Parents-Mediated, Play-based Interventions to Promote Social Communication among Preschool Children with Autism Spectrum Disorder

A Systematic Literature Review

One year master thesis 15 credits

Interventions in Childhood

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Individuals with autism spectrum disorder (ASD) often struggle with social communication. This situation further leads to adulthood depression along with other health issues if it is not diagnosed and intervened at an early age. As an early intervention play-based interventions have proven to be beneficial in promoting social communication skills in preschool-aged children. Engaging parents in the implementation of early interventions for children with ASD is currently popular. Consequently, the aim of this systematic review is to identify the play-based interventions implemented by parents to enhance social communication in children with ASD, as well as the outcomes and strategies that parents might use during the mediation process. For the final analysis, six studies were considered, and six interventions were identified. The findings demonstrate that Project Improving Parents As Communication Teachers (ImPACT), Joint Attention, Symbolic Play, Engagement & Regulation (JASPER), Focused Play Intervention (FPI), Floor Time Play (FTP), and the Program for the Education and Enrichment of Relational Skills (PEERS) can all effectively improve the social communication of preschool children with ASD. JASPER, FPI, and FTP are known to be play-based interventions, whereas Project ImPACT and PEERS use play as the main context. Various types of strategies that parents can utilize were identified. Further study will be required to investigate more play-based interventions and supportive strategies for 2–6-year-old preschool children with ASD to promote social communication that is implemented by parents.

Keywords: parents, caregivers, play, interventions, preschool, kindergarten, Autism, ASD
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# Introduction

Children with autism spectrum disorder (ASD) frequently struggle with social communication skills and this starts in early childhood and persists throughout their lifetime (Magiati et al., 2014). Impaired adaptive and social functioning as well as adult depression are the significant negative impact on pervasive impairment of social communication (Magiati et al., 2014). It is proven that early diagnosis, followed by early interventions, will lessen these difficulties, improve everyday functioning, and facilitate social interaction in ASD individuals (CDC, 2020). It is well known that play-based interventions provide an optimal platform to promote young children's social development in natural and pleasurable contexts as a part of early interventions (Gibson et al., 2021). An increasing body of research has revealed that active parental participation in play-based interventions maximizes children's skill sets. Thus, the purpose of this study is to explore how play-based interventions implemented by parents can encourage social interaction in children with ASD who are between the ages of 2 and 6.

# Background

## 2.1 Autism Spectrum Disorder

According to the World Health Organization (WHO) (2022), ASD is a complex disorder that contains a wide range of conditions related to brain development. American Psychological Association (2013) mentioned that ASD is characterized by difficulty with social communication and interaction, as well as confined and repetitive patterns in behaviors, interests, and activities. For some individuals, ASD is caused by a genetic condition, whilst for other others, the precise causes are still unknown (CDC, 2020). It often manifests before the age of 3 years and can last throughout a person’s life, although symptoms may improve over time (CDC, 2020). According to data from 2018, the Centers for Disease Control and Prevention (CDC) estimates that 1 in 44 children in the United States has an ASD, with 1 in 116 girls and 1 in 27 boys diagnosed (CDC, 2020). Thus, it can be said that males have diagnosed with ASD more than females and de Giambattista et al. (2021) mentioned that this can be due to the gender differences in diagnosis or treatment.
The Diagnostic and Statistical Manual of Mental Disorders (DSM) IV categorizes the diagnosis of autism into five categories: Rett syndrome, Asperger's syndrome, childhood disintegrative disorder, Asperger's disorder, and pervasive developmental disorder - not otherwise specified (PDD-NOS) (American Psychiatric Association [APA], 2000). Meanwhile, the recently updated DSM-5 has combined the four of these subcategories (autistic disorder, Asperger's disorder, childhood disintegrative disorder, and PDD-NOS) into one main diagnosis known as "autism spectrum disorder" (APA, 2022). “Persistent deficits in social communication and social interaction across multiple contexts, Restricted, repetitive patterns of behavior, interest, or activities, as manifested currently or history, Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning etc.” are some of the criteria in DSM-V. In this study, both manuals are used as all the categories related to ASD are accepted for this study by the author.

As an early identification, some children tend to show differences from typically developed children, as they avoid eye contact or conversations with their parents or others and become aloof and uninterested in social interaction or even have a special obsession with certain objects (Centers for Disease Control and Prevention, 2020). The primary characteristics of ASD include persistent deficits in social reciprocity, the capacity to form and sustain social connections, and verbal and non-verbal communication behavior employed in social interactions (Hage et al., 2022). The long-term negative impacts of not having proper social communication lead to depression, behavioral problems, and anxiety in individuals with ASD (Ali et al., 2019). Thus, it is worth discussing social communication skills in detail and its impact on individuals with ASD.

2.2 Social communication skills

Social communication refers to how individuals interact with others in various social contexts (Gal et al., 2009). Social interaction, social cognition, pragmatics, verbal and nonverbal communication, and language processing are the main components of social communication (ASHA, n.d.) as explained follows in briefly.

**Social interaction**
Social interaction is the reciprocal stimulation or response between two or more individuals, as defined by the American Psychological Association Dictionary of Psychology (APA Dictionary of Psychology, 2014). Dyads are such example for encounters between two individuals.

**Social cognition**
Social cognition includes facial expression, face processing, joint attention and joint engagement, theory of mind, empathy and moral processing. These key areas of social cognition involve recognizing and comprehending the mental states of others, relating emotional states, and utilizing executive functioning skills such as organization, planning, attention, and problem-solving (Beaudoin & Beauchamp, 2020). Meantime joint attention plays a key role as it is coordinated or shared attention with the social partner along with other key areas of social cognition (Beaudoin & Beauchamp, 2020).

**Pragmatics**
Pragmatics refers to the norms people follow while using language in social contexts (Beaudoin & Beauchamp, 2020). The text focuses on goal-oriented language use in social contexts and includes verbal and nonverbal communication as part of pragmatics.

**Language processing**
Language processing involves creating and understanding language. It's transferring thoughts and feelings into meaningful communication (Beaudoin & Beauchamp, 2020).

Success in social communication leads to success in academic activities later on and promotes emotional regulation and the prevention of problematic social behaviors. (Leipold et al., 2022). Meanwhile, it helps children to build healthy relationships with others including parents, friends, and adults as social communication is one of the core skills of communicative development in a child. At any rate, as children with ASD battle with social communication, it could be an obstruction to reaching the aforementioned long-term success in their life (Ali et al., 2019).

Some children with ASD find it difficult to understand and communicate with others effectively (Shrestha et al., 2021). This can be due to difficulties with language skills and comprehending what others are saying (Shrestha et al., 2021). Additionally, cues like eye contact, facial
expressions, and hand gestures can be difficult for them to use (Shrestha et al., 2021). Basically, joint attention, social reciprocity, and social cognition are the three specific deficit areas in child with ASD struggles in terms of social communication (Dijkstra-de Neijs et al., 2021). However, the characteristics of verbal and nonverbal social communication vary with age, cognitive ability, and linguistic proficiency (American Psychiatric Association, 2000). To minimize these issues and maximize their social communication, researchers focus more on play in children as the primary occupation of young children is play (Yogman et al., 2018).

