




Conspectus of effectiveness of the jasper model in developing symbolic play skills for children with autism spectrum disorders

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ABSTRACT

Article History

Received: 23 December 2023

Revised: 10 April 2024

Accepted: 26 April 2024

Published: 4 June 2024

Keywords

Autism spectrum disorders
Conspectus research
Effectiveness of the jasper model
JASPER model application
The symbolic play skills.

This study provides an overview of 20 research articles from international databases (PubMed, Scholar, Eric, and APA) assessing the effectiveness of the JASPER model in developing symbolic play skills among children with autism spectrum disorders (ASD). The researchers reviewed studies to examine the impact of the JASPER model on the frequency, diversity, and level of symbolic play skills in children with ASD. Results indicate that the JASPER model effectively increases symbolic play skills among children with ASD, enhancing their play experience quality. The application of the JASPER model in developing symbolic play skills for children with ASD in Vietnam shows promise. However, considering differences in intervention services and cultural contexts, recommendations are provided for adapting the JASPER model for effective implementation in Vietnam. This includes cultural adjustments and modifications to intervention protocols. Collaborative efforts between researchers, practitioners, and policymakers are crucial for the successful implementation and dissemination of the JASPER model in Vietnam, potentially improving outcomes for children with ASD in the country.

Contribution/Originality: The combination of a comprehensive literature review, focus on a specific intervention model, exploration of cultural contexts, and actionable recommendations for implementation collectively contribute to the originality of this study.

1. INTRODUCTION

Autism Spectrum Disorder (ASD), as described by Aldarmaki (2023) is a lifelong condition marked by difficulties in social interaction and communication, alongside restricted and repetitive behaviors and interests. Such challenges significantly impede the development of symbolic play skills among children with ASD. These children often display a preference for specific, repetitive play patterns, show resistance to changing play routines, find limited enjoyment in toys, and face challenges in sharing play experiences with their peers (Kasari et al., 2014). Moreover, the frequency and variety of symbolic play in children with ASD are notably low, with their play rarely involving symbolic representations (Kasari, Chang, & Patterson, 2013; Thorp, Stahmer, & Schreibman, 1995). This lack of independence and creativity in play has been widely acknowledged as an early indicator of ASD.

Despite these challenges, play serves as a pivotal role in the developmental journey of preschool-aged children, including those with ASD. Research has consistently shown that symbolic play is instrumental in fostering

development in key areas such as language, as highlighted by Barton and Wolery (2010) and McCune (1995) as well as Lifter and Bloom (1989). It also enhances cognition and imagination (Greenwood, Thiemann-Bourque, Walker, Buzhardt, & Gilkerson, 2011; Whitebread, Coltman, Jameson, & Lander, 2009) and supports social interaction skills (Garvey, 1974; Jarrold, 2003; Rubin & Krasnor, 1983). The benefits of symbolic play are not exclusive to neurotypical children but are also crucial for children with ASD (Sigman et al., 1999) making it an essential component of their developmental support. Thus, facilitating engagement in symbolic play emerges as a key strategy in education and therapy for children with ASD, aimed at overcoming their innate play limitations and fostering comprehensive development.

Currently, there are various early intervention programs worldwide aimed at reducing deficits in symbolic play skills for children with ASD, such as ABA, TEACCH, DENVER, among others. In addition, in 2018, the Ontario Association for Behavior Analysis introduced evidence-based intervention models for individual children with ASD, among which JASPER was identified as a new and scientifically supported method for developing symbolic play skills in children with ASD. However, research on the application of the JASPER model to enhance symbolic play skills in children with ASD in Vietnam is scarce. Therefore, synthesizing and analyzing international studies will contribute to understanding the effectiveness of the JASPER model and drawing lessons when applying it to the development and education of symbolic play skills for children with ASD in Vietnam.

2. RESEARCH METHOD

2.1. Database

The international database for the literature review consists of digitally formatted data searched on PubMed, Scholar, Eric, and APA PsycNet using terms such as "Autism Spectrum Disorder," "Symbolic Play Skills," "Pretend Play Skills," "JASPER Model," and "Effectiveness of the JASPER Model." The data were searched for the period from 2006 (the first year scientific research on JASPER was published) to 2023.

2.2. Selection Criteria

The selection and exclusion criteria for the study are illustrated in Table 1. These criteria were established to ensure a focused and relevant selection of studies for the literature review.

Table 1. Selection and exclusion criteria in the literature review.

