Let’s Pretend: Predictors of Spontaneous Pretend Production in Children

Eliana F. Klein

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Advisors: Prof. Angeline S. Lillard & Matthew D. Lerner
Second Reader: Prof. Rachel Keen
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Abstract
This study examined predictors (autism spectrum disorder [ASD] symptoms; verbal ability, theory of mind [ToM]; interest in and familiarity with presented toys) of quantity of overall, and subtypes of observed spontaneous pretend play in typically-developing children. Participants were 31 children (ages 4 – 9; 21 male). Better ToM predicted more attribution of false properties to toys and more interest in the toys presented predicted more object substitution. While those with more interest in presented toys displayed more instances of object substitution, this relationship was strongest for those with a history of fewer ASD symptoms. Results support the importance of considering novel predictors and examining subtypes of pretend play. Implications for development of pretend ability among children with typical development with varying amounts of ASD symptoms are discussed.
Let’s Pretend: Predictors of Spontaneous Pretend Production in Children

A common feature of childhood is playing. While exploring the world around them, children begin to play with everyday objects (i.e. pots and pans), more typical objects (i.e. dolls and toy cars), and eventually with their peers. By the time they are three years old, most typically developing (TD) children will independently and spontaneously engage in symbolic or pretend play, such as pretending a banana is a telephone (Lillard, 1993). Pretend play is a combination of play and pretense, or the “stretching (of) one reality over another” (p. 349, Lillard). The ability to pretend might also require a metarepresentational ability, or the ability to hold onto two mental representations in the mind (Leslie, 1987). The first reflects the state of the real world, or the perceived situation, and the second reflects the pretend situation. In order to engage in actions of pretend, one must take mental representations from the perceived situation (i.e. here is a cup, the cup is empty) and be able to map the pretend ideas onto the contexts of the real world (i.e. this cup that’s really empty contains tea; Leslie).

Crucially, research suggests that engaging in actions of pretend is related to the development of verbal, social, and perspective-taking (Theory of Mind; ToM) abilities in TD children (Jenkins & Astington, 2000). While increasingly sophisticated pretend naturally emerges in TD children, there are children, such as those with autism spectrum disorder (ASD) – even those “high-functioning” children with intact verbal ability (HFASD) – for whom the development of pretend appears impaired (Jarrold, 2003).

Even though children with ASD might pretend less and differently, research consistently suggests that many children with ASD do still pretend (Libby, Powell, Messer, & Jordan, 1998; Rutherford & Rogers, 2003; Baron-Cohen, 1987). Additionally, these children with ASD that can still pretend might show related benefits in other areas (i.e. ToM and verbal ability).
However, little work has carefully explored the factors that contribute to spontaneous pretend among children with varying levels of ASD symptoms, the consideration of which will help better illuminate the factors that contribute to the development of the ability to pretend.

It is possible that certain symptoms of ASD might not contribute as a whole to deficits in the ability to pretend. However, it is difficult to separate out these symptoms when diagnostic criteria for ASD require deficits in domains of socialization, communication, and restrictive and repetitive behaviors according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*, American Psychiatric Association, 2000). Indeed, while ASD symptoms necessarily cluster among ASD individuals, the symptoms themselves may be somewhat independent of one another (Russell-Smith, Maybery, Bayliss, & Sng, 2012). In order to determine how each symptom relates to the ability to pretend, it is helpful to separate out these ASD symptoms. Since individuals with ASD must meet criteria in all of these domains, one cannot easily separate out these symptoms among ASD individuals; thus, one must look to the presence of “ASD-like” traits that are distributed in the general population (Russell-Smith et al.). The Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2005) is a widely-used parent-report questionnaire that screens for a history of these “ASD-like” traits within individuals and demonstrates some variance in TD populations. Thus, it may be a useful measure to index ASD traits and their relation to outcomes, such as pretend, that may be impaired in ASD populations.

In addition to assessing how ASD symptoms might contribute to the ability to produce pretend, it is important to examine how various factors might directly influence different subtypes of pretend. Examining subtypes of pretend may provide deeper insight into which elements of pretend (and associated mental representations) might contribute to difficulties with
pretend among individuals with ASD. Actions of pretend play often fall under one of three categories: object substitution (OS; e.g., pretending a block is a car), attribution of false properties (AFP; e.g., pretending dishes are dirty), and reference to absent objects (RAO; e.g., pretending to read a book when there is no book present; Leslie, 1987). A small body of research suggests that it is not pretend as a whole, but certain types of pretend that are more challenging for individuals with ASDs. For instance, a study by Libby et al. (1998) demonstrated that children with ASD produced just as much OS as TD children, but produced significantly fewer acts of AFP and RAO. This finding suggests that although children with ASD engaged in fewer acts of overall pretend compared to TD children, this was in part due to difficulties with producing certain subtypes of pretend among children with ASD. It is plausible that each of these categories of pretend may require slightly different child capacities and experiences (e.g., knowledge and understanding that a doll represents a human might lead a child to attribute the false property of talking, while knowledge and understanding that a doll is a vertical object that you can bang against things might lead a child to engage in OS and substitute the doll for a hammer), and may therefore represent categorically different styles of pretend play. Thus, in order to gain a deeper understanding of which factors influence the ability to pretend, one must assess not only how certain predictors might influence pretend ability as a whole, but how they might influence these different subtypes of pretend.

