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The Relation between Individual Differences in Fantasy and Theory of Mind

Marjorie Taylor and Stephanie M. Carlson

The relation between early fantasy/pretense and children's knowledge about mental life was examined in a study of 152 3- and 4-year-old boys and girls. Children were interviewed about their fantasy lives (e.g., imaginary companions, impersonation of imagined characters) and were given tasks assessing their level of pretend play and verbal intelligence. In a second session 1 week later, children were given a series of theory of mind tasks, including measures of appearance-reality, false belief, representational change, and perspective taking. The theory of mind tasks were significantly intercorrelated with the effects of verbal intelligence and age statistically controlled. Individual differences in fantasy/pretense were assessed by (1) identifying children who created imaginary characters, and (2) extracting factor scores from a combination of interview and behavioral measures. Each of these fantasy assessments was significantly related to the theory of mind performance of the 4-year-old children, independent of verbal intelligence.

INTRODUCTION

Over the past decade, research on the development of social cognition has been dominated by work on the child's theory of mind. According to Premack and Woodruff (1978, p. 515), having a theory of mind means that an "... individual imputes mental states to himself and to others (either to conspecifics or to other species as well). A system of inferences of this kind is properly viewed as a theory, first, because such states are not directly observable, and second, because the system can be used to make predictions, specifically about the behavior of other organisms." Premack and Woodruff were interested in the extent to which chimpanzees could properly be described as having a theory of mind, but their work inspired developmental psychologists to address this issue, resulting in an outpouring of empirical studies investigating a broad spectrum of topics related to development in children's understanding of how mental states such as belief and desire guide human behavior (for reviews see Astington, 1993; Flavell & Miller, in press; Moses & Chandler, 1992; Perner, 1991; Taylor, 1996; Wellman, 1990). The results of this work indicate that by 4 or 5 years of age children acquire a host of related insights about the mind, including an understanding of the distinction between appearance and reality (Flavell, Flavell, & Green, 1983) and between mental and physical entities (Wellman & Estes, 1986), as well as an appreciation that it is possible to have a belief about the world that is false (Wimmer & Perner, 1983) and a grasp of the causal relation between people's percepts, beliefs, and desires and their behavior (Gopnik, Slaughter, & Meltzoff, 1994).

Now that there is some consensus about normative development of a theory of mind (but see Gopnik, 1993; Moses & Chandler, 1992, for discussions of controversies), many researchers have turned their attention to the abilities that precede and give rise to the watershed developments that occur between 3 and 5 years of age and the factors that influence individual differences in this development (Lewis & Mitchell, 1994). Pretend play is central to these issues. For some time there has been speculation that the early-developing ability to pretend is conceptually related to the later-developing understanding of false belief (Leslie, 1987, 1988). More recently, a lively debate has developed concerning the extent to which children's comprehension of pretense reflects a precocious understanding of mental representation (for a review, see Lillard, in press). With respect to the issue of individual differences in theory of mind development, recent research has converged on experience with pretense as potentially an important factor (Astington & Jenkins, 1995; Perner, Ruffman, & Leekam, 1994).

The present study was designed to investigate the relation between individual differences in pretense and theory of mind development with a large sample of preschool children and multiple measures of both pretense and theory of mind. To provide the context for this work, we begin by briefly reviewing theoretical and empirical research on the role of pretense in children's theories of mind and studies investigating the variables related to individual differences in theory of mind development.

Theory of Mind and Pretend Play

The challenge for theorists in finding a place for pretense in theory of mind development stems in part from the asymmetry between the ability of young children to pretend and their difficulty with theory of mind tasks that seem cognitively similar. For example, the understanding of false belief is considered to be a critical step in the development of the child's theory of mind because false belief tasks require children to distinguish between a mental representation (e.g., a belief that a cookie is in a jar) and the actual state of the world (e.g., the cookie really is in the cupboard). The routine failure of 3-year-olds on many false belief tasks seems inconsistent with their competence in distinguishing between what a person is pretending to do (e.g., ride a horse) and what he or she is actually doing (e.g., running around on a broom). Appearance-reality tasks also require the understanding that mental representations of stimuli and the stimuli themselves may not always be in one-to-one correspondence (Flavell, 1988). Children demonstrate their grasp of this insight when they are able to report that an object can simultaneously look like one type of thing, but in reality be something quite different. Three-year-old children often have difficulty distinguishing a real identity from an apparent one (e.g., a sponge that has the appearance of a rock), but are able to distinguish the real identity of an object from its *pretend* identity (e.g., a crayon that an experimenter is pretending is a toothbrush) (Flavell, Flavell, & Green, 1987).

There are several possible accounts of the relation between the early-developing ability to pretend and the later-developing understanding of false belief. According to Fodor (1992), children cannot pretend unless they already have a notion of false belief. He argues that the premise of pretense is taking something unreal to be real, and that this is functionally equivalent to taking something false to be true. Thus, children's ability to pretend is taken as evidence of their grasp of false belief, and children's problems with most common false belief tasks are interpreted as reflecting performance rather than competence issues.

At the other end of the continuum of views on this issue, Lillard (1993, 1994) believes that too much conceptual sophistication is credited to young pretend-ers. On the basis of a series of empirical studies, she claims that children do not initially conceptualize pretending as involving the mind at all, but instead understand pretending as a kind of action. Like Lillard, Perner (1991) claims that pretense can be interpreted within a theory of behavior rather than a

theory of mind, and that a representational understanding of pretense might be acquired more slowly than belief because children can get by on a nonmentalistic understanding of pretense for quite some time (see Harris, Lillard, & Perner, 1994). The research evidence for this position is mixed. The results of Lillard's studies are consistent with the position that children do not conceptualize pretense as involving mental representation. For example, Lillard's research has shown that until 5 or 6 years of age, children will claim that a "troll" doll who knows nothing about a particular animal (e.g., a rabbit) and is not thinking about it, but who is nonetheless behaving like that animal (e.g., hopping), is in fact "pretending" to be the animal. Lillard concluded that preschoolers think of pretense as action and fail to understand its mental component. However, the results of other studies suggest that this conclusion might be premature. For example, Custer (1996) points out that Lillard's procedure requires children to understand that it is only possible to have mental representations of things that the person knows about. When Custer eliminated this aspect of the task, she found evidence that even at age 3 many children were aware that pretenders have mental representations that correspond to the content of the pretense rather than to reality.

Other researchers do not consider pretense to be equivalent to false belief reasoning or to be devoid of an understanding of mental representation, but instead adopt an intermediate position in which pretense and false belief are conceptually related and pretending is central to theory of mind development. According to Leslie (1987, 1988), when children pretend, they are making the distinction between what an object really is and its pretend identity. Otherwise, children would become confused by the pretend overtures from play partners. Leslie postulates that children distinguish fantasy and reality by invoking a "decoupling" mechanism that is operational by the second year of life. With this mechanism, they channel "as if" actions into a pretense mode of thought and reality-based actions into a reality mode, and thus are able to maintain both the symbolic and real state of affairs in mind at once. Furthermore, Leslie suggests that the same decoupling mechanism used in pretense also is used to sort out the distinction between mental states of the self and other. Thus, the cognitive architecture of belief builds on that of pretense (see Leslie & Thaiss, 1992).