No	Selection criteria	Exclusion criteria
1	Application of the entire or part of the JASPER model	Use of a model other than JASPER
2	Research purpose includes education/Development of symbolic play skills for children with ASD	Research purpose does not include education/Development of symbolic play skills for children with ASD
3	Study subjects are children with ASD, aged equal to or under 8 years	Study subjects are children with different disabilities or children with ASD aged over 8 years
4	Research conducted from 2006-2023	Research conducted before 2006
5	Research with experimental control	Research without experimental control

2.3. Sample Selection

The literature review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) process (Page et al., 2021) for assessing and synthesizing evidence. The initial number of articles identified through the databases was 114. These articles underwent a synthesis and screening process, resulting in the final selection of 20 articles that met the criteria for qualitative synthesis. The specific process is illustrated in Figure 1.

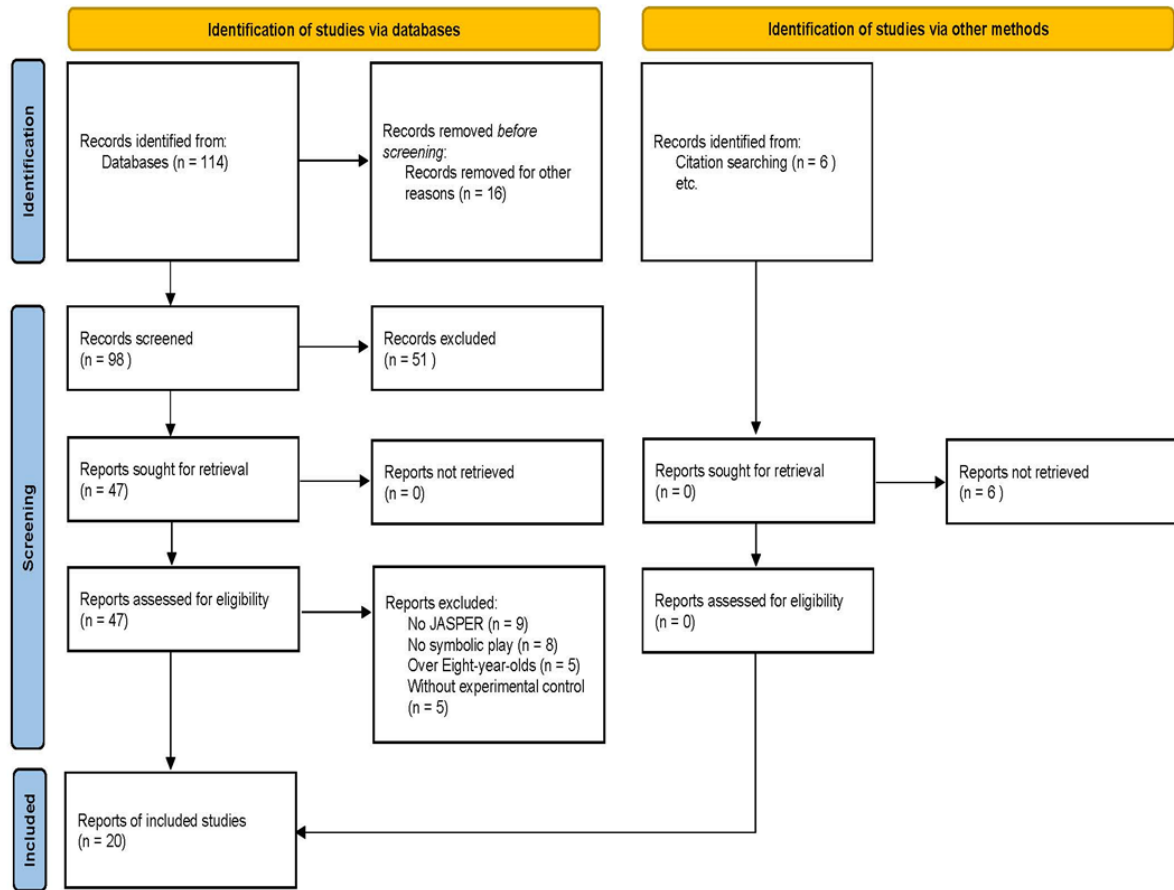


Figure 1. PRISMA Flowchart depicting the article selection process in the research.

Source: Page et al. (2022).

This flowchart visually represents the steps taken in the article selection process, adhering to the PRISMA guidelines, to ensure a systematic and transparent approach to sample selection for the literature review.