### 2.3 Play

One of the definitions for play is an activity in which anyone can engage with a result of intrinsic motivation which leads to joyful discovery (Yogman et al., 2018). However, childhood play, and adult play differs from each other in terms of the types of play. Practice play, symbolic play, constructive play, parallel play, associated play, and cooperative play are some of the play types for children’s different ages (Besio, 2018). Play in children is a common behavior that is innately present in all children and leads to a sense of happiness (Abrahamse et al., 2015). Play is crucial for children's development since it fosters their social, physical, emotional, and cognitive functioning (Burriss & Tsao, 2002). Play contributed to social development, by improving joint attention, mentalization, and social referencing. Physical development takes place by improving fine, and gross motor skills, and coordination through play (Kavanaugh & Harris, 1994). Stimulating self-regulation functions including emotional and behavioral regulations can be considered outcomes of emotional development in play (Miller, 2017). In terms of cognition, play stimulates the growth of the neural system, particularly the brain circuits linked to social functioning and linguistic skills (Fink et al., 2020). All in all, play contributes to overall development in early childhood, especially social communication.

### 2.4 Play and social communication skills, Play and ASD

According to Vogindroukas et al. (2020) play is a third skill domain that has been closely linked to social communication skills and it can be both functional and symbolic play. Social communication helps to improve broad areas of development in children including social play and symbolic play. Research highlighted that there is a high correlation between symbolic play and communication development, especially in symbolic language development (Watkins et al., 2015). When children are together, they need to perform social actions and react to others' behaviors (Aldred et
al., 2004). Play and social communication skills, assist children in using appropriate "rules" and language in different types of social settings and it further helps to broaden their friendship (Pellegrini & Smith, 1998).

When the play is compared with typically developed children and children with disabilities, especially children with ASD, it may be limited in terms of the quality and quantity of their play (Kossyvaki & Papoudi, 2016). In their study Dijkstra-de Neijs et al, (2021) stated that aberrant play such as repetitive play, in ASD individuals is caused by a neurodevelopmental impairment that is also linked to social and cognitive developmental issues. Meantime, children with ASD are more inclined to play by themselves, and their plays are frequently monotonous and aimless (Kossyvaki & Papoudi, 2016). Additionally, play is a difficult task for these children as they have lack of imitation skill, symbolic play skills, social communication skill including joint attention skills (Kossyvaki & Papoudi, 2016). However, play intervention is an approach for helping children with ASD become more themselves because most of the time they are unable to explore their abilities or interests and frequently stay stuck in a rut (Jo Rudy, 2022).

2.5 Play-based interventions

Intervention is defined as a professionally developed process followed by strategies that provide a service to achieve the desired change for individuals or families in need (Fraser & Galinsky, 2010). Interventions targeting children assist in both children's positive outcomes as well as parents’ or family support (National Academies of Sciences et al., 2016). Play-based intervention, which is followed by the use of games, whether virtual or physical, delivered by a trained professional or adult, is a well-known early intervention to improve several behavioral and emotional challenges including social skills (Bratton & Ray, 2000). Although the play is difficult for children with ASD trained adults can help children with ASD during play using evidence-based practices like modeling, repetition, behavior chain-building, and intentional replacement of negative behaviors with positive ones. (Bratton & Ray, 2000). According to Holmes & Willoughby (2005), there are few play-based interventions being used with children with ASD and they are proven to be beneficial in different aspects of development including social communication skills. Targeting play skills is crucial for children with ASD as they frequently pick up certain components of play, but they may
require assistance to develop a comprehensive set of play skills (Gibson et al., 2021). This assistance can be provided by trained parents as their closest caregivers, and it is important to discuss parents’ role in children with ASD.

2.6 Parents’ role in children with ASD
Every parent plays a major role in a child’s life. Although children can develop attachments to more than one carer, the most significant and long-lasting relationships are with those who have provided close care from early infancy. Most often, parents are the primary caregivers of children, and having healthy relationships and a secure attachment bond with the child can be identified as a major developmental milestone. Thus, it is evident that the development of a child is mainly based on the positive and negative support they receive from their parents.

Raising a child with ASD is challenging and a stressful task for a parent and many researchers reported that parents of children with ASD, especially mothers have high levels of stress index (Van Tongerloo et al., 2014). However, child with ASD needs additional support from parents because the child’s development depends entirely on the support the child receives from his closest environment and professional efforts. Parents play a major role in the assessment and diagnostic process as they can deliver specific information about the child. Additionally, their knowledge about the child's needs, preferences, and developmental history will better guide the therapists to decide about the treatment approach or any accommodation to be made. Apart from this, parents can be active members in delivering several interventions for children which are effective.

2.7 Parent-mediated interventions
Parental involvement is widely regarded as an essential component of early intervention programs, resulting in improved skill development. To achieve the necessary intensity duration, family members and carers should be included in therapeutic programs that integrate recommendations into everyday routines (Watson et al., 2017). Meanwhile, a growing body of research focuses on how parents can use various strategies to assist children with ASD in their natural environment (Watson et al., 2017). Parent-mediated Interventions (PMI) are then created, and they can be defined as when professionals coach and guide the parent or other caregiver of the child on how to act as the child's interventionist by implementing various types of strategies (Watson et al., 2017). It is the duty of the practitioner to select parenting interventions that work well and to consider any other
therapies that may be altered to be parent-mediated rather than involving the child directly in the interventions.

To better illustrate, the involvement of parents’ Zone of Proximal Development (ZPD) can be discussed, which is another concept developed by Lev Vygotsky based on how an individual learns with proper guidance (Tzuriel, 2019). ZPD can be defined as the difference between a child's actual level of development as measured by their ability to solve problems on their own and their potential level of development as measured by their ability to solve problems with adult assistance or more advanced peers (Eun, 2017). Thus, parents’ mediation can be considered a helpful, practical, and effective way of involving in children’s learning process considering their abilities and disabilities (Bradshaw et al., 2014). Such mediation in a playful context is an interesting move for researchers to find out the outcomes of children with ASD (Bradshaw et al., 2014).

2.8 Parents-mediated, play-based interventions for preschool ages

According to Bratton and Ray (2000), parents are the best playmates in children's early ages. They further mentioned that parent-child pretend, and physical play are linked with sets of skills including children’s competencies, gross motor skills, etc. while interactive play leads to regulating children’s emotions (Bratton & Ray,2000). Thus, many play-based interventions are utilized with children with ASD with the involvement of parents to enhance play levels, joint engagement, symbolic play including children’s well-being (Kasari et al., 2010). In their study Bradshaw et al, (2014) highlighted how parents of children with ASD can play an active role in exploratory play relational play, functional play, and symbolic play by utilizing various strategies targeting the outcome skill of each intervention. It is known to be a wonderful experience for parents when their difficult-to-engage child with ASD can be effectively engaged (Bratton & Ray,2000). Furthermore, parents’ mediation can be discussed based on the principles of Mediated Learning Experience Theory which is a concept of Reuven Feuerstein (Watson et al., 2017; Tzuriel, 2019).

