An investigation of pretend play, mental state terms and false belief understanding: In search of a metarepresentational link

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The aim of this study was to investigate the association between false belief comprehension, the exhibition of pretend play and the use of mental state terms in pre-school children. Forty children, aged between 36 and 54 months were videotaped engaging in free play with each parent. The exhibition of six distinct acts of pretend play and the expression of 16 mental state terms were coded during play. Each child was also administered a pantomime task and three standard false belief tasks. Reliable associations were also found between false belief performance and the pretence categories of object substitution and role assignment, and the exhibition of imaginary object pantomimes. Moreover, the use of mental state terms was positively correlated with false belief and the pretence categories of object substitution, imaginary play and role assignment, and negatively correlated with the exhibition of body part object pantomimes. These findings indicate that the development of a mental state lexicon and some, but not all, components of pretend play are dependent on the capacity for metarepresentational cognition.

The importance attributed to the role of pretend play in young children’s social and cognitive growth has ensured that it remains a constant focus of research in developmental psychology. Interest in this field grew following a proposal by Leslie (1987) which linked the pre-school child’s ability to engage in pretend play with the development and elaboration of the mental state lexicon and the subsequent emergence of a theory of mind. The foundation upon which Leslie bases his argument is that each of these processes has a common dependence on the cognitive capacity to ‘metarepresent’. This contention has fuelled an ongoing theoretical debate over the last decade, the implications of which have relevance not only to normal populations, but also to an understanding of the deficits associated with autism and other clinical populations (Baron-Cohen, 1989; Baron-Cohen, Leslie, & Frith, 1985; Doody, Goetz, Johnstone, Frith, & Cunningham Owen, 1998; Happe & Frith, 1996; Muris, 1998).

Although emerging in the second year of life, it is over the course of the child’s third year that the inclusion of pretence becomes consolidated into the child’s play repertoire. Typically, pretend play increases linearly in both frequency and complexity as simple

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behaviours directed towards the self translate to more sophisticated actions involving sequences and object substitution (Belsky & Most, 1981; Fenson & Ramsey, 1980; Nicolich, 1977; O’Reilly & Bornstein, 1993; Ruff, 1984; Ungerer, Zelazo, Kearsley, & O’Leary, 1981). During this time the meanings associated with pretend play become augmented by a differentiation from real life conditions and immediately present situations, persons and objects (Belsky & Most, 1981). With the support of mental transformations an object can be used to represent a different object, inanimate objects can be treated as if they are real, and imaginary objects or people can be created that have no tangible referents in the immediate environment. By the fourth year, pretence has evolved into the creation of elaborate fantasies that involve imaginary characters and animals (Hellendoorn, 1994; Samuels & Taylor, 1994; Taylor, Cartwright, & Carlson, 1993). This maturational elaboration in pretence capacity exemplifies the young child’s increasing ability to perform non-literal mental transformations.

It is the non-literal nature of pretence that presents a challenge to developmentalists as it emerges during the child’s second year, while he or she is still constructing his or her comprehension of the world. The child is able to concurrently build a corpus of knowledge regarding what objects are, what they do etc., and to engage in pretend play, where the very objects and actions the functions of which he or she is becoming aware are treated in a fashion which may be in direct contrast to their logical purpose. The question therefore arises of how the young child’s literal and fantasy worlds can co-exist.

Leslie (1987, 1988) proposes that in order for the child to perform the non-literal mental transformations typical of pretend play he or she must first be able to simultaneously appreciate two alternative and contradictory models of reality (e.g. ‘This banana is a telephone’). This simultaneous appreciation is dependent on the metarepresentational system, a cognitive mechanism which functions by ‘decoupling’ the pretend world from the real world such that the child is able to internally represent the external environment in a manner that prevents the literal world from being corrupted by what is represented in the fantasy world.

Determining the means by which the child may construct a mental state lexicon presents a similar challenge. Leslie (1987) maintains that the verbalization of mental states depends on the prior establishment of the metarepresentational system as neither language learning (where conceptual understanding must necessarily precede linguistic expression) nor perceptual evidence (given that mental states are unobservable) can enable the child to invent the idea of mental states. He thus argues that through the ability to appreciate dual representations first evident in pretence, the pre-school child begins to relate metarepresentational expressions to the language of thought. Furthermore, it is this capacity for metarepresentational reasoning which the child subsequently exploits when constructing a theory of mind.

The term ‘theory of mind’ refers to a kind of ‘commonsense understanding’ of the world (Flavell, Flavell, Green, & Moses, 1990; Leslie, 1990) that involves the appreciation that oneself and others are beings who possess a range of mental states such as thoughts, beliefs and desires, and that it is these mental states that determine behaviour (Aastington, Harris, & Olson, 1988). People act towards the world not as it really is, but how they perceive or believe it to be. Based on this reasoning, tasks used to assess understanding of ‘false-beliefs’ in others have become the standard tool used to index the child’s developing theory of mind. Success on these tasks depends on the child’s ability to distinguish
between a mental representation (the belief of X that an object remains where it had been left) and the actual state of the world (the object, unbeknown to X, has been moved).