3. RESULTS

3.1. Information on Symbolic Play Skills

3.1.1. Concept

Symbolic play is the ability of a child to use objects with symbolic meaning in play, such as using a piece of wood as food or a blue jar as an ocean. Symbolic play includes pretending that dolls/model animals are alive and pretending that the child can take on roles in imaginary situations. Language and the context in which the play action occurs are often relied upon as secondary cues to determine whether the play action is symbolic or not (Shire, Shih, Barriault, & Kasari, 2022).

3.1.2. Levels of Symbolic Play

Shire et al. (2022) categorizes play skills into four main groups: simple play, combined play, pre-symbolic play, and symbolic play, with 16 levels of play modeled after the research of Ungerer and Sigman (1981) and Lifter, Sulzer-Azaroff, Anderson, and Cowdery (1993). Although presented separately and in a specific order, the levels of play are interrelated, often complementing each other in the child's developmental process. Among them, symbolic play skills are the most complex, comprising six specific levels as detailed in Table 2.

Table 2. Six levels of symbolic play skills.

No.	Symbolic play level	Behavior	Example
1	Symbolic play using object substitution	Substituting one object for another, often communicated through sound or speech effects	Using a cup as a hat on their head
2	Symbolic play without using objects	Performing an action as if an object is present, even though it is not.	Stirring an imaginary bowl while saying "eating soup"
3	Symbolic play using dolls as a theme	Treating dolls as if they have human capabilities. Using language or sound effects to represent the characteristic of the play. The child may assist the doll in using or controlling objects.	Helping a doll feed another doll.
4	Symbolic play with multiple actions	Extending a sequence of different actions on the same object.	Taking a doll to the park, then home for a bath, and finally putting it to sleep
5	Sociodramatic play	Taking on roles to act like adults.	Role-playing family roles, such as mother and baby
6	Symbolic play with a thematic focus	Similar to sociodramatic play but extending into more imaginative characters rather than familiar roles.	Pretending to be a superhero or a fairy

Source: Shire et al. (2022).

These levels represent a hierarchical progression of symbolic play skills, reflecting the developmental complexity of a child's ability to engage in symbolic play.

3.1.3. Characteristics of Symbolic Play Skills in Children with Autism Spectrum Disorder

Children with Autism Spectrum Disorder (ASD) exhibit significantly lower symbolic play skills when compared to their typically developing peers and those with other disabilities. This disparity is evident in aspects such as the frequency, complexity, diversity, novelty, and spontaneous initiation of play, as noted by a range of studies (Baron-Cohen, 1987; Bentenuto, De Falco, & Venuti, 2016; Doherty & Rosenfeld, 1984; Jarrold, 2003; Jarrold, Boucher, & Smith, 1996; Lam & Yeung, 2012; Rutherford & Rogers, 2003). Additionally, distinguishing between functional and symbolic play poses a unique challenge for children with ASD, who often exhibit more concrete and less imaginative play patterns (Jarrold et al., 1996; Rutherford, Young, Hepburn, & Rogers, 2007). This group also tends to interact with toys less often and for shorter periods, indicating a reduced engagement in symbolic play (Naber et al., 2008). Such deficits in symbolic play are recognized as key diagnostic markers in various autism assessment tools, including ADOS, ADI, and the DSM-5. Despite these obstacles in the development of pretend play skills, employing tailored support and intervention strategies can significantly aid children with ASD. By enhancing their symbolic play abilities, we can support their cognitive, linguistic, and social development, thereby improving their chances for successful community integration.

3.2. Introduction to the JASPER Model

The JASPER model, which stands for Joint Attention, Symbolic Play, Engagement, and Regulation, is an intervention model focusing on behavioral interventions and a naturalistic approach for children with Autism Spectrum Disorder aged 1 to 8. Developed by Kasari, Shire, Shih, Gelfand, and Kasari (2016) and her colleagues at the Autism Center for Excellence, University of California, Los Angeles, the JASPER model emphasizes Joint Attention, Symbolic Play, Engagement, and Regulation (Kasari et al., 2016).

3.2.1. Purpose of the JASPER Model

The primary goal of the JASPER model is to enhance a child's relationships with others through joint attention and shared engagement. It aims to help children regulate appropriate behavior and, importantly, develop symbolic play skills during interactions with objects (Shire et al., 2022). In the realm of play, the JASPER model targets:

- Increasing the frequency of initiating play.
- Enhancing diversity in play styles.
- Elevating the complexity of play skills and the overall quality of play experiences for children.