**Pretend Play and ASD**

Individuals with ASD have been shown to produce fewer actions of pretend (Baron-Cohen, 1987) and different types of pretend (Libby et al., 1998) when compared to TD individuals. A review by Jarrold (2003) indicated that even when individuals with ASDs engage in actions of pretend, they do so less frequently than their peers. However, Jarrold (2003) noted
that individuals with ASD may have an underlying capacity to understand pretend, but struggle when expected to engage in spontaneous pretend. Several studies support the proposition of intact pretense comprehension in this population (Jarrold, Smith, Boucher, & Harris, 1994; Kavanaugh & Harris, 1994). These studies had an experimenter either ‘pour’, ‘drop’, ‘squirt’, or ‘paint’ non-existent substances onto toy animals (Jarrold, 2003; Jarrold et al., 1994; Kavanaugh & Harris, 1994). The findings showed that individuals with ASD were just as able as controls to correctly answer questions about the end result of the pretend sequence. For instance, the participants with ASD understood that the toy animal was made ‘wet’ with pretend tea (Jarrold, 2003; Jarrold et al., 1994; Kavanaugh & Harris, 1994). However, no work has yet examined whether differences in pretend play production vary as a function of ASD symptoms in TD populations.

Libby et al. (1998) examined the differences in early symbolic play among TD children, children with ASD, and children with Down syndrome. Each child was given five minutes alone to play with a set of toys and these sessions were then analyzed for type of play (i.e. functional and pretend), and type of pretend play produced (Libby et al.). The authors found that while all children produced roughly the same number of OS, children with ASD produced no actions of RAO and significantly fewer actions of AFP compared to the TD and Down syndrome children. This finding suggests that while certain individuals with ASD are able to pretend, the pretend they produce is considerably different from TD children and even children with other disabilities (i.e. Down syndrome). Given these findings, one would expect that individuals with more ASD symptoms would similarly produce fewer actions of AFP and RAO, and possibly more actions of OS. However, research studies have not yet explored whether differences of pretend play
subtypes produced would replicate among TD individuals with varying levels of ASD symptoms.

Overall, these findings (Jarrold, 2003; Jarrold et al, 1994; Kavanaugh & Harris, 1994; Baron-Cohen, 1987) suggest that production (including quantity) of pretend play remains impaired among certain individuals with ASDs (despite an underlying capacity to understand pretense). Furthermore, other studies (Libby et al., 1998) have provided insight into the different types of pretend produced by individuals with ASDs. However, no work has yet explored whether individual differences in ASD symptoms relate to the ability to pretend. Likewise, only little work has begun to explore whether predictors of pretend vary or are the same among youth with ASD and TD.

**Known Predictors of Pretend Play**

Research has often highlighted links between pretend play, ToM, and verbal ability (Taylor & Carlson, 1997; Bigham, 2010; Lewis, Boucher, Lupton, & Watson, 2000; Astington & Jenkins, 1995, 1999; Jenkins & Astington, 1996, 2000). Such links are helpful in understanding how pretend play normally develops.

ToM is the ability to understand others’ mental states and how other individuals might perceive the world (Leslie, 1987; Baron-Cohen, 1995). Taylor and Carlson (1997) conducted a study looking at the relationship between ToM and individual differences in pretend play produced by TD preschoolers. Each participant’s ToM ability and developmental level of pretend play were assessed. Results of this study indicated a relationship between ToM ability and pretend play (Taylor & Carlson). This link between ToM ability and the ability to pretend among TD children suggests that TD children with greater ToM ability may be able to produce
more actions of pretend. That is, the ability to understand others’ perspectives may facilitate a greater ability to understand and produce pretend play.

However, many individuals with ASD have difficulty understanding and interpreting others’ mental states, leading to a widely-cited hypothesis that impaired ToM may be the source of deficits in ASD (Baron-Cohen, 1995, 2001). Concurrently, while some children with ASD understand others’ actions of pretend, they still struggle to produce pretend (Jarrold, 2003). One explanation for these impaired abilities (ToM and pretend) among individuals with ASD might be that pretend play and ToM both reflect an underlying ability to abstract from the present reality, and that those with ASD have difficulty with this (Leslie, 1987).

Although research supports a link between production of pretend and ToM ability (Taylor & Carlson, 1997) among TD children, this might represent a pathway typically used by TD individuals, and less often used by individuals with ASD. This might be because ToM ability does not develop naturally among individuals with ASD. Instead, individuals with ASD may deliberately engage in a “hacked together” ToM, rather than intuitively engaging in a more “automatic” ToM (Dissanayake & Macintosh, 2003). The hacking hypothesis explains how individuals with high functioning ASD may pass ToM tasks via this less efficient, more deliberate route. Furthermore, those with ASD may engage in a “hacked together” ToM by learning specific rules that allow them to pass ToM tasks, rather than using social understanding and an understanding of other’s perspectives (Dissanayake & Macintosh). Given that intuitive, “automatic” ToM might not develop naturally among those with ASDs, it is plausible that the presence of ASD symptoms may weaken the relationship between ToM and pretend.

Bigham (2010) conducted a study on the relationship between understanding pretend and mentalizing (ToM) ability among children with ASD, TD children, and children with intellectual
disabilities (ID). Participants watched a series of pretend actions (i.e. writing) with either a real object (indicating functional play) or an imaginary object (indicating pretend play). In order to assess pretense comprehension, each participant was then asked to identify what the experimenter was doing, and what he or she was pretending the object to be. The ToM ability of each child was assessed using a false belief task. Bigham’s (2010) findings demonstrated a relationship between ToM ability and understanding actions of pretend. Additional findings revealed that individuals with ASD understood significantly fewer actions of pretend compared to TD and ID controls.

While Bigham’s (2010) findings suggest that ToM ability is linked to understanding pretend among individuals with ASD, no research has explored whether this link also exists when looking at the production of spontaneous pretend among this population. Additionally, no one has directly tested whether there would be a weakened relationship between ToM ability and pretend play among individuals with more ASD symptoms compared to those with fewer symptoms. Furthermore, little research has explored differences in subtypes of pretend in relation to ToM ability.

As with ToM, a link has also been suggested between verbal ability and pretend in TD youth (Bigham, 2010; Rutherford & Rogers, 2003; Lewis, Boucher, Lupton, & Watson, 2000). Lewis et al. (2000) looked at the relationship between language and conceptual ability and the relationship between language and pretend ability among verbal and non-verbal TD participants. The types of pretend assessed were object substitution, attribution of false properties, and reference to absent objects. Lewis et al.’s (2000) findings indicated a relationship between pretend play and language development, suggesting that both pretend play and verbal ability
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involve a certain degree of conceptual knowledge. Although these findings suggest a link between verbal ability and pretend, this study only looked at the relationship among TD children.