Although some controversy remains, it is widely acknowledged that it is between 3 and 4 years of age that the critical set of abilities contributing to the appreciation of belief and, hence, to the development of a theory of mind begin to emerge (Chandler, Fritz, & Hala, 1989; Chandler & Hala, 1994; Flavell et al., 1990; Gopnik & Astington, 1988; Moses & Flavell, 1990; Siegal & Beattie, 1991; Wimmer & Perner, 1983). In contrast, children typically begin to engage in pretend acts from 12- to 18 months (Belsky & Most, 1981; McCune, 1995). In response to this apparent asynchrony in development, Leslie (1987, 1988) claims that pretend play is in fact an early manifestation of the requisite abilities necessary for the development of a theory of mind. Based on this premise he also argues that all pretence is metarepresentational. Leslie’s thesis thus implicates the child’s metarepresentational mechanism as being responsible for the emergence of pretend play, underwriting the acquisition of a mental state lexicon, and the ensuing development of a theory of mind.

In contrast to Leslie’s (1987) proposal, a growing body of literature maintains that pretence does not require the cognitive ability to metarepresent (e.g. Harris, 1991; Harris & Kavanaugh, 1993; Harris, Lillard, & Perner, 1994; Lillard, 1993; Perner, 1991). Despite this, there has been no exploration of the association between pretend play, the mental state lexicon and false belief ability in pre-school children. Moreover, the results from those few studies that have explored the association between pretence and false belief are conflicting in their support of the explicitness of Leslie’s theory.

Youngblade and Dunn (1995) reported an association between role-oriented pretend play in 33-month-old children and their success in passing a series of false belief tasks seven months later. This association was found only when role play did not involve a verbal definition of the relevant role. Astington and Jenkins (1995) found a similar association between the oral explication of role play (e.g. ‘You be mummy’) and successful false belief comprehension in their sample of children aged from 37 to 65 months. Congruent with the metarepresentational account, Astington and Jenkins reported a further association between false belief comprehension and the frequency with which children make joint proposals (reference to both self and the play partner within an act of pretence). This association is interpreted as indicating that children who offer an explicit joint plan demonstrate knowledge that others may not share their understanding of the pretend situation.

However, neither Astington and Jenkins (1995) nor Youngblade and Dunn (1995) found an association between false belief comprehension and overall levels of pretend play. In contrast, Suddendorf and Fletcher-Flinn (1996) did find such a relationship. Unfortunately their result is difficult to interpret as the individual components which comprise pretend play (such as role play and object substitution) were not assessed, and it may have been the occurrence of individual components of pretence that determined the result. Hence, it may be that some, but not all, pretend play depends on the child’s metarepresentational understanding.

The proposal that only certain acts of pretence require metarepresentational ability is supported in two recent studies. Suddendorf, Fletcher-Flinn, and Johnston (1999) administered two standard false belief tests and a task designed to index pantomime ability to 40 children aged between 36 and 58 months. The pantomime task, derived
from Overton and Jackson (1973), involved requesting the participants to engage in six distinct behaviours, each using an object that was not physically present (e.g. to brush teeth with a toothbrush). A significant association was found between false belief performance and the use of ‘imaginary object’ (IO) pantomimes (e.g. the child acts as if he or she were really holding a toothbrush) but not between false belief performance and the use of ‘body part as object’ (BPO) pantomimes (e.g. the child uses his or her finger as a substitute for a toothbrush). The authors argue that these results support the notion that the exhibition of IO, but not BPO, pantomime depends on the child’s ability to metarepresent. Taylor and Carlson (1997) assessed 3- and 4-year-old children’s theory of mind development (as indexed by a series of 13 tasks, including false belief) and their involvement in fantasy/pretend play. They found that of 20 fantasy/pretend play measures, variance in theory of mind was best accounted for by three variables: the performance of imaginary object pantomimes, the use of blocks as props in pretend play rather than as functional items, and the ability to impersonate another person. Together, these findings support the view that only certain aspects of the pre-school child’s pretence are reliant on their developing metarepresentational ability.

Research investigating the relation of the child’s mental state lexicon to his or her metarepresentational ability is similarly inconclusive. McCune (1995) has demonstrated that distinct stages of both pretend play and 2-year-olds’ language lexicon emerge concurrently, supporting the notion of a dual dependence on an underlying mechanism of mental representation. Moreover, the child’s mental state lexicon has its most rapid development during his or her third year (Bretherton & Beeghly, 1982; Shatz, Wellman, & Silber, 1983), and it is at this age when pretend play is subject to a similar rate of growth (Belsky & Most, 1981; Fenson & Ramsey, 1980; Nicolich, 1977; O’Reilly & Bornstein, 1993; Ruff, 1984; Ungerer et al., 1981). Furthermore, the ability to successfully pass tasks of false belief also emerges during the third year. There is, however, a paucity of work that has investigated the metarepresentational reliance of the child’s use of mental state terms.