Perner, Baker, and Hutton (1994) have postulated that young children do not have a concept of "pretense" or "belief," but that they have an undifferentiated concept that alloys these two, termed "prelief." This analysis stems from the finding that young pre-

schoolers cannot verbally distinguish between anomalous events that are based on pretense and those that are based on a mistaken belief, such as a boy putting a carrot in the hole of a box because he is pretending there is a rabbit inside or because he falsely believes there is a rabbit inside. Perner et al. maintain that it is not until children can appreciate the representational nature of pretense and belief, around age 4, that they clearly differentiate the two. On this view, children's conceptual understanding of pretending is enmeshed with their understanding of false belief.

Harris has outlined a different role for pretense in children's social cognitive development. Some of the most compelling evidence for an early-developing comprehension of pretend sequences has come from research by Harris and his colleagues (Harris & Kavanaugh, 1993; Harris, Kavanaugh, & Meredith, 1994; Walker-Andrews & Harris, 1993); however, like Lillard, Harris argues that children's insight into pretense stops at the behavioral level and need not extend to understanding other minds. He suggests that 2-year-olds are able to follow pretense stipulations because they (1) have an understanding of what is causally possible in reality, (2) observe a deviation of these causal properties (e.g., witness mother "pouring" nothing into a cup), and (3) fill in the gaps with their own imagination and mark the event as make-believe, quarantined from the world of reality. According to Harris (1994), false belief is a different matter because with false belief the child must not only stipulate a nontruth proposition (as in pretense), but also must stipulate a "serious" nontruth proposition in the face of a competing, truthful one. He claims that children later acquire an understanding of these different truth-commitments of the false believer and the pretend player through more accurate simulation of different points of view. Although this account points to differences between children's understanding of pretense and their understanding of false belief, Harris gives children's imagination a central role in their ability to predict and explain human behavior. More specifically, children imagine themselves as being in the situation of another person and then assume that the intentions, thoughts, and emotions resulting from this simulation correspond to the actual experience of the other person.

In summary, several researchers have given pretense a special status in the development of theory of mind (Hickling, Wellman, & Gottfried, 1994; Leslie, 1987, 1988); however, others have claimed that pretense should not be thought of as a potential precursor of theory of mind because young children do not conceptualize pretending as a mental activity (e.g., Lillard, 1994). In fact, both Flavell (1993) and Lillard

(1994) have speculated that pretense could potentially interfere with children's developing notion of false belief because of the ease with which children relegate this form of misrepresentation to an action state.

Individual Differences in Theory of Mind Development

If children's understanding of pretense is conceptually related to their later-developing understanding of false belief, as at least some theory of mind researchers have claimed, then individual differences between children in the extent that they participate in pretend play should influence the rate at which they are able to master theory of mind tasks. This idea is consistent with Gopnik, Slaughter, and Meltzoff's (1994) proposal that false belief understanding requires two insights about the mind: (1) an understanding of the distinction between mental and physical entities or events, and (2) an understanding of the causal relation between perceiving events in the external world and our mental representations of them. According to Gopnik et al., children grasp (2) from an early understanding of perception and how perceiving leads to knowing. The first insight might be mastered as a consequence of engaging in pretend play.

Most research on individual differences in theory of mind development has focused on comparisons of autistic children with mentally retarded and normal controls.¹ However, some studies have addressed the possibility that the normal developmental course of children's growing awareness of mental states and the psychological causes of behavior might be related to the kinds of social interaction that children experience within the family (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Perner, Ruffman, & Leekam, 1994). Perner et al. tested the hypothesis that children with siblings would experience more of the types of social interactions that could promote an awareness of mental states and thus might do better on theory of mind tasks than only children. In two correlational studies with preschoolers aged 3 to 5

1. This literature has provided mounting evidence that autistic children have a specific deficit in their understanding of mind (Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen, Tager-Flusberg, & Cohen, 1993; Perner, Frith, Leslie, & Leekam, 1989). Although we will focus our discussion on recent studies investigating the factors that are related to individual differences in normal development, it is interesting to note that, as well as having great difficulty with theory of mind tasks, autistic children engage in virtually no spontaneous pretend play (Sigman & Ungerer, 1981).

years old, they found a relation between family size and performance on false belief tasks that supported this hypothesis. In fact, children with one or two siblings were twice as likely to pass a standard false belief task as only children. The benefit of having a sibling did not depend on the age of the sibling, as both children with older and with younger siblings performed equally well on the measure of false belief. Perner et al. suggested that having siblings might promote false belief understanding because siblings provide play partners for children and thus increase the amount of time children spend engaged in pretend play. According to Perner et al., "pretend play is perhaps our best candidate for a cooperative activity which furthers the eventual understanding of false belief" (p. 1236).

This conclusion is consistent with the results of a study by Dunn et al. (1991) examining the types of interaction among children and mothers that are related to an understanding of false belief. Dunn et al. observed the interactions of 50 33-month-old children with their mothers and with an older sibling in the home. When the children were 40 months old, they were given a series of measures assessing their social cognitive development, including nine tasks used by Bartsch and Wellman (1989) requiring children to predict and explain false beliefs. The extent that the children talked about their feelings, and that the mother and the child discussed feelings and causality, accounted for some of the variance in the children's false belief scores. In addition, understanding of false belief at 40 months was related to the ratings of observed cooperation of the child with the sibling (e.g., friendly imitation, response to questions or suggestions, helping, sharing, cooperative play). In contrast, ratings of observed conflict, control, competition, and affection shown toward the sibling did not correlate with the assessment of false belief understanding. Perner et al. interpreted Dunn et al.'s results as being consistent with their hypothesis that cooperative play with siblings might be particularly influential in promoting false belief understanding.

Astington and Jenkins (1995) also found a relation between pretend play and mastery of false belief. In their study, 69 4- and 5-year-olds were videotaped for 10 min playing in groups of three or four in an area of their day-care center that was set up for playing "house." The tapes were segmented into speaker turns, and each turn was coded for the presence of pretense (e.g., playing or assigning a role, substituting one object for another). All pretend turns were coded for joint proposals (e.g., "Let's make cookies") and explicit role assignment ("You be the mommy"). Overall, the *amount* of pretend play was not associ-

ated with children's performance on false belief tasks (two versions of the unexpected location task and two versions of the unexpected contents task). However, false belief understanding was significantly related to children's joint proposals and role assignments in pretend play. Children who performed well on the false belief tasks tended to generate more joint plans and assigned more roles to themselves and other children in pretend play interactions.

