; Yu et al. 2018; Zosh et al. 2017b; 2018a). This has been attributed to the unique balance this approach offers in terms of child autonomy and adult guidance and support (Hirsh-Pasek et al. 2009; 2015; Toub et al.

2016). As there is no single agreed-upon definition of play (Jensen et al. 2019; Zosh et al. 2018a), for the purpose of this review all play-based approaches, self-identified by the relevant authors were accepted.

Many researchers highlight the relationship between play and multiple aspects of social interaction including turn-taking and sharing (Anderson-McNamee and Bailey 2010; Stanton-Chapman and Snell 2011), collaboration (Rowe et al. 2018; White 2012; Yogman et al. 2018), negotiation (Bergen and Fromberg 2009; Hirsh-Pasek et al. 2009; Mraz et al. 2016), social reciprocity (Carrero et al. 2014; Wolfberg 1995) and theory of mind (Qu et al. 2015). Play also provides a natural context for the development of social relationships and has been described as children's 'natural means of making friends' (Gray 2011, p.457). Multiple researchers highlight the relationship between social play interactions and the development of friendships (Coehlo et al. 2017; Humphreys and Smith 1987; Scott and Panksepp 2003) and peer acceptance (Coehlo et al. 2017; Chang et al. 2016a; Flannery and Watson 1993). The relationship between play and communication skills has also been identified including joint attention (Lillard and Witherington 2004; Mateus et al. 2013; Quinn et al. 2018) joint engagement (Adamson et al. 2004; 2014; Moll et al. 2007; Perra and Gattis 2012) as well as gestures and body language (Carlson 2009; Cochet and Guidetti 2018; Qing 2011). While much of the literature has focused on the relationship between pretend play and social communication development (Farmer-Dougan and Kaszuba 1999; Fung and Cheng 2017; Lillard et al. 2013; Li et al. 2016; Uren and Stagnitti 2009; Vygotsky 1978), in recent years there has been increasing consensus towards the socially interactive nature of many different types of play and their contribution to social communication development (Pellegrini et al. 2002; Veiga et al. 2016; Whitebread et al. 2017). Finally, play provides an authentic context for social communication interactions embedded within the classroom (Balasubramanian et al. 2019; Reifel 2014; Shire et al. 2020) and, as such, offers a naturalistic platform for social communication development and learning within educational contexts. It has therefore been used as a practice-based intervention in supporting social communication skills for children with ASD. Researchers have highlighted the potential of play in supporting the social communication skills of pupils with ASD within educational contexts (Jordan 2003; Kossyvaki and Papoudi 2016; Manning and Wainwright 2010; Wolfberg et al. 2015) and called for a move away from clinical contexts (Guldberg 2017; Papoudi and Kossyvaki 2018; Whalon et al. 2015).

Previous reviews of the play of children with ASD have focused on the use of interventions to improve play skills (Jung and Sainato 2013; Kent et al. 2020a; Kossyvakaki and Papoudi 2016; Kuhaneck et al. 2019; Lang et al. 2011; Lory et al. 2018). Other researchers have conducted scoping reviews examining the promotion of playful engagement among children with ASD (Godin et al. 2019) and therapeutic approaches such as Lego therapy (Lindsay et al. 2017). Mpella and Evaggelinou (2018) systematically examined the impact of a specific play type, theatrical play, on social development among children with ASD. Jung and Sainato (2013) also discussed improvements in play and its concurrent impact on social interaction skills among children with ASD in their systematic review of play-based interventions. Gibson et al. (2020) conducted a scoping review of early play-based interventions across all contexts in supporting social communication development of children, aged two-seven years, with ASD. Such reviews provide positive findings in support of play in contributing to social developmental outcomes of children with ASD. This review sought to contribute further to research on play for children with ASD in early childhood and primary school contexts by reviewing play-based interventions which targeted social communication skills in naturalistic educational contexts.

## **Objectives**

The aim of this systematic review was to identify and synthesize research on play-based interventions for the social communication skills of children with ASD in educational contexts. The review was guided by four research questions: (1) What practice-based research has examined the impact of play-based interventions on the social communication outcomes of children with ASD in educational contexts?; (2) What are the characteristics of play-based interventions that target social communication skills of children with ASD in educational contexts; (3) What is the quality of research on play-based interventions for the social communication outcomes of children with ASD in educational contexts?; and (4) What recommendations can be drawn from a review of the existing literature for future practice-based research in the field of autism, play and social communication development?

## **Methods**

### **Protocol and Registration**

The planning, organization and implementation of this systematic review was based on the Preferred Items for Systematic Reviews and MetaAnalysis (PRISMA) guidelines (Moher et

al. 2009) and PRISMA-P statement (Shamseer et al. 2015). The review was pre-registered with the Open Science Framework (<https://doi.org/10.17605/OSF.IO/FYEQS>) to ensure transparency and reproducibility (Munafó et al. 2017; Sullivan 2019) and reduce the risk of publication bias (Van t’Veer and Giner-Sorrola 2016).

### **Eligibility Criteria and Study Selection**

Studies were included if they met the following criteria: (1) the study reported empirical research (single-case or group research) examining the impact of play-based interventions on social communication skills; (2) play (as defined in this review) was identified as the independent/manipulating variable of the intervention; (3) at least one outcome measure targeted social communication skills; (4) the article was published in a peer-reviewed journal between the years 2000 and 2020; (5) participants included children between the ages of three and twelve years; (6) the sample population included at least one participant with a diagnosis of ASD; (7) data on dependent variables could be isolated for participants with and without ASD; and (8) the study was conducted, at least partially, within educational contexts. Studies were excluded based on the following criteria: (1) the article was written in a language other than English; (2) the study design was a case study (3) the play intervention was a form of play therapy; (4) participants included children both younger and older than twelve years even if some of the children fell within the age range of three to twelve years; and (5) the study involved multiple intervention components where play was part of a larger intervention or play was used as the context for the implementation of alternative interventions. Single-case studies were excluded in order to reduce the risk of bias (Schünemann et al. 2013). Studies based on therapeutic interventions such as Play Therapy, Lego Therapy and Drama Therapy were excluded given that these approaches are based on the therapeutic properties of play (Association for Play Therapy 2020; Drews and Schaeffer 2016) and extend beyond the definition of play in this review and have been systematically examined within other literature (Hillman 2018; Lindsay et al. 2017).

### **Systematic Search Procedures**

The search string was informed by key words and subject terms within sample seminal research in the field (Barber et al. 2016; Boyd et al. 2018; Chester et al. 2019; Dykstra et al. 2012; Hu et al. 2018; Kasari et al. 2012; Katz and Girolametto 2013; Stagnitti et al. 2012; Vousden et al. 2019; Watkins et al. 2019b; Wolfberg, et al. 2015; Wong 2013; Yang et al. 2003), extensive pilot searching alongside subject librarian consultations, and exploration of

the thesaurus function across relevant databases. The final comprehensive search was conducted on January 9<sup>th</sup> 2020 across multiple academic databases including; PsychInfo, CINAHL, Education Research Complete and ERIC. Searches across databases were based on the following identical search string; ('Autism Spectrum Disorders' OR 'ASD' OR 'Autis\*') AND Play AND ('Social Skills' OR 'Social Interaction' OR 'Social Communication' OR 'Social Competence') AND (Education OR School\* OR Class\*). This process resulted in the return of 911 citations. Complementary backward chaining was also conducted given that database searching is not exhaustive (Evans and Benefield 2001). The reference lists of the seminal articles identified (and listed) above were searched for eligible studies alongside the examination of the bibliographies of previous systematic reviews in the area (Alagendran et al. 2019; Cornell et al. 2018; Gibson et al. 2020; Godin et al. 2019; Jung and Sainato 2013; Kent et al. 2020a; Kossyvaki and Papoudi 2016; Kuhaneck et al. 2019; Lai et al. 2018; Lang et al. 2011; Lindsay et al. 2017; Lory et al. 2018; Mpella and Evaggelinou 2018; Pyle et al. 2017). Overall, this process yielded an additional 130 citations resulting in a total of 1041 articles for potential inclusion. Finally, searches were re-run on November 10<sup>th</sup> 2020 to ensure all recently published material were included and the review was as current as possible, as recommended within the Cochrane guidelines (Lefebvre et al. 2020). This resulted in the inclusion of one additional full-text study based on eligibility criteria (Bauminger-Zviely et al. 2020). Following title and abstract screening, 88 studies were identified by the first author as meeting eligibility criteria. The full text of each article was then screened against the inclusion criteria which resulted in the identification of 29 full-text studies involving the use of play-based to target the social communication skills of children, aged three-twelve, with ASD within educational contexts. However, play was the primary independent variable in only nine of these interventions. As a result, the authors segregated these studies into: (a) those that were multi-component interventions (including play as one of several independent variables) (n=29) and (b) those that strictly met criteria for this review (n=9). Figure 1 displays the results of each stage of the screening process.

[Insert Figure 1 top]

### **Inter-rater Reliability**

Inter-rater coding was conducted throughout abstract and full-text screening stages. The first author screened all articles for inclusion and the second author blindly and independently screened 10% of this sample. Inter-rater agreement for inclusion was 84% when screening at



the abstract stage and 100% when screening full-texts in the final stage of the study search. Disagreements were resolved through discussions related to the inclusion and exclusion criteria.

### **Data Extraction and Narrative Synthesis**

Data were extracted by the first author for the purpose of narrative synthesis. Studies included in this review were summarized in terms of: (1) participant characteristics including number, gender, age and diagnostic information; (2) research designs including design and types of methods used; and (3) intervention characteristics including components, frequency, intensity, duration, intervention setting, intervention agent, type of play, social communication outcomes and findings (three-point system outlined in the following section). Data were extracted and reported in tabular form and a narrative synthesis of the extracted data was conducted to address the four research questions underpinning this systematic review. The second author blindly and independently extracted data from one of the nine selected texts (corresponding to 10% of sample) according to identical characteristics. Inter-rater reliability was calculated and demonstrated 93% agreement and discrepancies were solved through discussions.

### **Study Findings**

A three-point classification system was used to indicate the type of findings from each study: positive, mixed or negative. A similar approach has been implemented across other systematic reviews where diversity of study designs has meant that it is difficult to compare study results (Gunning et al. 2019; Tupou et al. 2019; Vershuur et al. 2014). Single-case design studies were classified as positive if all participants demonstrated an increase across all social communication dependent variables, mixed if only some participants increased performance across social communication dependent variables and negative if no participant demonstrated increase in any social communication dependent variables. Findings from group designs were classified as positive if statistically significant results were reported across all social communication dependent variables, mixed if statistically significant results were reported across some but not all social communication dependent variables and negative if no statistically significant results were reported across any social communication dependent variable.

## **Quality Appraisal**

The quality of each study was assessed according to the Evaluative Method for Determining Evidence Based Practice in Autism (Reichow et al. 2008). This appraisal tool was selected given its specific reference to research within the field of autism, widespread use across other systematic reviews in the field (Ke et al. 2018; Kossyvaki and Papoudi 2016; Watkins et al. 2015) and reports of validity within the literature (Cicchetti 2011; Wendt and Miller 2012). Furthermore, the framework distinguishes between single-case and group research and was, thus, deemed suitable for the diverse range of research designs included in this review.

Single-case and group research studies were evaluated according to specific primary and secondary quality indicators including: participant characteristics, clarity with which the independent variable was described, inter-observer agreement, fidelity, generalization and/or maintenance, and social validity. Studies subsequently received a quality rating of high, acceptable or unacceptable. Following this process, studies were categorized as strong, adequate, or weak research. The first author independently evaluated all full-text reviews. The second author blindly and independently rated one of the nine selected texts (corresponding to 10% of sample) according to identical primary and secondary quality indicators. Inter-rater reliability was calculated and demonstrated 92% agreement. Discrepancies were solved through discussion as well as reference to the original documentation. The empirical strength of each study was categorized as promising or established based on the outcome of the quality rating process.

## **Results**

### **Play-Based Interventions for the Social-Communication Skills of Children with ASD in Educational Settings**

Overall, a total of 29 full-text play-based interventions were identified following application of inclusion and exclusion criteria. However, only nine of these studies strictly met all eligibility criteria proposed within this review, specifically in relation to the use of play as the independent or manipulating variable in improving social communication outcomes of children with ASD in educational settings. The remaining 20 articles used play as part of a multi-component social intervention package involving strategies such as peer training, direct teaching and pre-teaching outside of scheduled play sessions (see Table 1). As it was difficult to isolate the impact of play on social communication outcomes in these studies, they are excluded from the data extraction and narrative synthesis reported below.

[Insert Table 1]

Data on participant characteristics, study design, and intervention characteristics were extracted from the nine eligible studies for inclusion and are first reported in tabular form (see Table 2). Data are further examined in narrative synthesis here.

[Insert Table 2]

## **Synthesis of Intervention Characteristics for the Social Communication Outcomes of Children with ASD in Educational Settings**

### **Participant Characteristics**

Overall, 107 children with ASD received treatment interventions within included studies with an additional 43 children with ASD included in wait-list control groups (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012). The vast majority of research samples were comprised of male participants with a total of 103 males and 16 females included across studies, with the exception of Goods et al. (2013) and Lawton and Kasari (2012) who did not report sample participants' gender. Overall, participants ranged in ages from three to twelve years across included studies with a mean age of 6.21 years. This does not include participants within Thomas and Smith's (2004) study given that information was only provided in relation to age range as opposed to mean. All participants had a professional diagnosis of ASD with some studies reporting IQ levels (Beadle-Brown et al. 2018; Ben-Sasson et al. 2012; Loncola and Craig-Unkefer 2005), mental age scores (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012) or severity of ASD (Loncola and Craig-Unkefer 2005; Watkins et al. 2019b). Five of the studies excluded respondents with co-occurring needs (Beadle-Brown et al. 2018; Ben-Sasson et al. 2012; Lawton and Kasari 2012; Loncola and Craig-Unkefer 2005) however it is unclear if the remaining interventions included children with co-occurring needs.

