



ORIGINAL ARTICLE

Theory of Mind Deficit Is Associated with Pretend Play Performance, but Not Playfulness, in Children with Autism Spectrum Disorder



Ping-Chen Chan^a, Cheng-Te Chen^b, Hua Feng^c,
Ya-Chen Lee^{d,e}, Kuan-Lin Chen^{d,f,*}

^a Department of Physical Medicine and Rehabilitation Center, Lin-Shin Medical Corporation Lin-Shin Hospital, Taichung City, Taiwan

^b Center for Teacher Education, National Tsing Hua University, Hsinchu, Taiwan

^c Graduate Institute of Rehabilitation Counseling, National Changhua University of Education, Changhua, Taiwan

^d Department of Occupational Therapy, College of Medicine, National Cheng Kung University, Tainan City, Taiwan

^e Department of Occupational Therapy, College of Medical and Health Science, Asia University, Taichung, Taiwan

^f Department of Physical Medicine and Rehabilitation, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan City, Taiwan

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Summary *Objective/Background:* This study aimed to examine the relationships of theory of mind (ToM) to both pretend play and playfulness in children with autism spectrum disorder (ASD).

Methods: Twenty children with ASD aged between 3 years and 7.11 years were assessed with the ToM test, and then placed in a free play condition and a pretend play condition to assess pretend play and playfulness with the Child-Initiated Pretend Play Assessment and Test of Playfulness, respectively. In addition, the children's symptom severities of ASD and verbal abilities were also assessed with the Childhood Autism Rating Scale (CARS) and Receptive and Expressive Vocabulary Test—second edition, respectively.

Results: The results of the regression analysis confirmed that ToM significantly predicted pretend play variables, namely, Number of Object Substitutions ($R^2 = .158$, $p = .002$) and

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* Corresponding author. Department of Occupational Therapy, College of Medicine, National Cheng Kung University, Number 1 University Road, Tainan City 701, Taiwan.

E-mail address: klchen@mail.ncku.edu.tw (K.-L. Chen).

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Number of Imitated Actions ($R^2 = .175, p = .001$), but not playfulness. The CARS score was a significant predictor of the Percentage of Elaborate Pretend Play Actions of pretend play ($R^2 = .075, p = .034$), as well as the internal control ($R^2 = .125, p = .006$) and framing ($R^2 = .071, p = .039$) variables of playfulness.

Conclusion: The findings support the idea that children with ASD who have better ToM might be able to develop better pretend play, but not better playfulness, which might be more strongly related to their autistic severity.

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Introduction

Autism spectrum disorder (ASD) is a lifelong neuro-developmental disorder. Children with ASD have the core symptoms of impaired socialisation and communication, and they exhibit restricted, repetitive, and stereotyped behaviours or interests (American Psychiatric Association, 2000), which lead to poor physical, psychological, and social outcomes (Billstedt, Gillberg, & Gillberg, 2011; Eaves & Ho, 2008; Howlin, Goode, Hutton, & Rutter, 2004). These symptoms also result in poor adaptive functioning (Kanne et al., 2011) and cause difficulties in play (American Psychiatric Association, 2013; Dominguez, Ziviani, & Rodger, 2006; Mastrangelo, 2009; Rutherford, Young, Hepburn, & Rogers, 2007).

Play, the main occupation of children (Parham & Fazio, 2008), both reflects and improves the development of their physical, cognitive, and social skills (Rubin, Fein, & Vandenberg, 1983). Play is the dynamic interaction between the individual child and the child's immediate environment, and it is influenced by sociocultural factors (Cooper, 2000; Sutton-Smith, 1980). The two essential manifestations of play are external performance and internal experience. The former is observable performance, which unfolds in play activities; the latter is playfulness, which is the key to determining whether an activity belongs to play or not (Bundy, 1993; Neumann, 1971; Parham & Fazio, 2008). Therefore, it is important to view play as a whole construct involving both external performance and internal experience.