The JASPER model adopts a holistic approach to support the development of social and play skills in children with ASD, contributing to improved overall functioning and interaction with the surrounding environment.

3.2.2. Play Skills Assessment in the JASPER Model

The Short Play and Communication Evaluation (SPACE), developed by Chang, Shih, Landa, Kaiser, and Kasari (2018) is utilized to assess play skills within the JASPER model. SPACE measures the competencies of children in core areas such as engagement, regulation, social communication, and play. The assessment is conducted within a play context and takes approximately 15 minutes to complete. In the domain of symbolic play, the examiner evaluates the child's skills at six levels. The assessment determines whether the child possesses the skills or not, whether they engage with 1-2 types or more than 3 types of toys, and assesses the quality of skills in terms of diversity, flexibility, and creativity in play. Through this assessment, interventionists can gain insights into the play skills that the child has mastered or is in the process of developing. This understanding enables them to set teaching goals through structured play activities.

3.2.3. JASPER Play Skills Development Strategies

JASPER is developed based on teaching techniques from Applied Behavior Analysis (ABA), such as prompting and prompt fading, and environmental arrangement, as well as techniques from the naturalistic intervention approach and in-depth research on play development in children. The core strategy of JASPER begins with play routines. In JASPER, play routines are defined as toy-based interactions that involve developmentally appropriate toys, positive two-way interactions, repeated practice, and the combination of familiar and flexible steps to achieve a specific purpose or central theme. To establish a successful routine, it is essential to first build a solid foundation for the basic steps and then restart or expand that routine. These routines provide opportunities to enhance a child's play skills (both the flexibility and complexity of play) and create contexts for communication. Figure 2 simulates the components of a coordinated play routine.

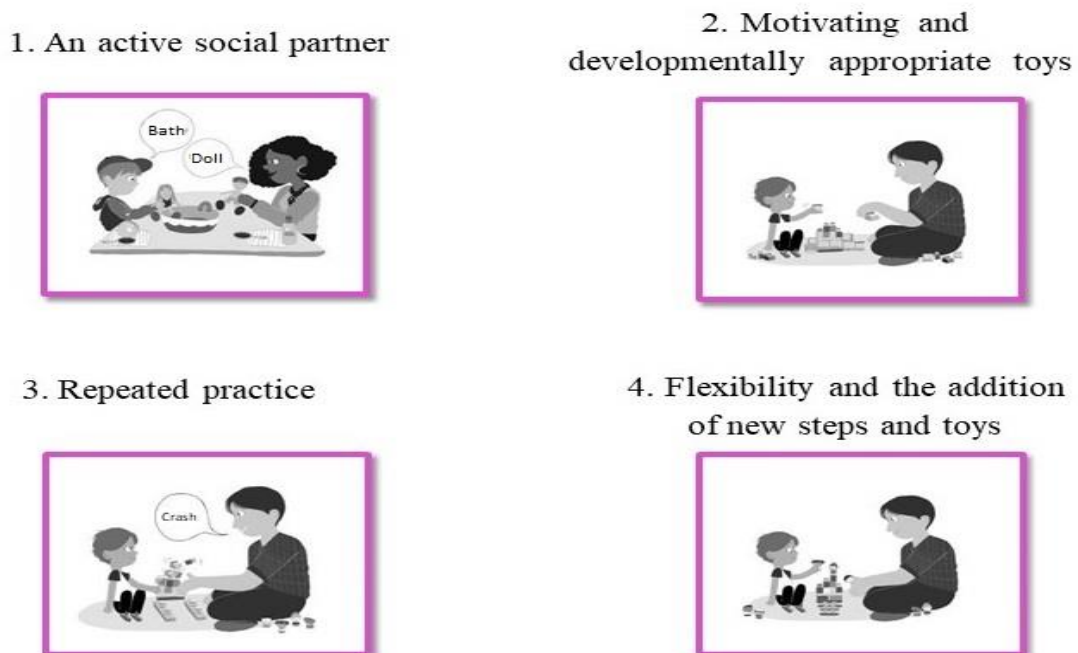


Figure 2. Components of a play routine - core strategy of JASPER.

The systematic development of play skills through JASPER emphasizes the importance of structured play habits to support children's social and symbolic play development.

3.3. Effectiveness of the JASPER Model in Developing Symbolic Play Skills for Children with Autism Spectrum Disorder

After synthesizing 20 studies worldwide on the effectiveness of the JASPER model in developing symbolic play skills for children with Autism Spectrum Disorder (ASD), we obtained results as presented in Table 3:

Table 3. Key features of 20 studies on the application of JASPER intervention model in developing symbolic play skills for children with autism spectrum disorder.