### **Play-Based Interventions**

Play-based interventions were employed as the independent variable across all nine full-text studies. Play-based interventions varied in their presentation across studies in terms of social partners, types of play used and level of child autonomy and adult involvement. This is unsurprising based on the multi-faceted nature of play. Given the focus on social-communication outcomes, all studies involved social play, ranging from play with a single peer (Ben-Sasson et al. 2012; Loncola and Craig-Unkefer 2005; Watkins et al. 2019b) to play in peer groups (Beadle-Brown et al. 2018; Vincent et al. 2018) and play with adults (Lawton and Kasari 2012; Thomas and Smith 2004) as well as the combination of both adult and peer play (Chang et al. 2016b) with the exception of Goods et al. (2013) whereby it is unclear whether adult play was combined with peer play. Furthermore, studies varied in their approach to peer play with some interventions employing peers with ASD (Beadle-Brown et al. 2018; Ben-Sasson et al. 2012; Loncola and Craig-Unkefer 2005) and others utilizing typically developing peers (Chang et al. 2016b; Vincent et al. 2018; Watkins et al. 2019b). The majority of play sessions involved a semi-structured or guided play approach and balance between adult and child agency (Beadle-Brown et al. 2018; Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012; Loncola and Craig-Unkefer 2005; Vincent et al. 2018; Watkins et al. 2019b) whilst others focused on adult-led structured play (Ben-Sasson et al. 2012; Thomas and Smith 2004). Although Watkins et al. (2019b) described their play intervention as structured, it involved minimal adult direction and was very much child-led and has consequently been classified as a semi-structured or guided play approach within this review. Finally, the majority of studies adopted a developmental approach to play whereby play types were often selected based on the developmental level of the child (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012) as well as the incorporation of interests and preferences within object play (Thomas and Smith 2004; Watkins et al. 2019b) or game play (Vincent et al. 2018). Chang et al. (2016b) implemented multiple types of play (cause and effect or object play, functional and symbolic play) with a similar approach adopted across other play-based interventions (Goods et al. 2013; Lawton and Kasari 2012). Although Goods et al. (2013) or Lawton and Kasari (2012) do not specify types of play employed, reference is made to previous publications which clearly indicate types of play used (object, functional and symbolic play) which have been recorded in Table 2. The remaining studies focused specifically on symbolic or imaginative play (Beadle-Brown et al. 2018; Loncola and Craig-Unkefer 2005) and digital play (Ben-Sasson et al. 2012). Despite such heterogeneity in approaches to play, selected theoretical approaches to play were not reported across all studies.

Finally, play intervention programs were employed across all nine full-text articles included within this review for example JASPER (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012) as well individualized adapted interventions (Watkins et al. 2019b). The majority of these approaches were based on a combination of principles from both behaviorist and developmental perspectives with the exception of Loncola and Craig-Unkefer (2005) who described their Plan-Play-Report intervention within the social-cognitive domain.

### **Educational Contexts for Play-Based Interventions**

All nine studies conducted play-based interventions within educational settings, as stipulated within the eligibility criteria. Three of the nine studies were carried out within special schools (Beadle-Brown et al. 2018; Goods et al. 2013; Watkins et al. 2019b) with the remaining interventions conducted within mainstream schools (Lawton and Kasari 2012; Loncola and Craig-Unkefer 2005; Vincent et al. 2018; Thomas and Smith 2004) and special classes (Ben-Sasson et al. 2012; Chang et al. 2016b; Lawton and Kasari 2012). Four of the interventions were conducted within authentic classroom play areas (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012; Watkins et al. 2019b) whilst the remaining four studies were implemented outside of the classroom context within an area of the school hallway (Beadle-Brown et al. 2018; Loncola and Craig-Unkefer 2005), isolated quiet room (Ben-Sasson et al. 2012) or playground recess (Vincent et al. 2018) with the exception of Thomas and Smith's (2004) who did not specify the context of their intervention. Selected studies were conducted across a limited range of geographical locations including the USA (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012; Loncola and Craig-Unkefer 2005; Vincent et al. 2018; Watkins et al. 2019b) UK (Beadle-Brown et al. 2018; Thomas and Smith 2004) and Israel (Ben-Sasson et al. 2012). Although all studies were conducted within educational settings, only two of the nine included interventions employed existing school teachers or paraprofessionals as interventionists (Chang et al. 2016b; Lawton and Kasari 2012). The remaining studies involved members of the research team (Ben-Sasson et al. 2012; Thomas and Smith 2004; Watkins et al. 2019b) or trained independent interventionists (Beadle-Brown et al. 2018; Goods et al. 2013; Loncola and Craig-Unkefer 2005; Vincent et al. 2018).

### **Intervention Frequency, Intensity and Duration**

Play-based interventions ranged from daily intervention techniques (Chang et al. 2016b; Lawton and Kasari 2012; Thomas and Smith 2004; Vincent et al. 2018; Watkins et al. 2019b) to weekly (Beadle-Brown et al. 2018), two-times weekly (Goods et al. 2013) three-times

weekly (Loncola and Craig-Unkefer 2005) or twice-monthly (Ben-Sasson et al. 2012). Interventions also varied in terms of the intensity of intervention sessions from five-ten minutes (Ben-Sasson et al. 2012; Thomas and Smith 2004; Watkins et al. 2019b) to 15-20 minutes (Chang et al. 2016b; Loncola and Craig-Unkefer 2005; Vincent et al. 2018) and 30-45 minutes (Beadle-Brown et al. 2018; Goods et al. 2013; Lawton and Kasari 2012). The average intensity of intervention was 21 minutes with the exception of Ben-Sasson et al. (2012) who did not specify intervention intensity. The duration of intervention periods also varied widely from a minimum of two weeks (Thomas and Smith 2004) to a maximum of 34 weeks (Vincent et al. 2018).

### **Social Communication Outcomes**

All nine full-text reviews targeted social communication outcomes, as stipulated within eligibility criteria. The majority of studies provided a clear operational definition of target outcomes based on the measurement of social initiations (Loncola and Craig-Unkefer 2005; Vincent et al. 2018; Watkins et al., 2019b) and responses (Loncola and Craig-Unkefer 2005; Watkins et al., 2019b) by target participants with ASD towards peers or adults within play. Ben-Sasson et al. (2012) also examined the frequency of positive and negative social interactions alongside social responsive scales whilst other studies focused specifically on initiations of joint attention behaviors (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012). However, social communication outcomes were less clear within some studies (Beadle-Brown et al. 2018; Thomas and Smith 2004) in particular when dependent measures were based on generic social communication subscales (Beadle-Brown et al. 2018) and social interaction (Thomas and Smith 2004).

Given that social communication skills did not have to be the exclusive outcome, eight of the nine included studies incorporated additional outcome measures. These included evaluation of teacher implementation of play-based interventions (Chang et al. 2016b; Lawton and Kasari 2012), impact of play-based interventions on additional areas of development including: language skills (Chang et al. 2016b; Loncola and Craig-Unkefer, 2005), play behaviors (Beadle-Brown et al. 2018; Chang et al. 2016b; Goods et al. 2013; Thomas and Smith 2004; Watkins et al. 2019b), cognitive skills (Chang et al 2016b) as well as the impact of interventionist support during play-based interventions (Loncola and Craig-Unkefer 2005), and the impact of level of social communication deficits on intervention outcomes (Ben-Sasson et al. 2012).

## **Appraisal of Play-Based Interventions in Supporting the Social Communication Outcomes of Children with ASD in Educational Settings**

### **Study Findings**

Results of studies were classified as positive, mixed or negative as outlined in the method section. Three single-case design studies reported an increase in all social and communication outcomes across all participants and were thus, classified as providing positive findings (Thomas and Smith 2004; Vincent et al. 2018; Watkins et al. 2019b) with a further group research study also exhibiting significant findings across all social communication dependent variables (Chang et al. 2016b). The remainder of study outcomes were classified as mixed due to demonstration of positive results across some but not all participants (Beadle-Brown et al. 2018; Ben-Sasson et al. 2012; Loncola and Craig-Unkefer 2005) or across some but not all social communication dependent variables (Goods et al. 2013; Lawton and Kasari 2012).

### **Study Quality**

The quality of included articles was examined using Reichow et al.'s (2008) evaluative framework however studies were not excluded based on evaluations of rigor. Given the limited research in this area, each of these studies was valuable in contributing to the evidence base however the majority of studies were classified as weak based on primary and secondary quality indicators (Beadle-Brown et al. 2018; Ben-Sasson et al. 2012; Goods et al. 2013; Lawton and Kasari 2012; Thomas and Smith 2004) with the remainder classified as adequate (Chang et al. 2016b; Loncola and Craig-Unkefer 2005; Vincent et al. 2018; Watkins et al. 2019b). Following implementation of Reichow et al.'s (2008) criteria, play-based interventions are regarded as a promising evidence based practice given identification of at least three single subject group experimental designs of at least adequate research report strength, conducted by at least two different research teams in at least two different locations, involving a total sample size of at least nine different participants across studies.

### **Generalization, Maintenance and Social Validity**

According to Reichow et al.'s (2008) criteria, two of the included full-texts collected data on generalization of social communication outcomes within free play sessions (Chang et al. 2016b) and as part of a formal generalization assessment (Goods et al. 2013). A further three studies implemented generalization measures (Lawton and Kasari 2012; Thomas and Smith 2004; Watkins et al. 2019b) however these were implemented throughout the intervention as

opposed to upon its completion, as stipulated within Reichow's (2008) criteria. Watkins et al. (2019b) measured generalization of social communication skills to novel peer partners. In addition, Thomas and Smith (2004) incorporated generalization measures to ascertain the generalization of play behaviors to free play contexts and Lawton and Kasari (2012) examined teachers' generalization of JASPER strategies within the classroom. Three of the included studies also completed maintenance measures following the termination of the intervention. Watkins et al. (2019b) conducted follow-up sessions six-weeks post-intervention whilst Chang et al. (2016b) conducted a one-month follow-up assessment and Beadle-Brown et al. (2018) conducted three follow-up sessions up to 12 months' post-intervention. Watkins et al. (2019b), was the only study to explicitly collect data in relation to social validity based on: classroom teacher evaluations, comparisons with typically developing peers and observer ratings. However, using Reichow et al.'s (2008) criteria for social validity, a further five studies included at least four out of seven social validity measures (Ben-Sasson et al. 2013; Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012; Vincent et al. 2018; Watkins et al. 2019b). These related to socially important outcomes, comparisons conducted between individuals with and without disabilities, clinically significant target behavior, consumer satisfaction with the results, implementation in natural contexts and by those who typically come into contact with participants as well as time and cost effectiveness (ends justified the means) of the intervention. Finally, treatment or procedural fidelity was reported by the majority of included studies using pre-defined checklists and criteria with statistical tests all reaching 80% or over, as stipulated within Reichow criteria (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012; Loncola and Craig-Unkefer 2005; Vincent et al. 2018; Watkins et al. 2019b). Table 3 presents a summary of results based on Reichow et al.'s (2008) criteria for generalization, maintenance, social validity and fidelity.

[Insert Table 3]

## **Discussion**

The present review aimed to identify practice-based research on play-based interventions for the social communication skills of children with ASD in educational contexts. The relationship between play and social communication development within early childhood education is widely recognized (Barnett 2018; Beazidou and Botsoglou 2014; Hirsh-Pasek et



al. 2009). However, this is an emerging field for children with ASD, as reflected by the results of this review whereby a total of just nine studies were identified, with seven of these studies conducted in the last eight years.

### **Research on Play-based Interventions for the Social Communication Skills of Children with ASD in Educational Settings**

Play-based interventions varied widely in terms of types and contexts of play, social communication measures, settings, intensity, frequency, duration and intervention agents. There were, however, commonalities across studies including the selection of types of play and materials based on children's developmental level or interests (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012; Thomas and Smith 2004; Vincent et al. 2018; Watkins et al. 2019b) in line with research recommendations (Jordan 2003; Kasari et al. 2006; Kossovaki and Papoudi 2016; Papoudi and Kossovaki 2018). Guided play appeared to form a key part of play-based interventions with the majority of studies involving adult involvement and child autonomy (Beadle-Brown et al. 2018; Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012; Vincent et al. 2018), reflecting broader recommendations in terms of the provision of support during play for children with ASD (Kok et al. 2002; Papoudi and Kossovaki 2018; Sherratt and Peter 2002; Wolfberg et al. 2012). The majority of studies incorporated authentic peers within play-based interventions (Beadle-Brown et al. 2018; Ben-Sasson et al. 2012; Chang et al. 2016b; Loncola and Craig-Unkefer 2005; Vincent et al. 2018; Watkins et al. 2019b), a key benefit of conducting research within educational contexts (Hume and Campbell 2019; Kent et al. 2020b; Wolfberg 2003). These included both typically developing peers (Chang et al. 2016b; Vincent et al. 2018; Watkins et al. 2019b) and peers with ASD (Beadle-Brown et al. 2018; Ben-Sasson et al. 2012; Loncola and Craig-Unkefer 2005), with the selection of peers often dependent on the nature of the educational setting.

Although play-based interventions across all studies involved a social element, they varied greatly in terms of the varieties of play employed from object play (Thomas and Smith 2004; Watkins et al. 2019b) and game play (Vincent et al. 2018) to symbolic or imaginative play (Beadle-Brown et al. 2018; Loncola and Craig-Unkefer 2005) and digital play (Ben-Sasson et al. 2012) highlighting the potential value of all types of play in supporting social and communication outcomes (Pellegrini et al. 2002; Veiga et al. 2016; Whitebread et al. 2017).

Finally, there were commonalities across targeted social communication outcomes specifically frequency of social initiations and responses (Loncola and Craig-Unkefer 2005; Vincent et al. 2018; Watkins et al. 2019b) alongside joint attention and engagement (Chang et al. 2016b; Goods et al. 2013; Lawton and Kasari 2012). This is surprising given the vast array of social communication skills associated with play for typically developing children including turn-taking and sharing (Anderson-McNamee and Bailey 2010; Stanton-Chapman and Snell 2011), collaboration (Rowe et al. 2018; White 2012; Yogman et al. 2018), negotiation (Bergen and Fromberg 2009; Hirsh-Pasek et al. 2009; Mraz et al. 2016) theory of mind (Qu et al. 2015) and relational components such as friendships (Coehlo et al. 2017; Humphreys and Smith 1987; Scott and Panksepp 2003) and peer acceptance (Coehlo et al. 2017; Chang et al. 2016a; Flannery and Watson 1993) as well as communication skills such as gestures and body language (Carlson 2009; Cochet and Guidetti 2018; Qing 2011), all skills in which children with ASD may benefit from assistance and support.