Unfortunately, none of the studies reviewed so far has attempted to capture the richness and complexity of children’s pretend play. It is thus of interest to examine whether pre-school children who possess a theory of mind, as indexed by standard false belief tasks, engage in different forms of pretend play to those who do not. Based on Leslie’s (1987, 1988) suggestion that the young child’s ability to use mental state terms is linked to his or her capacity to metarepresent, it is of further interest to examine whether pre-school children who verbalize mental states differently also exhibit differential success on tasks of false belief and/or different forms of pretend play.

The aim of the current study was to explore the association between metarepresentational ability and discrete types of pretence and the use of mental state terms in pre-school children. It has been suggested that metarepresentation might only become evident in joint play whereby the child becomes involved in a symbolically transformed world that is concomitantly dependent on a common frame of reference (Jarrold, Carruthers, Smith, & Boucher, 1994; Verba, 1993). Therefore, the relation of false belief comprehension and pretend play exhibition should be more apparent when the child engages in dyadic play where the perspective of another needs to be accounted for. It is, however, unclear with whom children play most collaboratively and with whom more pretence is likely to occur. Therefore, it was decided to observe children in play with their most constant and
experienced play partners – their parents. In addition to relying on naturalistic observation of pretence, an index of the child’s ability to engage in pretend play was obtained via administration of the pantomime task implemented by Suddendorf et al. (1999). Metarepresentational ability was measured using three standard false belief tasks (Bartsch & Wellman, 1989; Lewis & Osborne, 1990; Wimmer & Perner, 1983).

Following Leslie’s (1987, 1988) thesis, it was hypothesized that the ability of preschool children to pass tasks of false belief would be positively associated with their exhibition of each of the discrete types of pretence, their exhibition of both BPO and IO pantomime, and the frequency with which they use mental state terms. It was further hypothesized that the frequency with which pre-schoolers use mental state terms would be positively associated with their exhibition of pretend play.

Method

Participants

In all, 40 children (20 male, 20 female) aged between 36 and 53 months old (X age = 44.1 months, SD = 4.87) participated in this study with their mothers and fathers. All children spoke English as their preferred language. The majority of children came from middle SES families.

The majority (up to 90%) of participants were recruited from the Child Register at the La Trobe University Child Development Unit. The Child Register is comprised of a list of names of children whose mothers have expressed interest in participating in child development research. The remaining children were recruited from crèches and child-care centres located in the vicinity of the university. As prior research had demonstrated that sibling interaction can impact on both pretence and theory of mind performance (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Perner, Ruffman, & Leekam, 1994; Youngblade & Dunn, 1995) it was initially intended that only children without siblings would be assessed. However, because of the difficulty of recruiting fathers into the study, the sample was extended to include all children. Therefore, in the final sample no exclusion criteria were applied.

Procedure

Each child attended two sessions (one with each parent) of approximately one hour’s duration each at the La Trobe University Child Development Unit. Of the children, 18 attended the first session with their fathers and 22 attended the first session with their mothers. The sessions were conducted approximately one week apart (X days apart = 9.35, SD = 5.90).

Each session was conducted in a carpeted playroom (4.00m × 3.40m) equipped with a basket filled with toys chosen to encourage pretend play. Both sessions were videotaped using two wide-angle lens cameras. In the first session the parent was asked to complete a general questionnaire containing details about family demographics, family income and the number of hours per week spent in child care.

The child was asked to play with his or her parent for a short time and parents were asked to play with their child as if they were at home. Following 40 min of play the experimenter returned to the play room and administered three false belief tests (two in the first session, one in the second) and a pantomime production task (in the first session) to the child. The three false belief tasks were counterbalanced and presented in the form of a game. The child was seated at a small table opposite both the experimenter and the cameras during administration of these tasks.

False belief tasks. Three measures of false belief were administered to each child using puppets. The first task was based on a procedure described by Bartsch and Wellman (1989), the second on the original paradigm designed by Wimmer and Perner (1983), and the third by Lewis and Osborne (1990).

Task 1: The Band-Aid task. The child was simultaneously presented with a standard Band-Aid box and an identically sized, but unmarked, opaquely coloured box. The false belief premise was established by
asking the child to choose the box he or she thought contained Band-Aids. The child was then shown that the Band-Aids were in the unmarked box and introduced to a hand puppet, ‘Tigger’, who ‘fell over’ and needed a Band-Aid. The false belief question ‘Where do you think Tigger will look for a Band-Aid?’ was then administered. The child was also asked an attribute-to-self false belief question, ‘Where did you first think the Band-Aids were at the start?’ followed by a reality control question, ‘Where are the Band-Aids really?’ All children were required to pass the reality question before their false belief responses were scored.

**Task 2: The Pooh-Bear task.** A closed wooden box and an open plastic bowl of similar dimensions were placed on the table. The child was introduced to a ‘Winnie-the-Pooh’ puppet who was enjoying a snack from his honey-pot, which was then placed in the bowl prior to his departure. ‘Piglet’ then entered, took the honey-pot from the bowl, ate from it, and placed it in the closed box. The child was asked two control questions to establish his or her memory of the story: ‘Where is the honey really?’ and ‘Where did Pooh put the honey?’ If either question was answered incorrectly, the vignette was re-enacted, with emphasis in the story placed on the incorrectly answered question(s). If the child did not correctly answer the control questions following three re-enactments, the false belief question was not administered. If these control questions were answered correctly, the experimenter proceeded with the task. The child was reintroduced to Pooh, and told that he was hungry and asked the false belief question, ‘Where do you think Pooh will look for the honey?’