Pretend play is a form of external performance and is defined as play composed of both conventional imaginative play and symbolic play (Stagnitti & Unsworth, 2000). Conventional imaginative play is preliminary pretend play. It refers to perceiving objects (or conventional toys) as real or small copies of things, and using them in a functionally proper way outside of the typical context (Baron-Cohen, 1987; Lewis, Boucher, & Astell, 1992; Stagnitti & Unsworth, 2000). Examples are pretending to feed a doll using a toy spoon, using an empty cup to pretend to drink, or rolling a toy car on the floor and making engine noises. Symbolic play is sophisticated pretend play. It refers to using objects (or unstructured toys) as something else, attributing properties, or pretending an absent object is present (Baron-Cohen, 1987; Lewis et al., 1992; McCune-Nicolich, 1981; Stagnitti & Unsworth, 2000). Examples are

using a banana as a telephone, pretending a piece of cloth is wet, or making an imagined cup with the hands and pretending to drink. Therefore, pretend play provides an opportunity for children to practice events occurring in their daily lives or social worlds. Through engagement in pretend play, children learn the differences between reality and imagination. Moreover, pretend play reflects and facilitates the development of emotions, language, cognition, social skills, social awareness, and perspective-taking ability (Baron-Cohen, 1997; Lillard et al., 2013; Rubin et al., 1983; Vygotsky, 1976; Westby, 1991).

Pretend play deficit appears to be a clinical feature of children with ASD (Rutherford et al., 2007) and has long been a focus of the study of child development. Previous studies have found that children with ASD are unable to understand the pretend actions in play. Wing, Gould, Yeates, and Brierty (1977) conducted the first research that directly examined pretend play in children with ASD and children with intellectual disability and found that the majority of children with no observable pretend play or those with stereotyped, copying pretend play behaviours were children with autistic disorder. Several studies have also found that pretend play is apparently less frequent in children with ASD, and that their play behaviours lack symbolism, creativity, and complexity (Desha, Ziviani, & Rodger, 2003; Donnelly & Bovee, 2003; Riguet, Taylor, Benaroya, & Klein, 1981; Rutherford & Rogers, 2003; Sigman et al., 1999; Wulff, 1985). Rutherford et al. (2007) conducted a longitudinal study that measured children's pretend play in a free play condition and a structured condition with external instructions. Their results showed that children with ASD found it significantly more difficult than typically developing children to perform pretend play in both conditions and that spontaneous pretend play was more impaired. Furthermore, in addition to difficulties in performing pretend play, children with ASD have impaired comprehension of pretend play as well (Bigham, 2010). In summary, research has shown that children with ASD are unable to understand the pretend actions in play. Children with ASD have decreased frequency and complexity when performing pretend play, and the difficulties can present spontaneously or appear with external facilitations.

In addition to the external performance of play, playfulness is the internal experience and the quality of play (Barnett, 1990; Parham & Fazio, 2008). There are four dimensions of playfulness: internal control, freedom to

suspend reality, intrinsic motivation (Bundy, 1997), and framing (Bateson, 1971, 1972). Internal control refers to whether children can take charge of their play behaviours and some aspects of the behaviour's consequences, such as deciding with whom to play, what they want to play, and how to manage time and space (Bundy, 1997). Freedom to suspend reality means that children perform the play activity away from reality, such as by including nonreal, pretend objects or actions into play (Bundy, 1997). Intrinsic motivation refers to whether the activity itself can provide the stimulus for children to engage in play activity (Bundy, 1997). Framing is the ability of children to receive and produce social cues in order to interact with others (Bateson, 1971, 1972; Bundy, 2003; Neumann, 1971). The four dimensions of playfulness described above conceptualise the internal experience of play and make it measurable. That is to say, when a child feels self-motivated, self-controlled, and free from reality, and is thus able to interact with other people in play, it is believed that he/she is playful and experiencing play.

Researchers have indicated that children with ASD are less likely to have positive play experiences or gain pleasure from play (Brockmeyer, 2001; Hobson, Lee, & Hobson, 2009; Wulff, 1985). Additionally, Skaines, Rodger, and Bundy (2006) investigated playfulness in children with ASD using the Test of Playfulness (ToP; Bundy, 2003) in both unstructured and structured (with adult facilitation) conditions. The results showed that children with ASD had significantly lower playfulness than their typically developing peers in both conditions, although they were more playful in the structured condition than in the unstructured one. In summary, previous research has shown that children with ASD seem to have reduced playfulness in play whether the play condition is unstructured or structured.