2.9 Mediated Learning Experience (MLE) Theory

Parents, teachers, or other experienced individuals play an important role as learning mediators in a child’s learning process and their involvement sharpens the child’s cognitive development (Tiyarestu & Leonardi, 2019). Feuerstein's MLE theory highlights how parents can be active modifying mediators in a child's development, similar to Vygotsky's zone of proximal development.
and scaffolding. (Tzuriel, 2019). The mediation process always results in a child's cognitive modifiability which is acquiring new knowledge from learning and changing their cognitive structure according to the situation (Tiyarestu & Leonardi, 2019).

Direct exposure to stimuli and mediated learning experience are the basic two assumptions of MLE theory which explains how individuals learn. Direct exposure is defined as unmediated contact between individuals and environmental factors. In the MLE process, mediators placed themselves between the learner and the environment. The mediator alters the information in numerous ways to ensure that it is effectively grasped by the learner. MLE processes are influenced by multiple factors, including the child's cognitive abilities, motivations, emotions, personality, behavior, task characteristics, and environment, as well as the parent's ability to effectively mediate. Depending on the child's level of difficulty, improvement, and progress, as well as on factors such as the environment that influence learning, mediation should be either expanded or discontinued. Presseisen and Kozulin (1992) mentioned that the quality of MLE interaction is based on twelve parameters related to the MLE theory. The first three parameters are common for any cultural background, and it is considered necessary strategies for successful MLE interaction while the other nine parameters are not always necessary to be present in MLE (Tzuriel, 2019).

### 2.2.1 MLE strategies

*Intentionality and Reciprocity*

A mediator's intentional efforts to alter a child's attention, awareness, and perception are referred to as "intentionality" and "reciprocity." This parameter is one of the essential elements for beginning the mediation process.

*Mediation of Transcendence*

Expanding the learners' experiences beyond the immediate and integrating remote objectives is called transcendental mediation. It enables the application of learnings to different settings or times, broadening their experiences. This assists parents/mediators in helping their children apply these learnings in their daily lives and social contexts.

*Mediation of Meaning*
As a strategy of reinforcement, mediation of meaning can be expressed both vocally and nonverbally. Instead of waiting passively for meanings to emerge, children who experience mediation of meaning actively attach future meanings to new experiences.

3 Rational
As stated previously, children with ASD typically struggle with some level of communication and social contact, as well as repetitive behaviors and limited interests. This condition frequently results in poor social communication, which is defined by pragmatic, verbal, and nonverbal communication in a variety of social contexts.

The research emphasized the effectiveness of how parents can be active agents of delivering interventions in various contexts to minimize these characteristics followed by training with professionals. Meantime, play is mentioned as one of the main activities which can optimize children’s’ holistic development and how play-based interventions enhance social communication development in children with ASD.

Most of the play-based interventions for preschool children have been designed to be implemented with preschool teachers and, there is a gap between current literature on how play-based interventions are carried out with these children with their parents as their closest carers. Therefore, it is important to provide parents with interventions to assist their autistic children to improve social communication skills in non-educational settings.

4 Aim
The aim of this systematic literature review is to explore the parent-implemented, play-based interventions that focus on promoting social communication in preschool-aged children with ASD followed by the following research questions.

1. What are the available parent-mediated, play-based interventions/ programs to promote social communication skills in preschool children with ASD?
2. What are the outcomes of these programs for children with ASD?
3. What are the strategies parents use with their children with ASD when implementing these interventions?
5 Methodology

To reach the study’s aim, a systematic literature review was conducted. Systematic Review can be defined as a research method to collect and synthesize empirical evidence on a specific topic (Jesson et al., 2011). The primary characteristics of a systematic literature review should be followed by a defined search strategy with inclusion and exclusion criteria to select the final articles (Jesson et al., 2011). According to Jesson et al, (2011), the search process and collection of research need to be transparent and well-documented in order to replicate by other researchers. In this section Search strategy, selection criteria, selection process, quality assessment, and data extraction will be elaborated and the whole process can be seen in Figure 1.

![Methodological Process Diagram](image)

**Figure 5.1 – Methodological Process**

5.1 Search procedure
The database search for this systematic literature review took place in January 2023. The Jönköping University’s electronic library was used to access the web databases. Four web databases PUBMED, Scopus, CINAHL, and Psych INFO were used to obtain the results. PubMed is used as it focuses on biomedical literature citations from MEDLINE, a life sciences journal based in the fields of medicine and health, and PsycINFO because it focuses on behavioral and social studies and the interdisciplinary aspects of research. SCOPUS is based primarily on peer-reviewed articles in the medical and social sciences. CINAHL is used as it serves primarily to research subject areas for health journals. In all databases, four filters were applied based on the PIO framework mentioned in table 1 and inclusion and exclusion criteria. To obtain the maximum number of relevant articles various search strings were tried out several times. Truncations (*) and Boolean (AND/OR) were used to yield more results. The same search words were used in PubMed, Scopus, and PsycINFO while free search terms were used in CINHAL as follows and the final search in each database can be found in Appendix A.

```
parent* OR caregiver* OR home AND implement* OR deliver OR led AND play* OR game AND therapy OR intervention AND preschool* OR kindergarten AND autis* child* AND social communication.
```

**Table 5.1.1- PIO framework**

<table>
<thead>
<tr>
<th>PIO</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>children with ASD in preschool age (2-6 years)</td>
</tr>
<tr>
<td>Intervention</td>
<td>play-based Intervention implemented by parents</td>
</tr>
<tr>
<td>Outcome</td>
<td>Social communication</td>
</tr>
</tbody>
</table>
5.2 Selection Criteria

To select the articles inclusion and exclusion criteria were based on the aim, research questions, and PIO framework as stated. Firstly, there is a need to investigate the play interventions implemented by parents that are available to promote social communication among preschool children with ASD. Secondly, the age is prioritized for 2-6 years to utilize the implication of this study as some Nordic countries have set the preschool age from 2-6 (Tveita et al., 2019). A possible extraction form with inclusion and exclusion criteria is shown in Table 2 below.