Authors and year	Research participants	Research purpose	Research method	Research results
1. Kasari, Paparella, Freeman, and Jahromi (2008)	Children with ASD (n = 58)	Develop joint attention and symbolic play skills	Random assignment to experimental (JASPER intervention) or control group. Intervention: 30 mins/day for 5-6 weeks. Structured evaluations conducted pre and post-intervention by independent assessors.	Improved symbolic play skills, increased play diversity.
2. Kasari, Freeman, and Paparella (2006)	Children with ASD (n = 37), 43 months old	Evaluate JASPER effectiveness by experts and parents	JASPER applied by expert and parent groups.	Increased symbolic play skills with expert-led intervention.
3. Gulsrud, Kasari, Freeman, and Paparella (2007)	Children with ASD (n = 18) and typically developing (n = 17)	Explore ASD children's reactions to new stimuli during joint attention and symbolic play intervention	5-8 weeks of intervention with three assessments. Experimental group demonstrated generalization of symbolic play skills in real-life situations.	The experimental group demonstrated the ability to generalize symbolic play skills in real-life situations.
4. Kasari, Gulsrud, Wong, Kwon, and Locke (2010)	Children with ASD (n = 38), 18-30 months old	JASPER intervention for newly walking ASD children	24 sessions by caregivers, followed for one year. Significant improvements in play diversity, sustained for a year.	Children in the JASPER group significantly improved the diversity of their play skills. These skills were maintained one year later.
5. Lawton and Kasari (2012)	Children with ASD (n = 32), preschool age	Effectiveness of JASPER intervention for core deficits in ASD children in public preschools	Random assignment to JASPER or control group for 6 weeks. Improvement in core deficits observed through JASPER.	The study indicates improvements in the core deficits of children with ASD in symbolic play skills within public preschools through JASPER.
6. Kaale, Smith, and Sponheim (2012)	Children with ASD (n = 61), experimental (n = 34), control (n = 27), 29-60 months old	Controlled intervention for joint attention and symbolic play in kindergarten	Intervention by kindergarten teachers, weekly supervision. Changes measured using social communication scale and video recordings. Increased joint attention and symbolic play in	Children participating in the intervention spent more time engaging in symbolic play with their mothers.

Authors and year	Research participants	Research purpose	Research method	Research results
7. Kasari, Gulsrud, Freeman, Paparella, and Hellemann (2012)	Children with ASD (n = 40), 3-8 years old	Examining outcomes of ASD children five years after targeted joint attention and play skills intervention (JASPER)	experimental group. Followed 40 children for 5 years after JASPER intervention. 80% used spoken language with basic play skills. Concentrating on joint attention and play skills crucial for long-term language outcomes.	After 5 years of follow-up, 80% of children with ASD used spoken language with a basic play level. Diversity in basic play predicted cognitive scores at age 8. This study represents one of the only long-term follow-up studies of children participating in early interventions in preschool to address core developmental challenges. The research results indicate that focusing on general attention and play skills in comprehensive treatment models is crucial for long-term speech-language outcomes.
8. Goods, Ishijima, Chang, and Kasari (2013)	Minimally verbal children with ASD (n = 15), 3-5 years old	Impact of JASPER on minimally verbal children with ASD in non-public preschool	Random assignment to control or JASPER group. After 12 weeks, JASPER group showed increased play diversity and reduced free time. Even short interventions can improve core deficits in minimally verbal ASD children.	After 12 weeks, the group of children intervened with JASPER showed increased diversity in play. The children began to engage in more gestures and spent less idle time. These results provide additional support that even brief interventions, targeting attention and shared play, can improve core deficits in minimally verbal children with autism.
9. Wong (2013)	Children with ASD (n = 33), 3-6 years old	Interventions in special education classes focusing on creating play and joint attention conditions	Fourteen preschool special education teachers were randomly assigned to one of three groups: (1) symbolic play followed by joint attention intervention, (2) joint attention followed by symbolic play intervention, and (3) a control phase on a waitlist that was later randomly assigned to either group 1 or group 2. In the intervention,	Teachers can implement JASPER interventions to significantly improve the level of symbolic play skills. Therefore, these pilot data emphasize the need for further research and implementation of interventions in the classroom targeting play skills for young children with autism.