Researchers have suggested that impairment in theory of mind (ToM) may be associated with pretend play deficits (Astington, 1993; Leslie, 1987) and with the reduction or absence of playfulness in children with ASD (Beyer & Gammeltoft, 2000; Skaines et al., 2006; Wolfberg, 1999). ToM is the social cognitive ability that allows people to understand and infer the mental states (e.g., feelings, beliefs, desires, and intentions) of others and self, and enables people to explain and predict corresponding behaviours (Adolphs, 2001; Premack & Woodruff, 1978). ToM is an essential ability for the establishment of social relationships and interpersonal communication (Wellman, 1990). It is also important for children to understand emotional states, beliefs, and complex social information (Astington & Gopnik, 1991; Baron-Cohen, Leslie, & Frith, 1985; Bartsch & Wellman, 1995; Flavell, Flavell, Green, & Moses, 1990; Wellman, Cross, & Watson, 2001). Several studies have shown that children with ASD display impairment and delayed development in ToM (Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999; Feng, 2001; Kaland et al., 2002; Mathersul, McDonald, & Rushby, 2013; Perner & Wimmer, 1985; Williams & Happe, 2009), which in turn may lead to impaired socialisation, communication, and play deficits (Baron-Cohen, 1997; Baron-Cohen et al., 1985; Dennett, 1978).

Previous studies that examined the relationships of ToM, pretend play, and playfulness in children with ASD had

several issues that necessitate further examination. ToM measurements used did not cover most of the ToM components. Only joint attention or false belief tasks were used to represent the whole construct of ToM. However, ToM is a broad construct that involves many component skills (Hutchins, Bonazinga, Prelock, & Taylor, 2008; Hutchins, Prelock, & Bonazinga, 2010). Types of pretend play were not considered in the measurements. Only the frequency of pretend actions was recorded, without consideration of the different types of pretend play. Results of previous studies on the relationships between ToM and pretend play were inconsistent (Bigham, 2010; Lam & Yeung, 2012; Rutherford & Rogers, 2003; Rutherford et al., 2007). Therefore, the purpose of this study was to investigate the relationship between ToM and pretend play and that between ToM and playfulness when statistically controlling for the children's symptom severity of ASD.

Methods

Participants

A convenience sample of children with ASD was recruited from hospitals and paediatric clinics in south-central Taiwan. Children were included in the ASD group if they (a) had a chronological age (CA) of 3–7.11 years, and (b) had received formal diagnosis, by a trained psychiatrist or paediatrician, of autistic disorder or Asperger's disorder according to the diagnostic criteria in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. Children were excluded if they (a) had symptoms associated with organic brain dysfunction (e.g., seizures, cerebral palsy), chromosomal abnormality (e.g., Down syndrome), or rare disorders; (b) were unable to follow orders or complete the procedure; (c) had uncorrected hearing or visual impairment, (d) failed to demonstrate verbal ability for basic communication; or (e) had Childhood Autism Rating Scale (CARS) scores lower than 30.

This study was approved by the institutional review boards of National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University (A-ER-102-201) and Chi Mei Medical Center, Tainan (10307-010), Taiwan. Parents and guardians were fully informed and signed consent forms prior to the assessment.

Measures

ToM test

Children's ToM was measured with the ToM test. The ToM test used in this study combined the original version developed by Feng (2001) and the version modified and expanded by Hsu (2007). The ToM test is assessed in a one-on-one setting and takes about 30–40 minutes to complete. The ToM test includes seven subtests with a total of 17 stories, which reflect the three levels of ToM with increasing difficulty: Basic, Advanced, and High-level Mental Development. The level of Basic Mental Development covers basic mental development of prerequisite skills of ToM with the desire-based emotions subtest. The level of Advanced Mental Development measures the

general skills of ToM with the basic belief subtest and the first-order false belief subtest. The level of High-level Mental Development measures the sophisticated skills of ToM with the second-order false belief subtest, the understanding of irony subtest, the understanding of metaphor subtest, and the understanding of faux pas subtest.