Rutherford and Rogers (2003), however, looked at verbal mental age as a possible factor influencing the ability to spontaneously pretend among children with ASD. This study examined spontaneous pretend production among children with ASD, and had children with other developmental disorders (DD) and TD children as controls. The verbal mental age of all participants was assessed and each participant was given the opportunity to spontaneously play with a set of toys (Rutherford & Rogers, 2003). Findings indicated that although verbal mental age was correlated with pretend play production for both control groups, it was not significantly correlated for participants with ASD. This finding suggests that the link between verbal ability and pretend might be a pathway typically used by TD individuals and individuals with other DD, but one that individuals with ASDs are less able to access. Individuals with ASDs might be less able to access this pathway due to developmental deficits in communication, a diagnostic feature required for having an ASD (DSM-IV-TR, 2000). Similarly, those with more ASD symptoms might also experience some deficits in communication that make this pathway between verbal ability and pretend less accessible. Furthermore, given Rutherford and Roger’s (2003) findings, one might predict that the relationship between verbal ability and pretend would be weaker among TD children with greater levels of ASD symptoms; however, this has not been directly tested. Additionally, little research has explored differences in subtypes of pretend in relation to verbal ability.

If children with ASDs are less able to use more typical pathways to pretend, like ToM and verbal ability, it is possible that individuals with ASD that are able to pretend must use
alternate pathways. Next, we consider two novel predictors that might more strongly influence the ability to engage in actions of pretend among individuals with ASD.

**Novel Predictors of Pretend**

It is possible that different factors may predict patterns of pretend in youth with ASD relative to TD. Such factors might reflect the divergent developmental pathways used by children with ASD and TD children to arrive at the ability to produce actions of pretend. Two plausible factors are interest in and experience (familiarity) with specific toys. Although research studies have measured familiarity and interest to control for these factors when evaluating the effectiveness of pretend play interventions for youth with ASD (Murdock & Hobbs, 2010), little research has examined them as predictors of pretend play.

A child’s interest in an object can be characterized by repeated voluntary engagement with that object, with no outside encouragement (Hidi, Renninger, & Krapp, 2004). Furthermore, interest can be described as having some increase in general curiosity towards an object or action. Interest in an object or activity may also motivate a person to engage with that object or in that activity.

Indeed, research has demonstrated that interest appears to drive and motivate the behaviors in which TD individuals choose to engage and the objects with which they chose to play (Hidi et al., 2004). If TD children repeatedly engage with certain toys due to personal interest, they might be more likely to explore different ways that they can interact with and play with those toys. Pretend is one type of play that might result from repeatedly engaging with toys. Thus, interest in a toy might motivate TD children to engage in actions of pretend with that toy. However, these motivational aspects might play a minimal role in driving the pretend behavior of TD children, given its robust and seemingly spontaneous emergence in most TD children by
the age of three (i.e. they may not require higher levels of interest, since they will spontaneously pretend anyway; Lillard, 1993).

Given that specialized interests (e.g., in toys or topics) are more common among individuals with ASDs (Baker, Koegel, & Koegel, 1998; Vismara & Lyons, 2007), interest and motivation may play an especially crucial role in the play behaviors of youth with ASD (Koegel & Mentis, 1985). In turn, interest might influence spontaneous pretend play behaviors more in this population.

Even though children with ASD have been shown to engage in fewer actions of pretend and different subtypes of pretend (Libby et al., 1998), interest in objects might play an important role in initiating the actions of spontaneous pretend that these children can and do produce. For instance, a more heightened interest in a specific toy might motivate a child with ASD to repeatedly engage in actions of play with that toy. By already understanding the typical functions of the toy and playing with it frequently due to personal interest, they might be more readily able to try out novel uses, including pretend. Such experiences may, in turn, facilitate basic metarepresentational capacities in youth with ASD.

Furthermore, familiarity with an object might also motivate a child with ASD to produce actions of pretend. A child’s level of familiarity with an object is based on how often that child has seen or been exposed to that object (Hidi et al., 2004). The more a child (either TD or ASD) is exposed to or sees a certain object, the more they begin to understand the characteristics of that object. Perhaps it is easier for a child with ASD to attribute abstract (pretend) characteristics to an object once they become more familiar with it. Conversely, as some youth with ASD tend to engage in repetitive behavioral routines with familiar objects (Leekam, Prior, & Uljarevic, 2011), they may in fact be more likely to engage in novel play routines (e.g. pretend) with less-familiar
objects. In this sense, familiarity could be seen to relate to more or less pretend in this population; crucially, though, it could plausibly be more related to pretend production in ASD relative to TD children.

Despite the proposed relationship of interest in and familiarity with objects to spontaneous pretend play, and the theorized differences in this relationship between TD and ASD youth, no previous research has explored this connection directly. Furthermore, no research has explored differences in subtypes of pretend in relation to interest in and familiarity with toys.