Table 5.1

Inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>Adults</td>
</tr>
<tr>
<td>Children aged 2-6 with a diagnosis of ASD</td>
<td>children aged 0-23 months and older than 7</td>
</tr>
<tr>
<td></td>
<td>Typically developing children</td>
</tr>
<tr>
<td></td>
<td>Children with other disabilities</td>
</tr>
<tr>
<td><strong>Focus</strong></td>
<td>Implemented by teachers</td>
</tr>
<tr>
<td>parents-mediated, play-based interventions</td>
<td>Implemented in the preschool setting</td>
</tr>
<tr>
<td>Social communication skills as a whole or components</td>
<td></td>
</tr>
<tr>
<td>Mediated with or without professional present</td>
<td></td>
</tr>
<tr>
<td>In home-based or clinics or community</td>
<td></td>
</tr>
<tr>
<td><strong>Publication Type</strong></td>
<td>Book or book chapters</td>
</tr>
<tr>
<td>Peer review articles</td>
<td>Master thesis</td>
</tr>
<tr>
<td>Published from 2010 to 2022</td>
<td>Other languages</td>
</tr>
<tr>
<td>In English</td>
<td></td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td>Systematic literature reviews</td>
</tr>
<tr>
<td>Quantitative, mixed method</td>
<td></td>
</tr>
</tbody>
</table>
5.3 Selection Process

In total, 356 articles were identified and transferred to Rayyan. Rayyan is a web-based tool for screening processes in systematic reviews (Glogowski, n.d.). 28 articles were eliminated for being duplicates. In Rayyan, all the articles were sorted using inclusion and exclusion criteria. Articles were arranged in several categories with the labels "Included," "Excluded," and "Maybe" depending on the design. To make sure no relevant articles were missed, articles that partially matched the inclusion criteria were marked as "Maybe" and moved onto full-text screening. A flow chart shows the complete search and extraction process (Figure 2.2).

5.1.1 Title and Abstract Screening and Full-text Screening

For title and abstract screening, inclusion criteria were employed. The following factors led to the exclusion of 311 out of 328: wrong population (n=22), wrong intervention (n=51), wrong result (n=43), wrong study design (n=48), and irrelevancy (n=147).

To ensure no relevant article was missed; reference list search was done in the excluded articles which were based on wrong study design. Reference list search were not employed in the excluded articles which had wrong intervention and wrong population as intervention and population is main focuses in this study. Four articles were found within the pre-set inclusion and exclusion criteria of this study, and it further considered for full text screening.

17 articles from the search strings and 4 articles from reference searching remained for the full text screening. After the full text reading in search strings 12 articles were removed due to the wrong population(n=3), wrong study design(n=6), and wrong intervention(n=3). Three out of four articles from citation searching were excluded due to not being accessible, not being peer-reviewed and wrong intervention. Finally, six studies were included in this study.

5.1.2 Data Extraction

Data extraction was performed using a protocol which includes the authors, the article's title, the year it was published, the country where the research was conducted, the aim and purpose of the
study, the research questions, and the hypotheses. The methodology data, includes details about the sample of children, sampling characteristics, study design, information about the interventions (type, setting, goals, outcome), data analysis, results, limitations, and conclusions discussed in the article.
Identification of studies via databases.

**Identification**

Records identified from:
- Databases (n = 356)
  - PubMed (n = 69)
  - PsyINFO (n = 11)
  - Scopus (n = 198)
  - CINHAL (n = 78)

Records removed before screening:
- Duplicate records removed (n = 28)

Records identified from:
- Reafference searching (n = 4)
  - etc.

**Screening**

Records screened (n = 328)

Records excluded** (n = 311)
- Wrong Intervention - 51
- Wrong Outcome - 43
- Wrong Population - 22
- Wrong Study Design - 48
- Irrelevant - 147

**Included**

Reports assessed for eligibility (n = 17)

Reports excluded:
- Wrong Population - 3
- Wrong Study Design - 6
- Wrong Intervention - 3

Studies included in review (n = 6)

Records excluded:
- Not Accessible - 1
- Not peer-review - 1
- Wrong Intervention - 1
5.1.3 Quality Assessment

The CASP checklists for quantitative research were used to evaluate the quality of the final papers (CASP, 2018). Both the CASP qualitative checklist and the CASP cohort study checklist were utilized for the articles that were found to have a mixed-method design. There were no alterations made. The CASP’s questions were scored on a scale from 0% to 100%. The percentages from each study were added up and rated as "Low" (less than 50 percent), "Medium" (between 50 and 80 percent), and "High" (more than 80 percent) quality. Two studies were rated as being of medium quality, while four were rated as being of high quality.

6 Data Analysis

Key information from the six articles that were chosen was analyzed and reported using the data extraction protocol. All studies underwent a thorough rescreening to identify and extract pertinent data that would be necessary to fully address the research topic. The first research question was answered by analyzing the descriptions of the intervention. The results of the intervention programs were examined to analyze the second study question. Strategies were assessed and categorized with MLE parameters to answer the third research question.

7 Ethical Consideration

According to Vergnes et al. (2010), a fundamental component of the systematic reviews approach should be ethical evaluation. To address the existing absence of ethical assessment in systematic reviews, certain straightforward actions could be taken (Vergnes et al., 2010). Furthermore, it is an integral component of measuring the quality of systematic reviews (Vergnes et al., 2010). Ethics must be taken into account, and participants must give their informed consent (Thompson et al., 2020). Researchers must take precautions to preserve children's rights when studying children with impairments (Thompson et al., 2020). Six articles included in this study considered ethics. Informed consent from the children's carers and ethical committee or board is mentioned.
8 Results

Six articles were included to answer the research questions within the inclusion criteria and the availability of play interventions implemented by parents in promoting the social communication of preschoolers with ASD. In essence, six interventions were recognized, and each approach yielded favorable results in social communication. The strategies implemented by parents can be classified as adhering to the universal parameters of MLE theory.

To make referencing simpler, a referencing number (RN) was given to each study. The answers to the study questions are obtained by observing changes in outcomes following an intervention, by contrasting the findings with those of a control group, or by the combination of these two data. Four studies were deemed to be of high quality (1, 3, 4, 6) while two were deemed to be of medium quality (2, 5). Four of the six studies were based in the United States and one each in Canada and Taiwan. All studies concern preschoolers, who range in age from 2 to 6 years old. Table 3 provides a summary of the studies that were included in this study that were published between 2010 and 2022 in peer-reviewed journals. Expanded details of included articles can be found in Appendix B.

Table 8.1 Summary of included studies.

<table>
<thead>
<tr>
<th>RN</th>
<th>Author year</th>
<th>Intervention</th>
<th>Aim/purpose of the study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ingersoll and Wainer (2013)</td>
<td>Project ImPACT (Improving Parents As Communication Teachers)</td>
<td>To examine the efficacy of the model for improving parent intervention fidelity and child spontaneous language.</td>
</tr>
<tr>
<td>2</td>
<td>Dionne and Martini (2011)</td>
<td>FTP Intervention (Floor Time Play)</td>
<td>To determine the effectiveness of FTP intervention with a child with autism</td>
</tr>
<tr>
<td>3</td>
<td>Kasari et al. (2014)</td>
<td>JASPER (Joint Attention, Symbolic Play, Engagement, and Regulation)</td>
<td>To compare 2 short-term, community caregiver training interventions for preschool-aged children with autism spectrum disorder who had low resources primary aim was to improve dyadic joint engagement between caregiver and child</td>
</tr>
</tbody>
</table>
To answer the first research questions the following section provides the available intervention programs implemented by parents to promote social communication among preschool-age children with ASD. An overview of the intervention procedure can be found in Appendix C.