### **Recommendations for Future Education-Based Research in the Field of Autism, Play and Social Communication Development**

This review identified promising research studies on play-based interventions in supporting social communication skills of children with ASD within education contexts, a field very much in its infancy. There are several implications for future research in this area. Firstly, future research should explicitly report participant characteristics including IQ, functioning levels and presence of co-occurring needs in order to ascertain if results can generalize across all students with ASD given the heterogeneity of the spectrum, as recommended within similar reviews (Gibson et al. 2017; 2020; Hansen et al. 2017; Kent et al. 2020a; Kossvyaki and Papoudi 2016). Secondly, although all studies were conducted within educational contexts, future practice-based research may benefit from examining play-based interventions as part of classroom practice as opposed to isolated educational settings, as recommended within previous systematic reviews in the field (Bellini et al. 2007; Hansen et al. 2017; Jung and Sainato 2013; Kent et al. 2020a) and broader research literature (Kasari and Smith 2013; Koegel et al. 2012; Laugeson et al. 2014; Mazurik-Charles and Stefanour 2010). Given the diversity and heterogeneity of the classroom environment, this will also enable researchers to identify the influence of contextual variables such as inclusive classroom practices (Woodman et al. 2016), teacher support (Pintrich et al. 1993) and activity types (Vitiello et al. 2012) on social communication outcomes (Gibson et al. 2017; Hume et al. 2019; Kent et al.

2020a). Furthermore, further research is needed to examine the role of educators as interventionists in play-based interventions, as previously recommended (Bellini et al. 2007; Hansen et al. 2017; Kossyvaki and Papoudi 2016). In addition, future research should incorporate measures of generalization and maintenance in line with previous reviews in the field (Brady et al. 2020; Gunning et al. 2019; Hansen et al. 2017; Kent et al. 2020a). This is especially important given the reported generalization (Carruthers et al. 2020; Ostmeyer and Scarpa 2012; Rao et al. 2008) and maintenance (Bellini et al. 2007; Neely et al. 2016; Rogers 2000) benefits of practice-based research (Bellini et al. 2007; Gresham et al. 2001; Neely et al. 2016). Thirdly, future research should consider seeking input from teachers, peers and also children with ASD, as reflected within broader participatory research recommendations (den Houting et al. 2020; Fletcher-Watson et al. 2019; Jivraj et al. 2014; Lau and Stille 2014) and, consequently, add to the social validity of this evidence base. Fourthly, given that the vast majority of play-based interventions included in this review were based on predominately male samples across the UK and USA, future research may consider including more geographical and gender representative samples, as identified within other systematic reviews in the field (Gibson et al. 2020; Kossyvaki and Papoudi, 2016; Stiller and Möble, 2018). Fifthly, using Reichow et al.'s (2008) quality criteria, the vast majority of studies in this review were classified as weak or adequate. This finding supports recommendations by Gibson et al. (2020) in their recent scoping review of play-based interventions to support social communication development of children, aged two-seven, with ASD in which they highlighted the need for increased rigor in research on play interventions for the social communicative development of children with ASD. Finally, given the multi-faceted nature of both play and social communication, future research should provide an account of selected theoretical approaches adopted in relation to the above constructs, as recommended within similar reviews (Gibson et al. 2020; Ke et al. 2018; Lindsay et al. 2017).

## **Limitations**

This review offers a unique and timely insight into current practice-based evidence surrounding the impact of play on the social communication outcomes of children with ASD within educational contexts. There are, however, several limitations which need to be acknowledged. Firstly, a diverse range of study types were included involving both single-case and group research which restricted subsequent analysis to narrative synthesis as opposed to meta-analysis. Although this allowed for an overview of relevant studies to be

synthesized, it prevented effective comparisons to be drawn between research thus, the extent to which play-based interventions impacted social communication skills is unknown.

Secondly, studies were only included if they met strict eligibility criteria. As a result, it is possible that meaningful papers were excluded that did not fit these specific criteria. Whilst every effort was made to conduct searches across multiple database and types, including the implementation of hand searching and updated follow-up searches, this search was not exhaustive and it is not possible to ensure all relevant studies were included. Thirdly, quality appraisal was conducted based on strict interpretation of criteria outlined by Reichow et al. (2008). This was selected following careful consideration of quality frameworks given the diverse range of single-case and group research included in this review. However, appraisal ratings were based on the level of detail outlined within studies and it is possible details may have been omitted which subsequently may have influenced appraisal rating. In addition, such studies may have received alternative ratings if different appraisal tools were selected.

## **Conclusion**

Overall, this review identified the emerging evidence base of practice-based research that has examined the potential of play-based interventions in supporting the social communication outcomes of children with ASD within educational contexts. To the best of our knowledge, this is the first systematic review to investigate the impact of play on the social communication skills of children with ASD in naturalistic educational contexts. As a result, this review significantly contributes to the emerging literature surrounding practice-based research in supporting social and communication development of children with ASD (Barry et al. 2020; Boyd et al. 2019; Locke et al. 2019) and, in particular, provides support for the potential of play-based interventions in contributing to the social communication skills of children with ASD within educational contexts as part of a new ‘era of translational research’ (Boyd et al. 2019, pp.595). This is important given the increasing numbers of children with ASD accessing inclusive education (European Agency for Special Needs and Inclusive Education 2018; National Council for Special Education 2016) and associated demands and expectations of formal schooling (Bauninger-Zviely 2014; Einfeld et al. 2018; Loveland and Tuanali-Kotoski 2005). However, as highlighted by the limited number of studies in this review, there is insufficient evidence to draw conclusions regarding the mechanisms by which play-based interventions might be especially beneficial for the social communication skills of children with ASD in educational contexts. Further rigorous research is warranted to expand on this emerging evidence base.

## **Ethics Approval**

### Declarations

This is a review study. As a result, no ethical approval is required. However, the planning, organisation and implementation of this systematic review was based on the Preferred Items for Systematic Reviews and MetaAnalysis (PRISMA) guidelines (Moher et al., 2009) and PRISMA-P statement (Shamsheer et al., 2015). The review was also pre-registered with the Open Science Framework (<https://doi.org/10.17605/OSF.IO/FYEQS>).

## References

### \*Study included in the review

- Adamson, L.B., Bakeman, R. & Deckner, D.F. (2004). The development of symbol-infused joint engagement. *Child development*, 75(4), 1171-1187. <https://doi.org/10.1111/j.1467-8624.2004.00732.x>
- Adamson, L.B., Bakeman, R., Deckner, D.F. & Nelson, P.B. (2014). From interactions to conversations: The development of joint engagement during early childhood. *Child development*, 85(3), 941-955. <https://doi.org/10.1111/cdev.12189>
- Alagendran, K., Hitch, D., Wadley, C. & Stagnitti, K. (2019). Cortisol responsivity to social play in children with autism: A systematic review. *Journal of Occupational Therapy, Schools, & Early Intervention*, 12(4), 427-443. <https://doi.org/10.1080/19411243.2019.1604285>
- Anderson-McNamee, J.K. & Bailey, S.J. (2010). *The importance of play in early childhood development*. Montana State University Extension, <http://msuextension.org/publications/HomeHealthandFamily/MT201003HR.pdf>. Accessed 9 June 2020,
- Anderson, D.K., Liang, J.W. & Lord, C. (2014). Predicting young adult outcome among more and less cognitively able individuals with autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, 55(5), 485-494. <https://doi.org/10.1111/jcpp.12178>
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders; DSM-V* (5th ed.). Washington: American Psychiatric Association.
- Association for Play Therapy (2020). *What is play therapy*. Association for Play <https://www.a4pt.org/> Accessed 4 December 2020.
- Balasubramanian, L., Blum, A.M. and Wolfberg, P. (2019). Building on early foundations into school: Fostering socialization in meaningful socio-cultural contexts. In R. Jordan, J.M. Roberts & K. Hume (Ed.) *The SAGE handbook of autism and education* (pp.134-253). London: Sage.
- Barber, A.B., Saffo, R.W., Gilpin, A.T., Craft, L.D. & Goldstein, H. (2016). Peers as clinicians: Examining the impact of Stay Play Talk on social communication in young preschoolers with autism. *Journal of communication disorders*, 59, 1-15. <https://doi.org/10.1016/j.jcomdis.2015.06.009>
- Barnett, J.H. (2018). Three evidence-based strategies that support social skills and play among young children with autism spectrum disorders. *Early Childhood Education Journal*, 46(6), 665-672. <https://doi.org/10.1007/s10643-018-0911-0>
- Barnett, L. A. (1990). Playfulness: Definition, design, and measurement. *Play & Culture*, 3, 319–336.
- Barry, L., Holloway, J. & McMahon, J (2020). A scoping review of the barriers and facilitators to the implementation of interventions in autism education. *Research in Autism Spectrum Disorders*, 78, 101617. <https://doi.org/10.1016/j.rasd.2020.101617>
- Bauminger-Zviely, N., Eytan, D., Hoshmand, S., & Ben-Shlomo, O. R. (2020). Preschool peer social intervention (PPSI) to enhance social play, interaction, and conversation: Study outcomes. *Journal of Autism and Developmental Disorders*, 50(3), 844-863. <https://doi.org/10.1007/s10803-019-04316-2>
- Bauminger-Zviely, N. (2014). School age children with ASD. In F.R. Volkmar et al. (4<sup>th</sup> Ed.), *Handbook of autism and pervasive developmental disorders*, (pp.148-175). New Jersey: John Wiley and Sons Inc.
- Bauminger, N., Solomon, M., Aviezer, A., Heung, K., Gazit, L., Brown, J. & Rogers, S.J. (2008). Children with autism and their friends: A multidimensional study of friendship in high-functioning autism spectrum disorder. *Journal of abnormal child psychology*, 36(2), 135-150. <https://doi.org/10.1007/s10802-007-9156-x>
- Bauminger, N. & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Child development*, 71(2), 447-456. <https://doi.org/10.1111/1467-8624.00156>
- Bauminger, N. & Shulman, C. (2003). The development and maintenance of friendship in high-functioning children with autism: Maternal perceptions. *Autism*, 7(1), 81-97. <https://doi.org/10.1177%2F1362361303007001007>

- \*Beadle-Brown, J., Wilkinson, D., Richardson, L., Shaughnessy, N., Trimmingham, M., Leigh, J., Whelton, B. & Himmerich, J. (2018). **Imagining Autism: Feasibility of a drama-based intervention on the social, communicative and imaginative behavior of children with autism.** *Autism*, 22(8), 915-927. <https://doi.org/10.1177%2F1362361317710797>
- Beazidou, E. & Botsoglou, K. (2016). Peer acceptance and friendship in early childhood: The conceptual distinctions between them. *Early child development and care*, 186(10), 1615-1631. <https://doi.org/10.1080/03004430.2015.1117077>
- Bellini, S., Peters, J.K., Benner, L. & Hopf, A. (2007). A meta-analysis of school-based social skills interventions for children with autism spectrum disorders. *Remedial and Special Education*, 28(3), 153-162. <https://doi.org/10.1177%2F07419325070280030401>
- \*Ben-Sasson, A., Lamash, L. & Gal, E. (2012). **To enforce or not to enforce? The use of collaborative interfaces to promote social skills in children with high functioning autism spectrum disorder.** *Autism*, 17(5), 608-622. <https://doi.org/10.1177%2F1362361312451526>
- Bergen, D. & Fromberg, D.P. (2009). Play and social interaction in middle childhood. *Phi Delta Kappan*, 90(6), 426-430. <https://doi.org/10.1177%2F003172170909000610>
- Blatchford, P., Pellegrini, A.D. & Baines, E. (2015). *The child at school: Interactions with peers and teachers*. London: Routledge.
- Blatchford, P. & Pellegrini, A.D. (2010). Peer relations in school. In K. Littleton, C. Wood & J.K. Staarman (Ed.) *International handbook of psychology in education* (pp.227-274). Bingley: Emerald Group Publishing Limited.
- Boucher, J. (1999). Editorial: Interventions with children with Autism – Methods based on play, *Child Language Teaching and Therapy*, 15, 1–5.
- Boyd, B. A., Dykstra Steinbrenner, J. R., Reszka, S. S., & Carroll, A. (2019). Research in autism education: Current issues and future directions. In R. Jordan, J. Roberts, & K. Hume (Ed.), *The SAGE handbook of autism and education* (pp. 595-605). London: SAGE.
- Boyd, B.A., Watson, L.R., Reszka, S.S., Sideris, J., Alessandri, M., Baranek, G.T., Crais, E.R., Donaldson, A., Gutierrez, A., Johnson, L. & Belardi, K. (2018). Efficacy of the ASAP intervention for preschoolers with ASD: A cluster randomized controlled trial. *Journal of Autism and Developmental Disorders*, 48(9), 3144-3162. <https://doi.org/10.1007/s10803-018-3584-z>
- Brady, R., Maccarrone, A., Holloway, J., Gunning, C. & Pacia, C. (2020). Exploring interventions used to teach friendship skills to children and adolescents with high-functioning autism: A systematic review. *Review Journal of Autism and Developmental Disorders*, 1-11. <https://doi.org/10.1007/s40489-019-00194-7>
- Brock, M.E., Dueker, S.A. & Barczak, M.A. (2018). Brief report: Improving social outcomes for students with autism at recess through peer-mediated pivotal response training. *Journal of autism and developmental disorders*, 48(6), 2224-2230. <https://doi.org/10.1007/s10803-017-3435-3>
- Bundy, A. (1997). Play and playfulness: What to look for. In L. D. Parham & L. S. Fazio (Ed), *Play in occupational therapy for children* (pp. 52–66). Mosby: Elsevier.
- Burk, D.I. (1996). Understanding friendship and social interaction. *Childhood Education*, 72(5), 282-285. <https://doi.org/10.1080/00094056.1996.10521867>
- Callahan, K., Henson, R.K. & Cowan, A.K. (2008). Social validation of evidence-based practices in autism by parents, teachers, and administrators. *Journal of Autism and Developmental Disorders*, 38(4), 678-692. <https://doi.org/10.1007/s10803-007-0434-9>
- Cappadocia, M.C., Weiss, J.A. & Pepler, D. (2012). Bullying experiences among children and youth with autism spectrum disorders. *Journal of autism and developmental disorders*, 42(2), 266-277. <https://doi.org/10.1007/s10803-011-1241-x>
- Carlson, F. (2009). Rough and tumble play. *Exchange*, 188, 70-73.
- Carrero, K.M., Lewis, C.G., Zolkoski, S. & Lusk, M.E. (2014). Research based strategies for teaching play skills to children with autism. *Beyond Behavior*, 23(3),17-25. <https://doi.org/10.1177%2F107429561402300304>