**Hypotheses**

The current study examined the relation between overall quantity and well-established subtypes of pretend play (object substitution [OS], attribution of false properties [AFP], and reference to absent object [RAO]; Libby et al., 1998) spontaneously produced by TD and measures of ASD symptoms, verbal ability, ToM, and interest in and familiar with presented toys. We first hypothesized that children reported to have more ASD symptoms would engage in less spontaneous pretend play overall, fewer acts of AFP and RAO, and more acts of OS relative to those with fewer ASD symptoms (Libby et al., 1998). Second, we hypothesized that both well-established (verbal ability and ToM) and novel (interest and familiarity) predictors of pretend would relate positively to overall pretend play. We also considered exploratory sub-hypotheses regarding the relationships between ToM, verbal ability, and interest and familiarity, and subtypes of pretend. Given Libby et al.’s (1998) finding that individuals with ASD produced fewer acts of AFP and RAO, and the conjecture that certain pathways to pretend might be less (ToM and verbal ability) or more (interest and familiarity) accessible to individuals with ASDs and those with more ASD symptoms, we hypothesized that better ToM and verbal ability would relate to more instances of AFP and RAO and that more interest in and familiarity with the
presented toys would relate to more instances of OS. Third, we hypothesized that ToM and verbal ability would show stronger relations to pretend quantity among individuals with fewer reported ASD symptoms compared to those with more symptoms. In an exploratory sub-hypothesis, we hypothesized that better ToM and verbal ability would result in more instances of AFP and RAO for those with fewer ASD symptoms compared to those with more symptoms. Finally, we hypothesized that levels of familiarity and interest in presented toys would show stronger relations to pretend quantity among individuals reported to have more ASD symptoms compared to those with fewer symptoms. In an exploratory sub-hypothesis, we hypothesized that more interest in and familiarity with the presented toys would result in more instances of OS for those with more symptoms of ASD compared to those with fewer symptoms.

Method

Participants

Participants were 31 children ranging in age from four to nine (\(M_{age}= 6.61, SD_{age}= 1.45\); 21 male). Participants were recruited using the University of Virginia Babypool database, which is comprised of names and numbers of local Charlottesville families willing to be contacted to participate in research (see Table 1 for demographic information).

Procedure

Each participant completed two visits. During their first visit, participants completed a measure of cognitive ability, including verbal ability (the Kaufman Brief-Intelligence Test 2; K-BIT-2; Kaufman & Kaufman, 2004). Parents completed a measure of ASD symptoms throughout their child’s development (Social Communication Questionnaire; SCQ; Rutter, Bailey, & Lord, 2005), a standard developmental history form, and a questionnaire regarding their child’s experience with and interest in specific toys.
At the beginning of the second visit (usually completed by the same research assistant as visit 1), ToM measure(s) were administered, followed by two 5-minute free-play sessions with toys. One play session involved a set of six conventional objects (toy car, female doll, male doll, pan, spoon, and bowl) and the other involved a set of six “junk” objects (piece of string, piece of cardboard, butter tub, margarine tub, empty spool, and empty matchbox), consistent with the work of Libby et al.’s (1998) study. Both conventional and junk objects were used given that “high structured” conventional objects have been shown to elicit more pretend play than “low structured” junk objects (McLoyd, 1983). Having both toy sets allowed for gathering more data regarding how children pretend with different toys, and allowed for estimation of each child’s “average” spontaneous pretending across situations that may tend to elicit more or less pretense. The order in which object sets were presented was randomized.

When introducing a toy set, the six objects were arranged in a semicircle around the child, ensuring that each toy had an equal opportunity of being selected (Servin, Bohlin, & Berlin, 1999). While placing the toys, the research assistant recited the following script (similar to McLoyd, 1983; Baron-Cohen, 1987): “I have some work to finish up. I will be back in a few minutes. Here are some toys for you to play with while I’m working. You can do anything you like with them”. After five minutes of free-play with the first set of objects, the next set was introduced in the same manner, and the procedure repeated. All play sessions were videotaped to allow for independent blinded subsequent coding of play content by separate raters.

**Measures**

**SCQ** (Rutter, Bailey, & Lord, 2005). This parent-report questionnaire is a widely-used screener for ASDs. This measure examines the presence or absence of specific ASD symptoms across a child’s development thus far, and was used to compare ASD symptom levels across
participants. The subscales of the SCQ are reciprocal interactions (example item: Does your child have any particular friends or a best friend?), communication (example item: Did your child ever spontaneously point at things around him/her just to show you things (not because she/he wanted them)?), and restrictive repetitive behaviors (example item: Did your child seem unusually interested in the sight, feel, sound, taste, or smell of things or people?; Rutter et al.). These subscales represent the three core deficits among individuals with ASDs. SCQ scores can range from 0 – 40 and scores above the threshold of 15 suggest a high likelihood of meeting criteria for ASD.

**Theory of Mind Scale (ToM Scale;** Wellman & Liu, 2004). This ToM Scale was used, because it is a standardized instrument designed to measure ToM development among TD individuals up through the mental age of five (Petersen, Wellman, & Liu, 2005). To maximize the sensitivity of these scales to diverse forms of theory of mind we used the original six-item version. The scale is comprised of six tasks, with each task increasing in level of difficulty. The tasks are: diverse desires, diverse beliefs, knowledge access, contents false belief, explicit false belief, and real-apparent emotion (Wellman & Liu, 2004). All six tasks were administered due to the finding that no task alone can account for the progressive development of ToM capabilities (Wellman & Liu, 2004). Participants were awarded zero points for incorrect answers and one point for correct. Total points awarded could range from 0 – 6.

**Strange Stories** (Happé, 1994). This advanced ToM battery is able to effectively measure ToM capabilities among TD individuals ranging in age from five to twelve years old (O’Hare, Bremner, Nash, Happé, & Pettigrew, 2009). There were ten stories, nine of which were measures of ToM ability, and one was a control story that only asked questions regarding physical events to ensure that there was no comprehension deficit. The stories were either read
aloud to the participant by the experimenter or the child read the story aloud. Administration of Strange Stories allowed for a deeper examination of a child’s ToM development by looking at whether or not the child was able to provide mental state explanations for why a story’s character might have acted a certain way (Happé, 1994). In order to test for higher levels of ToM, Strange Stories was administered to any participant that passed all six of the tasks presented in the Wellman and Liu (2004) ToM scale. Participants received a score of 1 (successfully provided the correct mental state explanation for a character’s behavior) or 0 (failed to provide correct mental state explanation) for each story, yielding overall scores ranging from 0 to 9 on this measure. Scores on the ToM Scale and Strange Stories were summed to create a composite ToM score for youth across the given age range, ranging from 0 to 15.