**Task 3: The Smarties task.** The child was shown a closed Smarties tube, in order to establish the false belief premise, asked what was inside. He or she was then offered the tube, which contained pencils. The cover was placed back on the tube and the child was asked the control question, ‘Can you remember what is inside the tube?’ If the child remembered correctly the task proceeded; if not, the true contents of the tube were re-established and the control question readministered. The child was then asked the attribution-to-self false belief question, ‘What did you think was in the tube before I took the lid off?’ and the attribution-to-other false belief question, ‘What will Tigger think is in the tube before the lid is taken off?’ Once again, all children were required to correctly pass the control question before their false belief responses were scored.

A composite theory-of-mind score was obtained by combining all correct responses to the attribution-to-self and attribution-to-other questions across the three tasks. Past research has shown that both attribution-to-self and attribution-to-other questions are passed at the same age (Gopnik & Astington, 1988). Each child could obtain a theory-of-mind score ranging from 0 to 5.

**Pantomime task.** The pantomime task, designed by Overton and Jackson (1973), required the child to demonstrate his or her ability to mime the use of six different items (comb, toothbrush, cup, hammer, knife, scissors). The child was first required to successfully identify each of the items that were then placed out of sight. The experimenter instructed the child that he or she was to pretend (or make-believe) to use the items and presented a pretend item, saying, for example, ‘Here is the toothbrush. Now show me how you would brush your teeth.’ The comb and cup were similarly presented. The remaining items were presented as follows: hammer – the child was presented with a block of wood with a nail protruding from it and asked, ‘Show me how you would hammer in this nail if I gave you the hammer’; knife – a foam block was presented and the child asked, ‘Show me how you would cut this block if I gave you the knife’; scissors – a piece of paper was presented and the child asked, ‘Show me how you would cut this piece of paper if I gave you the scissors’.

The child’s response was scored separately as being an imaginary object (IO) pantomime (e.g. the child acted as if he or she were really holding a toothbrush), a body part as object (BPO) pantomime (e.g. the child used his or her finger to substitute for a toothbrush), or no pantomime (the child failed to produce a pantomime act). Each child was thus given a score for the total number of IO and the total number of BPO pantomimes exhibited.

**Pretend play behaviours.** The pretence categories of interest were coded continuously off videotapes of the play sessions using The Observer software package (Noldus Information Technology, 1995) which served
to transform a standard PC keyboard into an event recorder. Play coding was conducted for 30 min following a 10-min warm-up period.

The categories of pretend play were derived from the literature (Austing & Jenkins, 1995; Lillard, 1993; Ungerer & Sigman, 1981; Youngblade & Dunn, 1995) and from preliminary observations of children’s play. A pretend play bout was coded if one of the following six non-literal behaviours was exhibited by the child. Play categories B, C and E were coded for the frequency and duration of occurrence, and categories A, D and F were coded for frequency only. Play categories were not mutually exclusive in that one category could be coded simultaneously with another (e.g. having a ‘tea party’ while pretending to be ‘mum’).

(A) **Object substitution.** The child either designated an object as being another (e.g. picked up a pencil and said, ‘This is a dagger’) or used an object in a manner other than its normal use (e.g. used a cup as a telephone).

(B) **Imaginary play.** The child created objects or people having no physical representation in the immediate environment (e.g. the child had a ‘tea party’ with his or her parent, pouring non-existent milk and tea; had a prolonged conversation on the toy phone).

(C) **Attribution of animacy.** The child attributed real-life properties to an inanimate object such as talking for a doll or talking to a doll as if expecting a response.

(D) **Role assignment.** The child verbally and explicitly assigned a pretend role to him- or herself, an object (e.g. the doll) or his or her parent (e.g. ‘You be/are Batman’). It was not required that the child participate in the activity nor the role be adopted following assignment.

(E) **Role play.** The child enacted a specific role (e.g. mother feeding a baby). It was not necessary for the child to verbalize the role that was being adopted.

(F) **Joint proposals.** Joint proposals were coded when the child made reference to him- or herself and the parent or other within the same turn (e.g. ‘You have to pour me my tea’; ‘Let’s have dinner now’). Joint proposals were only scored during a bout of pretend play.

Inter-rater agreement was assessed using a randomly selected sample of five subjects. Intraclass correlation coefficients (Shrout & Fleiss, 1979) ranged between .90 and 1.0 for the occurrence of all play categories.