### 8.1 Overview of the Interventions

The six chosen articles each undertook an intervention to enhance the components of social communication separately which leads to maintaining healthy relationships with others. Each intervention had a clear goal or purpose that directed the actions and interventions that were made although several differences can be found. In these six studies, they are focused on one social communication component at a time or several components together at once. For instance, focusing on joint attention, communication, dyads, etc. in a playful context as a separate outcome or together. The length of the intervention varied amongst programs minimum of 7 weeks to 12 weeks maximum.

---

<table>
<thead>
<tr>
<th></th>
<th>Article (Year)</th>
<th>Intervention Program</th>
<th>Secondary Aims</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Liao et al. (2014)</td>
<td>Development Individual based Relationship-based DIR/Floortime TM home-based intervention program</td>
<td>to investigate the effects of home-based DIR/FloortimeTM intervention program on increasing the social interaction and adaptive behaviors of children with ASD.</td>
</tr>
<tr>
<td>5</td>
<td>Siller et al. (2012)</td>
<td>Focused Playtime Intervention (FPI)</td>
<td>to evaluate the effect of FPI on gains in responsive parental communication and gains in children’s expressive language abilities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>to examine two conditional effects of FPI.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>to explore whether the treatment effect on children’s long term language outcomes is mediated by short-term gains in maternal synchronization.</td>
</tr>
<tr>
<td>6</td>
<td>Tripathi et al. (2021)</td>
<td>PEERS® for Preschoolers The Program for the Education and Enrichment of Relational Skills</td>
<td>to examine child and associated parent outcomes 1–5 years after completing the PEERS® for Preschoolers program</td>
</tr>
</tbody>
</table>
8.2 Basic Procedure of interventions

The summary of the basic procedure of interventions can be found in Table 5. The RN [1] involved carrying out sessions using The toys of families in their homes as well as in a laboratory. A parenting manual was provided, containing intervention strategies, homework, and reflection questions. The parent and trainer set goals for social engagement, language, imitation, and play. Mothers carried out the intervention at home with provided toys.

In the RN [2] a baseline observation phase (A) and an intervention phase (B) were included. In design (B) child's mother was engaged in a discussion in the last 15 minutes of each phrase. Semi-structured activities such as fine motor tasks and free play were carried out during phrase A. Tactile, cause and effect, and early symbolic play resources such as baby dolls, toy cars, a garage, and stuffed animals were offered as age-appropriate play material.

The RN [3] had two groups: CMM (Caregiver Mediated Module) and CEM (Caregiver Education Module). CMM received JASPER intervention while CEM underwent training without their child present. CMM had active coaching on techniques for learning, modeling, shared attention, play extension, and appropriate language. A new strategy was introduced each week while parents played with their children normally. To provide equal access to toys, a standard set was given such as building blocks, figurines, cars, and shape sorters. Recordings of a 10-min interaction between caregiver and child were made at each stage of treatment, with the children's play being filmed.

The carers in the CEM group participated in weekly 2-hour group sessions that addressed information comparable to that presented in the CMM intervention, with an emphasis on teaching communication to their children, the fundamentals of behavior management, and creating routines. The CEM group used a manualized intervention and received weekly informative handouts that were identical to CMM. Afterward they engaged with children, and it was videotaped.

In RN [4] mothers took part in a one-on-one training session with the first author of the study before the first session to become familiar with the DIR/Floortime™ paradigm. Mothers were guided by a video lecture conducted by the first author, which included the fundamental ideas of the DIR system and play techniques that can be used during the intervention. Mothers were directed by a video lecture given by the first author, which covered the basic concepts of the DIR
system and play strategies that might be employed during the intervention. The mother received training in the home-based DIR/Floortime TM intervention program at each one-on-one session and established unique goals for her child. During the play, the parent-child interaction was recorded on video.

In RN [5], FPI employs graduates and postdoc students along with a set of eight themes to enhance toy play between parents and children. The intervention consists of two parts involving both parents and children, with a case of typical toys provided at the start. The interventionist encourages parent-child play for ten minutes before introducing a session theme.

The parent is the only participant in each session's second half. The interventionist selects these instances deliberately to highlight particular actions, adult actions, or child replies that are relevant to the play sessions. The interventionist attempts to maintain a collaborative working relationship and involve the parent in proactive problem resolution while discussing the difficulties a parent may encounter in getting her young child with autism to participate in coordinated toy play.

In the RN [6] PEERS® intervention there were two groups occupied. Didactic material was presented to the children's group through a puppet show. Children took turns using the skill in front of their peers during the lesson. Following instruction from the therapy team, children exercised new abilities in the setting of well-known group activities (such as "Musical Chairs" or "Red Rover") while getting coaching and feedback. To help them become good social coaches for their children, parents underwent extensive psychoeducation on prosocial and challenging behaviors, socialization activities, and relationship building. Weekly homework assignments included attending playdates and improving skills while receiving feedback from the parents.
### Table 8.2

*The Basic Procedure of Interventions*

<table>
<thead>
<tr>
<th>RN</th>
<th>Duration</th>
<th>Frequency of sessions</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12 weeks</td>
<td>1 to 2 sessions per week, 1 month follow up</td>
<td>Research laboratory and home</td>
</tr>
<tr>
<td>2</td>
<td>Phase A: Observation-weeks 2</td>
<td>8 sessions, 28 sessions-20 minutes per session (3 sessions per day)</td>
<td>Private Clinic and Home</td>
</tr>
<tr>
<td></td>
<td>Phase B: Intervention-weeks 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The CMM (Caregiver Mediated Module) group- 12 weeks</td>
<td>21 hours per week</td>
<td>Home</td>
</tr>
<tr>
<td></td>
<td>The CEM (Caregiver Education Module) group involved small group-based caregiver training without the child being present</td>
<td>2 hours per week</td>
<td>Neighboring houses</td>
</tr>
<tr>
<td>4</td>
<td>Pre-intervention- 3 weeks intervention- parents play at home 10-week</td>
<td>2-3 hours per week</td>
<td>Home-based</td>
</tr>
<tr>
<td></td>
<td>intervention-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1 session per week for 12 weeks</td>
<td>1 session 90 minutes</td>
<td>Home based</td>
</tr>
<tr>
<td>6</td>
<td>16 weeks</td>
<td>1 session 90-minute</td>
<td>Not mentioned</td>
</tr>
</tbody>
</table>

### 8.3 Outcomes of the Interventions

Concerning the second research question six of the articles included reported successful outcomes. The results of these six articles can be categorized as different facets of social communication, including social interaction, pragmatics, and language processing. Meantime, joint attention and joint engagement also added as the outcome of social communication skill as it is considered as the key areas of social cognition. All the interventions indicated in the six articles aim to either enhance the targeted social communication component or investigate the efficacy of the social
communication-based intervention. Each of the six articles utilized a different scale to evaluate the intended result. Most children with ASD achieved the desired outcome as in table 5 below and detailed results with measurements and scales can be found in Appendix C.