**K-BIT-2** (Kaufman & Kaufman, 2004). The K-BIT-2 is a measure of verbal IQ, non-verbal IQ, and Full Scale IQ scores. It produces standard scores ($M = 100$, $SD = 15$). The verbal IQ score was used to assess participant’s verbal ability and ensure that each participant was of normally-developed intelligence (IQ>85) and verbal ability (verbal IQ>85). The benefit of using the K-BIT-2 is that it is faster to administer than the more common Wechsler intelligence scales, while still measuring both verbal and nonverbal cognitive functions and providing a composite IQ score (Naugle, Chelune, & Tucker, 1993). Furthermore, research findings (Naugle et al.) indicate that scores from the K-BIT are comparable to the Wechsler scales in this age range, and construct validity was supported.

**Toy Survey.** Parents completed a survey in which they indicated their child’s interest in and familiarity with each of the toys presented during the play sessions. Parents rated interest and familiarity for all of the toys on a 1 (*not at all*) to 5 (*extremely*) scale. This resulted in 12 ratings of familiarity and 12 ratings of interest (given the 6 junk and 6 conventional toys). These ratings
were averaged in order to get an overall measure and gross approximation of each participant’s familiarity and interest with these sets of toys.

**Pretend Play Coding Scheme:** The pretend play coding scheme was designed to code for different types of play (No Play, Non-Symbolic Play, Pretend Play) and, if pretending, subtype (OS, AFP, RAO; Libby et al., 1998). No Play meant that a child was engaging in various types of behavior, but that he or she was not playing (e.g., not attending to objects, labeling objects, and looking at objects without acting on them). Any type of play that could not be categorized as one of the three types of pretend was coded as Non-Symbolic Play (e.g., piling and stacking objects, spinning objects, tossing objects, and banging objects). OS was defined as clearly using an object as if it was another specific item (e.g., using the doll as a spoon, using the car as a piece of food). AFP was defined as indicating the presence of features (i.e. color, size, abilities to talk) to an object that deviated from the true features an object actually had. These features could represent actual characteristics the object could have or imaginary characteristics (e.g., walking the female or male, and claiming the toy pan was hot). RAO was defined as acting as if an actual item that was not present in the room was in fact present. RAO required the behavior to involve the presented toys (i.e. could not involve talking to an imaginary friend), and be explicit such that the coder could clearly identify each absent object (e.g., eating imaginary food, stirring “something” in pan or bowl). These definitions were chosen to maximize clarity that target behaviors were observed, yielding conservative estimates of each play type.

Pairs of coders, blind to each other’s scores as well as the scores of the observed child on other measures, watched five-minute play sessions and coded the play in 15-second intervals, similar to the procedure of Libby et al. (1998). The coding team consisted of three undergraduate students naïve to study hypotheses. Over a two-month period, the team was trained by reading
the pretend play coding manual, attending weekly meetings, practicing coding using training
tapes, and reviewing and discussing specific training intervals. ICCs were calculated to assess
reliability according to standards specified by Cicchetti (1994). Coders were “certified” for
coding once their ratings, as a group, achieved acceptable scale level interrater reliability
(ICC(2,4) > .60) relative to master codes on 20 separate practice tapes of child interactions with a
variety of toys. Once coding began, reliability assessments were performed and discussed at
weekly meetings to minimize coder drift (Margolin et al., 1998).

All sessions were observed and double-coded for play type (no play, non-symbolic play,
pretend play) and, if pretending, subtype (OS, AFP, RAO; Libby et al., 1998), yielding 62 pairs
of ratings. For each 15-second interval, play was coded for the highest level of play in which
participants engaged (From lowest to highest; No Play, Non-Symbolic Play, Pretend Play). If
Pretend Play was selected, the subtype of pretend was also coded. Subtype of pretend was based
on which type of pretend best characterized the interval. Each participant could have engaged in
any type of play, or subtype of pretend, yielding scores of 0 to 20 for each play type and subtype,
given the 15-second intervals and the five-minute play session. We averaged across the two five-
minute play sessions (conventional and junk) in order to obtain a sample of spontaneous pretend
from situations shown to elicit lesser and greater quantities and qualities of pretend (McLoyd,
1983). This was then used to determine each child’s “average” ability to produce actions of
pretend. Interrater reliability ICC(1,2) was excellent for No Play (.85), Non-Symbolic Play (.83),
Pretend Play (.90), AFP (.89), and RAO (.97), and was good for OS (.63) (Cicchetti, 1994).

Data Analytic Plan

We first used descriptive analyses to assess amount of play types and pretend play
subtypes produced (No Play, Non-Symbolic Play, Pretend Play, OS, AFP and RAO), number of
ASD symptoms, verbal ability, ToM ability, and interest in and familiarity with the toys. We then used univariate correlations to explore relations between continuous variables. To test hypothesis 1, that children with more ASD symptoms would engage in less spontaneous pretend overall, fewer acts of AFP and RAO, and more acts of OS relative to lower scoring participants, we examined the correlations between play types and pretend subtypes compared to SCQ scores.

To test hypothesis 2, that both well-established (verbal and ToM abilities) and novel (interest and familiarity) factors would relate positively to amount of overall pretend play, we looked at the correlations between each factor and overall pretend. To examine the exploratory sub-hypothesis that better ToM and verbal ability would result in more instances of AFP and RAO and that more interest in and familiarity with presented toys would result in more instances of OS, we examined correlations between these predictors and the respective pretend subtypes.

Our third hypothesis was that ToM and verbal ability would show stronger relations to overall pretend among individuals with fewer ASD symptoms compared to those with more symptoms. The exploratory sub-hypothesis was that better ToM and verbal ability would predict more instances of AFP and RAO for those with fewer ASD symptoms compared to those with more symptoms. To test these hypotheses, we ran hierarchical multiple regressions predicting overall pretend, AFP, and RAO, with all predictors (ToM, verbal ability, interest, and familiarity) on step 1, and the interactions between each of these terms and SCQ scores on step 2. We then examined the interactions between ToM and verbal ability and SCQ scores. If an interaction was found, we used post-hoc probing to assess these effects (Holmbeck, 2002).