The purpose of the present study was to examine the relation between pretense and theory of mind in more detail. We focused on the period between 3 and 4 years of age because this period is marked by considerable development in children's performance on tasks designed to assess theory of mind. Past research on individual differences has tended to use false belief tasks as the sole measurement of theory of mind development (Astington & Jenkins, 1995; Dunn et al., 1991; Perner, Ruffman, & Leekam, 1994). In contrast, our assessment of theory of mind included four kinds of tasks that are commonly used in the theory of mind literature:

1. Appearance and reality: Three-year-old children typically have difficulty reporting that an object has an appearance discrepant from its underlying reality (Flavell et al., 1983). They tend to give the same answers to questions about appearance and reality until about 4 years of age.

2. False belief: Children typically develop an understanding of false belief (as measured by standard tests) around 4 years of age (Perner, Leekam, & Wimmer, 1987; Wimmer & Perner, 1983). The majority of 3-year-olds have difficulty appreciating that an individual can possess a belief that is discrepant from the actual state of the world.

3. Representational change: Representational change refers to children's reports of their own former false beliefs. Children master representational change about the same time that they master false belief (Gopnik & Astington, 1988).

4. Interpretive diversity: Interpretive diversity refers to the insight that two people observing the same stimulus may understand it differently (Chandler & Helm, 1984; Taylor, 1988; Taylor, Cartwright, & Bowden, 1991). Many 4-year-olds tend to assume that someone who sees an object or event will share the children's own knowledge of it because they equate their own subjective interpretation of an event with an objective reality that is external to the self and is shared with other people.

Our assessment of individual differences in pretend play included a variety of observations, interview questions, and tasks gleaned from the pretend play literature. Some researchers interested in indi-

vidual differences in this domain have focused on overt behavior (e.g., Wolf & Grollman, 1982), whereas others have included fantasies and daydreams in their assessment (e.g., Singer, 1961; Singer & Singer, 1990). We included assessments of both active and passive forms of pretense in this study because these behaviors may be closely related (Fein, 1981; Sherrod & Singer, 1977) and both give children experience with mental creations that do not correspond to reality.² Given Astington and Jenkins's finding that role assignment in pretend play is related to false belief mastery, as well as the results of our past research on imaginary companions, we were particularly interested in the relation between theory of mind development and children's creation of imaginary characters (i.e., fantasy/pretense involving the impersonation of a role or the assignment of a role to an imaginary other).

To determine the extent to which our participants engaged in fantasy and pretense, the children and their parents were interviewed extensively about the children's play behaviors and fantasy, including questions about imaginary companions, toy preferences, and impersonation games. In addition, children were observed during free play and were given laboratory tasks designed to assess their toy preferences and the developmental level of their pretense (Overton & Jackson, 1973). Our hypothesis was that children's behaviors on the fantasy/pretense measures would be related to their performance on theory of mind tasks. One of our concerns was that children who are more intelligent might both engage in more fantasy and pretend play and acquire insight about the mind at an earlier age. Thus, a positive relation between our fantasy measures and theory of mind measures might be mediated by the relation of these variables with intelligence. We administered the Peabody Picture Vocabulary Test—Revised to the children to allow an assessment of the relation between fantasy/pretense and theory of mind with verbal intelligence controlled. The Peabody was chosen because positive relations of intelligence with fantasy (e.g., Mauro, 1991; Perlmutter & Pellegrini, 1987) and with theory of mind (e.g., Astington & Jen-

kins, 1995) have been found primarily with tests of verbal intelligence.

METHOD

Participants

The participants in this study were 152 preschool children (M age = 4.0; range = 3.4 to 4.8). This age range was tested because prior research has documented substantial changes in performance on theory of mind tasks from age 3 to 4 years (Flavell et al., 1983; Gopnik & Astington, 1988; Perner & Davies, 1991; Wellman, 1990). For the purpose of examining developmental change, the sample was divided into a group of 57 3-year-olds (M age = 3.6; range = 3.4 to 3.11) and 95 4-year-olds (M age = 4.4; range = 4.0 to 4.8).

The children included 75 boys and 77 girls from lower middle-class and middle-class backgrounds. The sample was predominantly White (two African American children and one Asian child), which reflects the demographics of the area in which the study was conducted. Children were recruited by posting advertisements in local day-cares and preschools and by sending letters to the parents of 3- and 4-year-old children who were identified from birth announcements in the local newspaper.

Theory of Mind Measures

Appearance-reality tasks. Each child was shown four objects that had misleading appearances: two involving a discrepancy between real and apparent identity (i.e., a sponge that looked like a rock and an eraser that looked like a cookie) and two involving a discrepancy between real and apparent color (i.e., a picture of a red castle that looked black when held behind a green filter and a picture of a pink rabbit that looked blue when held behind a blue filter). For each stimulus, children were shown how the object looked and the true identity (i.e., sponge and eraser) or true color of the object (i.e., red castle and pink rabbit), and then were asked two questions: (1) "When you look at this with your eyes right now, does it look like _____ or does it look like _____?" and (2) "What is this really and truly, _____ or _____?" These tasks have been used in past research investigating children's ability to distinguish appearance from reality (Flavell et al., 1983; Flavell, Green, & Flavell, 1986). If children answered both the appearance and the reality questions correctly for a stimulus, they were given 1 point. Thus total scores ranged from 0 to 4.

False belief and representational change tasks. For

2. Perner (1991) uses "fantasy" to refer to passive forms of make-believe such as daydreaming, creating images, and listening to fictional stories, and "pretense" to refer to more active behaviors such as a child pretending to brush her teeth with an imaginary toothbrush. We have tried to follow Perner's usage; however, this distinction is not always straightforward. For example, a child with an imaginary companion sometimes acts in ways that suggest the companion is present and at other times interacts with the companion in a more passive, daydreaming way.

three different tasks, children were shown a container (i.e., a Bandaid box, a crayon box, and a raisin box) and asked to guess what was inside. The child opened the box and discovered that it did not have the expected contents (i.e., there was a small toy bear in the Bandaid box, a toy horse in the crayon box, and a heart in the raisin box). The object was placed back into the container, the child was introduced to a puppet, and then was told that "Chris [the puppet] has not looked inside this box." Then the child was asked, "Does she think there are _____ or _____ inside?" (the false belief question). Then children were asked about their own former belief: "When you first saw this box, before you looked inside, did you think there was _____ or _____ inside?" (the representational change question). Finally, children were asked what was really inside to make sure they had not forgotten the contents of the box. In addition to the three boxes with surprising contents, children were also shown and asked questions about two boxes that contained what one would expect (i.e., a Cheerios box that contained Cheerios and a toothpaste box that contained toothpaste). These distractor items were included so that children would not start to believe that all the boxes had surprising contents. Children were given a score from 0 to 3 for their responses to the false belief questions and from 0 to 3 for their responses to the representational change questions.