Table 8.3

Summary of results

<table>
<thead>
<tr>
<th>RN</th>
<th>Social interaction</th>
<th>Joint attention</th>
<th>Joint engagement</th>
<th>Pragmatics</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

8.4 Strategies used by parents to their children according to MLE during the Mediation Process

Six of the articles included in this study mentioned the different types of play strategies that can be implemented by parents to their children. RN [1], [2], and [4] specifically mentioned the strategies that can be utilized in each stage of intervention whereas RN [5], [6] did not specifically mention them. In contrast, in all studies, it is mentioned that parents were taught to use different types of play strategies during the intervention. Table 6 provides a summary of the findings.
Table 8.4

Strategies Used in the studies.

<table>
<thead>
<tr>
<th>RN</th>
<th>Intentionality and Reciprocity</th>
<th>Mediation of Transcendence</th>
<th>Mediation of Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Follow the Child's Lead, Imitate Child, &amp; Animation, Playful Obstruction &amp; Balanced Turns, Playful interaction</td>
<td>Modeling &amp; Expanding Language, Creates Opportunities for Initiations</td>
<td>Prompting and Reinforcement</td>
</tr>
<tr>
<td>2</td>
<td>child’s preferred games, playful interaction</td>
<td>took place around the child’s routine, such as meals or bath time, provide opportunity to play with new partners, expand games (hide and seek to other rooms), frequently involved games</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>3</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>4</td>
<td>follow the child’s lead, making play interactive</td>
<td>*</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>5</td>
<td>let child find a shared activity, sit down to play, A special play time routine, a familiar location with few distractions, the toys need to be the most interesting parts of the room, offer only child’s favorite toys</td>
<td>Asking the child, a question, suggesting or telling the child what to do next, Keep the balance, use short sentences, and try to highlight important words, use language to describe something your child is looking at,</td>
<td>Praising, using fun words, Imitate the child in play</td>
</tr>
<tr>
<td>6</td>
<td>Reciprocal interaction (praise and reinforcement for making them engage)</td>
<td>Turn-taking, asking for a turn, keeping cool, asking a friend to play,</td>
<td>praise and reinforcement</td>
</tr>
</tbody>
</table>

* Mentioned strategies taught to parents during the parental program and during the intervention but not given any examples
9 Discussion

This systematic literature review identified six studies with either a high or medium level of methodological quality to obtain an understanding of how parents-mediated, play-based interventions promote social communication in children with ASD. These studies investigated the available intervention programs, the outcome of these interventions on children, and the strategies that parents can use with their children during these interventions. Overall, the studies indicate that the social communication skills of children with ASD can be promoted by parental involvement.

9.1 Reflection on findings

Project ImPACT, FTP, JASPER, home-based FTP, FPI, and PEER intervention, are included in the current review. Regardless of the variations in their activities, they were all directed by a clear objective or aim, which guided their responses and interventions. They all used play techniques to enhance preschool-aged children with ASD with their social communication abilities. Project ImPACT and PEERS interventions used play as a main context while other interventions are solely based on Play. In parent-mediated interventions, parents are given a parental training program followed by psychoeducation, care coordination, etc. Meanwhile, they were guided on how to engage autistic children in enduring and how to use several strategies throughout each stage of the intervention, such as initiating children to play, providing support, asking them to cooperate, and motivating them. These activities should be mental age and their development appropriately. Some studies specifically discussed the toys and play activities the children engaged in during the intervention period. In contrast, all these studies discussed how to reduce parental stress, and depression and how to improve parenting with children with ASD.
9.2 Outcome of Children

The studies analyzed in this review produced statistically significant results for several aspects of social communication abilities. According to this study parent-implemented play-based intervention dramatically improved social interaction, pragmatics, verbal and nonverbal communication, joint attention, and engagement among autistic children. It is noteworthy that most of the interventions included in this study targeted at increasing social interaction and communication (verbal and non-verbal, Circle of Communication [CoC]) as a component of social communication. Meanwhile, joint attention, and joint engagement were focused on. The positive aspects of all the studies can be considered as the parental involvement and Mercer (2015) stated that children with ASD have a great impact on parents’ presence in their play activities. The measurements and scales used in all these studies seemed to be appropriate to measure the desired outcomes (SaS, 2019). Visual and statistical analysis of CoC is an example of that (Dionne & Martini, 2011).

However, not every child benefited from every intervention for a variety of reasons such as individual differences including temperaments (reactivity, self regulation and sociability) and lack of exposure to interventions. It is clear from the included articles that the duration of intervention sessions varies, and according to Erekson et al. (2015), the frequency and duration of sessions have an impact on intervention outcomes. Erekson et al. (2015) found a significant relationship between the frequency of receiving interventions and the outcomes, and their study found that the more frequent sessions are held, the better the outcomes of the participants are. As these interventions are implemented by parents it is important to look from their perspectives as not every parent can fully put their selves into these intervention processes due to their family obligations such as other siblings, employment, income etc.
9.3 Strategies used by parents related to MLE

Regarding the third research question, it is important to discuss the strategies implemented by parents with their young children with ASD during the intervention in the studies listed in this paper. Overall, all strategies discussed in the included articles can be categorized under three universal parameters in MLE: Mediation of intentionality and reciprocity, Mediation of transcendence and Mediation of meaning (Tzuriel, 2019) as summarized in table 7. By looking into the table, it is clearly noticed that strategies used by the parents under the Meaning of the transcendence and mediation of intentionality and reciprocity are widely mentioned in the articles and the strategies used during the mediation of meaning are less mentioned. The study of Siller et al. (2012), mentioned lots of strategies that can be used during the mediation process with the examples in the attached supplementary document. Furthermore, these mediation strategies can be useful in working with children who diagnosed with mild to moderate and cut-off margin (Ingersoll and Wainer, 2013) as the included articles were utilized with these ranges.

As the first parameter in MLE, intentionality and reciprocity play a key role in implementing interventions, especially grab the attention of children and arousing their desire for activity. The studies of Ingersoll and Wainer (2013) and Siller et al. (2012) mentioned that various strategies such as remaining face to face, letting the child select their favorite activities, getting down to the floor to play, providing them with various toys can reinforce the child to participate in the activity. On the other hand, these interventions highlighted playful engagement, and Rust and Thanasiu (2019) claim that children with ASD who engage in play with others and feel happy would seek out such interactions in the future, which will promote social and emotional development. These strategies prove that the child (mediatee) has a significantly better chance of fully participating in the learning experience when both parent (mediator) and child (mediatee) have the same intention (D. G. Kinard, 2020).