Our fourth hypothesis was that levels of interest in and familiarity with presented toys would show stronger relations to overall pretend among individuals with more ASD symptoms compared to those with fewer symptoms. The exploratory sub-hypothesis was that more interest
in and familiarity with the presented toys would result in more instances of OS for those participants with more symptoms of ASD compared to those with fewer symptoms. To test these hypotheses, we used the same overall pretend regression model as for the third hypothesis (and ran an identical model predicting OS), except we examined interactions between interest, familiarity, and SCQ scores. If an interaction was found, we again probed these effects. For hypotheses 1, 3, and 4, if significant effects were found, analyses were re-run replacing the SCQ score with each of its 3 subscales to determine which, if any, were driving the effect.

**Results**

**Descriptives**

Table 1 presents descriptive statistics. Participants displayed normal intelligence and verbal ability, and a wide range of interest in and familiarity with the toys. Participants also displayed developmentally-appropriate ToM ability. Participants ranged from having a history of 0 ASD symptoms to 13 ASD symptoms, just below the screening cutoff (15) for ASD. Play scores indicate that participants’ play was characterized by No Play about a third of the time, Non-Symbolic Play about half the time, and Pretend Play about a fifth of the time. However, most participants (+/- 1 SD) engaged in 0 to 7 instances of Pretend Play. In terms of subtypes of pretend, AFP was the most common and although OS was rare, it still made up roughly a quarter of the observed instances of Pretend Play.

**Univariate Correlations**

Table 2 presents correlations between continuous variables. Older participants had better ToM, fewer instances of No Play, and more instances of Non-Symbolic Play and AFP. Older participants also displayed less interest in the toys. Participants with higher overall IQ and verbal IQ had better ToM. More ASD symptoms predicted less familiarity with the toys. Better ToM
predicted less No Play and more AFP. More interest in the toys predicted more OS. Less No Play was correlated with more Pretend Play and Non-Symbolic Play. Subtypes of pretend play were not significantly correlated with each other.

Hypothesis 1 – ASD symptoms and Pretend

No significant correlations were found between SCQ scores and the amount of overall pretend produced or subtypes of pretend produced (Table 2).

Hypothesis 2 – ToM, Verbal Ability, & Interest and Familiarity and Pretend

ToM, verbal ability, and interest and familiarity were not shown to be predictors of overall pretend. However, Better ToM predicted more AFP to the toys and more interest in the toys predicted more OS with the toys. Familiarity and verbal ability were not shown to be predictors of any pretend play subtypes (Table 2).

Hypothesis 3 – ToM, Verbal ability, ASD symptoms and Pretend

There was no interaction between SCQ scores and ToM or verbal ability (all $p > .32$) in predicting overall pretend play, AFP or RAO.

Hypothesis 4 – Interest and Familiarity, ASD symptoms and Pretend

There was no interaction between SCQ scores and familiarity in predicting overall pretend play or OS (both $p > .56$), or between SCQ scores and interest in predicting overall pretend play ($p = .09$). However, there was an interaction such that the relationship between interest and OS differed based on participants’ SCQ scores (Table 3, Model 2). Post-hoc probing of this interaction suggests that, while there was a positive relationship between interest and OS when SCQ scores were low ($\beta = 6.86, p < .01$) and high ($\beta = 2.00, p < .01$), the relationship was stronger when SCQ scores were low (see Figure 1). Examining the three SCQ subscales, the interaction between interest and communication in predicting OS was marginally significant ($\beta =$
-2.50, \( p = .09 \) while the interactions between interest and reciprocal interaction (\( \beta = 1.97, p = .20 \)) and restrictive repetitive behaviors (\( \beta = -.41, p = .84 \)) were not.

**Discussion**

The current study examined ASD symptoms, as well as ToM, verbal ability, and interest in and familiarity with presented toys, as potential predictors of overall pretend and subtypes of pretend play spontaneously produced by TD children.

First, we hypothesized that measures of ASD symptoms would correlate with overall pretend and subtypes of pretend spontaneously produced, such that those with more ASD symptoms would engage in fewer actions of overall pretend, less attribution of false properties and reference to absent objects, and more object substitution. However, findings did not support this hypothesis, as ASD symptoms did not correlate with overall pretend or subtypes of pretend. Although previous studies have shown that the overall pretend and subtypes of pretend differ between TD individuals and individuals with ASD (Libby et al., 1998), these differences in pretend production were not seen when comparing TD children with higher number of ASD symptoms to those with lower scores. This suggests that although the number of ASD symptoms may vary among TD children, this variance alone did not result in differences in either the amount of overall pretend or subtypes of pretend produced. It may be that a sufficient quantity of ASD-related deficits is required before ASD symptoms are able to influence pretend ability.

Second, we hypothesized that established (ToM, verbal ability) and novel (interest in and familiarity with the presented toys) predictors of pretend would positively correlate with overall pretend. Additionally, we hypothesized that better ToM and verbal ability would result in more instances of attribution of false properties and reference to absent objects, and that more interest in and familiarity with the presented toys would result in more instances of object substitution.
While previous studies have found compelling links between ToM ability and pretend (Taylor & Carlson, 1997), the current study found that, while better ToM was not correlated with overall pretending, it was linked to more instances of attribution of false properties. This finding suggests that ToM ability might contribute more to engaging in and understanding certain types of pretend. Furthermore, it is interesting that this link was only found with attribution of false properties and not reference to absent objects or object substitution. When engaging in actions of attribution of false properties, children explore what else an object can do. Thus, both ToM and attribution of false properties involve ascribing novel capacities to people (i.e. ability to know something they might otherwise not) and to objects (i.e. the ability to do something that they might otherwise not). This suggests that rather than emanating from a basic metarepresentation ability (Leslie, 1987), both ToM ability and the ability to attribute false properties may stem from a common metaattribution ability.