All items are presented on a computer in the form of pictures, written descriptions, verbal descriptions, or audio descriptions. Each subtest has identification questions (scored 0–2), confirmation questions (scored 0–3), and control questions (scored pass or fail). The control questions are used to exclude the effects of attention, memory, and verbal understanding. The test is stopped when the child fails to answer the control question or the identification question of an item. The pass rate of each level is calculated as the percentage of the highest score relative to the total score. A pass rate higher than 70% represents that the child has mastered the ToM of that level. If the child cannot pass the first level of Basic Mental Development, his or her stage is classified as “Before Basic Mental Development.” The reliability and validity of the ToM test have been examined (Feng, 2001; Hsu, 2007).

Child-Initiated Pretend Play Assessment

The Child-Initiated Pretend Play Assessment (ChIPPA; Stagnitti, 2007) was used to measure children’s pretend play. This measure is a norm-referenced standardised assessment that individually measures a child’s ability to self-initiate and sustain pretend play over a period of 30 minutes (4–7.11 years old) or 18 minutes (3 years old). To ensure the consistency of the assessment, we uniformly measured the pretend play of all participants for 30 minutes. The administration of the ChIPPA is called the “pretend play condition” in this study. The ChIPPA includes both a conventional imaginative play session and a symbolic play session. At the beginning of each session, the child is encouraged to play with the objects freely. The administrator then models five play actions with a “doll” toy, after which the child is once again encouraged to play with the objects as they wish (Stagnitti, 2007). The toys for each play session are a farm set (conventional imaginative play) and a set of unstructured play materials (symbolic play; Stagnitti, Rodger, & Clarke, 1997).

The scoring of the ChIPPA includes three items: (a) Percentage of Elaborate Pretend Play Actions (PEPA), which reflects the elaborateness, complexity, and organisation of play actions; (b) Number of Object Substitutions (NOS), which represents the number of objects the child uses as something else, indicating flexibility and problem solving abilities when using objects; and (c) Number of Imitated Actions (NIA), which represents the number of imitations appearing soon after the modelled actions, indicating the child’s ability to self-initiate play ideas. The NIA is a reverse-scored item—that is, a higher score represents poorer performance. Raw scores can be transformed to standard scores or compared with the range and the mode of the normative sample (Stagnitti, 2007). Raw scores of the PEPA, NOS, and NIA were used in this study. The psychometric properties of the ChIPPA have been well established, including the content validity and construct validity (Stagnitti, 2007), test–retest reliability (Stagnitti & Unsworth, 2004), interrater reliability (Stagnitti, Unsworth, & Rodger, 2000; Swindells & Stagnitti,

2006), discriminative validity (Stagnitti, 2001; Stagnitti et al., 2000), and sensitivity and specificity (Stagnitti, 2001).

Test of Playfulness

Children’s playfulness was measured with the fourth version of the ToP. The ToP is an observational assessment designed to objectively assess the playfulness of any individual aged from 6 months to 18 years (Bundy, 2003). The child is allowed to play freely with toys for 15–20 minutes, and the play period is videotaped and later rated. The administration of the ToP is called the “free play condition” in this study. The ToP measures one general construct of playfulness with four dimensions of playfulness: intrinsic motivation, internal control, freedom to suspend reality, and framing.

The ToP consists of 30 items, each of which is rated on a 4-point (0–3) scale. Scores indicate extent (i.e., proportion of time), intensity (i.e., degree of presence), or skillfulness (i.e., ease of performance). A score of “not applicable” is recorded if there is no opportunity to observe a particular item (Bundy, 2003). The ordinal-level raw scores for each child are converted to interval-level scores through Rasch analysis to compare playfulness with age-equivalent children (Linacre, 2007). The ToP, which has good clinical utility, has been used to examine playfulness in children with autistic disorder and other disabilities (Harkness & Bundy, 2001; Leipold & Bundy, 2000; Okimoto, Bundy, & Hanzlik, 2000; Skaines et al., 2006). The psychometric properties of the ToP have been well established, including both reliability and validity (Brentnall, Bundy, Catherine, & Kay, 2008; Bundy, Nelson, Metzger, & Bingaman, 2001; Harkness & Bundy, 2001).