Interpretive diversity tasks. Children were shown a series of animal pictures; then the pictures were covered so that only a small part could be seen. The child was introduced to a puppet and told that "Chris [the puppet] has never seen this picture before and this is what she can see" (pointing to the part that is in view). Then the child was asked, "Do you think that Chris knows there is a _____ in the picture?" First children were given two control tasks in which (1) the restricted view showed an identifiable part of the animal (i.e., the head of a dog) and (2) the view showed no part of the animal (i.e., empty space near the picture of a turtle). These two control tasks were included to demonstrate to children that the right answer could be either "yes" or "no." The three experimental tasks involved restricted views of a deer, girl, and rabbit that showed only nondescript parts (i.e., the tip of a deer's antler, the pigtail of a girl, and the top of a rabbit's ear).

Pretense/Fantasy Measures

The assessment of children's interest in fantasy and the developmental level of their pretend play included information from interviewing the child and

the parent and from behavioral measures, as listed below.

Child Interview Measures

Child report of imaginary companion. Repeating the procedure used in past research (Taylor, Cartwright, & Carlson, 1993), we asked about imaginary companions (ICs) in the following way: "Now I'm going to ask you some questions about friends. Some friends are real like the kids who live on your street, the ones you play with. And some friends are pretend friends. Pretend friends are ones that are make-believe, that you pretend are real. Do you have a pretend friend?" If the child answered "yes," he or she was asked a series of questions about the friend, including questions about its name; whether it was a toy or completely pretend; its gender, age, and physical appearance; what the child liked and did not like about the friend; and where the friend lived and slept.

Imaginative play predisposition interview. For continuity with previous research, children were asked the following set of questions, which have been used as the basis for categorizing children into high and low fantasy groups (e.g., Singer, 1961; Singer & Streiner, 1966).

What is your favorite game?

What do you like to do when you are by yourself?

Do you have a pretend friend? (as described above)

Do you talk to yourself when you are lying in bed?

What do you like to think about just before you go to sleep?

Favorite story. Children were asked to name their favorite story. Their responses were coded as either fantasy oriented (e.g., "Cinderella"), which received a score of 1, or reality oriented (e.g., animal stories), which received a score of 0.

Favorite toy. Children were asked to name their favorite toy. Their responses were coded as either fantasy oriented (e.g., ninja turtle), which received a score of 1, or reality oriented (e.g., puzzle), which received a score of 0.

Favorite TV show. Children were asked to name their favorite television show. Their responses were coded as either fantasy oriented (e.g., "Barney"), which received a score of 1, or reality oriented (e.g., "Full House"), which received a score of 0.

Favorite play (with other children). Children were asked what they liked to do when they were with

other children. The activity they named was coded as indicating an interest in fantasy-oriented play (e.g., playing house), which received a score of 1, or reality-oriented play (e.g., tag), which received a score of 0.

Impersonation games. In past research on imaginary companions, we found that some children described an animal or person they pretended to be on a regular basis rather than an imaginary entity that served the function of a friend. This kind of impersonation is a relatively common pretend activity that some researchers consider to be closely related to the creation of imaginary companions (Ames & Learned, 1946; Partington & Grant, 1984). To find out more about impersonation, we asked the following questions:

Do you ever pretend to be an animal? What animal do you pretend to be?

Do you ever pretend to be a different person? What person do you pretend to be?

Have you ever pretended to be anything else, like a machine, airplane, or something like that?

What sort of thing did you pretend to be?

Children received a score of 0 (the child said "no") or 1 (the child said "yes") for their answers to each impersonation question.

Parent Interview Measures

Favorite play (solitary). Parents' answers to questions about the children's favorite type of play activity were coded as indicating an interest in fantasy-oriented play, which received a score of 1, or reality-oriented play, which received a score of 0.

Favorite play (with other children). Parents' answers to questions about the children's favorite type of play activity with other children were coded as indicating an interest in fantasy-oriented play, which received a score of 1, or reality-oriented play, which received a score of 0.

Favorite story. The story that parents reported as being their child's favorite was coded as either fantasy oriented, which received a score of 1, or reality oriented, which received a score of 0.

Favorite toy. The toy that parents reported as being their child's favorite was coded as either fantasy oriented, which received a score of 1, or reality oriented, which received a score of 0.

Favorite TV show. The television program that parents named as their child's favorite was coded as either fantasy oriented, which received a score of 1, or reality oriented, which received a score of 0.

Parent report of IC. Parents reported whether or not their child currently had an imaginary companion (0 = no, 1 = yes).

Impersonation games. The parent reported whether the child ever pretended to be an animal, person, or machine, and how often the child engaged in impersonation. For each kind of impersonation, the child received one score indicating whether the parent said "yes" (a score of 1) or "no" (a score of 0). In addition, children received a frequency score for each kind of impersonation. If the parent indicated that the child engaged in the impersonation every day for a period of at least 1 month, the child received a score of 1, and otherwise a score of 0.

Information about child's stuffed animal. If a child indicated that he or she had an imaginary companion that was a stuffed animal, we asked the parent a series of questions about the extent to which the child played with the toy.

Imaginary Companion (Parent and Child Interview Composite)

To determine whether the child actually had an imaginary companion, we developed criteria based on both the child and parent interviews. Children were asked about the existence of an imaginary companion at Session 1 and Session 2. Parents were interviewed about their children's imaginary companions at Session 1 and were asked for information at Session 2 to clarify what the child had reported at Session 1. For example, parents were asked if ICs mentioned at Session 1 corresponded to a real friend. If the child named a toy or a stuffed animal at Session 1, the parent was asked to fill out a questionnaire at Session 2 about the child's interaction and play with the named toy. In addition, if the parent mentioned an IC at Session 1 that the child did not mention, the child was asked about that IC by name at Session 2. Two coders examined the data from both parent and child reports at both sessions and categorized the child as having an IC if: (1) The child provided a description of an IC at Session 1, named the same IC at Session 2, and the parent said the description did not correspond to a real friend, or (in the case of a stuffed animal) the parent indicated that the child played with the toy regularly, treating it as if it were a real companion (the parent did not have to independently identify the IC). (2) The child said "yes" at Session 1 or Session 2 and named an IC described independently by the parent. (3) The child described different ICs at the two sessions and the parent said the child had lots of ICs (parent may describe a third).

The child was categorized as not having an IC if: (1) The child said "no" at both sessions. (2) The parent said the child did not play regularly with a stuffed animal named as an IC by the child. (3) The

child said "yes," but could not give any details (e.g., a name) for the IC.