Additionally, more interest in the toys was linked to more object substitution. Interest in the toys was explored as a novel predictor of pretend and pretend subtypes on the basis that children might be more motivated to engage in higher levels of play, like pretend, if they were more motivated to play with the presented toys. Past literature suggests that interest in objects drives the play behaviors in which children choose to engage (Hidi et al., 2004). The finding that interest correlated with more object substitution suggests that those with more interest in the presented toys may engage in more holistic exploration of them. Holistic exploration means that children explore the characteristics of the entire object (i.e. toy car) rather than focusing on individual features of that object (i.e. wheels). Object substitution may reflect such holistic exploration, as it is a subtype of pretend that involves exploring what else the whole object can be (in contrast to the other two types, which involve exploration of what else an object can do
[attribution of false properties] and what outside associations can be made [reference to absent objects]). This finding also indicates that interest in toys might play a previously-unexamined role in the development of the ability to pretend among TD children.

Thus, ToM and interest in the toys predicted distinct, hypothesized subtypes of pretend. These findings highlight the importance of directly examining and understanding different types of pretend. This, in conjunction with our finding that pretend subtypes were not significantly correlated with each other, further stresses the importance of dissociating subtypes of pretend.

Conversely, although previous literature has suggested a link between verbal ability and pretend among TD individuals (Lewis et al., 2000; Rutherford & Rogers, 2003) findings from the current study indicated that verbal ability did not predict overall pretend or subtypes of pretend produced. However, this previous literature has used much younger samples of TD participants, such that all of Rutherford and Rogers (2003) participants were younger than four years old and Lewis et al.’s (2000) ranged in age from one to six. Furthermore, our findings were consistent with previous literature that did not find a relationship between verbal ability and pretend production among certain samples, such as individuals with ASD (Rutherford & Rogers, 2003). This suggests that although verbal ability may relate to the ability to produce actions of pretend it is possible that verbal ability’s influence varies across populations and diminishes with age. Additionally, the current study used a more conservative measure to code pretend in order to ensure that coders were certain that each instance of pretend coded was in fact pretend. Thus, it is possible that the link between verbal ability and pretend disappears when more rigorous, conservative measures are used to assess pretend play (Lillard et al., under review).

Familiarity with the toys was also not shown to predict either overall pretend or pretend subtypes. While past literature has suggested that more familiarity with toys indicates better
knowledge and understanding of the characteristics of those toys (Hidi et al., 2004), the current study’s findings’ suggest that perhaps familiarity does not induce participants to engage in pretend with presented toys. That is, knowing what a toy is may not be sufficient to prompt greater exploration of it as an object with which to pretend.

Third, we hypothesized that the links between ToM, verbal ability and overall pretend produced would be stronger for those with fewer ASD symptoms compared to those with more symptoms. We also hypothesized that better ToM and verbal ability would result in more instances of attribution of false properties and reference to absent objects for those with fewer ASD symptoms compared to those with more symptoms. However, no significant interaction was found. Perhaps this was because the current study looked at ASD symptoms within TD children rather than conducting a direct comparison between TD children and children with ASDs. Again, it may be that it takes a sufficient quantity of ASD-related deficits before these ASD symptoms are able to highlight distinct differences in the way ToM and verbal ability influence production of pretend.

Finally, we hypothesized that the links between interest in and familiarity with toys and overall pretend produced would differ based on ASD symptoms, such that these relationships would be stronger for those with more ASD symptoms compared to those with fewer symptoms. We also hypothesized that more interest in and familiarity with the presented toys would result in more instances of object substitution for those with more symptoms of ASD compared to those with fewer symptoms. Although we again found no effect for familiarity, there was an interaction such that the relationship between interest and object substitution differed based on SCQ scores. Contrary to our hypothesis, while there was a positive relationship between interest and object substitution across the sample, this relationship was stronger when SCQ scores were
low. As noted by the Weak Central Coherence (WCC) theory, youth with ASD (as well as TD youth with more ASD symptoms) tend to demonstrate a detail-focused cognitive style, and have consequent difficulty seeing the “big picture” in various contexts (Happé & Frith, 2006). More holistic exploration (i.e. object substitution) with a toy may be seen as a play-based behavioral indicator of such “big picture” engagement. Thus, this finding is consistent with the WCC theory, as it suggests that individuals with more ASD symptoms might tend towards relatively more detail-focused engagement with toys rather than the holistic type of play reflected in object substitution. This is also consistent with recent work (Russell-Smith et al., 2012) indicating a relationship between detail-focused cognitive style and ASD-like impairments in social development in TD individuals. This result further highlights the importance of considering subtypes of pretend play when examining its relation to cognitive development, and future work should explore this intriguing link between object substitution and features related to ASD.

Additionally, post-hoc analyses indicated that developmental delays in communication, but not reciprocal interaction or restrictive repetitive behaviors, seemed to drive this relationship. This finding, along with the finding of no interaction between verbal ability and SCQ scores in predicting pretend, suggests that historical (rather than current) impairments in development of communication ability might prevent children from being able to connect their interest in toys to pretending in very sophisticated ways with the toys (i.e. object substitution). However, while the interaction effect for communication was larger than either reciprocal interaction or restrictive repetitive behaviors, it is important to note that the interaction was only marginally-significant. Thus, it appears that aggregate ASD symptoms appear to best account for this effect.

Limitations & Future Directions

While this study provided a novel inquiry into predictors of spontaneous pretend play in
TD children, there are several limitations that bear discussion. First, while this study examined ASD symptoms in TD youth, it lacked a “true” ASD sample or sub-sample. Thus, it cannot strongly support any contention that observed findings relate to ASD symptoms and not other factors (e.g. delays in communication development) to which the employed measures may be sensitive. Likewise, if deficits in pretend play are truly specific to those who meet diagnostic criteria for ASD (i.e. are pathognomonic), then this study would fail to detect the hypothesized severity-related effects, even if they were present. Thus, future studies should explore the same predictors (ToM, verbal ability, familiarity and interest) with an ASD sample and TD controls.