Childhood Autism Rating Scale

The CARS (Schopler, Reichler, & Rochen, 1988) was used to assess the symptom severity of ASD in this study. The CARS is a 15-item scale targeting autistic behaviours in individuals older than 2 years. The CARS can be completed within 15 minutes based on clinical observation, test measures, and case reports, or—as in this study—based on caregiver interview. Each item is rated from 1 (normal) to 4 (severely abnormal), with a total score ranging from 15 to 60. A total score of below 30 means the child does not meet the clinical threshold considered to indicate symptoms of ASD, a score of 30–36 represents mild to moderate symptoms of ASD, and a score of 37 or higher indicates severe symptoms of ASD (Schopler et al., 1988). The reliability and validity of the CARS have been well established (Breidbord & Croudace, 2013; Eaves & Milner, 1993; Matson, Mahan, Hess, Fodstad, & Neal, 2010; Schopler, Reichler, & Renner, 1994).

Receptive and Expressive Vocabulary Test—second edition

The Receptive and Expressive Vocabulary Test, second edition (REVT2; Huang, Chien, Zhu, & Lu, 2011) was used to assess verbal ability in the current study to develop the profiles of the children. The REVT2 was designed for children aged 3–6 years, and for children older than 7 years with suspected verbal delay. The REVT2 is a norm-referenced standardised assessment that can identify verbal developmental disorders and measure vocabulary-related cognitive ability.

The REVT2, which is assessed in a one-on-one setting without distractions, can be completed within 20–40 minutes. The measurement covers the receptive scale and the expressive scale, each of which has four subscales: naming, category, definition, and reasoning. The REVT2 has been found to have good reliability and validity (Huang et al., 2011).

Procedures

Measurement preparations

Prior to data collection, two administrators, who were occupational therapists, were specially trained on the measurement manuals to ensure that the administrators met the qualifications and fully understood the measurements. One administrator (the tester) was responsible for the assessment session, in which the REVT2, the ToM test, the CARS, the ToP (free play condition), and the ChIPPA (pretend play condition) were administered. Before formal recruitment began, the tester needed to be familiar with all the measurements, practice with an experienced therapist several times, and finish a pilot study under supervision. The tester was allowed to begin formal recruitment when the experienced therapist approved her assessment skills.

Another administrator (the coder), who was blind to the group status of the participants, was responsible for the coding session. The coder coded the videos of the two play conditions based on the scoring criteria of the ToP and the ChIPPA. Prior to scoring, the manual and the scoring criteria were translated into Chinese for easier scoring. The Chinese manual and scoring criteria were confirmed by experienced therapists and clinicians to ensure that the scoring

criteria were applied based on the original version and were relevant to Taiwanese culture. The interrater reliabilities between the coder and a therapist experienced with the ToP and the ChIPPA were examined with 10 videos. The interrater agreement of the ToP ranged from 85% to 90%, and that of the ChIPPA ranged from 81% to 90%.

Study procedures

The data were collected in two visits. The procedure of this study is depicted in Figure 1. Each visit lasted about an hour, and the two visits were completed within 2 weeks. In the first visit, the child was assessed with the REVT2 and then entered the free play condition. The caregiver of children finished a basic information sheet and was interviewed with the CARS. Children who met the criteria continued to participate in the second visit. In the second visit, the child was measured with the ToM test and then entered the pretend play condition. The entire measurement session was completed by a trained tester. All play, including the free play condition and the pretend play condition, was videotaped and later rated with the criteria of the ToP and the ChIPPA, respectively, by the trained coder.

Data analysis

The data obtained from each measurement were analysed in SPSS version 17.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to describe the demographic characteristics, ToM, pretend play, and playfulness of the participants. Pearson's correlation coefficients were used to investigate the correlations among the variables of ToM, autism severity, pretend play, and playfulness. As regards