Authors and year	Research participants	Research purpose	Research method	Research results
			teachers participated in eight one-hour sessions individually each week with a researcher emphasizing the incorporation of symbolic play and joint attention strategies into their routines and daily activities in the classroom.	
10. Kasari et al. (2014)	Preschool children with ASD (n = 112), 56 months old	Comparison of two short-term caregiver training interventions for low-resourced preschoolers with ASD	Participants assigned to two interventions for 3 months. JASPER group showed significant improvement in joint attention and symbolic play.	The JASPER intervention group observed a greater increase in initiating joint attention and initiating symbolically based play. The results of shared engagement were sustained over the follow-up period.
11. Kasari, Gulsrud, Paparella, Hellemann, and Berry (2015)	Toddlers with ASD (n = 86), 22-36 months old	Comparison of two parent-mediated interventions for joint attention in early intervention	Randomly assigned to JASPER or psychoeducational intervention in 10 weeks. JASPER group showed increased and sustained joint attention.	Children in the JASPER intervention group showed a significant increase in joint engagement, which was sustained for six months and generalized to the classroom context. The JASPER group also observed an increasing diversity in play behaviors over time.
12. Gould (2015)	Toddlers with ASD (n = 65), nonverbal, various ages	Comparison of play targets using DTT and JASPER interventions	Randomized controlled trial. Both interventions improved symbolic play, but JASPER group showed greater progress.	Symbolic play skills improved in both intervention approaches, but children who received the JASPER intervention demonstrated greater progress than those in the DTT group. Moreover, only the JASPER intervention group was able to maintain this increase six months after the follow-up. Individuals in the JASPER intervention were more likely to select play goals appropriate to the child's developmental

Authors and year	Research participants	Research purpose	Research method	Research results
				level compared to DTT.
13. Chang and Locke (2016)	Preschoolers with ASD (n = 66), 49 months old	Implementing social communication intervention using JASPER in kindergarten	Randomly assigned to immediate JASPER or waitlist control for 3 months. JASPER group demonstrated increased initiation of joint attention, gestures, language, and play skills.	Children in the JASPER intervention group experienced a greater increase in the initiation of joint engagement, joint attention gestures, language, and play skills, as well as a greater increase in standardized perceptual measures. JASPER teachers also achieved and maintained a high level of fidelity.
14. Gulsrud, Hellemann, Shire, and Kasari (2016)	Newly walking toddlers with ASD (n = 86)	Examining components of social communication intervention	Randomly assigned to JASPER or psychoeducational intervention. Parents in JASPER group increased engagement with children.	Parents of the children learned how to use JASPER intervention strategies, leading to increased engagement with their children. Specifically, the strategy of creating play routines enhanced the relationship between parents and children in a positive direction.
15. Shire et al. (2017)	Preschoolers with ASD (n = 113), 89 months old	Implementing early intervention model with community engagement for preschoolers with ASD	JASPER and psychoeducational interventions compared. Both groups achieved significant gains in social communication and play skills.	Higher progress was observed in shared engagement, joint attention, and play skills, which were maintained throughout the monitoring period in the group using JASPER.
16. Chang et al. (2018)	Preschoolers with ASD (n = 58), 3-6 years old	Developing symbolic play skills in school-age preschoolers with ASD	Children randomly assigned to receive augmentative communication device with or without JASPER intervention. Both groups showed improvement in play skills.	Children in the school-age intervention group showed an increase in symbolic play skills both during structured intervention sessions and in unfamiliar, structured contexts with unfamiliar assessors. Additionally, the enhanced symbolic play was positively associated with language development.
17. Shire et al. (2019)	Year 1 (n = 55), Year	Efficacy of JASPER	Two groups of	Children in both