**Mental state terms.** As with the play categories, coding of mental state terms was conducted for 30 min off the videotapes following the 10-min warm-up period. The frequency of utterances made by the child which contained one or more of 16 cognitive mental state terms (derived from Shatz et al., 1983; see Table 1), in either the present or past participle, were coded. References to internal states that were not considered to be indications of cognitive awareness (such as expressions of moral judgment and obligation, perception, physiology, affect, volition and ability) were not coded (Bretherton, McNew, & Beeghly-Smith, 1981). Furthermore, any reference to one of the 16 mental state terms which was embedded in an incomplete utterance, was an immediate repetition of the parent’s previous utterance, or to which more than one interpretation could be assigned, was not coded. On those occasions when the child made an exact, immediate repetition of his or her own utterance, only the initial reference was coded (e.g. the term ‘pretend’ embedded in ‘Let’s pretend it’s dead, let’s pretend it’s dead’ was coded only once). Direct responses to parental questions such as ‘What do you think this is?’ with the reply ‘I think it’s a cow’ were also excluded from coding. If more than one reference was made within a single utterance, each individual reference was coded independently (e.g. ‘I know we can pretend to eat that’).

Past research has demonstrated that references to mental state terms in the spontaneous speech of preschoolers frequently takes the form of idiomatic or conversational expression without specifically indicating actual mental states (Shatz et al., 1983; Tager-Flusberg, 1992). Therefore, coding was based on Tager-Flusberg’s (1992) modification of the scheme developed by Shatz et al. (1983) which enabled a distinction to be made between an actual reference to mental states from idiomatic and conversational uses. Thus, the articulation of each mental state term was assigned to one of the following three categories:

**Idiomatic use.** The expression ‘I don’t know’, without a predicate complement, occurs frequently in children’s speech, functioning as an idiomatic negative expression (Shatz et al., 1983). Preliminary analysis of the current data also revealed that the phrase ‘I think so’ occurred similarly. As interpretation of both these statements is difficult it was decided to code them both as idioms. If the idiomatic expression was
Table 1. Verbs referring to mental state terms (derived from Shatz et al., 1983)

<table>
<thead>
<tr>
<th>know</th>
<th>remember</th>
<th>bet/reckon</th>
<th>wish</th>
</tr>
</thead>
<tbody>
<tr>
<td>think</td>
<td>guess</td>
<td>hope</td>
<td>figure</td>
</tr>
<tr>
<td>mean</td>
<td>pretend</td>
<td>trick</td>
<td>believe</td>
</tr>
<tr>
<td>forget</td>
<td>dream</td>
<td>wonder</td>
<td>understand</td>
</tr>
</tbody>
</table>

followed by a clarifier that contained a mental state term (e.g. ‘I don’t know, do you know what it is?’), the clarifying expression was coded but not the idiomatic expression.

**Conversational use.** The use of a mental state term may also function to maintain discourse rather than exemplifying the child’s comprehension of either the state or its meaning. Therefore, a number of conversational uses of mental state terms were coded into this category. These included references to mental states that (1) marked the degree of certainty the speaker had when making an assertion (e.g. ‘I know what this is for’; ‘What do you think?’), (2) directed the interaction (e.g. ‘Remember where the sword is?’), or (3) clarified either a past or present utterance (e.g. ‘The ball, I mean the car’).

**Mental states.** Mental states were coded when the utterance referred to the thoughts, memories or knowledge of the child, the parent or a third person (including a doll). Assessment was made based on the meaning of both the following and preceding sentences verbalized by the child and/or the parent. Examples are: ‘They forgot to bath’; ‘She thought I was asleep’; ‘Let’s pretend it’s bacon’.

**Results**

As preliminary analysis indicated that the indices of duration and frequency did not provide differential information regarding any of the play variables of interest, all analysis was conducted on the frequency data as this was the common measure taken across all pretend play categories. Furthermore, as no significant differences were revealed in the play behaviour of the children with either parent, data from both sessions was collapsed in further analysis. In addition, inspection of the overall frequency of each play category revealed that joint proposals were exhibited by too few children and were excluded from further analysis.

Of the 40 children, nine failed two or more control questions on the three tasks of false belief and were therefore excluded from all analysis. These children did not differ from the 31 children remaining in the sample on any of the variables. Of these 31 children, five failed one control question in one of the three tasks. In order to gain a comparable index of false belief success while retaining as many participants as possible, the score for each child that successfully passed control questions on at least two of the three tasks was converted to a pro-rata theory of mind score by dividing the number of attribution questions correctly answered by the number of attribution questions asked. Data in all subsequent analysis was thus conducted on 31 children. Of these 31 children, seven passed all of the false belief questions and seven failed all. The means, standard deviations, medians and ranges for these 31 children on each of the variables of interest are presented in Table 2. This table reveals the enormous variability inherent in the data.

As a result of the reduced sample size and the pretence categories being typified by low frequencies of occurrence, and the variability of the data, all subsequent analysis was conducted using non-parametric statistics. Correlational analysis using the Spearman’s Rho Correlation Coefficient between the demographic variables of age and time spent in
child care, and the dependent variables of interest revealed that age was significantly associated with the variables of theory of mind and IO Pantomime (see Table 3). Chronological age was thus partialled out in all subsequent analyses. Furthermore, time spent in child care was significantly associated with mental states and was thus partialled out in further analysis involving the latter variable.