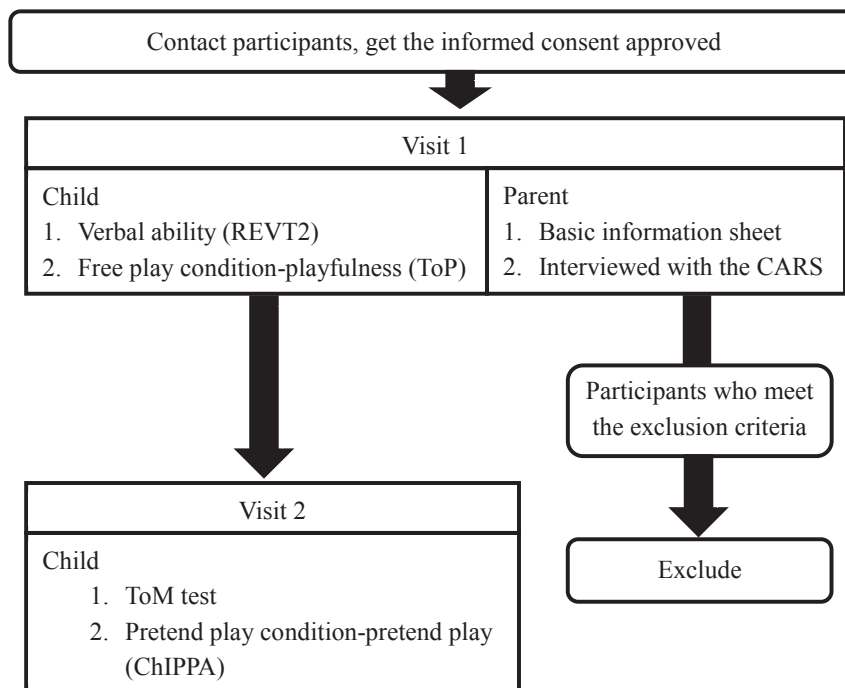


Figure 1 Study procedure. *Note.* CARS = Childhood Autism Rating Score; ChIPPA = Child-Initiated Pretend Play Assessment; REVT2 = Receptive and Expressive Vocabulary Test—second edition; ToM test = Theory of Mind test; ToP = Test of Playfulness.

the regression analysis, seven regression models were examined. The pretend play variables (PEPA, NOS, NIA) and the playfulness variables were the dependent variables (intrinsic motivation, internal control, freedom to suspend reality, framing). The independent variables, including the ToM, autism severity, and the interaction term of CARS and ToM test total scores, were entered and removed in a stepwise manner using the default criteria of probability of F -to-enter = $p < .05$ and probability of F -to-remove criteria = $p > .10$. The procedure was stopped when adding an additional predictor did not yield a t test p value of $< .15$. In addition, the F test of overall significance and coefficient of determination (R^2) of the final model were also provided. The significance level was set at $\alpha < .05$.

Results

Twenty children with ASD and their caregivers participated in this study. Table 1 summarises the demographic characteristics of the children and shows the children's performance of assessments of ToM, pretend play, and playfulness. The results of the REVT2 showed that the children with ASD in this study were verbal and relatively high-functioning. Based on their performance on the ToM test, most of the children were found to be in the "Basic Mental Development" stage of ToM (16/80%), which means the children had the prerequisite skills of ToM with desire-based emotions but not adequate ToM for their ages.

Table 2 shows the correlations among the independent and dependent variables, and the results of the stepwise regression analysis are summarised in Table 3. The interaction effects of ToM and CARS were insignificant for all

Table 1 Sample Characteristics of the Children ($N = 20$).

Characteristics	Mean (SD, range)/(%)
Chronological age (mo)	67.3 (16.3, 51–95)
Sex (boys/girls) (n)	17/3 (85/15)
Childhood Autism Rating Scale	33.6 (2.9, 30–39)
Receptive and Expressive Vocabulary Test	
Receptive scale	82.1 (18.2, 39–109)
Expressive scale	74.5 (24.3, 37–110)
Overall scale	156.6 (40.9, 76–219)
Theory of Mind test	
Basic Mental Development	12.2 (1.6, 6–14)
Advanced Mental Development	5.8 (2.4, 2–12)
High-level Mental Development	16.7 (11.9, 0–33)
Total score	34.6 (13.6, 14–56)
Child-Initiated Pretend Play Assessment	
Percentage of Elaborate Pretend Play Actions (PEPA)	77.2 (33.2, 34–153)
Number of Object Substitutions (NOS)	12.0 (6.2, 2–25)
Number of Imitated Actions (NIA)	1.4 (1.3, 0–4)
Test of Playfulness	
Intrinsic motivation	12.0 (1.6, 9–15)
Internal control	24.2 (5.2, 18–37)
Freedom to suspend reality	9.1 (4.7, 3–18)
Framing	6.9 (1.8, 4–10)