Authors and year	Research participants	Research purpose	Research method	Research results
	2 (n = 63)	in community settings and examining changes after discontinuation	toddlers received JASPER intervention. Both groups showed similar progress in joint attention, with the Year 1 group demonstrating significantly greater play outcomes when JASPER was ongoing.	Year 1 and Year 2 showed similar progress in increasing joint attention. However, children in Year 1 achieved significantly greater play outcomes when JASPER was sustained into the second year. In symbolic play skills, there was a change in the diversity of symbolic play actions rather than in the duration of interactive playtime.
18. Shire, Gulsrud, and Kasari (2016)	Preschoolers with ASD (n = 31), 3-6 years old	Extending JASPER intervention model to new classroom settings	Children assigned to JASPER or classroom interventions. Both groups showed increased social communication and play skills.	Both groups achieved significant achievements in social communication and play. Children engaged in peer play bonded more with their peers in the presence of an adult compared to when they were not supported.
19. Wang, Ma, Wang, Zhang, and Chen (2022)	Preschoolers with ASD (n = 37), 3-6 years old	Comparing JASPER and other naturalistic interventions	Random assignment to JASPER or other intervention group for 8 weeks. Both groups showed increased social communication and play skills.	Both groups of therapists showed a similar level of fidelity in implementation and observed significant growth in initiating joint attention, requesting skills, and diverse play in children.
20. Shih, Shire, Chang, and Kasari (2021)	Children with ASD (n = 66), 3-6 years old	Effectiveness of JASPER in inclusive preschools	Children assigned to JASPER or usual practice group. JASPER group showed significantly greater improvement in joint attention and play skills.	The effectiveness of the JASPER model in improving the scores of the experimental group following JASPER compared to the control group is affirmed. It indicates statistically significant differences in each group before and after applying JASPER when children with ASD increase in joint attention and symbolic play skills.

Note: The table summarizes the key details of each study, including the authors and year, research participants, research purpose, research method, and research results.

Based on the synthesized data in [Table 3](#) we observe that the JASPER model has brought about certain effectiveness in the development of symbolic play skills for children with ASD as follows:

3.3.1. The Application of the JASPER Model Helps Increase the Frequency of Initiating Symbolic Play in Children with ASD

In this study, we have synthesized and analyzed 20 studies on the application of the JASPER model to develop symbolic play skills in children with ASD, including 15 studies identifying that JASPER strategies have increased the initiation ability and frequency of symbolic play skills in children with ASD. Symbolic play skills in children with ASD appear more frequently in structured contexts, in public and non-public preschool settings, and in special classes at intervention centers when guided and supported by JASPER-trained teachers and when parents of children with ASD have been instructed in JASPER play rhythm techniques. Additionally, the study by [Shire, Shih, Bracaglia, Kodjoe, and Kasari \(2020\)](#) pointed out that individual intervention or dyadic group intervention both achieved significant achievements in play for children with ASD. Children who played in dyadic groups bonded more with their peers, creating conditions for social interaction and integration into the community. Thus, although children with ASD face difficulties in initiating, JASPER intervention strategies have helped improve this deficit in children with ASD.

3.3.2. The Application of the JASPER Model Helps Develop Diversity in Symbolic Play Skills in Children with ASD

One of the core deficits in children with ASD is the rigidity in interests, activities, and behaviors. Therefore, when engaging in symbolic play, children tend to repetitively play in a specific manner with certain games or objects they favor. This rigidity is repeated both in the style of play and the choice of toys. The goal of developing diversity in symbolic play in children with ASD is targeted by JASPER. Some studies worldwide have documented the improvement in symbolic play skills in children with ASD when exposed to the JASPER model, specifically in increasing diversity during symbolic play. Precisely, 13 out of 20 synthesized studies identified this issue. In a study by [Hilary \(2015\)](#) comparing play goals using both intervention approaches for children with ASD, Discrete Trial Teaching (DTT), and JASPER, the authors found that symbolic play skills increased in both intervention approaches, but children intervened with JASPER achieved greater progress in diversity compared to those using DTT. Additionally, [Goods et al. \(2013\)](#) suggested that after 12 weeks of experimentation, the group of children with ASD intervened with JASPER demonstrated more diversity in play. They began to exhibit more gestures, spent less idle time, and could engage in symbolic play with various types of toys. Furthermore, a study by [Kasari, Paparella, Freeman, and Jahromi \(2012\)](#) indicated that diversity in symbolic play skills was maintained five years after the cessation of instructional interventions. These results provide additional evidence that even short, play-focused interventions can improve core deficits in play for children with ASD.

3.3.3. The Application of the JASPER Model Helps Develop Different Levels of Symbolic Play Skills in Children with ASD

According to [Ungerer and Sigman \(1981\)](#); [Lifter et al. \(1993\)](#) and [Shire et al. \(2020\)](#) symbolic play represents the highest level of play as it involves imagination—a high-level cognitive skill in children. Children with ASD often struggle to form and develop different levels of symbolic play skills, typically engaging in symbolic play at the level of using one object for another, making it challenging to reach the thematic symbolic play level ([Aldarmaki, 2023](#)). However, based on a comprehensive review, 10 out of 20 studies identified the effectiveness of the JASPER model in increasing the level of symbolic play in children with ASD. [Kasari et al. \(2006\)](#) suggested that 3-4-year-old children with ASD increased their level of symbolic play when intervened with JASPER for 30 minutes daily over 5-6 weeks. [Wong \(2013\)](#) indicated that teachers could implement JASPER interventions to significantly improve the level of symbolic play skills for children with ASD in special education classrooms. According to [Hilary \(2015\)](#) children intervened with JASPER were more likely to select play goals appropriate to the child's developmental

level compared to those intervened with DTT. Thus, initial studies on the effectiveness of the JASPER model show positive signals in forming and developing different levels of symbolic play skills in children with ASD.