- Carruthers, S., Pickles, A., Slonims, V., Howlin, P. & Charman, T. (2020). Beyond intervention into daily life: A systematic review of generalization following social communication interventions for young children with autism. *Autism Research*, 13(4), 506-522. <https://doi.org/10.1002/aur.2264>
- Chamberlain, B., Kasari, C. & Rotheram-Fuller, E. (2007). Involvement or isolation? The social networks of children with autism in regular classrooms. *Journal of autism and developmental disorders*, 37(2), 230-242. <https://doi.org/10.1007/s10803-006-0164-4>
- Chang, Y.C., Shih, W. & Kasari, C. (2016a). Friendships in preschool children with autism spectrum disorder: What holds them back, child characteristics or teacher behavior? *Autism*, 20(1), 65-74. <https://doi.org/10.1177%2F1362361314567761>
- \*Chang, V.C., Shire, S.Y., Shire, W., Gelfand, C. & Kasari, C. (2016b). Preschool deployment of evidence-based social communication intervention: JASPER in the classroom, *Journal of Autism and Developmental Disorders*, 46, 2211-2223 <https://doi.org/10.1007/s10803-016-2752-2>**
- Chawarska, K., Ye, S., Shic, F. & Chen, L. (2016). Multilevel differences in spontaneous social attention in toddlers with autism spectrum disorder. *Child development*, 87(2), 543-557. <https://doi.org/10.1111/cdev.12473>
- Chawarska, K., Macari, S., Volkmar, F.R., Kim, S.H. & Shic, F. (2014). ASD in infants and toddlers. In F.R. Volkmar et al. (4<sup>th</sup> Ed.), *Handbook of autism and pervasive developmental disorders* (pp.121-147). New Jersey: John Wiley and Sons Inc.
- Chester, M., Richdale, A.L. & McGillivray, J. (2019). Group-based social skills training with play for children on the autism spectrum. *Journal of autism and developmental disorders*, 49(6), 2231-2242. <https://doi.org/10.1007/s10803-019-03892-7>
- Christie, J.F. & Johnsen, E.P. (1983). The role of play in social-intellectual development. *Review of Educational Research*, 53(1), 93-115. <https://doi.org/10.3102%2F00346543053001093>
- Cicchetti, D.V. (2011). On the reliability and accuracy of the evaluative method for identifying evidence-based practices in autism. In B. Reichow, P. Doehring, D.V. Cicchetti & F.R. Volkmar (Ed.), *Evidence-based practices and treatments for children with autism* (pp.41-51). Boston: Springer.
- Cochet, H. & Guidetti, M. (2018). Contribution of Developmental Psychology to the Study of Social Interactions: Some Factors in Play, Joint Attention and Joint Action and Implications for Robotics. *Frontiers in psychology*, 9, 1992. <https://doi.org/10.3389/fpsyg.2018.01992>
- Coelho, L., Torres, N., Fernandes, C. & Santos, A.J. (2017). Quality of play, social acceptance and reciprocal friendship in preschool children. *European Early Childhood Education Research Journal*, 25(6), 812-823. <https://doi.org/10.1080/1350293X.2017.1380879>
- Conn, C. (2016). *Observation, assessment and planning in inclusive Autism education: Supporting learning and development*. London: Routledge.
- Cornell, H.R., Lin, T.T. & Anderson, J.A. (2018). A systematic review of play-based interventions for students with ADHD: implications for school-based occupational therapists. *Journal of Occupational Therapy, Schools, & Early Intervention*, 11(2), 192-211. <https://doi.org/10.1080/19411243.2018.1432446>
- Deckers, A., Muris, P. & Roelofs, J. (2017). Being on your own or feeling lonely? Loneliness and other social variables in youths with autism spectrum disorders. *Child Psychiatry & Human Development*, 48(5), 828-839. <https://doi.org/10.1007/s10578-016-0707-7>
- den Houting, J., Higgins, J., Isaacs, K., Mahony, J. & Pellicano, E., 2020. 'I'm not just a guinea pig': Academic and community perceptions of participatory autism research. *Autism*, 1-16, <https://doi.org/10.1177/1362361320951696>
- Dijkstra, J. (2015). Social exchange: relations and networks. *Social Network Analysis and Mining*, 5(1), 60. <https://doi.org/10.1007/s13278-015-0301-1>
- Drews, A.A. & Schaefer, C.E. (2016). The therapeutic powers of play. In K.J. O'Connor, C.E. Schaefer & L.D. Braverman (2<sup>nd</sup> Ed.), *Handbook of play therapy*, (pp.35-60). New Jersey: John Wiley and Sons Inc.
- Duck, S. & Montgomery, B.M. (1991). The interdependence among interaction substance, theory and methods. In B.M. Montgomery and S. Duck (Ed.), *Studying interpersonal interaction* (pp.3-15). New York: Guilford Press.



- Dykstra, J.R., Boyd, B.A., Watson, L.R., Crais, E.R. & Baranek, G.T. (2012). The impact of the Advancing Social-communication and Play (ASAP) intervention on preschoolers with autism spectrum disorder. *Autism*, 16(1), pp.27-44. <https://doi.org/10.1177%2F1362361311408933>
- Eberle, S.G. (2014). The elements of play: Toward a philosophy and a definition of play. *American Journal of Play*, 6(2), 214-233.
- Einfeld, S.L., Beaumont, R., Clark, T., Clarke, K.S., Costley, D., Gray, K.M., Horstead, S.K., Redoblado Hodge, M.A., Roberts, J., Sofronoff, K. & Taffe, J.R. (2018). School-based social skills training for young people with autism spectrum disorders. *Journal of Intellectual & Developmental Disability*, 43(1), 29-39. <https://doi.org/10.3109/13668250.2017.1326587>
- European Agency for Special Needs and Inclusive Education (2018). European agency statistics on inclusive education: 2018 dataset cross-country report, <https://www.european-agency.org/resources/publications/european-agency-statistics-inclusive-education-2018-dataset-cross-country>. Accessed 10 March 2020,
- Farmer-Dougan, V. & Kaszuba, T. (1999). Reliability and Validity of Play-based Observations: relationship between the PLAY behavior observation system and standardised measures of cognitive and social skills. *Educational Psychology*, 19(4), 429-440. <https://doi.org/10.1080/0144341990190404>
- Flannery, K.A. & Watson, M.W. (1993). Are individual differences in fantasy play related to peer acceptance levels? *The Journal of genetic psychology*, 154(3), 407-416. <https://doi.org/10.1080/00221325.1993.10532194>
- Fletcher-Watson, S., Adams, J., Brook, K., Charman, T., Crane, L., Cusack, J., Leekam, S., Milton, D., Parr, J.R. & Pellicano, E. (2019). Making the future together: Shaping autism research through meaningful participation. *Autism*, 23(4), 943-953. <https://doi.org/10.1177%2F1362361318786721>
- Franchini, M., Duku, E., Armstrong, V., Brian, J., Bryson, S.E., Garon, N., Roberts, W., Roncadin, C., Zwaigenbaum, L. & Smith, I.M. (2018). Variability in verbal and nonverbal communication in infants at risk for autism spectrum disorder: Predictors and outcomes. *Journal of Autism and Developmental Disorders*, 48(10), 417-3431. <https://doi.org/10.1007/s10803-018-3607-9>
- Fuller, E.A. & Kaiser, A.P. (2019). The effects of early intervention on social communication outcomes for children with autism spectrum disorder: A meta-analysis. *Journal of Autism and Developmental Disorders*, 1-18. <https://doi.org/10.1007/s10803-019-03927-z>
- Fung, W.K. & Cheng, R.W.Y. (2017). Effect of school pretend play on preschoolers' social competence in peer interactions: Gender as a potential moderator. *Early Childhood Education Journal*, 45(1), 35-42. <https://doi.org/10.1007/s10643-015-0760-z>
- Garvey, C. (1990). The modals of necessity and obligation in children's pretend play. *Play & Culture*, 3(3), 206-218.
- Gibson, J.L., Cornell, M. & Gill, T. (2017). A systematic review of research into the impact of loose parts play on children's cognitive, social and emotional development. *School Mental Health*, 9(4), 295-309. <https://doi.org/10.1007/s12310-017-9220-9>
- Gibson, J. L., Pritchard, E. J. & de Lemos, C. (2020). Play-based interventions to support social and communication development in autistic children aged 2-8 years: A scoping review., *PsyArXiv*, <https://doi.org/10.31234/osf.io/mp2xc>
- Godin, J., Freeman, A. & Rigby, P. (2019). Interventions to promote the playful engagement in social interaction of preschool-aged children with autism spectrum disorder (ASD): a scoping study. *Early Child Development and Care*, 189(10), 1666-1681. <https://doi.org/10.1080/03004430.2017.1404999>
- Goffman, E. (1963). *Stigma: Notes on the management of spoiled identity*. Englewood Cliffs, NJ: Prentice-Hall.
- Goldberg, J.M., Sklad, M., Elfrink, T.R., Schreurs, K.M., Bohlmeijer, E.T. & Clarke, A.M. (2019). Effectiveness of interventions adopting a whole school approach to enhancing social and emotional development: a meta-analysis. *European Journal of psychology of Education*, 34(4), 755-782. <https://doi.org/10.1007/s10212-018-0406-9>
- \*Goods, K.S., Ishijima, E., Chang, Y.C & Kasari, C. (2013). Preschool based JASPER intervention in minimally verbal children with Autism: Pilot RCT, *Journal of Autism and Developmental Disorders*, 43, 1050-1056 <https://doi.org/10.1007/s10803-012-1644-3>**

- Gould, J. (2009). There is more to communication than tongue placement and ‘show and tell’: Discussing communication from a speech pathology perspective. *Australian Journal of Linguistics*, 29(1), 59-73. <https://doi.org/10.1080/07268600802516384>
- Gray, P. (2011). The decline of play and the rise of psychopathology in children and adolescents. *American Journal of Play*, 3(4), 443-463.
- Guldberg, K. (2017). Evidence-based practice in autism educational research: can we bridge the research and practice gap. *Oxford Review of Education*, 43(2), 149-161. <https://doi.org/10.1080/03054985.2016.1248818>
- Gunning, C., Breathnach, Ó., Holloway, J., McTiernan, A. & Malone, B. (2019). A systematic review of peer-mediated interventions for preschool children with autism spectrum disorder in inclusive settings. *Review Journal of Autism and Developmental Disorders*, 6(1), 40-62. <https://doi.org/10.1007/s40489-018-0153-5>
- Hansen, S.G., Blakely, A.W., Dolata, J.K., Raulston, T. & Machalicek, W. (2014). Children with autism in the inclusive preschool classroom: A systematic review of single-subject design interventions on social communication skills. *Review Journal of Autism and Developmental Disorders*, 1(3), 192-206. <https://doi.org.dcu.idm.oclc.org/10.1007/s40489-014-0020-y>
- Hansen, S.G., Frantz, R.J., Machalicek, W. & Raulston, T.J. (2017). Advanced social communication skills for young children with autism: A systematic review of single-case intervention studies. *Review Journal of Autism and Developmental Disorders*, 4(3), 225-242. <https://doi.org/10.1007/s40489-017-0110-8>
- Harper, C.B., Symon, J.B. & Frea, W.D. (2008). Recess is time-in: Using peers to improve social skills of children with autism. *Journal of autism and developmental disorders*, 38(5), 815-826. <https://doi.org/10.1007/s10803-007-0449-2>
- Hillman, H. (2018). Child-centered play therapy as an intervention for children with autism: A literature review. *International Journal of Play Therapy*, 27(4), 198. <https://psycnet.apa.org/doi/10.1037/pla0000083>
- Hirsh-Pasek, K., Golinkoff, R.M., Berk, L.E. & Singer, D. (2009). *A mandate for playful learning in preschool: Applying the scientific evidence*. Oxford: Oxford University Press.
- Hirsh-Pasek, K., Zosh, J.M., Golinkoff, R.M., Gray, J.H., Robb, M.B. & Kaufman, J. (2015). Putting education in “educational” apps: Lessons from the science of learning. *Psychological Science in the Public Interest*, 16(1), 3-34. <https://doi.org/10.1177%2F1529100615569721>
- Howlin, P. (2000). Outcome in adult life for more able individuals with autism or Asperger syndrome. *Autism*, 4(1), 63-83. <https://doi.org/10.1177%2F1362361300004001005>
- Hu, X., Zheng, Q. & Lee, G.T. (2018). Using peer-mediated LEGO® play intervention to improve social interactions for Chinese children with autism in an inclusive setting. *Journal of autism and developmental disorders*, 48(7), 2444-2457. <https://doi.org/10.1007/s10803-018-3502-4>
- Hume, K., Sam, A., Mokrova, I., Reszka, S. & Boyd, B.A. (2019). Facilitating social interactions with peers in specialized early childhood settings for young children with ASD. *School Psychology Review*, 48(2), 123-132. <https://doi.org/10.17105/SPR-2017-0134.V48-2>
- Hume, K. & Campbell, J.M. (2019). Peer interventions for students with autism spectrum disorder in school settings: Introduction to the special issue. *School Psychology Review*, 48(2), 115-122. <https://doi.org/10.17105/SPR-2018-0081.V48-2>
- Humphreys, A. P. & Smith, P. K. (1987). Rough and tumble, friendship, and dominance in schoolchildren: Evidence for continuity and change with age. *Child Development*, 58(1), 201-212. <https://doi.org/10.2307/1130302>
- Jensen, H., Pyle, A., Zosh, J.M., Ebrahim, H.B., Scherman, A.Z., Reunamo, J. & Hamre, B.K., (2019). *Play facilitation: the science behind the art of engaging young children*. Bilund: The LEGO Foundation.
- Jivraj, J., Sacrey, L.A., Newton, A., Nicholas, D. & Zwaigenbaum, L. (2014). Assessing the influence of researcher-partner involvement on the process and outcomes of participatory research in autism spectrum disorder and neurodevelopmental disorders: A scoping review. *Autism*, 18(7), 782-793. <https://doi.org/10.1177%2F1362361314539858>
- Jordan, R. (2003). Social play and autistic spectrum disorders: a perspective on theory, implications and educational approaches. *Autism*, 7(4), 347-360. <https://doi.org/10.1177%2F1362361303007004002>