Note. SD = standard deviation.

dependent variables, and only five of the dependent variables showed significant relationships with one of the main effects. For the PEPA model, the results showed that only the CARS was a significant predictor, accounting for 7.5% of the variance ($F_{1,18} = 4.698, p = .034$). In the NOS and NIA models, the ToM was significant, explaining 15.8% of the variance ($F_{1,18} = 10.871, p = .002$) and 17.5% of the variance ($F_{1,18} = 12.287, p = .001$), respectively. For the internal control and framing models, only the CARS was left. It accounted for 12.5% of the variance of the Internal control ($F_{1,18} = 8.296, p = .006$) and 7.1% of the variance of the Framing ($F_{1,18} = 4.442, p = .039$). No significant variable was entered into the final models for Internal motivation and Freedom to suspend reality.

Discussion

The present study examined the relationships of ToM with pretend play and playfulness in children with ASD. The results showed that children's ToM was significantly associated with their pretend play in initiating play actions, object substitutions, property attribution, and pretending an imaginary object were present. However, the correlation coefficients failed to show a significant relationship between children's ToM and their playfulness. From the regression results, autism severity appears to be a relatively important factor that influences children's playfulness, especially their internal control and framing. This study provides better understanding of the relationships of ToM with pretend play and playfulness in two ways: (a) by covering the ToM from prerequisite to sophisticated skills, rather than only targeting a single component skill; and (b) by investigating the relationships of ToM with pretend play and playfulness simultaneously to consider both the external performance and the internal experience as parts of play and thereby to view play more comprehensively.

The results of the regression analysis showed that ToM and autistic severity were important predictors of pretend play. The ToM could predict a child's behaviours of object substitutions, property attribution, and pretending an imaginary object was present, as well as the numbers of times a child would imitate the modelled play actions. The results were consistent with previous research indicating that impairments in ToM may cause difficulty for children with ASD in developing the ability of pretense and thereby limit their engagement in pretend play (Baron-Cohen et al., 1985; Leslie, 1987). When performing a pretend action, children need to dismiss the primary representation of the object and simultaneously generate a new representation, called a metarepresentation. It is believed that ToM and pretend play may share a similar metarepresentational construct.⁴³ Therefore, when a child is able to engage in pretend play, an implicit understanding of pretend play is shown and ToM is involved. As a result, improving the ToM of children with ASD may help them to develop their abilities to engage in pretend play, and involving these children in an environment of pretend play may also provide opportunities for them to practice and develop their ToM.

Interestingly, the results of the regression model of play elaborateness (the PEPA model) showed that autistic behaviour, not ToM, can better predict the elaborateness,

Table 2 Correlations on Measurements of Interest in Children with ASD ($N = 20$).

Measurements	1	2	3	4	5	6	7	8	9
1. ToM									
2. CARS	-.520**								
3. PEPA	.265*	-.274*							
4. NOS	.397**	-.095	.395**						
5. NIA	-.418**	.233	-.143	-.244					
6. Intrinsic motivation	.144	-.133	-.003	-.026	-.043				
7. Internal control	.326*	-.354**	.344**	.101	-.180	.409**			
8. Freedom to suspend reality	-.044	-.190	.188	-.161	.080	.080	.456**		
9. Framing	.220	-.267*	.350**	.185	-.266*	.359**	.709**	.366**	

Note. CARS = Childhood Autism Rating Scale; NIA = Number of Imitated Actions; NOS = Number of Object Substitutions; PEPA = Percentage of Elaborate Pretend Play Actions; ToM = Theory of Mind.

* $p < .05$; ** $p < .001$

complexity, and organisation of a child's play. In this study, it was observed that children with ASD who had poor adaptation to change and more unique use of objects would exhibit play behaviours that were less changeable and lacked narrative. For example, the children might keep rolling the toy truck to watch the rotation of the wheels without any play purpose, and the children would also show resistance when asked to play with other objects or when the tester modelled the play actions.