Behavioral Measures

Toy preference. At the beginning and end of the two test sessions, children were given a choice of either a fantasy-oriented toy or a reality-oriented toy to play with while the experimenter talked briefly with the parent (beginning of the session) or to take home as a gift (end of the session). The designation of a toy as reality or fantasy oriented was guided by the work of Field, DeStephano, and Koewler (1982) and Wolf and Grollman (1982). Wolf and Grollman investigated individual differences in play style and found that some children are particularly interested in the physical attributes of objects. They enjoy piling blocks and exploring visual patterns, for example, but do not spend much time pretending. In contrast to these "patterners," "dramatists" enjoy pretend play and social exchange. Field et al. make a related distinction between reality play and pretend play. They define reality play as the "use of objects for their intended function, such as using blocks to construct a tower or combing hair with a comb, or as involvement in a realistic activity, such as reading a book" (p. 504). Fantasy play was defined as "play that involves the attribution of an entirely new identity to an object or the portrayal of the qualities of a character by active representation" (p. 504).

The toys we chose were ones that would tend to be used predominantly in either reality or fantasy play. In Session 1, children chose between a plastic wand with sparkles and streamers and a small wooden ball-and-cup game (beginning of session) and between a finger puppet and a top (end of session). In Session 2, children chose between a book about animals dressed up like people and a book about farm animals (beginning of session) and between a gold paper crown and a small rubber ball (end of session). The number of fantasy selections (out of four) was used as a measure of the child's interest in fantasy-oriented toys.

Free play with reality-oriented toys. In past research, we videotaped children playing with blocks and found that children with ICs tended to use the blocks as props in pretend play, whereas children without ICs tended to pile the blocks and crash them (Taylor et al., 1993). To determine if this result would replicate, children were told at the end of Session 1 that the experimenter needed to fill out some papers and they were given 3 min of free play with a selection of colorful blocks of various sizes and shapes. Two independent observers rated the fantasy content of

children's play from 1 (little fantasy) to 3 (extensive fantasy).

Free play with fantasy-oriented toys. At the end of Session 2, children were given 3 min of free play with a selection of dress-up hats (cowboy, Robin Hood, firefighter, princess, Dr. Seuss Cat-in-the-Hat, Native American headdress, and a straw hat) and props (long wooden wand with streamers, a feather boa, and a beaded necklace). We included this free play to determine if high and low fantasy/pretense children differ when playing with toys that are highly suggestive of fantasy, as well as when playing with toys that are considered to be reality oriented (e.g., blocks). Two independent observers rated the fantasy content of children's play from 1 (little fantasy) to 3 (extensive fantasy).

Pretend actions. Children were asked to perform six different kinds of pretend actions, three involving actions directed toward the body and three involving actions directed externally. The Pretend Action task was included because some of the best established developmental differences in pretend play involve the ability to use imagined objects in action sequences (e.g., Elder & Pederson, 1978; Overton & Jackson, 1973). Overton and Jackson found that most young children used parts of their bodies to represent the objects they were pretending to use in actions rather than imaginary objects (e.g., when asked to pretend to brush their teeth, they used their finger as a toothbrush instead of pretending to hold an imaginary toothbrush). The percentages of 3-, 4-, and 6-year-old children who pretended to hold an imaginary object rather than substitute a body part were 7%, 22%, and 65%, respectively. In past research (Taylor et al., 1993), we found that 4-year-old children with ICs used imaginary objects when performing pretend actions significantly more often than did 4-year-olds without ICs (58% versus 26%).

Children in the present study were asked to perform actions that were directed toward the self (a replication of our past procedure) and actions directed externally. The use of imaginary objects for externally directed actions (e.g., holding imaginary scissors when pretending to cut paper) is mastered somewhat later than actions directed toward the self (Overton & Jackson, 1973). Thus, the inclusion of externally directed pretend actions presented children with a more difficult pretend action test. The three actions directed toward the self were: (1) pretend you are combing your hair with a comb, (2) pretend you are drinking from a cup, and (3) pretend you are brushing your teeth with a toothbrush. The three actions directed toward the external world were: (1) pretend you are hammering this (wooden peg) with a ham-

mer, (2) pretend you are cutting this (wooden block) with a knife, and (3) pretend you are cutting this (piece of paper) with a pair of scissors. For each action, the child's response was recorded as involving either a body part or an invisible object. Children received two scores: one indexing the number of times (out of three) that the children used symbolic objects for actions directed toward the self and one indexing the number of times (out of three) they used symbolic objects in pretend actions directed externally.

Measure of Verbal Intelligence

Children were given the Peabody Picture Vocabulary Test—Revised, a test in which the child's task is to select the picture considered to illustrate best the meaning of a stimulus word presented orally by the experimenter. We selected the Peabody because it is appropriate for 3- and 4-year-olds, is more easily administered than the Stanford-Binet, and has been widely used as a standardized measure of verbal intelligence in research with preschool children. Although the Peabody tests only vocabulary, it correlates .62 with the Stanford Binet Intelligence Scale (.72 with the Stanford-Binet Vocabulary Subtest) and .64 with the full scale of the WISC. In past research, 7-year-old children who previously or currently had ICs scored higher on the Vocabulary subtest of the WISC-R than did 7-year-olds who had never had ICs, whereas there was no difference between the two groups of children in performance on the Block Design subtest of the WISC-R (Mauro, 1991). In addition, Perlmutter and Pellegrini (1987) found that fantasy play in preschoolers was related to children's receptive vocabulary as measured using the Peabody. These results suggest that a measure of verbal intelligence is the type of test most likely to reveal differences between children with and without ICs.

Procedure

Each child was tested twice, with an average of 8 days elapsing between visits. The division of the procedure into two sessions was necessary to make the length of the test sessions manageable. Both sessions were videotaped. At the time of each test session, parents filled out questionnaires and were interviewed about their children's behavior. The first session included (1) the Peabody Picture Vocabulary Test—Revised, (2) the fantasy interview with the child, (3) the pretend action tasks, (4) the 3 min free-play session with reality-oriented toys, and (5) two assessments of the child's toy preferences.

About 1 week later, children returned for the second test session, which included (1) the 13 theory of mind tasks, (2) a retest of the Imaginative Play Predisposition Interview, (3) a retest of the three self-directed Pretend Action tasks, (4) a 3 min free-play session with fantasy-oriented toys, and (5) two assessments of the child's toy preferences.

At the time of Session 2, an experimenter asked the parent questions about information provided by the child at Session 1. In particular, we asked parents about imaginary companions mentioned by children on the first visit. If the child had named a stuffed animal or doll, the parent filled out a questionnaire designed to help us assess the child's involvement with the toy. This questionnaire included items about the amount of time the child played with the toy, whether the toy had an air of reality for the child, and whether the toy functioned more or less like Hobbes in the comic strip "Calvin and Hobbes," which is about a boy and his stuffed tiger.

RESULTS

The primary goal of this study was to investigate the relation between individual differences in fantasy behavior and theory of mind. We assessed individual differences in fantasy in two different ways: (1) one based on whether or not the child created imaginary characters, and (2) an overall fantasy score based on converging measures across data sources. We investigated the relation between theory of mind development and each of these assessments of individual differences in fantasy. In this section we will first describe the results for the verbal intelligence and theory of mind assessments. Then each of the ways of assessing individual differences in fantasy will be described, along with the relation of each to theory of mind development.