Second, we used a measure that provided only a rough approximation of past history of ASD symptoms. The SCQ is a measure of historical ASD symptoms, not present. Thus, future studies should employ continuous measures of contemporaneous ASD symptoms, such as the Autism Spectrum Quotient –Children’s Version (AQ-Child; Auyeung, Baron-Cohen, Wheelwright, & Allison, 2008) to obtain a current measure of ASD symptoms.

Third, the pretend play coding scheme was a novel system for coding pretend play and play type. While the system proved to be reliable and rigorous, it is difficult to make direct comparisons to past studies that also looked at production of pretend play but used different measures. Future studies should use similar systems when coding actions of pretend play and play type with toys to determine if similar findings occur. Fourth, the system we created for coding pretend play and play type also used a very conservative estimate of pretend. We chose to take a more conservative approach to coding pretend to ensure that coders were absolutely certain an action with the toys was pretend before coding it. However, by taking this more conservative approach, it is possible that certain instances of pretend were missed.

Finally, when measuring interest in and familiarity with the different toys, we aggregated
across and did not distinguish the toys. Similarly, with the two play conditions (junk and conventional) we aggregated across the play sessions and did not distinguish between the two conditions. This aggregation may have obscured meaningful differences that otherwise would have been discovered. Specifically, given the important role that interest in toys seems to play in influencing object substitution, future studies should examine the specific toys in which children are interested, and compare that to the specific toys with which they pretend.

Clinical & Theoretical Implications

This was the first study to examine the relation between ASD symptoms in TD children and observed spontaneous pretend play. It was the first to examine the relation between novel predictors (interest in and familiarity with presented toys) and pretend play. Finally, it was one of the first to carefully consider predictors of differences in subtypes of pretend.

One of the strengths of the current study was that it presented a new system for coding pretend play and play types with different toys. This coding system, while novel, proved to be a rigorous, conservative, reliable measure of play type using blinded raters (a crucial, under-represented approach in this literature; see Lillard et al., under review), and may prove to be a useful measure for future research studies aiming to code play type with objects. Indeed, based on the methodological strengths of this measure, these results can be seen to shed new light on the prediction of pretend.

This study suggests that ASD symptoms are not, on their own, a predictor of spontaneous play with toys in TD children. This finding suggests that use of play-based evaluation measures (e.g. the Autism Diagnostic Observation Schedule; Lord et al., 1999) may not yield sensitivity or continuity in TD populations. It also suggests that abnormal play behaviors may be truly unique to those meeting criteria for ASD, and may thus provide a valuable indicator of deficits and
treatment response within this population.

This study also suggests that supposedly established predictors of pretend (verbal ability and ToM) do not appear to relate to pretending when a more rigorous measure is applied, indicating that these relationships in previous studies may be due to experimenter effects (as suggested by Lillard et al., under review). On the other hand, that ToM related to a theoretically-similar subtype of pretend (attribution of false properties) suggests that pretending may be a more complex, multifaceted construct, and that consideration of subtypes may provide a better window into play.

Additionally, this study suggests that interest in toys might be an important predictor of certain subtypes of pretend, specifically object substitution, that until now have gone unexamined. Furthermore, the finding that interest was a strong predictor of object substitution among TD participants, and that this relationship differed based on number of ASD symptoms, suggests that interest might prove to be a predictor of pretend among individuals with ASD (albeit to a lesser degree than in TD youth). Thus, future studies should explore whether interest is a predictor of pretend among individuals with ASDs.

Finally, that interest in toys predicts object substitution suggests possible implications regarding how certain types of pretend might develop among TD children. For instance, interest in an object might lead to holistic exploration of that object, which in turn may result in a child exploring (and pretending) what else that object can be (object substitution). Findings regarding the subtypes of pretend provide deeper insight into the factors that influence the development of the ability to pretend. By gaining a better understanding of what factors contribute to the development of pretend among TD children, we are better able to understand why some
individuals (such as those with ASD) might have difficulty with certain types of pretend and how pretend might develop differently among these individuals.
References


Cicchetti, D. V. (1994). Guidelines, criteria and rules of thumb for evaluating normed and


Circle Pines, MN: AGS Publishing.


Table 1

*Participant Descriptive Statistics (N = 31)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SD)</th>
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ToM = Combined Theory of Mind score (Theory of Mind Scale plus Strange Stories).
Table 2
Correlations among Continuous Variables

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<th>ToM</th>
<th>FAM</th>
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<th>NP</th>
<th>NSP</th>
<th>PP</th>
<th>PP-OS</th>
<th>PP-AFP</th>
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<td>0.39*</td>
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Table 3

**Hierarchical Multiple Regression Predicting Object Substitution Subtype of Pretend Play**

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<td>$se$ $B$</td>
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*p < .05, **p < .01, ***p < .001. SCQ = Social Communication Questionnaire. IQ – V = Verbal IQ. TOM = Theory of Mind. FAM = Familiarity. INT = Interest. SCQ x IQ – V = Interaction between Verbal IQ and SCQ. SCQ x TOM = Interaction between Theory of Mind and SCQ. SCQ x FAM = Interaction between familiarity with toys and SCQ. SCQ x INT = Interaction between interest in toys and SCQ.
Figure 1. **p < .01. SCQ = Social Communication Questionnaire. Relationship between level of interest in toys and observed instances of object substitution based on high or low scores on the SCQ (i.e. history of many versus few ASD symptoms). While there was a positive relationship between interest and quantity of object substitution for both those with a history of many and few ASD symptoms, this relationship was stronger for those with a history of fewer ASD symptoms. Note: Values below 0 are model-predicted values. It is not possible to exhibit fewer than 0 instances in an observed session.