However, the results showed that ToM was not a significant predictor of children's playfulness, possibly because of the small sample size. In addition, the results showed that autistic behaviour was the most significant predictor of children's playfulness. It suggested that children with more autistic behaviours would look less joyful during play. As autistic behaviour encompasses the characteristics of ASD, the results are congruent with those of previous studies demonstrating that children's playfulness is related to individual characteristics, such as age, sex, and other personality attributes (Kooij & Vrijhof, 1981; Lieberman, 1977; Rubin et al., 1983). Therefore, these autistic behaviours seemed to be more dominant than ToM in children maintaining play themes, sequences, and narrative during play.

This study had three limitations. The small sample size may limit the statistical power of the results. Further study is warranted to recruit more children with ASD. Second, because this study recruited only children with relatively high-functioning and verbal ASD, the findings cannot be generalised to lower-functioning and nonverbal children with ASD. Third, the ToM test used in this study required children to speak aloud or explain their decisions. It is difficult to separate children's expressive verbal ability from the measurement of ToM, which is also the reason why the association was high between ToM and expressive verbal ability. Therefore, expressive verbal ability was not entered into the regression models to avoid multicollinearity. Further studies should include more participants, apply a measurement of ToM that is less verbally demanding, and recruit lower-functioning and nonverbal children with ASD to illustrate the relationships among ToM, pretend play, and playfulness.

The results of this study provide a better understanding of the relationships of ToM with pretend play and playfulness in children with ASD. The results showed that the ToM of children with ASD is significantly associated with both the number of objects a child uses as something else and self-

Table 3 The Stepwise Regression Models of Pretend Play and Playfulness ($N = 20$).

Model	Predictors	B	Standard error (B)	R ²	F (p)
Models for pretend play (measured by the Child-Initiated Pretend Play Assessment)					
PEPA ^a	Constant	110.494	12.099	.075	4.698 (.034)
	CARS	-1.065	0.491		
NOS ^b	Constant	4.185	2.569	.158	10.871 (.002)
	ToM	0.185	0.056		
NIA ^c	Constant	2.658	0.508	.175	12.287 (.001)
	ToM	-0.039	0.011		
Models for playfulness (measured by the Test of Playfulness)					
Internal control ^d	Constant	31.474	1.942	.125	8.296 (.006)
	CARS	-0.227	0.079		
Framing ^e	Constant	8.766	0.725	.071	4.442 (.039)
	CARS	-0.062	0.029		

Note. CARS = Childhood Autism Rating Scale; NIA = Number of Imitated Actions; NOS = Number of Object Substitutions; PEPA = Percentage of Elaborate Pretend Play Actions; ToM = Theory of Mind.

Predictive equations: ^a PEPA = 110.494 + -1.065 CARS; ^b NOS = 4.185 + 0.185 ToM; ^c NIA = 2.658 + -0.039 ToM; ^d Internal control = 31.474 + -0.227 CARS; ^e Framing = 8.766 + -0.062 CARS.

initiated pretend play actions, respectively indicating children's flexibility and problem-solving abilities when using objects and the ability to self-initiate play ideas. However, the results did not show a significant relationship between ToM and playfulness.

The present study suggests that it is necessary to target interventions at ToM, pretend play, and playfulness in children with ASD, because the results indicated that children with ASD who have better ToM may have better performance in pretend play, particularly in the initiation of pretend play actions and the behaviours of object substitution, and that children's playfulness might be more strongly related to their autistic severity. For clinical practice, we suggest that clinicians help children with ASD to develop their ability of ToM in order to enhance their performance in pretend play rather than their playfulness.

Conclusion

Based on the results, children with better ToM have better performance in pretend play, and autistic severity influences both pretend play performance and playfulness, especially the latter. ToM deficit is associated with pretend play performance in children with ASD, but not with their playfulness. Children's playfulness might be more strongly related to their autistic severity. We suggest that occupational therapists, clinicians, and parents help children with ASD to develop their ability of ToM in order to enhance their performance in pretend play rather than their playfulness.

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