Following standard statistical procedure (Howell, 1992), as a result of the directional hypotheses outlined in the introductory text, one-tailed tests were used in the remaining analyses. As can be seen in Table 4, the correlation analyses revealed a significant positive relationship between children’s theory of mind scores and the frequency with which they exhibited the pretend play acts of both object substitution and role assignment. No relationship was found between the theory of mind scores and the play categories of imaginary play, the attribution of properties or role play. In addition, performance of IO, but not BPO, pantomimes was positively correlated with theory of mind. Furthermore, the use of mental states was positively correlated with theory of mind and the pretence categories of object substitution, imaginary play and role assignment, and negatively correlated with the exhibition of BPO pantomimes. No associations were found between the idiomatic and conversational use of mental state terms and any of the other dependent variables.

Table 2. Mean, standard deviation, median frequency of occurrence and ranges for measures of pretend play, pantomime and mental state terms, and mean pro-rata score for theory of mind (N = 31)

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Median</th>
<th>Range</th>
</tr>
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<tr>
<td>Pretend Play Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Object Substitution</td>
<td>2.04</td>
<td>2.30</td>
<td>2.0</td>
<td>0.0–8.0</td>
</tr>
<tr>
<td>Imaginary Play</td>
<td>3.46</td>
<td>3.41</td>
<td>3.0</td>
<td>0.0–12.0</td>
</tr>
<tr>
<td>Attribution of Animacy</td>
<td>1.14</td>
<td>1.59</td>
<td>1.0</td>
<td>0.0–6.0</td>
</tr>
<tr>
<td>Role Assignment</td>
<td>2.66</td>
<td>3.69</td>
<td>1.0</td>
<td>0.0–13</td>
</tr>
<tr>
<td>Role Play</td>
<td>.82</td>
<td>1.19</td>
<td>.0</td>
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<tr>
<td>Pantomime Measures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO Pantomime</td>
<td>1.68</td>
<td>1.51</td>
<td>2.0</td>
<td>0.0–5.0</td>
</tr>
<tr>
<td>BPO Pantomime</td>
<td>3.39</td>
<td>1.96</td>
<td>4.0</td>
<td>0.0–6.0</td>
</tr>
<tr>
<td>Mental State Terms</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idiomatic Use</td>
<td>2.55</td>
<td>3.12</td>
<td>1.0</td>
<td>0.0–12.0</td>
</tr>
<tr>
<td>Conversational Use</td>
<td>4.19</td>
<td>4.24</td>
<td>2.0</td>
<td>0.0–18.0</td>
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<tr>
<td>Mental States</td>
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<td>4.25</td>
<td>3.0</td>
<td>0.0–19.0</td>
</tr>
<tr>
<td>Theory of Mind</td>
<td>0.52</td>
<td>0.38</td>
<td>0.6</td>
<td>0.0–1.0</td>
</tr>
</tbody>
</table>

Discussion

The inference deduced from Leslie’s (1987, 1988) theory is that children who demonstrate heightened success in answering false belief questions should also demonstrate a greater
Table 3. Spearman’s rank correlation coefficients between demographic variables of age, and time spent in childcare and measures of pretend play, pantomime, mental state terms and theory of mind (N = 31)

<table>
<thead>
<tr>
<th>Pretend Play Measures</th>
<th>Age</th>
<th>Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Object Substitution</td>
<td>.00</td>
<td>.10</td>
</tr>
<tr>
<td>Imaginary Play</td>
<td>-.23</td>
<td>.06</td>
</tr>
<tr>
<td>Attribution of Animacy</td>
<td>.20</td>
<td>-.03</td>
</tr>
<tr>
<td>Role Assignment</td>
<td>-.13</td>
<td>.12</td>
</tr>
<tr>
<td>Role Play</td>
<td>-.06</td>
<td>.11</td>
</tr>
<tr>
<td>Pantomime Measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IO Pantomime</td>
<td>.39</td>
<td>-.02</td>
</tr>
<tr>
<td>BPO Pantomime</td>
<td>-.13</td>
<td>-.10</td>
</tr>
<tr>
<td>Mental state terms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idiomatic Use</td>
<td>-.18</td>
<td>.26</td>
</tr>
<tr>
<td>Conversational Use</td>
<td>.31</td>
<td>.11</td>
</tr>
<tr>
<td>Mental States</td>
<td>.33</td>
<td>.37</td>
</tr>
<tr>
<td>Theory of mind</td>
<td>.60</td>
<td>.12</td>
</tr>
</tbody>
</table>

Note: All bold coefficients are significant at p < .05 or better (two-tailed).

Table 4. Partial (‘time spent in care’ for mental states and ‘age’ for all variables) Spearman’s rank correlation coefficients between measures of pretend play, pantomime, mental state terms and theory of mind (N = 31)

<table>
<thead>
<tr>
<th>Pretend Play Measures</th>
<th>Mental state terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>IP</td>
</tr>
<tr>
<td>Theory of Mind</td>
<td>.35</td>
</tr>
<tr>
<td>Mental (ID)</td>
<td>.08</td>
</tr>
<tr>
<td>State (CU)</td>
<td>-.03</td>
</tr>
<tr>
<td>Terms (MS)</td>
<td>.36</td>
</tr>
</tbody>
</table>

Note: All bold coefficients are significant at p < .05 or better (one-tailed).
(OS = object substitution; IP = imaginary play; AB = attribution of animacy; RA = role assignment; RP = role play; IO = IO pantomime; BPO = BPO pantomime; ID = idiomatic use; CU = conversational use; MS = mental states.)
capacity to both engage in the varied components of pretend play and a greater use of mental state terms. This inference was partially supported in the current study. The use of mental states was associated with both the comprehension of false belief questions and the exhibition of object substitutions, imaginary play and role assignments. Furthermore, only certain components of pretence (object substitution and role assignment) showed a relationship with false belief performance indicating that some, but not all, types of pretence may depend on the maturation of an advanced representational mechanism.