As the second parameter, the meaning of transcendence the strategies used by parents in mediation can be discussed as follows. In their study, Dionne and Martini (2011) mentioned that the child expanded his playing in different rooms (hide and seek in other rooms) and he accepted playing with new playmates. In this study mother scaffolded, him with prior knowledge with newly
acquired knowledge by helping him to practice these skills. Meanwhile, Ingersoll and Wainer (2013) noted that parents were instructed to provide meaning to their children's activities, model language and play around their area of interest, use simplified language, and expand on their language as well as using simplified language also other examples for this. In the Mediation of Transcendence, the mediator helps the learner apply what they have learned to different contexts, including their daily lives and social settings, in addition to helping them interpret what they have acquired during the learning process (D. G. Kinard, 2020). In the mediation process, mediation of meaning is crucial along with the other two parameters discussed to get the desired outcome for children. The effective techniques mentioned in included studies mentioned directing, clapping, raising, and lowering one's voice, and encouraging the child through facial expression can be used to motivate children. To foster awareness of what is happening during the mediation process, D. G. Kinard (2020) stated that mediation of meaning encourages each child to create their own personal interest and curiosities.
10 Methodological Challenges and Limitations

The search procedure was quite challenging for this systematic literature review due to the age range of preschool age is 2-5 in most of the countries. Meantime, none of the countries in included articles do not have preschool age set for 2-6 years although the included sample range in this age. Various search procedures were attempted multiple times to maximize article output, but other interventions may have yielded additional articles. There is a risk of bias since the article selection process, quality assessment, and analysis of results were performed by one researcher. One of the limitations of this study is except for one study other studies have a small sample size and a single case study. The result cannot be generalized to a larger population due to this.

11 Future Implications

Research related to parents-mediated, play-based interventions for preschool children with ASD seems very limited. This study only identified six interventions with the search strings used. Therefore, future studies are required to focus more on developing effective parents-mediated interventions that enhance the social communication of children with ASD. When planning the interventions, it is favourable to have more access to typically developing peers, children with ASD would have more opportunities for social communication success and develop positive health and well-being. As preschool age varies from country to country, more research in children with ASD aged 2 to 6 years should be encouraged. Meantime, when designing the research, it is better to consider the family background of the participants, especially the commitments their caregivers have and to provide the necessary support to overcome them. Furthermore, by looking into the overview of articles, all these studies have been conducted in developed countries and it is interesting to conduct such research in developing countries to compare the outcomes of young children with ASD.
12 Conclusion

Children with ASD often have deficits in social interaction, joint attention, verbal, and nonverbal communication. All these characteristics lead to impairment in social communication. Lack of social communication would increase mood disorders and impairment in social interaction and eventually it leads to adulthood depression and social impairments. Thus, this issue should be diagnosed and intervened. To promote social communication in this population, researchers pay more attention to play-based interventions as the children’s main occupation at this age is play. It would be more beneficial for the children with ASD to being participated in these interventions with their parents as they share a special relationship with them. Thus, various types of structured play activities would enhance the social communication of children with ASD along with the structured strategies they use in this mediation process.

All six interventions in this study were authenticated to be effective in promoting social communication among preschool children with ASD. Each intervention possesses a unique set of strengths, techniques, and focuses. To maximize the desired outcome of the intervention, parents should be aware of the strategies used in the mediation process and be able to apply them appropriately during the mediation. Social communication skills should be promoted by concerning all the components of that as it is needed to build up a healthy relationship and overall well-being of preschool autistic children. Based on the findings, future research is suggested to develop more effective interventions for preschool children with ASD at two to six years of age. More importantly, consider parental accessibility to these interventions and expand these interventions to low and middle-income countries.
13 References for Included Articles


14 References

https://doi.org/10.1007/s10862-015-9482-1

https://doi.org/10.1111/j.1469-7610.2004.00338.x

https://doi.org/10.5539/mas.v13n5p48


D. G. Kinard, G. (2020, October 2). *Mediation of intentionality and reciprocity* – *IACE - institute for the advancement of cognitive education*. Institute for the Advancement of


Gal, E., Bauminger, N., Goren-Bar, D., Pianesi, F., Stock, O., Zancanaro, M., & Tamar

https://doi.org/10.1007/s00146-009-0199-0

https://doi.org/10.1177/23969415211015840


https://doi.org/10.1016/j.ijporl.2021.111000

https://doi.org/10.1080/13668250500204034


Shrestha, R., Dissanayake, C., & Barbaro, J. (2021). Implementing and evaluating social attention and communication surveillance (SACS) to prospectively identify autism in


https://doi.org/10.5772/intechopen.80976


### 15 Appendix

#### Appendix A - Final Search string

<table>
<thead>
<tr>
<th>Data Base</th>
<th>Search Words</th>
<th>Number of Hits</th>
</tr>
</thead>
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<td>CINHAL</td>
<td>(+parents+or+caregivers+or+home+)+AND+(+play+or+game+or+playtime+or+playful+or+playing+)+AND+(+interventions+or+therapy+or+program+or+strategies+)+AND+(+preschool+or+kindergarten+or+early+childhood+education+)+AND+(+autism+or+asd+or+autism+spectrum+disorder+or+autistic+disorder+and+child+)+AND+(+social+communication+or+communication+or+social+skills+or+communication+skills+or+social+behavior+)</td>
<td>78</td>
</tr>
<tr>
<td>PubMed</td>
<td>(((((parent* OR caregiver* OR home) AND (implement* OR deliver OR led)) AND (play* OR game AND therapy OR intervention)) AND (preschool* OR kindergarten)) AND (autis* child*)) AND (social communication) AND ((ffrft[Filter]) AND (english[Filter]) AND (2010:2022[pdat]))) Filters: Free full text, English</td>
<td>69</td>
</tr>
</tbody>
</table>

("parent*[All Fields] OR "caregiver*[All Fields] OR "home environment*[MeSH Terms] OR "home*[All Fields] AND "environment*[All Fields]) OR "home environment*[All Fields] OR "home*[All Fields]) AND ("implement*[All Fields] OR "deliver*[All Fields] OR "delivered*[All Fields] OR "delivered*[All Fields]) AND (((("play*[All Fields] OR "game*[All Fields]) AND ("therapeutics*[MeSH Terms] OR "therapeutics*[All Fields] OR "therapies*[All Fields] OR "therapy*[MeSH Subheading] OR "therapy*[All Fields] OR "therapy*[All Fields] OR "therapies*[All Fields]) AND ("intervention*[All Fields] OR "interventions*[All Fields] OR "interventional*[All Fields]) AND ("autis*[All Fields] AND "child*[All Fields]) AND ("preschool*[All Fields] OR ("kindergarten*[All Fields] OR "kindergarteners*[All Fields] OR "kindergartens*[All Fields]) AND ("communication*[MeSH Terms] OR "communication*[All Fields] OR ("social*[All Fields] AND "communication*[All Fields]) OR "social communication*[All Fields]) AND (loattrfree full text*[Filter]) AND "english*[Language] AND 2010/01/01:2022/12/31[Date - Publication]) AND ((ffrft*[Filter]) AND (english*[Filter])))
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<th>Database</th>
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<tr>
<td>Scopus</td>
<td>parent* OR caregiver* OR home AND implement* OR deliver OR led AND play* OR game AND therapy OR intervention AND preschool* OR kindergarten AND autism child* AND social communication</td>
<td>198</td>
</tr>
<tr>
<td>PsycINFO</td>
<td>parent* OR caregiver* OR home AND implement* OR deliver OR led AND play* OR game AND therapy OR intervention AND preschool* OR kindergarten AND autism child* AND social communication</td>
<td>11</td>
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### Appendix B – detailed of included articles