- Jordan, R. (2019). Particular learning needs of individuals on the autism spectrum. In R. Jordan, J.M. Roberts and K. Hume (Ed.), *The sage handbook of autism and education* (pp.12-23). Thousand Oaks: Sage.
- Jung, S. & Sainato, D.M. (2013). Teaching play skills to young children with autism. *Journal of Intellectual and Developmental Disability*, 38(1), 74-90. <https://doi.org/10.3109/13668250.2012.732220>
- Juvonen, J. (2018). The potential of schools to facilitate and constrain peer relationships. In W. M. Bukowski, B. Laursen and K. H. Rubin (Ed.), *Handbook of peer interactions, relationships, and groups* (pp. 491–509). New York: The Guilford Press.
- Kamps, D., Mason, R., Thiemann-Bourque, K., Feldmiller, S., Turcotte, A. & Miller, T. (2014). The use of peer networks to increase communicative acts of students with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 29(4), 230-245. <https://doi.org/10.1177%2F1088357614539832>
- Kasari, C., Dean, M., Kretzmann, M., Shih, W., Orlich, F., Whitney, R., Landa, R., Lord, C. & King, B. (2016). Children with autism spectrum disorder and social skills groups at school: A randomized trial comparing intervention approach and peer composition. *Journal of Child Psychology and Psychiatry*, 57(2), 171-179. <https://doi.org/10.1111/jcpp.12460>
- Kasari, C., Gulsrud, A., Freeman, S., Paparella, T. & Hellemann, G., (2012). Longitudinal follow-up of children with autism receiving targeted interventions on joint attention and play. *Journal of the American Academy of Child & Adolescent Psychiatry*, 51(5), 487-495. <https://doi.org/10.1016/j.jaac.2012.02.019>
- Kasari, C. & Smith, T. (2013). Interventions in schools for children with autism spectrum disorder: Methods and recommendations. *Autism*, 17(3), 254-267. <https://doi.org/10.1177%2F1362361312470496>
- Kasari, C., Locke, J., Gulsrud, A., & Rotheram-Fuller, E. (2011). Social networks and friendships at school: Comparing children with and without ASD. *Journal of Autism and Developmental Disorders*, 41, 533–544. [10.1007/s10803-010-1076-x](https://doi.org/10.1007/s10803-010-1076-x)
- Katz, E. & Girolametto, L. (2013). Peer-mediated intervention for preschoolers with ASD implemented in early childhood education settings. *Topics in Early Childhood Special Education*, 33(3), 133-143. <https://doi.org/10.1177%2F0271121413484972>
- Ke, F., Whalon, K. & Yun, J. (2018). Social skill interventions for youth and adults with autism spectrum disorder: a systematic review. *Review of Educational Research*, 88(1), 3-42. <https://doi.org/10.3102%2F0034654317740334>
- Kent, C., Cordier, R., Joosten, A., Wilkes-Gillan, S., Bundy, A. & Speyer, R. (2020a). A systematic review and meta-analysis of interventions to improve play skills in children with Autism Spectrum Disorder. *Review Journal of Autism and Developmental Disorders*, 7(1), 91-118. <https://doi.org/10.1007/s40489-019-00181-y>
- Kent, C., Cordier, R., Joosten, A., Wilkes-Gillan, S. & Bundy, A. (2020b). Can We Play Together? A Closer Look at the Peers of a Peer-Mediated Intervention to Improve Play in Children with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, 1-14. <https://doi.org/10.1007/s10803-020-04387-6>
- Koegel, L., Matos-Freden, R., Lang, R. & Koegel, R. (2012). Interventions for children with autism spectrum disorders in inclusive school settings. *Cognitive and Behavioral practice*, 19(3), 401-412. <https://doi.org/10.1016/j.cbpra.2010.11.003>
- Koegel, L.K., Koegel, R.L., Ashbaugh, K. & Bradshaw, J. (2014). The importance of early identification and intervention for children with or at risk for autism spectrum disorders, *International Journal of Speech-Language Pathology*, 16 (1), 50-56, <https://doi.org/10.3109/17549507.2013.861511>
- Kok, A.J., Kong, T.Y. & Bernard-Opitz, V. (2002). A comparison of the effects of structured play and facilitated play approaches on preschoolers with autism: A case study. *Autism*, 6(2), 181-196. <https://doi.org/10.1177%2F1362361302006002005>
- Kossyvaki, L. (2018). *Adult Interactive Style Intervention and Participatory Research Designs in Autism: Bridging the gap between academic research and practice*. London: Routledge.
- Kossyvaki, L. & Papoudi, D. (2016). A review of play interventions for children with autism at school. *International Journal of Disability, Development and Education*, 63(1), 45-63. <https://doi.org/10.1080/1034912X.2015.1111303>

- Kuhaneck, H., Spitzer, S.L. & Bodison, S.C. (2020). A Systematic Review of Interventions to Improve the Occupation of Play in Children With Autism. *OTJR: Occupation, Participation and Health*, 40(2), 83-98.  
<https://doi.org/10.1177%2F1539449219880531>
- Kuhn, L.R., Bodkin, A.E., Devlin, S.D. & Doggett, R.A (2008). Using pivotal response training with peers in special education to facilitate play in two children with autism. *Education and Training in Developmental Disabilities*, 37-45.
- Kuo, M.H., Orsmond, G.I., Cohn, E.S. & Coster, W.J. (2013). Friendship characteristics and activity patterns of adolescents with an autism spectrum disorder. *Autism*, 17(4), 481-500.  
<https://doi.org/10.1177%2F1362361311416380>
- Lai, N.K., Ang, T.F., Por, L.Y. & Liew, C.S. (2018). The impact of play on child development-a literature review. *European Early Childhood Education Research Journal*, 26(5), 625-643.  
<https://doi.org/10.1080/1350293X.2018.1522479>
- Lang, R., Kuriakose, S., Lyons, G., Mulloy, A., Boutot, A., Britt, C., Caruthers, S., Ortega, L., O'Reilly, M. & Lancioni, G. (2011). Use of school recess time in the education and treatment of children with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, 5(4), 1296-1305.  
<https://doi.org/10.1016/j.rasd.2011.02.012>
- Lasgaard, M., Nielsen, A., Eriksen, M.E. & Goossens, L. (2010). Loneliness and social support in adolescent boys with autism spectrum disorders. *Journal of autism and developmental disorders*, 40(2), 218-226.  
<https://doi.org/10.1007/s10803-009-0851-z>
- Lau, S.M.C. & Stille, S. (2014). Participatory research with teachers: Toward a pragmatic and dynamic view of equity and parity in research relationships. *European Journal of Teacher Education*, 37(2), 156-170.  
<https://doi.org/10.1080/02619768.2014.882313>
- Laugeson, E.A. & Ellingsen, R. (2014). Social skills training for adolescents and adults with autism spectrum disorder. In *Adolescents and adults with autism spectrum disorders*. In F.R. Volkmar, B. Reichow and J.C. McPartland (Ed.), *Adolescents and adults with autism spectrum disorders* (pp.61-85). New York: Springer.
- Laugeson, E.A., Ellingsen, R., Sanderson, J., Tucci, L. & Bates, S. (2014). The ABC's of teaching social skills to adolescents with autism spectrum disorder in the classroom: The UCLA PEERS® program. *Journal of autism and developmental disorders*, 44(9), 2244-2256. <https://doi.org/10.1007/s10803-014-2108-8>
- Laugeson, E.A., Frankel, F., Gantman, A., Dillon, A.R. & Mogil, C. (2012). Evidence-based social skills training for adolescents with autism spectrum disorders: The UCLA PEERS program. *Journal of autism and developmental disorders*, 42(6), 1025-1036. <https://doi.org/10.1007/s10803-011-1339-1>
- Laursen, B. & Harup, W. W. (2002). The origins of reciprocity and social exchange in friendships. In: Laursen B. and Graziano, W.G. (Ed.) *Social exchange in development. New Directions for Child and Adolescent Development* (pp.27-40). San Francisco: Jossey-Bass.
- Laushey, K.M. & Heflin, L.J. (2000). Enhancing social skills of kindergarten children with autism through the training of multiple peers as tutors. *Journal of autism and developmental disorders*, 30(3), 183-193.  
<https://doi.org/10.1023/A:1005558101038>
- \*Lawton, K. & Kasari, C. (2012). Brief report teacher implemented joint attention intervention: Pilot randomised control study for pre-schoolers with Autism, *Journal of Consulting and Clinical Psychology*, 80 (4), 687-693. <https://psycnet.apa.org/doi/10.1037/a0028506>**
- Lee, S., Odom, S.L. & Loftin, R (2007). Social engagement with peers and stereotypic behavior of children with autism. *Journal of Positive Behavior Interventions*, 9(2), 67-79.  
<https://doi.org/10.1177%2F10983007070090020401>
- Lefebvre C., Glanville J., Briscoe S., Littlewood A., Marshall C., Metzendorf M-I., Noel-Storr A., Rader T., Shokraneh F, Thomas J. & Wieland LS. (2020). Searching for and selecting studies. In: J.P.T. Higgins et al. (Ed.), *Cochrane Handbook for Systematic Reviews of Interventions*. [www.training.cochrane.org/handbook](http://www.training.cochrane.org/handbook)
- Li, J., Hestenes, L.L. & Wang, Y.C. (2016). Links between preschool children's social skills and observed pretend play in outdoor childcare environments. *Early Childhood Education Journal*, 44(1), 61-68.  
<https://doi.org/10.1007/s10643-014-0673-2>

- Licciardello, C.C., Harchik, A.E. & Luiselli, J.K. (2008). Social skills intervention for children with autism during interactive play at a public elementary school. *Education and Treatment of Children, 31*(1), 27-37. <https://doi.org/10.1353/etc.0.0010>
- Lillard, A.S. & Witherington, D.C. (2004). Mothers' behavior modifications during pretense and their possible signal value for toddlers. *Developmental Psychology, 40*(1), 95. <https://psycnet.apa.org/doi/10.1037/0012-1649.40.1.95>
- Lindsay, S., Hounsell, K.G. & Cassiani, C. (2017). A scoping review of the role of LEGO® therapy for improving inclusion and social skills among children and youth with autism. *Disability and health journal, 10*(2), 173-182. <https://doi.org/10.1016/j.dhjo.2016.10.010>
- Locke, J., Ishijima, E.H., Kasari, C. & London, N. (2010). Loneliness, friendship quality and the social networks of adolescents with high-functioning autism in an inclusive school setting. *Journal of Research in Special Educational Needs, 10*(2), 74-81. <https://doi.org/10.1111/j.1471-3802.2010.01148.x>
- Locke, J., Kang-Yi, C., Pellecchia, M. & Mandell, D.S. (2019). It's messy but real: a pilot study of the implementation of a social engagement intervention for children with autism in schools. *Journal of Research in Special Educational Needs, 19*(2), 135-144. <https://doi.org/10.1111/1471-3802.12436>
- Locke, J., Olsen, A., Wideman, R., Downey, M.M., Kretzmann, M., Kasari, C. & Mandell, D.S. (2015). A tangled web: the challenges of implementing an evidence-based social engagement intervention for children with autism in urban public school settings. *Behavior therapy, 46*(1), 54-67. <https://doi.org/10.1016/j.beth.2014.05.001>
- \*Loncola, J.A. & Craig-Unkefer, L. (2005) Teaching social communication skills to young urban children with Autism, *Education and Training in Developmental Disabilities, 40* (3), 243-263.**
- Lory, C., Rispoli, M. & Gregori, E. (2018). Play interventions involving children with autism spectrum disorder and typically developing peers: A review of research quality. *Review Journal of Autism and Developmental Disorders, 5*(1), 78-89. <https://doi.org/10.1007/s40489-017-0124-2>
- Loveland, K. A. & Tunali-Kotoski, B. (2005). The school-age child with an autistic spectrum disorder. In F. R. Volkmar, R. Paul, A. Klin, & D. Cohen (Ed.), *Handbook of autism and pervasive developmental disorders: Diagnosis, development, neurobiology, and behavior* (pp. 247–287). New Jersey John Wiley & Sons Inc.
- Loveland, K.A. (2001). Towards an ecological theory of autism. In J.A. Burack, T. Charman, N. Yirmiya, & P.R. Zelazo (Ed.) *The development of autism: Perspectives from theory and research* (pp. 17–38). New Jersey: Lawrence Erlbaum.
- Maich, K., Hall, C.L., van Rhijn, T. & Squires, K. (2018). Investigating Stay, Play, & Talk: A peer-mediated social skills intervention for young children with Autism Spectrum Disorder and other social challenges. *Exceptionality Education International, 28*(2), 82–104.
- Manning, M.M. & Wainwright, L.D. (2010). The role of high level play as a predictor social functioning in autism. *Journal of autism and developmental disorders, 40*(5), 523-533. <https://doi.org/10.1007/s10803-009-0899-9>
- Marsh, J., Plowman, L., Yamada-Rice, D., Bishop, J. & Scott, F. (2016). Digital play: A new classification, *Early Years, 36*:3, 242-253. <https://doi.org/10.1080/09575146.2016.1167675>
- Mateus, V., Martins, C., Osório, A., Martins, E.C. & Soares, I. (2013). Joint attention at 10 months of age in infant–mother dyads: Contrasting free toy-play with semi-structured toy-play. *Infant Behavior and Development, 36*(1), 176-179. <https://doi.org/10.1016/j.infbeh.2012.09.001>
- Mazurik-Charles, R. & Stefanou, C. (2010). Using Paraprofessionals to Teach Social Skills to Children with Autism Spectrum Disorders in the General Education Classroom. *Journal of Instructional Psychology, 37*(2), 161-169.
- Mehta, S.R. (1987). Communication and development: Concepts and methods. *Sociological Bulletin, 30* (1), 1-19. <https://doi.org/10.1177%2F0038022919870101>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G. & Prisma Group (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS med, 6*(7), e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
- Muzammal, M.S. & Jones, E.A. (2017). Social-communication intervention for toddlers with autism spectrum disorder: Effects on initiating joint attention and interactions with mother. *Journal of Developmental and Physical Disabilities, 29*(2), 203-221. <https://doi.org/10.1007/s10882-016-9519-8>