Before entering into a more detailed appraisal of the results, it is worth noting that there remains a degree of contention with regard to the use of false belief tasks to index metarepresentational ability. First, past research has found that successful comprehension of false belief tasks is related to verbal intelligence (Astone & Jenkins, 1995; Suddendorf et al., 1999; Taylor & Carlson, 1997), and indeed modification of the language used in these tasks has resulted in differential success (Siegal & Beattie, 1991). It is therefore appropriate to acknowledge that the children in the current sample were not assessed with regards to their general language development. Second, modification of the ecological validity of false belief tasks has also been found to influence success rates (Chandler & Hala, 1994). Given these issues the possibility that the results are a particular outcome of the tasks used to assess metarepresentation cannot be dismissed. It is thus recommended that future research implement a wider assessment of metarepresentational tasks (see Taylor & Carlson, 1997).

Leslie (1987, 1988) has proposed that it is through the ability to appreciate dual representations, first evident in pretence, that the pre-school child begins to relate metarepresentational expressions to the language of thought, and hence construct a mental state lexicon. In support of this, a positive correlation was revealed between the use of mental states and theory of mind. It may therefore be argued that in order for children to construct a mental state lexicon they must first appreciate the representational nature of mental state terms—an appreciation that is reliant on their capacity for metarepresentational thought. However, it may be argued that the association between theory of mind and mental states is a function of the verbal demands of false belief tasks and not metarepresentational cognition. Therefore, as children in the current sample were not assessed with regards to their general language development, the strength of this argument remains tentative.

Leslie (1987, 1988) also maintains that as the representational system of children expands there is a concomitant increase in their ability to both comprehend mental states and to engage in pretend play. In partial support of this view, the current findings revealed that children’s exhibition of object substitutions, imaginary play and role assignment were positively related to their spontaneous use of mental state terms. However, the verbalization of mental states occurred independently of the frequency with which children exhibited the pretence acts of attribution of animacy and role play. This may be an outcome of the latter two categories not placing a demand on the child’s representational mechanism – which is also reflected in the failure to find an association between these aspects of pretence and the comprehension of false belief. This interpretation is rendered problematic though, given that imaginary play, while positively correlated with the use of mental states, was not associated with an appreciation of false beliefs. Similarly, the exhibition of IO pantomimes was positively correlated with an appreciation of false beliefs but occurred independently of the verbalization of mental
state terms. An alternative to the metarepresentational perspective is that the exhibition of certain aspects of pretend play are more likely to be coupled with mental state references. For example, a child may be more likely to say ‘Pretend this banana is a telephone’ (object substitution) than ‘Pretend I am feeding dolly’ (attribution). Certain types of pretence may thus encourage the explication of mental states and it may be this that drives the reported associations.

In the present study, the ability of children to successfully answer questions of false belief was associated with the frequency with which they exhibited object substitutions and role assignments. No reliable associations were found between the other categories of pretend play and false belief performance.

Object substitution, according to Leslie (1987, 1988), is a form of ‘referential opacity’, whereby the child must suspend the normal reference of the object of focus. That is, when a child engages in an object substitution he or she must be able to use the new symbolized object, with its inherent characteristics, without it interfering with his or her ‘real-life’ knowledge of the object’s literal traits. Likewise, the child’s ‘real-world’ knowledge is at risk by assigning make-believe roles to a play partner. Pretending that a partner is someone other than who he or she really is involves a non-entailment of truth where the child must appreciate that outside the pretence realm the traits of the adopted character are not a true representation of the partner’s actual traits. Hence, with object substitution and role assignment, the child must maintain an awareness of both a mentally represented existence and a literal existence. It is this same ability which appears requisite for successful comprehension of the false belief task.

Interestingly, the exhibition of both these forms of pretence varied among the children in the current sample, ranging from the stereotypical (a red ball substituting for a tomato; the child instructing her mother to be a ‘baby’) to the more idiosyncratic (a toy sword substituting for a fountain; the child instructing her mother to be a ‘wicked witch’). It may be that the further a substitution is removed from it’s functional properties and the more advanced an assignment becomes, the greater is the need for a refined representational mechanism and, hence, an appreciation of the mentalistic underpinnings of pretence. The suggestion here is that even within specific categories of pretence, only certain forms may require the ability to metarepresent. This notion warrants further investigation.