Furthermore, there have been studies examining the effectiveness of the JASPER model after discontinuing behavioral interventions. Five out of 20 studies identified that JASPER maintained symbolic play skills from 3 months to 5 years after the intervention. Kasari, et al. (2012) is one of the long-term follow-up studies on JASPER aimed at addressing core developmental difficulties in children with ASD. The results showed that 80% of children with ASD used spoken language with basic play skills after 5 years of follow-up.

4. CONCLUSION AND DISCUSSION

The synthesis and analysis of 20 international scientific papers have led to optimistic findings regarding the application of the JASPER model in developing play skills for children with ASD, especially symbolic play skills. The JASPER model has increased the frequency, diversity, and level of symbolic play skills, thereby improving the overall quality of play in children with ASD. The application of JASPER to develop symbolic play skills for children with ASD in Vietnam is a promising research direction for the future. However, due to differences in intervention services provided in Vietnam compared to other countries, there is a need for appropriate adjustments to maximize the effectiveness of the JASPER model in intervening with children with ASD in Vietnam.

The results of the comprehensive review of 20 international scientific papers indicate that the application of the JASPER model in interventions for children with ASD has increased the frequency of symbolic play skills in these children. It has also enhanced the diversity in play and elevated the level of symbolic play in the games of children with ASD. Therefore, applying the JASPER model to develop symbolic play skills in children with ASD is an appropriate and scientifically grounded approach. It contributes to helping these children minimize core deficits and maximize their potential for social integration.

In Vietnam, there have been comprehensive studies on evidence-based practice programs for children with ASD by authors such as Cong and Āiep (2017) and Van Cong, Linh, and Thanh (2023) etc. These studies have affirmed the effectiveness of the JASPER model with precise and rigorous experimental designs. However, these studies have stopped at evaluating comprehensive reviews without control experiments, and the assessment of JASPER's impact on symbolic play skills in children with ASD is still lacking. Therefore, researching the application of the JASPER model to verify its effectiveness in the cultural context of Vietnam is a potential avenue for future research.

4.1. Considerations for Future Research on JASPER Model Application in Developing Symbolic Play Skills for Children with ASD in Vietnam

In future research, focusing on the application of the JASPER model to develop symbolic play skills for children with ASD in Vietnam, researchers should take note of the following issues:

4.2. Evaluating Intervention Goals

Examine whether the objectives of increasing the frequency of symbolic play skills, enhancing diversity within each level of symbolic play, and improving the effectiveness of symbolic play skills are achievable for children with ASD in Vietnam.

4.3. Comparative Effectiveness

Consider direct comparisons between the JASPER intervention model and other evidence-based intervention models to determine their relative effectiveness.

4.4. Intervention Formats

Explore different intervention formats, including individual and dyadic/small group interventions for children in special education centers/early intervention centers, as well as inclusive preschools. These interventions should be conducted under the guidance of special education teachers, preschool teachers, and parents trained in JASPER strategies.

4.5. Duration of Intervention

Consider the optimal intervention duration, with a suggested range from 5 to 12 weeks. Longer durations, such as 12 weeks, have been widely used in global research studies.

4.6. Long-Term Follow-Up

Investigate the developmental trajectory of symbolic play skills in children with ASD after discontinuing the JASPER model's behavioral interventions.

By addressing these considerations, future research can contribute valuable insights into the application and effectiveness of the JASPER model for enhancing symbolic play skills in children with ASD in the Vietnamese context.

Funding: This research is supported by the Ministry of Education and Training and Hanoi National University of Education (Grant number: B2024-SPH-03).

Institutional Review Board Statement: The Ethical Committee of the MOET and the Hanoi National University of Education, Vietnam has granted approval for this study on 30 June 2023 (Ref. No. 1918/QĐ-BGDĐT).

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests: The authors declare that they have no competing interests.

Authors' Contributions: Writing, and review, T.N.T.; conceptualization, T.D.T.; methodology, data analysis, N.P.B. All authors have read and agreed to the published version of the manuscript.

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