Verbal Intelligence Assessment

The PPVT-R scores ranged from 74 to 149, with an overall mean of 107 ($SD = 13$). (The score for one 4-year-old is missing because the child was unable to complete the test.) As an age-standardized measure, the Peabody is not meant to reflect developmental changes in level of receptive vocabulary, and, in fact, there was no age difference in scores, M (3-year-olds) = 107, $SD = 11$; M (4-year-olds) = 107, $SD = 13$. In addition, boys' ($M = 107$, $SD = 13$) and girls' ($M = 107$, $SD = 13$) scores did not differ.

Table 1 Mean Scores on Theory of Mind Tasks as a Function of Age

Age Group	Theory of Mind Task				
	AR ^a	FB ^b	RC ^b	RV ^b	Composite ^c
3-year-olds (<i>n</i> = 57)	1.7(1.2)	.5(.9)	.7(1.1)	.6(1.2)	3.5(2.9)
4-year-olds (<i>n</i> = 95)	2.8(1.4)	1.8(1.3)	1.7(1.3)	1.4(1.4)	7.7(3.8)
Total (<i>N</i> = 152)	2.4(1.4)	1.3(1.3)	1.3(1.3)	1.1(1.4)	6.1(4.0)

Note: AR = Appearance-Reality; FB = False Belief; RC = Representational Change; RV = Restricted View. There are two participants missing in the False Belief analyses of 4-year-olds. Standard deviations are shown in parentheses.

^a Out of 4.

^b Out of 3.

^c Out of 13.

Theory of Mind Assessment

Appearance-reality, false belief, representational change, and interpretive diversity tasks are all believed to assess the child's developing theory of mind, and past research suggests that performance on at least the first three of these measures is related (Frye, Zelazo, & Palfai, 1994; Gopnik & Astington, 1988). However, this study is unique in that a relatively large number of 3- and 4-year-olds were given all four tasks, as well as a measure of verbal intelligence. The mean numbers of correct responses for each of the theory of mind tasks broken down by age is shown in Table 1. Theory of mind composite scores were significantly correlated with age, $r(150) = .49$, $p < .01$, and with PPVT-R scores, $r(150) = .28$, $p < .01$. (Sex was unrelated to theory of mind scores.) We were interested in the extent to which performance on the four tasks was intercorrelated independent of the effects of age and verbal intelligence. Thus, we computed partial correlations for the scores on each of the theory of mind tasks with each other, controlling for age in months and PPVT-R scores. These partial correlations are shown in Table 2. Each of the theory of mind tasks was significantly correlated with

all three of the other tasks. These results suggest that it is appropriate to collapse across the four tasks and interpret the aggregate score (out of 13) as an index of the child's theory of mind development.

Individual Differences in Children's Fantasy Play

Children who create imaginary characters (imaginary companions and impersonated characters). Compared with past research, we used relatively stringent criteria for identifying imaginary companions. Using these criteria (outlined in the Method section), two coders worked independently for 40% of the participants (94% agreement) and worked together to categorize the remaining children. Overall, 42 children met our criteria for having an imaginary companion (28% of our sample). Eight (14%) of the 3-year-olds and 34 (36%) of the 4-year-olds met the criteria. The parents of an additional 19 children (12 girls and 7 boys) reported that their children had imaginary companions, but these children did not meet our criteria because they did not name the imaginary companions independently, and when asked about the

Table 2 Partial Correlations for Theory of Mind Tasks Controlling for Age and Verbal Intelligence (PPVT-R)

Theory of Mind Tasks	Partial Correlations		
	False Belief	Representational Change	Interpretive Diversity
Appearance-Reality	.30	.19	.23
False Belief		.42	.34
Representational Change			.26

Note: *N* = 152. On the False Belief task, *n* = 150. All correlations are significantly greater than zero ($p < .01$).

Table 3 Examples of Children's Imaginary Companions

Derek (a 91-year-old man who is only 2 feet tall but can "hit bears")
Bobo (a monkey who plays hide-and-seek and sometimes messes up the bed)
Station Pheta (a boy with "big beady eyes and a big blue head"; his job is to hunt for sea anemones and dinosaurs at the beach)
The Girl (a 4-year-old girl who is "a beautiful person" and "wears pink all the time")
Joshua (a possum who lives in San Francisco)
Baintor (an invisible boy who "lives in the light"; you can't see him because he is white)
Hekka (a 3-year-old invisible boy who is very small but "talks so much" and is "mean" sometimes)

imaginary companion named by the parent, they did not provide any information.

Children's descriptions of their imaginary companions suggested that the characteristics of these pretend friends vary widely from child to child. Despite this variability, however, our past research has shown that children's descriptions of their imaginary companions are relatively stable over time (Taylor et al., 1993). Table 3 provides examples of the imaginary companions described by children in this study.

In our sample, more girls than boys created imaginary companions. The imaginary companion group included 27 girls and 15 boys (5 girls and 3 boys in the 3-year-old group; 22 girls and 12 boys in the 4-year-old group). In addition, girls tended to report having a larger number of imaginary companions than did the boys, M (girls) = 3.8, SD = 3.6, $range$ = 1 to 13, M (boys) = 1.8, SD = 1.47, $range$ = 1 to 6, $t(39) = 2.0$, $p = .05$. (One girl was excluded from this analysis because she had too many imaginary companions to count, according to the parent.) These findings replicate the results of past research, which also shows sex differences in the incidence of imaginary companions (e.g., Hurlock & Burnstein, 1932; Jersild, Markey, & Jersild, 1933; Mauro, 1991; Svendsen, 1934; Vostrovsky, 1895).

Sometimes children assume the identity of an imagined character rather than treat the imagined character as a companion. In past research, we have found that children also combine impersonation with imaginary companion play, sometimes pretending to be the imagined character and sometimes interacting with the character. Like imaginary companion play, impersonation may be inspired by popular culture (e.g., Batman) or be unique to the child (e.g., Mr. Electricity). We decided to combine children who impersonated imagined characters with children who had imaginary companions into a group of High Fantasy

children because (1) impersonation is closely related to creating an imaginary companion (Partington & Grant, 1984), and (2) there is some suggestion in the literature that high fantasy boys might be more likely to be identified on the basis of their impersonation than on the basis of having an imaginary companion (Ames & Learned, 1946).