- Moll, H., Carpenter, M. & Tomasello, M. (2007). Fourteen-month-olds know what others experience only in joint engagement. *Developmental Science*, 10(6), 826-835. <https://doi.org/10.1111/j.1467-7687.2007.00615.x>
- Mpella, M. & Evaggelinou, C. (2018). Does theatrical play promote social skills development in students with autism? A systematic review of the methods and measures employed in the literature. *Preschool and Primary Education*, 6(2),96-118. <https://doi.org/10.12681/ppej.16135>
- Mpella, M., Evaggelinou, C., Koidou, E. & Tsigilis, N. (2019). The Effects of a Theatrical Play Programme on Social Skills Development for Young Children with Autism Spectrum Disorders. *International Journal of Special Education*, 33(4), 828-845.
- Mraz, K., Porcelli, A. & Tyler, C. (2016). *Purposeful play: A teacher's guide to igniting deep and joyful learning across the day*. Portsmouth, NH: Heinemann.
- Mundy, P., Kim, K., McIntyre, N., Lerro, L. & Jarrold, W. (2016). Brief report: Joint attention and information processing in children with higher functioning autism spectrum disorders. *Journal of autism and developmental disorders*, 46(7), 2555-2560. <https://doi.org/10.1007/s10803-016-2785-6>
- Myles, B.S. & Simpson, R.L., (2001). Understanding the hidden curriculum: An essential social skill for children and youth with Asperger syndrome. *Intervention in school and clinic*, 36(5), 279-286. <https://doi.org/10.1177%2F105345120103600504>
- National Council for Special Education (2016). *NCSE policy advice: Supporting students with Autism Spectrum Disorder in schools*, NCSE. [http://ncse.ie/wp-content/uploads/2016/07/3\\_NCSE-Supporting-Students-with-ASD-Guide.pdf](http://ncse.ie/wp-content/uploads/2016/07/3_NCSE-Supporting-Students-with-ASD-Guide.pdf) Accessed 10 March 2020
- Neely, L.C., Ganz, J.B., Davis, J.L., Boles, M.B., Hong, E.R., Ninci, J. & Gilliland, W.D. (2016). Generalization and maintenance of functional living skills for individuals with autism spectrum disorder: A review and meta-analysis. *Review Journal of Autism and Developmental Disorders*, 3(1), 37-47. <https://doi.org/10.1007/s40489-015-0064-7>
- Nilsen, T.R. (1957). On defining communication. *Communication Education*, 6(1), 10-17. <https://doi.org/10.1080/03634525709376841>
- Ornstein-Davis, N. & Carter, A.S. (2014). ASD in infants and toddlers, in F.R. Volkmar et al. (4<sup>th</sup> ed.), *Handbook of autism and pervasive developmental disorders*, pp.212-229. New Jersey: John Wiley and Sons Inc.
- Ostmeyer, K. & Scarpa, A. (2012). Examining school-based social skills program needs and barriers for students with high-functioning autism spectrum disorders using participatory action research. *Psychology in the Schools*, 49(10), 932-941. <https://doi.org/10.1002/pits.21646>
- Papoudi, D. & Kossyvaki, L. (2018). Play and children with autism: insights from research and implications for practice. In P. Smith & J. L. Roopnarine (Ed.), *The Cambridge handbook of play: Developmental and disciplinary perspectives* (pp.563-579). Cambridge: Cambridge University Press <https://doi.org/10.1017/9781108131384.031>
- Parsons, S., Charman, T., Faulkner, R., Ragan, J., Wallace, S. & Wittemeyer, K. (2013). Commentary—bridging the research and practice gap in autism: The importance of creating research partnerships with schools. *Autism*, 17(3), 268-280. <https://doi.org/10.1177%2F1362361312472068>
- Parten, M.B. (1932). Social participation among pre-school children. *The Journal of Abnormal and Social Psychology*, 27(3), 243. <https://psycnet.apa.org/doi/10.1037/h0074524>
- Pellegrini, A.D., Kato, K., Blatchford, P. & Baines, E. (2002). A short-term longitudinal study of children's playground games across the first year of school: implications for social competence and adjustment to school. *American Educational Research Journal*, 39(4), 991-1015. <https://doi.org/10.3102%2F00028312039004991>
- Perra, O. & Gattis, M. (2012). Attention engagement in early infancy. *Infant behavior and development*, 35(4), 635-644. <https://doi.org/10.1016/j.infbeh.2012.06.004>
- Petrina, N., Carter, M. & Stephenson, J. (2014). The nature of friendship in children with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, 8(2), 111-126. <https://doi.org/10.1016/j.rasd.2013.10.016>
- Piaget, J. (1952). *Play, dreams, and imitation in childhood*. New York: Norton

- Pintrich, P.R., Marx, R.W. & Boyle, R.A. (1993). Beyond cold conceptual change: The role of motivational beliefs and classroom contextual factors in the process of conceptual change. *Review of Educational Research*, 63(2), 167-199. <https://doi.org/10.3102%2F00346543063002167>
- Plimley, L., Bowen, M. & Morgan, H. (2007). *Autistic spectrum disorders in the early years*. London: Paul Chapman
- Prizant, B. & Fields-Meyer, T. (2019). *Uniquely human: A different way of seeing Autism*, New York: Simon and Schuster.
- Pyle, A., DeLuca, C. & Danniels, E. (2017). A scoping review of research on play-based pedagogies in kindergarten education. *Review of Education*, 5(3), 311-351. <https://doi.org/10.1002/rev3.3097>
- Qing, X.U. (2011). Role play-an effective approach to developing overall communicative competence. *Cross-Cultural Communication*, 7(4), 36-39. <http://dx.doi.org/10.3968/j.ccc.1923670020110704.317>
- Qu, L., Shen, P., Chee, Y.Y. & Chen, L., (2015). Teachers' Theory-of-mind Coaching and Children's Executive Function Predict the Training Effect of Sociodramatic Play on Children's Theory of Mind. *Social Development*, 24(4), 716-733. <https://doi.org/10.1111/sode.12116>
- Quinn, S., Donnelly, S. & Kidd, E. (2018). The relationship between symbolic play and language acquisition: A meta-analytic review. *Developmental review*, 49, 121-135. <https://doi.org/10.1016/j.dr.2018.05.005>
- Reichow, B., Volkmar, F.R. & Cicchetti, D.V. (2008). Development of the evaluative method for evaluating and determining evidence-based practices in autism. *Journal of autism and developmental disorders*, 38(7), 1311-1319. <https://doi.org/10.1007/s10803-007-0517-7>
- Rao, P.A., Beidel, D.C. & Murray, M.J. (2008). Social skills interventions for children with Asperger's syndrome or high-functioning autism: A review and recommendations. *Journal of autism and developmental disorders*, 38(2), 353-361. <https://doi.org/10.1007/s10803-007-0402-4>
- Reifel, S. (2014). Developmental play in the classroom. In E. Brooker, M. Blaise & S. Edwards (Ed.) *The SAGE handbook of play and learning in early childhood* (pp.157-168). London: SAGE.
- Rogers, S.J. & Williams, J.H. (2006). *Imitation and the social mind: Autism and typical development*. New York: Guilford Press.
- Rogers, S. J. (2000). Interventions that facilitate socialization in children with autism. *Journal of Autism and Developmental Disorders*, 30(5), 399-409. <https://doi.org/10.1023/A:1005543321840>
- Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context*. New York: Oxford University Press.
- Rotheram-Fuller, E., Kasari, C., Chamberlain, B. & Locke, J (2010). Social involvement of children with autism spectrum disorders in elementary school classrooms. *Journal of Child Psychology and Psychiatry*, 51(11), 1227-1234. <https://doi.org/10.1111/j.1469-7610.2010.02289.x>
- Rowe, M.L., Salo, V.C. & Rubin, K.. (2018). Toward Creativity: Do Theatrical Experiences Improve Pretend Play and Cooperation among Preschoolers? *American Journal of Play*, 10(2), 193-207.
- Rubin, K. H., Fein, G. G. & Vandenberg, B. (1983). Play. In E. M. Hetherington & P. H. Mussen (Ed.), *Handbook of child psychology: Vol. 4. Socialization, personality, and social development* (pp.693-774). New York: Wiley,
- Rubin,K.H., Watson, K.S. & Jambor, T.W. (1978). Free play behaviors in preschool and kindergarten children. *Child Development*, 49 (2), 534-536. <https://doi.org/10.2307/1128725>
- Samp, J. A. (2009). Communication goal theories. In S. Littlejohn & K. Foss (Ed.), *The encyclopedia of communication theory* (pp.129-132). Thousand Oaks: Sage.
- Sasson, N.J. & Touchstone, E.W. (2014). Visual attention to competing social and object images by preschool children with autism spectrum disorder. *Journal of autism and developmental disorders*, 44(3), 584-592. <https://doi.org/10.1007/s10803-013-1910-z>
- Schlosser, R. (2003). Roles of speech output in augmentative and alternative communication: Narrative review. *Augmentative and Alternative Communication*, 19(1), 5-27. <https://doi.org/10.1080/0743461032000056450>

- Scott, E. & Panksepp, J. (2003). Rough-and-tumble play in human children. *Aggressive Behavior: Official Journal of the International Society for Research on Aggression*, 29(6), 539-551. <https://doi.org/10.1002/ab.10062>
- Schünemann, H.J., Tugwell, P., Reeves, B.C., Akl, E.A., Santesso, N., Spencer, F.A., Shea, B., Wells, G. & Helfand, M. (2013). Non-randomized studies as a source of complementary, sequential or replacement evidence for randomized controlled trials in systematic reviews on the effects of interventions. *Research synthesis methods*, 4(1), 49-62. <https://doi.org/10.1002/jrsm.1078>
- Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P. & Stewart, L.A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P): Elaboration and explanation. *British Medical Journal*, 349, <https://doi.org/10.1136/bmj.g7647>
- Shea, V. & Mesibov G.B. (2005). Adolescents and adults with autism. In F.R. Volkmar et al. (3<sup>rd</sup> Ed.), *Handbook of autism and pervasive developmental disorders, assessment, interventions and policy* (pp.288-311). New Jersey: John Wiley and Sons Inc.
- Sherratt, D. & Peter, M. (2002). *Developing play and drama in children with autistic spectrum disorders*. London: Routledge.
- Shire, S.Y., Shih, W., Bracaglia, S., Kodjoe, M. & Kasari, C. (2020). Peer engagement in toddlers with autism: Community implementation of dyadic and individual Joint Attention, Symbolic Play, Engagement, and Regulation intervention. *Autism*, 24(8), 2142-2152. <https://doi.org/10.1177%2F1362361320935689>
- Shores, R.E. (1987). Overview of research on social interaction: A historical and personal perspective. *Behavioral Disorders*, 12(4), 233-241. <https://doi.org/10.1177%2F019874298701200408>
- Stanton-Chapman, T.L. & Snell, M.E., (2011). Promoting turn-taking skills in preschool children with disabilities: The effects of a peer-based social communication intervention. *Early Childhood Research Quarterly*, 26(3), 303-319. <https://doi.org/10.1016/j.ecresq.2010.11.002>
- Stagnitti, K., O'Connor, C. & Sheppard, L. (2012). Impact of the learn to play program on play, social competence and language for children aged 5–8 years who attend a specialist school. *Australian occupational therapy journal*, 59(4), 302-311. <https://doi.org/10.1111/j.1440-1630.2012.01018.x>
- Stiller, A. & Möble, T. (2018). Media use among children and adolescents with autism spectrum disorder: A systematic review. *Review Journal of Autism and Developmental Disorders*, 5(3), 227-246. <https://doi.org/10.1007/s40489-018-0135-7>
- Suhrheinrich, J., Zeedyk, S., Vojnoska, S. & Stahmer, A. (2019). Educator involvement in research and evaluation. In R. Jordan, J.M. Roberts & K. Hume (Ed.) *The Sage handbook of autism and education* (pp.380-393). London: Sage.
- Sullivan, I., DeHaven, A. & Mellor, D. (2019). Open and reproducible research on open science framework. *Current Protocols Essential Laboratory Techniques*, 18(1), e32. <https://doi.org/10.1002/cpet.32>
- Sullivan, M., Finelli, J., Marvin, A., Garrett-Mayer, E., Bauman, M. & Landa, R., 2007. Response to joint attention in toddlers at risk for autism spectrum disorder: A prospective study. *Journal of autism and developmental disorders*, 37(1), 37-48. <https://doi.org/10.1007/s10803-006-0335-3>
- Sutton-Smith, B. (2001). *The ambiguity of play*. Cambridge: Harvard University Press:
- Sutton, B.M., Webster, A.A. & Westerveld, M.F. (2019). A systematic review of school-based interventions targeting social communication behaviors for students with autism. *Autism*, 23(2), 274-286. <https://doi.org/10.1177%2F1362361317753564>
- Symes, W. & Humphrey, N. (2012). Including pupils with autistic spectrum disorders in the classroom: The role of teaching assistants. *European Journal of Special Needs Education*, 27(4), 517-532. <https://doi.org/10.1080/08856257.2012.726019>
- Szumski, G., Smogorzewska, J., Grygiel, P. & Orlando, A.M. (2019). Examining the effectiveness of naturalistic social skills training in developing social skills and theory of mind in preschoolers with ASD. *Journal of autism and developmental disorders*, 49(7), 2822-2837. <https://doi.org/10.1007/s10803-017-3377-9>