<table>
<thead>
<tr>
<th>RN</th>
<th>Title</th>
<th>Participants Gender</th>
<th>Children’s age in months</th>
<th>Participants</th>
<th>DSM</th>
<th>No. of Participants</th>
<th>Country</th>
<th>Study Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Initial efficacy of project IMPACT: A parent-mediated social communication intervention for young children with ASD</td>
<td>M-7 F-1</td>
<td>44-80</td>
<td>Children with ASD (n=8) Mothers (n=8) <strong>Cut off for Autism</strong> Diagnosis Observation Schedule (ADOS)</td>
<td>DSM- iv</td>
<td>C-8 P-8</td>
<td>USA</td>
<td>Quantitative, a single-subject, multiple-baseline design</td>
</tr>
<tr>
<td>2</td>
<td>Floor time play with a child with autism: A single-subject study</td>
<td>M</td>
<td>42</td>
<td>Boy diagnosed with autism (<strong>mild to moderate</strong>) at the age of 2 years 5 months and mother</td>
<td>DSM- iv</td>
<td>C-1 P-1</td>
<td>Canada</td>
<td>Mix and single-subject study</td>
</tr>
<tr>
<td>3</td>
<td>Caregiver-Mediated intervention for low-resourced preschoolers with autism: An RCT</td>
<td>M-93 F-19</td>
<td>24-60</td>
<td>Children with ASD (112) ADOS Module 1,2,3 Caregivers (112)</td>
<td>Not Mentioned</td>
<td>C-112 p-123</td>
<td>California</td>
<td>Mix method and Randomized Controlled Trial</td>
</tr>
<tr>
<td>4</td>
<td>Home-based DIR/Floor-time™ intervention program for preschool children with autism spectrum disorders: Preliminary findings</td>
<td>M-11</td>
<td>45–69</td>
<td>Children with ASD (11) (<strong>mild to moderate</strong>) and mother (11)</td>
<td>DSM- iv</td>
<td>C-11 P-11</td>
<td>Taiwan</td>
<td>Mix method</td>
</tr>
</tbody>
</table>

**Note:**
- DSM- iv: Diagnostic and Statistical Manual of Mental Disorders, 4th Edition
- USA: United States of America
- Canada
- California
- Taiwan
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Gender</th>
<th>Age Group</th>
<th>Participants</th>
<th>Country</th>
<th>Study Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>A parent-mediated intervention to increase responsive parental behaviors and child communication in children with ASD: A randomized clinical trial</td>
<td>M-64 F-6</td>
<td>33-82</td>
<td>64 children with ASD 5- autism spectrum disorder</td>
<td>California</td>
<td>Quantitative and Randomized Controlled Trial</td>
</tr>
<tr>
<td>6</td>
<td>Long-Term Treatment Outcomes of PEERS® for Preschoolers: A Parent-Mediated Social Skills Training Program for Children with ASD</td>
<td>Not mentioned</td>
<td>48-60</td>
<td>ASD children (45) Parents 45</td>
<td>USA</td>
<td>Quantitative Study</td>
</tr>
</tbody>
</table>

Note: f-female, c-child, p-parent
Appendix C – procedure of Interventions

<table>
<thead>
<tr>
<th>RN</th>
<th>Measurements related to child outcome</th>
<th>Scales in Measurements</th>
<th>Overall result</th>
<th>Long-term effects/follow ups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Child Spontaneous Language</td>
<td>per minute of spontaneous language for each session</td>
<td>5 out of 8 children improve their spontaneous language after intervention</td>
<td>spontaneous language was high p&lt; .01 at follow up</td>
</tr>
<tr>
<td></td>
<td>Goal Achievement</td>
<td>calculated by dividing the number of new language goals written at the end of treatment by the total number of initial language goals</td>
<td>12 of the initial 17 (71 %) goals had been achieved for the pre-set 8 dyads</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Autism Rating Scale</td>
<td>15 items behavior rating scale</td>
<td>significant increase in the numbers of Circle of Communication (CoC)</td>
<td>Not mentioned</td>
</tr>
<tr>
<td></td>
<td>The Sensory Profile</td>
<td>A standardized questionnaire for determines the ability to process and modulate sensory information.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Functional Emotional Assessment Scale (FEAS)</td>
<td>Rating scale- deficient, at risk, or normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Circle of Communication frequency</td>
<td>Count total number of CoC per session</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>ADOS (Autism Diagnostic Observation Schedule)</td>
<td>Standard set of probes</td>
<td>Joint engagement, a measure of the child's and caregiver's active and reciprocal engagement, has improved.</td>
<td>Follow up results are mild to moderate.</td>
</tr>
<tr>
<td><strong>The Early Social Communication Scales</strong></td>
<td>e frequency of initiations of joint attention</td>
<td>Initiating shared attention and symbolic play as secondary outcomes of CMM also led to modest but significant benefits.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mullen Scales of Early Learning</strong></td>
<td>1 to 5 scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Caregiver-Child Interaction</strong></td>
<td>The SPA is videotaped and coded for the diversity of play acts, defined as the number of different acts with toys within the same level of play</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SPA (Structured Play Assessment) scale related to Symbolic play</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Functional Emotional Assessment Scale** | six functional developmental levels (a) self regulation and interest in the world; (b) formulation of relationships, attachments, and engagements; (c) two-way, purposeful communication; (d) behavioral organization, problem solving, and internalization; (e) representational capacity; and (f) representational differentiation. rating 0-2 | Children's emotional functioning, including two-way communication, behavioral organization, and connection building, significantly improved. |
| **Vineland Adaptive Behavior Scales** | scale covers the domains of communication, daily living skills, socialization, and motor skills. Higher scores indicate greater skills. | Their adaptive functioning increased, particularly their social and communication abilities. |

<p>| <strong>Assessments of non-verbal cognitive and language abilities</strong> | Mullen Scales of Early Learning used with four scales | Improve expressive language (a significant, medium to large treatment impact) |
| <strong>Children’s toy-directed attention:</strong> | 30 videos- direct attention Yes/not | No evidence found |</p>
<table>
<thead>
<tr>
<th>Measure of maternal synchroniza- tion</th>
<th>Response to bids for joint attention (RJA)</th>
<th>Insightfulness Assessment</th>
<th>Social Responsiveness Scale, Second Edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Social Responsiveness Scale, Second Edition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of Play Questionnaire</td>
<td>Social Skills Improvement System Rating Scales</td>
<td>9-point rating scales</td>
<td>65 items- 4 scales</td>
</tr>
<tr>
<td></td>
<td>26 items-frequency reported</td>
<td>79 items- “Never”, “Sometimes”, “Often”, or “Always”.</td>
<td>long-term improvements in social behaviors, social skills and ASD-related social impairments in play and friendship-making skills</td>
</tr>
</tbody>
</table>