Almost all of the children in our sample reported that they pretended to be animals and/or people, so we relied on parent report to determine the extent of the impersonation activity. Children were included in the High Fantasy group if their parents reported that the child pretended to be someone or something (an animal, person, or machine) *every day* for a period of at least 1 month. In our sample, 29 of the 152 children (19%) (19 boys and 10 girls) were categorized as impersonators. Eight (14%) of the 3-year-olds (seven boys and one girl) and 21 (22%) of the 4-year-olds (12 boys and nine girls) met the criteria. Twelve of the impersonating children also had imaginary companions, and 17 did not. The group of 17 impersonators who did not have imaginary companions included four children (two girls and two boys) who did not meet our criteria for having an imaginary companion, but whose parents reported that the child previously had an imaginary companion that was not mentioned by the child (e.g., one parent reported that her son had created an imaginary pet rat that went everywhere with him for several months). The overlap in having an imaginary companion and impersonating imagined characters is consistent with our claim that these kinds of fantasy play are closely related.

We categorized children as creating an imaginary companion but not an impersonated character (9 boys and 21 girls), creating an impersonated character but not an imaginary companion (13 boys and 4 girls), or creating both an imaginary companion and an impersonated character (6 boys and 6 girls). We then combined children who impersonated a character and children who created an imaginary companion to create one High Fantasy group (28 boys and 31 girls). Children who neither had an imaginary companion nor impersonated a character were categorized as Low Fantasy (47 boys and 46 girls).

More 4-year-olds than 3-year-olds were categorized as High Fantasy. The mean ages of children in the High and Low Fantasy groups are shown in Table 4. In the total sample, children in the High Fantasy group were significantly older than children in the Low Fantasy group, $t(150) = 2.77$, $p < .01$. However, among the 3-year-olds and 4-year-olds taken separately, there was no significant age difference between the High and Low Fantasy groups.

Table 4 Mean Ages of Children in the High and Low Fantasy Groups

Fantasy Group	Age Group		
	3-Year-Olds (<i>n</i> = 57)	4-Year-Olds (<i>n</i> = 95)	Total (<i>N</i> = 152)
High Fantasy	3,7(2) (<i>n</i> = 14)	4,4(2) (<i>n</i> = 45)	4,2(5) (<i>n</i> = 59)
Low Fantasy	3,6(2) (<i>n</i> = 43)	4,4(3) (<i>n</i> = 50)	3,11(5) (<i>n</i> = 93)

Note: Standard deviations (in months) are shown in parentheses.

The relation between the imaginary character measure and other measures of fantasy. We conducted several tests to determine if the children who created imaginary characters differed from the children who did not create imaginary characters on other measures of fantasy administered in this study. Because of the overall age difference between children in the High Fantasy and Low Fantasy groups, these analyses were conducted separately for the 3-year-olds and 4-year-olds. Table 5 provides the mean scores on several fantasy measures as a function of fantasy group.

Toy preference: Among the 3-year-olds, the mean number of fantasy choices (out of four) was not significantly higher for the High Fantasy group than for the Low Fantasy group. Among the 4-year-olds, however, children in the High Fantasy group selected more fantasy-oriented toys and gifts to take home than did children in the Low Fantasy group, $t(85) = 2.3, p < .025$.

Level of pretend play: The High Fantasy and Low Fantasy groups of children were also compared to

Table 5 Mean Performance on Fantasy Measures as a Function of Fantasy Group and Age

Fantasy Measure and Fantasy Group	Age Group	
	3-Year-Olds	4-Year-Olds
Toy preference:		
High	1.8(1.1)	2.0(1.1)
Low	1.6(1.1)	1.4(1.1)
Level of pretend:		
High	2.1(2.3)	1.9(1.8)
Low	.7(1.2)	1.3(1.7)
Free play with reality toys:		
High	1.9(.9)	2.3(.7)
Low	2.0(.8)	2.0(.7)
Free play with fantasy toys:		
High	2.4(.5)	2.2(.6)
Low	2.3(.6)	2.4(.6)

Note: Standard deviations are shown in parentheses.

Table 6 Mean Theory of Mind Composite Scores of Children in the High and Low Fantasy Groups

Fantasy Group	Age Group		
	3-Year-Olds (<i>n</i> = 57)	4-Year-Olds (<i>n</i> = 95)	Total (<i>N</i> = 152)
High Fantasy	3.4(2.8) (<i>n</i> = 14)	8.8(3.6) (<i>n</i> = 45)	7.5(4.1) (<i>n</i> = 59)
Low Fantasy	3.6(2.9) (<i>n</i> = 43)	6.7(3.8) (<i>n</i> = 50)	5.2(3.7) (<i>n</i> = 93)

Note: Standard deviations (in months) are shown in parentheses.

determine if children in the High Fantasy group used more symbolic objects when asked to perform the six pretend actions. This measure was reliable on the two test sessions (for pretend actions directed at the self), $r(150) = .77, p < .01$. For the 3-year-olds, the composite pretend actions score was significantly different for the two groups, $t(55) = 2.95, p < .005$. For the 4-year-olds, there was a trend in the predicted direction, $t(92) = 1.72, p < .10$.

Free play with reality-oriented toys: In past research (Taylor et al., 1993), we found that children who create imaginary companions also display more pretense in a free play session with blocks. Two independent observers coded children's free play with blocks on a 3 point scale for pretense content. The agreement of the two coders was 80%; disagreements were resolved by a criterion coder. For the 3-year-olds, the mean pretense score for the High Fantasy group was not significantly different from the mean pretense score for the Low Fantasy group. However, for the 4-year-olds, there was a trend in the predicted direction, $t(93) = 1.93, p < .06$.

Free play with fantasy-oriented toys: The coding reliability for the fantasy play sessions was 83%. There were no significant differences in the scores of the High and Low Fantasy groups of children at either age when given hats and dress-up items to play with.

The relation between creating imaginary characters and theory of mind development. To determine if children in the High Fantasy group performed differently on the theory of mind tasks than children in the Low Fantasy group, children were each given a score (out of 13) for the number of theory of mind items answered correctly. In the following analyses, we will report the results for the sample as a whole and for the 3-year-olds and 4-year-olds separately.

The mean numbers of correct responses on the theory of mind tasks by children in the two groups are shown in Table 6. We conducted a 2 (High Fantasy

Table 7 Mean PPVT-R Scores of Children in the High and Low Fantasy Groups

Fantasy Group	Age Group		
	3-Year-Olds (<i>n</i> = 57)	4-Year-Olds (<i>n</i> = 95)	Total (<i>N</i> = 152)
High Fantasy	110(11) (<i>n</i> = 14)	109(14) (<i>n</i> = 45)	109(14) (<i>n</i> = 59)
Low Fantasy	106(11) (<i>n</i> = 43)	104(12) (<i>n</i> = 50)	105(12) (<i>n</i> = 93)

Note: Standard deviations are shown in parentheses.