- Szumski, G., Smogorzewska, J. & Karwowski, M. (2016). Can play develop social skills? The effects of 'Play Time/Social Time' programme implementation. *International Journal of Developmental Disabilities*, 62(1), 41-50. <https://doi.org/10.1179/2047387715Y.0000000002>
- Tager-Flusberg, H., Joseph, R & Folstein, S. (2001). Current directions in research on autism. *Mental retardation and developmental disabilities research reviews*, 7(1),21-29. [https://doi.org/10.1002/1098-2779\(200102\)7:1%3C21::AID-MRDD1004%3E3.0.CO;2-3](https://doi.org/10.1002/1098-2779(200102)7:1%3C21::AID-MRDD1004%3E3.0.CO;2-3)
- Thiemann-Bourque, K. (2012). Peer-mediated AAC instruction for young children with autism and other developmental disabilities. *Perspectives on augmentative and alternative communication*, 21(4), 159-166. <https://doi.org/10.1044/aac21.4.159>
- \*Thomas, N. & Smith, C. (2004). Developing play skills in children with autistic spectrum disorders. *Educational Psychology in Practice*, 20(3), 195-206. <https://doi.org/10.1080/0266736042000251781>**
- Tomaino, M.E., Miltenberger, C.A. & Charlop, M.H. (2014). Social skills and play in children with autism. In J. Tarbox, D.R. Dixon, R. Strumey & J.L. Matson (Ed.) *Handbook of early intervention for autism spectrum disorders* (pp.341-353). New York: Springer.
- Toub, T.S., Rajan, V., Golinkoff, R.M. & Hirsh-Pasek, K. (2016). Guided play: A solution to the play versus learning dichotomy. In D.C. Geary & D.B. Berch (Ed.) *Evolutionary perspectives on child development and education* (pp.117-141). Switzerland: Springer.
- Tupou, J., van Der Meer, L., Waddington, H. & Sigafoos, J. (2019). Preschool interventions for children with autism spectrum disorder: A review of effectiveness studies. *Review Journal of Autism and Developmental Disorders*, 1-22. <https://doi.org/10.1007/s40489-019-00170-1>
- Uren, N. & Stagnitti, K. (2009). Pretend play, social competence and involvement in children aged 5–7 years: The concurrent validity of the Child-Initiated Pretend Play Assessment. *Australian Occupational Therapy Journal*, 56(1), 33-40. <https://doi.org/10.1111/j.1440-1630.2008.00761.x>
- van't Veer, A.E. & Giner-Sorolla, R. (2016). Pre-registration in social psychology—A discussion and suggested template. *Journal of Experimental Social Psychology*, 67, 2-12. <https://doi.org/10.1016/j.jesp.2016.03.004>
- Van Roekel, E., Scholte, R.H. & Didden, R. (2010). Bullying among adolescents with autism spectrum disorders: Prevalence and perception. *Journal of autism and developmental disorders*, 40(1), 63-73. DOI 10.1007/s10803-009-0832-2
- Veiga, G., de Leng, W., Cachucho, R., Ketelaar, L., Kok, J.N., Knobbe, A., Neto, C. & Rieffe, C., (2017). Social competence at the playground: Preschoolers during recess. *Infant and Child Development*, 26(1), <https://doi.org/10.1002/icd.1957>
- Verschuur, R., Didden, R., Lang, R., Sigafoos, J. & Huskens, B. (2014). Pivotal response treatment for children with autism spectrum disorders: A systematic review. *Review Journal of Autism and Developmental Disorders*, 1(1), 34-61. <https://doi.org/10.1007/s40489-013-0008-z>
- \*Vincent, L. B., Openden, D., Gentry, J. A., Long, L. A. & Matthews, N. L. (2018). Promoting Social Learning at Recess for Children with ASD and Related Social Challenges. *Behavior analysis in practice*, 11(1), 19-33. <https://doi.org/10.1007/s40617-017-0178-8>**
- Vitiello, V.E., Booren, L.M., Downer, J.T. & Williford, A.P., 2012. Variation in children's classroom engagement throughout a day in preschool: Relations to classroom and child factors. *Early Childhood Research Quarterly*, 27(2), 210-220. <https://doi.org/10.1016/j.ecresq.2011.08.005>
- Volkmar, F.R., Reichow, B. & McPartland, J.C. (2014). *Adolescents and adults with autism spectrum disorders*. New York: Springer.
- Vousden, B., Wilkes-Gillan, S., Cordier, R. & Froude, E., 2019. The play skills of children with high-functioning autism spectrum disorder in peer-to-peer interactions with their classmates: A multiple case study design. *Australian Occupational Therapy Journal*, 66(2), 183-192. <https://doi.org/10.1111/1440-1630.12530>
- Vygotsky, L. (1978). *Mind in society*, Cambridge: Harvard University Press.
- Watkins, L., O'Reilly, M., Kuhn, M., Gevarter, C., Lancioni, G.E., Sigafoos, J. & Lang, R. (2015). A review of peer-mediated social interaction interventions for students with autism in inclusive settings. *Journal of autism and developmental disorders*, 45(4), 1070-1083. <https://doi.org/10.1007/s10803-014-2264-x>

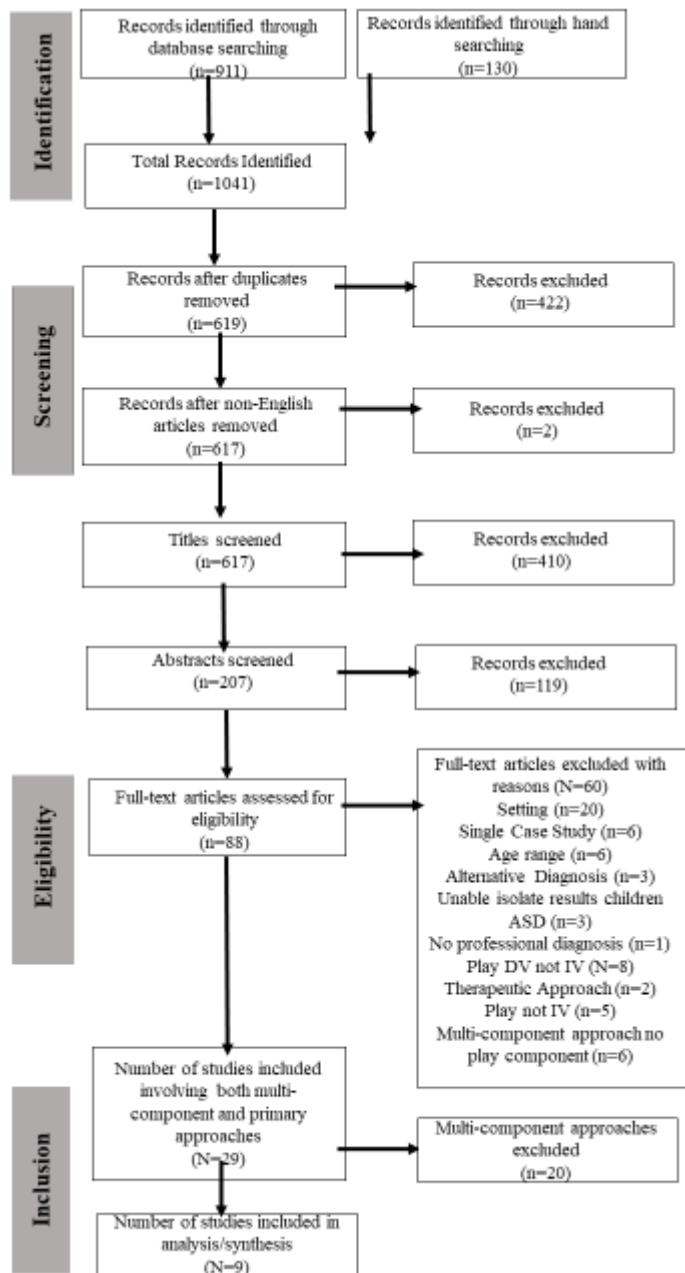
- Watkins, L., Ledbetter-Cho, K., O'Reilly, M., Barnard-Brak, L. & Garcia-Grau, P. (2019a). Interventions for students with autism in inclusive settings: A best-evidence synthesis and meta-analysis. *Psychological bulletin*, 145(5), 490. <https://psycnet.apa.org/doi/10.1037/bul0000190>
- \*Watkins, L., O'Reilly, M., Kuhn, M. & Ledbetter-Cho, K. (2019b). An interest-based intervention package to increase peer social interaction in young children with autism spectrum disorder. *Journal of applied behavior analysis*, 52(1), 132-149. <https://doi.org/10.1002/jaba.514>**
- Weisberg, D.S., Hirsh-Pasek, K., Golinkoff, R.M., Kittredge, A.K. & Klahr, D. (2016). Guided play: Principles and practices. *Current Directions in Psychological Science*, 25(3), 177-182. <https://doi.org/10.1177%2F0963721416645512>
- Weisberg, D.S., Hirsh-Pasek, K. & Golinkoff, R.M. (2013). Guided play: Where curricular goals meet a playful pedagogy. *Mind, Brain, and Education*, 7(2), 104-112. <https://doi.org/10.1111/mbe.12015>
- Weisz, J.R., Chu, B.C. & Polo, A.J. (2004). Treatment dissemination and evidence-based practice: Strengthening intervention through clinician-researcher collaboration. *Clinical Psychology: Science and Practice*, 11(3), 300-307. <https://doi.org/10.1093/clipsy.bph085>
- Wendt, O. & Miller, B. (2012). Quality appraisal of single-subject experimental designs: An overview and comparison of different appraisal tools. *Education and Treatment of Children*, 235-268.
- Wetherby, A.M. (2006). Understanding and measuring social communication in children with autism spectrum disorders. In T. Charman & W. Stone (Ed.) *Social and communication development in autism spectrum disorders: Early identification, diagnosis, and intervention* (pp.3-34). New York: The Guilford Press.
- Wetherby, A.M., Watt, N., Morgan, L. & Shumway, S. (2007). Social communication profiles of children with autism spectrum disorders late in the second year of life. *Journal of autism and developmental disorders*, 37(5), 960-975. <https://doi.org/10.1007/s10803-006-0237-4>
- Wetherby, A.M., Woods, J., Allen, L., Cleary, J., Dickinson, H. & Lord, C. (2004). Early indicators of autism spectrum disorders in the second year of life. *Journal of autism and developmental disorders*, 34(5), 473-493. <https://doi.org/10.1007/s10803-004-2544-y>
- Whalon, K.J., Conroy, M.A., Martinez, J.R. & Werch, B.L. (2015). School-based peer-related social competence interventions for children with autism spectrum disorder: A meta-analysis and descriptive review of single case research design studies. *Journal of autism and developmental disorders*, 45(6), 1513-1531. <https://doi.org/10.1007/s10803-015-2373-1>
- Whitaker, P. (2004). Fostering communication and shared play between mainstream peers and children with autism: Approaches, outcomes and experiences. *British Journal of Special Education*, 31(4), 215-222. <https://doi.org/10.1111/j.0952-3383.2004.00357.x>
- White, R.E. (2012). *The power of play: A research summary on play and learning*. Children's Museum, <https://www.childrensmuseums.org/images/MCMResearchSummary.pdf> Accessed 28 September 2020
- Whitebread, D., Basilio, M., Kuvalja, M., & Verma, M. (2012). *The importance of play*. Brussels: Toy Industries of Europe.
- Whitebread, D., Neale, D., Jensen, H., Liu, C., Solis, S.L., Hopkins, E., Hirsh-Pasek, K. & Zosh, J., (2017). *The role of play in children's development: a review of the evidence*. Bilund: The LEGO Foundation
- Winstead, B.A. & Derlega, V.J. (1986), Friendship and social interaction: An introduction. In V.J. Derlega & B.A. Winstead (Ed.), *Friendship and social interaction* (pp.1-7). New York: Springer.
- Wolfberg, P. (1995). Enhancing children's play. In K. A. Quill (Ed.), *Teaching children with autism: Strategies to enhance communication and socialization* (pp.193-218). New York: Delmar.
- Wolfberg, P. J. (1999) *Play and imagination in children with autism*, New York: Teachers College Press
- Wolfberg, P.J. (2003). *Peer play and the autism spectrum: The art of guiding children's socialization and imagination*. Kansas: Autism Asperger Publishing Company.
- Wolfberg, P., Bottema-Beutel, K. & DeWitt, M. (2012). Including children with autism in social and imaginary play with typical peers: Integrated play groups model. *American Journal of Play*, 5(1), 55-80.

- Wolfberg, P., DeWitt, M., Young, G.S. & Nguyen, T. (2015). Integrated play groups: Promoting symbolic play and social engagement with typical peers in children with ASD across settings. *Journal of autism and developmental disorders*, 45(3), 830-845. <https://doi.org/10.1007/s10803-014-2245-0>
- Wong, C.S. (2013). A play and joint attention intervention for teachers of young children with autism: A randomized controlled pilot study. *Autism*, 17(3), 340-357. <https://doi.org/10.1177%2F1362361312474723>
- Wood, E.A. (2014). Free choice and free play in early childhood education: Troubling the discourse. *International Journal of Early Years Education*, 22(1), 4-18. <https://doi.org/10.1080/09669760.2013.830562>
- Wood, J.J., McLeod, B.D., Klebanoff, S. & Brookman-Frazee, L. (2015). Toward the implementation of evidence-based interventions for youth with autism spectrum disorders in schools and community agencies. *Behavior therapy*, 46(1), 83-95. <https://doi.org/10.1016/j.beth.2014.07.003>
- Woodman, A.C., Smith, L.E., Greenberg, J.S. & Mailick, M.R., 2016. Contextual factors predict patterns of change in functioning over 10 years among adolescents and adults with autism spectrum disorders. *Journal of autism and developmental disorders*, 46(1), 176-189. <https://doi.org/10.1007/s10803-015-2561-z>
- Yang, T.R., Wolfberg, P.J., Wu, S.C. & Hwu, P.Y. (2003). Supporting children on the autism spectrum in peer play at home and school: Piloting the integrated play groups model in Taiwan. *Autism*, 7(4), 437-453. <https://doi.org/10.1177%2F1362361303007004009>
- Youell, B. (2008). The importance of play and playfulness. *European Journal of Psychotherapy and Counselling*, 10(2), 121-129. <https://doi.org/10.1080/13642530802076193>
- Yogman, M., Garner, A., Hutchinson, J., Hirsh-Pasek, K., Golinkoff, R.M. & Committee on Psychosocial Aspects of Child and Family Health (2018). The power of play: A pediatric role in enhancing development in young children. *Pediatrics*, 142(3). <https://doi.org/10.1542/peds.2018-2058>.
- Yu, Y., Shafto, P., Bonawitz, E., Yang, S.C.H., Golinkoff, R.M., Corriveau, K.H., Hirsh-Pasek, K. & Xu, F., (2018). The theoretical and methodological opportunities afforded by guided play with young children. *Frontiers in psychology*, 9, 1152, <https://doi.org/10.3389/fpsyg.2018.01152>.
- Zosh, J.M., Hirsh-Pasek, K., Golinkoff, R.M. & Dore, R.A. (2017). Where learning meets creativity: The promise of guided play. In R.A. Beghetto & B. Sriraman (Ed.) *Creative contradictions in education* (pp.165-180). Switzerland: Springer.
- Zosh, J.M., Hirsh-Pasek, K., Hopkins, E.J., Jensen, H., Liu, C., Neale, D., Solis, S.L. & Whitebread, D. (2018a). Accessing the inaccessible: Redefining play as a spectrum. *Frontiers in Psychology*, 9, 1124. <https://doi.org/10.3389/fpsyg.2018.01124>
- Zosh, J.M., Hopkins, E.J., Jensen, H., Liu, C., Neale, D., Hirsh-Pasek, K., Solis, S.L. & Whitebread, D. (2018b). *Learning through play: A review of the evidence*. Bilund: The Lego Foundation.
- Zwaigenbaum, L., Bryson, S. & Garon, N. (2013). Early identification of autism spectrum disorders. *Behavioral brain research*, 251, 133-146. <https://doi.org/10.1016/j.bbr.2013.04.004>