Role assignment, but not role play, was associated with false belief comprehension. It is possible that the association between role assignment and false belief indicates that once the child has developed a theory of mind he or she appreciates that unless a pretence scenario is clarified, his or her partner may remain ignorant of its direction and the play be at risk of failure. However, while these findings are congruent with Astington and Jenkins (1995), they contrast with those reported by Youngblade and Dunn (1995). In assessing this disparity it is important to take into account both the child’s play partner and the location of testing. Youngblade and Dunn observed children in play sessions with either the child’s mother or an older sibling at the participant’s home, commenting that role play predominantly occurred with the sibling. Astington and Jenkins observed their participants playing with three to four other children in a day-care setting. It may be that both the environment and the child’s play partner elicit differential forms of role-related metarepresentational pretence. This was not assessed in the current study and remains as a topic for future research.
Astoning and Jenkins (1995) also reported a positive association between ability on tasks of false belief and the number of joint proposals made by their participants. Because of the low frequency of joint proposals in the current study, this association could not be tested. By observing children at play with their parents, their life-long play partners, the need for them to verbalize a joint plan may have been negated, thereby explaining the paucity of joint proposals observed.

The frequency with which bouts of imaginary play were exhibited occurred independently of children’s ability to pass tasks of false belief. It is unclear why this result was obtained. To engage in imaginary play the child must conceive that something, which has no immediate physical presence, can be mentally represented and treated as if it were real. Theoretically, this should rely on the child’s ability to metarepresent. One explanation for this finding is that the imaginary play exhibited by the children in the current study typically involved the retention of the imagined items’ real-world properties and functions. This may only require a capacity to model common actions. Furthermore, the imaginary play observed generally occurred with the assistance of props, and it may be that this is sufficient to scaffold the child’s imagination without the necessary reliance on a fully developed metarepresentational mechanism. There may, for example, be a differential metarepresentational load between drinking imaginary tea that was poured from a play teapot into a play cup, and drinking imaginary tea that was poured from an imaginary teapot into an imaginary cup.

As with imaginary play, the exhibition of attribution of animacy was not associated with theory of mind. This result was surprising given that the attribution of animacy appears to place the child’s literal model of the world at risk of ‘abuse by deviant truth’. For example, a doll may be spoken to as if it were real only once the child is able to suspend his or her literal model that inanimate objects do not really speak. However, the failure to find an association between attribution and false belief emphasizes the complexity of classifying pretend play. For example, treating a doll as if it is animate may be more accurately categorized as functional play where the child is simply demonstrating his or her knowledge of the conventional use of a doll (Leslie, 1987). It is of interest that the application of parametric statistics to the current data reveals an association between theory of mind and the attribution of animacy, which has been reported elsewhere (Nielsen & Dissanayake, in press).

Investigation of the pantomime task revealed that performance of IO, but not BPO, pantomimes were related to successful comprehension of false belief. This result supports the findings of both Suddendorf et al. (1999) and of Taylor and Carlson (1997). While it may seem that the results of the pantomime task contradict those of the observational measures—that is, the cognitive demand of producing IO pantomimes appears similar to that of imaginary play, while BPO pantomimes similarly resemble object substitutions—this apparent disparity is taken as support for the argument stated above that even within distinct categories of pretense only certain aspects require the capacity to metarepresent, and that the availability of veridical props is important in determining those aspects. When presented with the pantomime task the child must generate his or her response without the availability of props. It is proposed that the child who has yet to fully develop his or her metarepresentational system requires props to scaffold his or her pretense and thus reverts to the only ones available—body parts. The metarepresentational child, however, is less dependent on props and is able to generate IO pantomimes. Therefore,
what may be crucial in differentiating metarepresentational from non-metarepresentational pretence is the interaction of the type of props available with the type of pretend play engaged in, and it is this interaction that drives the IO pantomime–false belief association.

Before concluding it is important to acknowledge some of the limitations of the current study. The relatively small sample size was exacerbated by the low frequencies and high variability of the pretend play and mental state categories. Together, these problems may have mitigated against finding associations between the variables of interest. It is also important to acknowledge the correlational nature of the present study and the associated inability to infer causality. Nonetheless, the value of this exploratory study lies in its attempt to begin to discern what elements of pretend play are metarepresentational. The present results are of particular developmental interest and it is possible to draw some tentative conclusions from the study while emphasizing the need for further research.

It is argued here that all pretend play shown by pre-school children does not place an equitable demand on their metarepresentational system. This finding has implications for those theorists who posit that a single underlying mechanism, regardless of its nature, is responsible for pretence, use of mental state terms and false belief conception. It is further argued that while the emergence of a mental state lexicon and certain aspects of pretence may be reliant on metarepresentational cognition, there remain alternative explanations for these findings that deserve continued investigation. Further research that focuses on the specific types of pretence that are dependent on the child’s capacity to metarepresent is now needed.

Acknowledgements

The authors would like to thank the parents and children who gave their time to participate in the current study. They also thank the two reviewers who provided valuable feedback on an initial draft. Portions of this work were presented at the 10th Australasian Human Development Conference in 1997 (Adelaide, South Australia) and the Annual Meetings of the Society for Cross-Cultural Research & the Association for the Study of Play in 1998 (St Petersburg, Florida). A portion of the work presented here appears in the published proceedings of the latter conference.

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Received 4 September 1998; revised version received 12 November 1999