**Figure Captions**

*Figure 1.* Prisma flow diagram

## Figures



## Tables

Table 1 Studies with a play-based component for social communication skills of children with ASD in education

Reference	Sample 3-12 years	Professional Diagnosis ASD	Play IV/manipulating variable	Intervention components	Social-Communication Outcomes	Educational Setting
Bauminger-Zviely et al. (2020)	Y	Y	N	Preschool Peer Social Intervention; Experiential learning activity + Practice sessions in small mixed peer groups during play, snack, joint activity crafts. Techniques involved role play, doll play, visual/audio-visual stimuli and play	Y	Y
Beadle-Brown et al. (2018)	Y	Y	Y	Imagining Autism; Children engage with drama practitioners in participatory play within multisensory 'pods'	Y	Y
Ben-Sasson et al.(2012)	Y	Y	Y	Collaborative Puzzle Game: Comparison of conditions (Free play and Enforced collaboration) involving collaborative puzzle game on diamond touch interface	Y	Y
Boyd et al. (2018)	Y	Y	N	ASAP: 1-1 and group sessions involving play + naturalistic classroom activities e.g. snack, toilet	Y	Y
Brock et al.(2018)	Y	Y	N	Peer Mediated Intervention: Pivotal Response Training + Recess Play Sessions	Y	Y
Chang et al. (2016)	Y	Y	Y	JASPER: Trained teachers implement at pre-existing play centres and promote social interaction and strategies	Y	Y
Dykstra et al. (2012)	Y	Y	N	ASAP: 1-1 and group sessions involving play + naturalistic classroom activities e.g. snack, toilet	Y	Y
Goods et al. (2013)	Y	Y	Y	JASPER; Play routines used to target communication skills. Strategies include expanding play within routines, all conducted within play session	Y	Y
Harper et al.(2008)	Y	Y	N	Peer Mediated Intervention: Pivotal Response Training + Recess Play Sessions	Y	Y
Hu et al. (2018)	Y	Y	N	Peer-Mediated Lego Play: Lego Play + Peer-training in naturalistic strategies to engage children with ASD	Y	Y
Kamps et al. (2015)	Y	Y	N	Peer Mediated Intervention: Peer Mediated Training + Direct Instruction + Written Text Cues + Play	Y	Y
Kasari et al. (2016)	Y	Y	N	Compared SKILLS and ENGAGE. SKILLS involved didactic groups for children with ASD from different classes and grades to teach social skills. ENGAGE involved interest based groups consisting of multiple activities including free play, games, storytelling and music for children with ASD and typically developing classmates.	Y	Y
Katz and Girolametto (2013)	Y	Y	N	Peer mediated intervention; Peer training sessions + Play sessions	Y	Y
Kuhn et al. (2008)	Y	Y	N	Peer Mediated Intervention: Peer Training + Pivotal Response Training + Play sessions	Y	Y
Laushey and Heflin (2000)	Y	Y	N	Stay Play Talk: Peer training buddy skills + free play	Y	Y

<b>Lawton and Kasari (2012)</b>	Y	Y	Y	JASPER; Teacher implementation of JASPER following training; Social communication outcomes embedded within play routines	Y	Y
<b>Lee et al.(2007)</b>	Y	Y	N	Peer mediated intervention; Peer training sessions + Play sessions	Y	Y
<b>Licciardello et al. (2008)</b>	Y	Y	N	Intervention Package; Pre-teaching target children and peers how to engage in play + playground play session including use of reinforcement and prompting	Y	Y
<b>Loncola and Craig-Unkefer (2005)</b>	Y	Y	Y	Plan-Play-Report: Play-based session involving brief planning/discussion with interventionist conducted	Y	Y
<b>Maich et al. (2018)</b>	Y	Y	N	Stay Play Talk: Peer training buddy skills + structured play sessions	Y	Y
<b>Mpella et al.(2019)</b>	Y	Y	N	Theatrical Play Intervention Package; Physical Education + theatrical play including use of modelling, shaping and reinforcement	Y	Y
<b>Szumski et al.(2016)</b>	Y	Y	N	Play Time/Social Time; Structured Play session including the use of reinforcement and prompting + Direct Teaching Session (Social Skills Lesson)	Y	Y
<b>Szumski et al. (2019)</b>	Y	Y	N	Play Time/Social Time and I Can Problem Solve. PTST involved structured play + Direct teaching. ICPS involved activities including play, games, stories, role play in whole class group.	Y	Y
<b>Thiemann-Bourque (2012)</b>	Y	Y	N	Modified Stay Play Talk based on AAC Instruction: Peer training buddy skills + structured play sessions	Y	Y
<b>Thomas and Smith (2004)</b>	Y	Y	Y	Tabletop Identityplay: Table divided in two with clear area for child's toys and adult's toys. Adult lays out toys, implements according to script and models, imitates child	Y	Y
<b>Vincent et al. (2018)</b>	Y	Y	Y	FRIENDS Playground Program: Structured Play based activities implemented during recess	Y	Y
<b>Watkins et al. (2019)</b>	Y	Y	Y	Individualized peer/child play intervention session facilitated by interventionist	Y	Y
<b>Whitaker (2004)</b>	Y	Y	N	Peer Mediated Intervention: Peer training session + Play sessions	Y	Y
<b>Wong (2013)</b>	Y	Y	N	JASPER Intervention; Teacher training Symbolic Play x 4 and implemented within classroom play sessions then Joint Attention Activities x 4 weeks and implemented across multiple activity types or vice versa	Y	Y

Table 2 Characteristics of included play-based intervention studies

Author, Year, Country	Sample Characteristics			Research Design			Intervention							Results
	Number	Age	Gender	Professional Diagnosis	Methodology	Strength	Name	Components	Frequency, Intensity, Duration	Interventionist	Educational Setting/Context	Play Type	Social Communication Outcomes	
<b>Beadle-Brown et al. (2018)</b> UK	22	7-12 years M=9.16 years	18 Males; 4 Females	ASD	AB Single Case Design	Weak	Imagining Autism	Children engaged with drama practitioners in participatory play within multisensory 'pods'. Encountered range of stimuli including puppetry, light, sound, costume, masks, digital media and responsive technology. Engaged in five imaginary themes- forest, outer space, arctic, underwater, city.	Weekly; 45 minute; 10 weeks	Trained Drama Practitioner	Special School (x3); School hall	Social Play Peer Groups (3-4 children with ASD); Guided Play (Child-led + Adult Involvement); Imaginative/ Dramatic	Communication Subscale ADOS; Socialisation Subscale VABS (Interpersonal Relationships, Play, Coping Skills); Communication Subscale VABS (Receptive, Expressive, Written combination)	Mixed
<b>Ben-Sasson et al. (2012)</b> Israel	12 (6 dyads)	8-11 years M=9.28 years	12 Males	ASD	Within Subjects Design	Weak	Collaborative Puzzle Game	Individual Training Session followed by Experimental Session. Children paired in dyads and engaged in 3 puzzle games for free play mode and 3 puzzle games for enforced collaboration mode. FP mode involved two players independently moving puzzle pieces to match completed puzzle piece on digital table. EC mode forced partners to move puzzle pieces together during joint activity.	2 experimental sessions one month apart. Duration varied for each dyad depending on time taken to complete	Researcher	Mainstream Public School; Special Class; Quiet room within School	Social Play (Child with ASD + Peer with ASD); Structured Play (Adult-led); Digital Play on Diamond Touch Interface; Puzzle Game	Friendship Observation Scale; Frequency of Positive and Negative Social Interactions; Social Responsiveness Scale: Parent reported measure social cognition, social awareness, social communication, social motivation	Mixed
<b>Chang, et al. (2016b)</b> USA	66 (38 intervention; 28 waitlist control)	3-5 years M=4.18 years	59 Males; 7 Female	ASD	Randomised Wait-List Control	Adequate	JASPER	Classrooms randomised to JASPER intervention or continue usual ABA preschool curriculum. Teachers underwent training and implemented JASPER at pre-existing play centres using appropriate toy selection to promote peer to peer interaction. Teachers actively interacted with children and researchers coached teachers	Daily; 15 minute; 8 weeks, total 40 sessions	Trained Class Teacher and Paraprofessionals (N=13)	6 Mainstream Public Schools; Pre-school Autism Special Classroom Play Centre	Social Play (Child with ASD + 2-4 Typically Developing Peers or 1-1 Interaction with Teacher (depending on ability levels); Guided Play (Child-led + Adult Involvement); Play type based on developmental level; simple (cause and effect), combination (object), pre-symbolic (functional) or symbolic	Percentage of engagement with peers and teachers during play interactions; Frequency of spontaneous initiation of joint attention behaviors (verbal and non-verbal) during play interactions; Frequency of initiated behavior regulation during play interactions	Positive
<b>Goods, et al. (2013)</b> USA	15 (7 intervention; 8 waitlist control)	3-5 years	NS	ASD	Randomised Wait-List Control	Weak	JASPER	JASPER; Treatment group withdrawn from same classroom as control.	Twice weekly; 30 minute	Graduate Student Educational Psychology	Private Autism Special Preschool;	Social Play (Adult + Child)	Frequency of spontaneous initiations of Joint	Mixed



	8 waitlist control)	M=4.32 years						Opportunities were embedded within play routines based on developmental level and interests of child to target social communication skills	12 weeks, total 24 sessions		Children withdrawn	Guided Play (Child-led + Adult Involvement); Play type based on developmental level; object play, functional play or symbolic play	Attention and Request Behaviors; Duration of Engagement State in Classroom Play Interactions	
<b>Lawton and Kasari (2012) USA</b>	16 (9 Intervention Group; 7 Waitlist Control)	3-5 years M=3.71 years	NS	ASD	Randomised Waitlist Control Trial	Weak	JASPER	JASPER: Teachers from intervention group received training from interventionist in JASPER within classroom context twice weekly; Teachers implemented JASPER daily within play routines; set up environment, follow child's toy choice, initiate child's play actions, prompt play actions, establishing play routine, wait for communication, contingent language, prompts for joint attention and modelling	Daily, 20 minute JASPER session, 6 week intervention	Trained Classroom Teacher	16 Public Preschools; 8 inclusive classrooms and 3 self-contained classrooms Classroom Play area	Social Play (Adult + Child); Guided Play (Child-led + Adult Involvement); Play type based on developmental level; object play, functional play or symbolic play	Frequency of initiations of Joint Attention; Duration of Engagement States in Classroom Play Interactions	Mixed
<b>Loncola and Craig-Unkefer (2005) USA</b>	6	6-8 years M=6.71 years	5 Males; 1 Female	ASD	Multiple Baseline Design	Adequate	Plan-Play-Report	Plan-Play-Report: 5-minute play organiser session with interventionist and peer dyad. Plan according to designated play theme, label toys and includes role-play and modelling if necessary; 10-minute play session minimal involvement of interventionist; 5-minute review session where interventionist re-enters play and discusses play with peer dyad	Three times weekly; 20 minute; Varied across participant dyads	Trained researcher	Public Mainstream School; Self-contained classrooms; Sectioned off area hallway	Social Play (Child with ASD + Peer with ASD); Guided Play (Child-led + Adult Involvement); Symbolic Play	Frequency of comments, requests and verbal others directed towards peers	Mixed
<b>Thomas and Smith (2004) UK</b>	3	3.4-4.1 years M=NS	2 Males; 1 Female	ASD	AB Single Case Design	Weak	Tabletop Identiplay	Table divided in two with clear area for child's toys and adult's toys, child and interventionist face to face on chairs with two identical sets of toys. Adult lays out toys, implements according to script and models, imitates child	Daily; 5 minute; 2 weeks, total 10 sessions	Researcher	Mainstream Pre-School; NS	Social Play (Adult + Child); Structured Play (Adult - led); Object play	Time engaged in social interactions; Frequency Eye contact; Frequency Verbal Communication	Positive
<b>Vincent et al. (2018) USA</b>	6 (6 children ASD and 1 child EBD)	5-9 years M=7.14 years	4 Males; 2 Females	ASD	Multiple Baseline across Participants Design	Adequate	FRIEND Playground Program	Multiple structured activities provided on playground to increase motivation to engage in play with typically developing peers. This was guided by trained researcher who implemented strategies	Daily 20-minute recess session; 30-34 weeks throughout school year	Trained researcher	Mainstream Elementary School; Playground	Social Play (Child ASD + Typically Developing Peers); Guided Play (Child-led + Adult Involvement);	Duration of engagement with peers; Frequency of Social Initiations	Positive

								including following child's lead, facilitating interactions between students, supporting with prompts and providing reinforcement				Games with Rules		
<b>Watkins, et al.(2019b) USA</b>	4	4,5-6.2 years M=5.21 years	3 Males; 1 Female	ASD	Multiple Baseline Design	Adequate	Individualized Play Intervention	Individualized play intervention. 4 children paired with typically developing peers from classroom. Participants and peers engaged in mutually appealing play activity within classroom, facilitated by researchers.	Daily; 10-minute; Varied across participants, total 43 sessions	Researcher	Private Special School; Inclusive Pre-School Classroom Play Area	Social Play (Child with ASD + Typically Developing Peer); Guided Play (Child-led+ Adult Involvement) Object Play	Frequency of social initiations and responses to peers during interactive play	Positive

NS=Not Specified

Table 3 Generalization, maintenance, social validity and fidelity results (Reichow et al. 2008)

<i>Author</i>	<i>Assessments</i>			
	<b>Generalisation</b>	<b>Maintenance</b>	<b>Social Validity</b>	<b>Treatment and/or Procedural Fidelity</b>
<i>Beadle-Brown et al. (2018)</i>	N	Y	Y	N
<i>Ben-Sasson et al. (2012)</i>	N	N	Y	N
<i>Chang et al. (2016b)</i>	Y	Y	Y	Y
<i>Goods, et al.(2013)</i>	Y	N	Y	Y
<i>Lawton and Kasari (2012)</i>	N	N	Y	Y
<i>Loncola and Craig-Unkefer (2005)</i>	N	N	N	Y
<i>Thomas and Smith (2004)</i>	N	N	N	N
<i>Vincent et al. (2018)</i>	N	N	Y	Y
<i>Watkins, et al. (2019b)</i>	N	Y	Y	Y