versus Low Fantasy) \times 2 (3-year-olds versus 4-year-olds) ANOVA on the theory of mind scores and found significant main effects for fantasy and age, $F_s(1, 151) = 5.5$ and 42.8 , $p_s < .03$ and $.001$, respectively. There was a marginal fantasy \times age interaction, $F(1, 151) = 3.3$, $p < .08$. Follow-up tests showed that the scores were significantly higher for children in the High Fantasy group than in the Low Fantasy group in the total sample, $t(150) = 3.5$, $p < .01$, and among the 4-year-olds, $t(93) = 2.7$, $p < .01$. There was no significant difference in theory of mind scores among High Fantasy and Low Fantasy 3-year-olds. We also examined the extent that the 34 4-year-olds who created imaginary companions (including the 10 participants who were also impersonators) differed from the 11 4-year-olds who only impersonated imaginary characters (and did not have imaginary companions) in their performance on the theory of mind tasks and found no significant difference in scores for these two groups of children: *M* (Imaginary Companion) = 8.6 , *SD* = 3.6 , *M* (Impersonation) = 9.3 , *SD* = 3.6 . However, the mean theory of mind score for each of these groups was significantly higher than the mean score for the Low Fantasy group (*M* = 6.7 , *SD* = 3.8): Imaginary Companion versus Low Fantasy, $t(82) = 2.31$, $p < .025$; Impersonation versus Low Fantasy, $t(69) = 2.93$, $p < .005$. These results indicate that it was appropriate to combine children who create imaginary companions and children who impersonate imagined characters into a single group.

The difference in theory of mind scores for the High Fantasy and Low Fantasy groups of children is suggestive; however, we also found that children in the High Fantasy group had higher scores on our measure of verbal intelligence than did children in the Low Fantasy group. Table 7 provides the mean PPVT-R scores for children in each group. The difference in PPVT-R scores was significant for the total sample, $t(150) = 2.0$, $p < .05$, and there was a trend

in this direction for the 4-year-olds, $t(92) = 1.83$, $p < .10$. The difference was not significant for the 3-year-olds. In addition, as reported earlier, theory of mind scores were significantly correlated with scores on the PPVT-R and with age. Thus, the theory of mind difference between the two fantasy groups might have been related to differences in verbal intelligence and age rather than differences in fantasy per se.

To assess the relation between creating an imaginary character and performance on theory of mind tasks while controlling for the effect of verbal intelligence and age, we carried out an ANCOVA on theory of mind composite scores with both PPVT-R and age in months as covariates. The results showed a trend for a main effect of fantasy, $F(1, 150) = 3.5$, $p < .07$. We next repeated the ANCOVA examining the 4-year-olds independently and found that creating an imaginary character (High Fantasy) explained unique variance in theory of mind performance even after the effects of verbal intelligence and age were statistically controlled, $F(1, 93) = 5.1$, $p < .03$. A similar analysis of the 3-year-olds' data revealed no significant results.

Principal components analysis of fantasy. This analysis of individual differences in children's fantasy was based on 20 measures of fantasy and play derived from the parent and child interviews, as well as laboratory measures. The fantasy measures included all those listed in the Method section, with the exception of four measures. The child's favorite story (Session 1) and the child's favorite play activity with other children were dropped because many of the responses to these questions were uncodable ($n = 17$ and 18 , respectively). The favorite toy according to the parent was not used because 98% of these responses were fantasy oriented. Finally, frequency scores for the impersonation of a machine were not used because every child's score was 0 on this measure (i.e., no parent reported that their child impersonated a machine every day for at least 1 month). We used composite scores for variables that could be summed to increase the variance of those measures. The reliabilities for items measured at both Session 1 and Session 2 were high, so scores from the first visit were used in the principal component analysis: Favorite TV show, agreement = 90%; Favorite Story, agreement = 80%; and Favorite Toy, agreement = 74%.

The data from the 152 children on the 20 fantasy measures were factor analyzed using principal components. The first unrotated principal component (FUPC) was interpreted as an indicator of engagement in fantasy / pretense. Table 8 lists the 20 fantasy measures in descending order of correlation with the

Table 8 Correlations of Fantasy Measures with the First Unrotated Principal Component for Fantasy

Measure	Fantasy Factor Loading
Imaginary companion (our criteria)	.73
Impersonation (our criteria)	.67
Imaginary companion (according to parent)	.66
Impersonation of person (according to parent)	.61
Singer's IPP (Session 1)	.53
Impersonation of animal (according to parent)	.46
Pretend actions (self-directed)	.44
Favorite play activity (alone) (according to parent)	.40
Favorite play activity (with others) (according to parent)	.37
Toy preference	.35
Pretend actions (object-directed)	.30
Favorite TV program (according to parent)	-.21
Impersonation of person (according to child)	.17
Impersonation of machine/vehicle (according to child)	.17
Favorite TV program (Session 1) (according to child)	-.14
Impersonation of animal (according to child)	.12
Favorite story (according to parent)	.10
Free play with hats	-.10
Free play with blocks	.08
Favorite toy (Session 1) (according to child)	.04

Note: $N = 152$.

fantasy/pretense factor. As can be seen in this table, IC, impersonation, and Singer's measures loaded most heavily on the fantasy/pretense factor. Factor scores were derived from the FUPC for fantasy/pretense and were significantly correlated with children's performance on the PPVT-R in the total sample, $r(150) = .28, p < .01$, as well as for the 4-year-olds, $r(93) = .37, p < .01$. This correlation was not significant for the 3-year-olds, $r(55) = .15$.

To assess the relation between this general fantasy/pretense measure and theory of mind, the fantasy/pretense factor scores were correlated with the theory of mind composite scores, controlling for the effects of verbal intelligence and age. This partial correlation was significant in the total sample of children, $r(150) = .16, p < .04$, as well as in the 4-year-old age group, $r(93) = .27, p < .02$. The result for the 3-year-olds was not significant.³

3. At a reviewer's suggestion, we repeated these analyses using fantasy factor scores derived from the subset of 11 fantasy

Next, we wanted to determine which of the fantasy/pretense variables were most related to theory of mind performance. We conducted a multiple regression entering all 20 fantasy variables together. The correlations between these measures and the theory of mind composite scores, as well as the corresponding regression weights, are shown in Table 9. Symbolic object use in pretend actions toward the self (e.g., pretending to brush your teeth with a toothbrush) was most strongly related to theory of mind, followed by free play with blocks, impersonation, and our imaginary companion measure. Finally, we performed a stepwise regression to determine which of the 20 fantasy measures could account for the most variance in theory of mind. As shown in Table 10, these were pretend actions (self), block play, and impersonation of a person according to the parent.

This analysis yielded two unexpected results. Contrary to our predictions, fantasy-oriented responses to questions about the child's favorite television show were inversely related to the theory of mind scores. Although a relatively small number of children reported reality television shows as their favorite (10%), these children tended to do better on theory of mind tasks (composite scores) than did children who named fantasy programs, $M(\text{Reality}) = 7.9, SD = 3.4, M(\text{Fantasy}) = 6.0, SD = 4.0, t(145) = 1.7, p < .10$.

We also found that the impersonation of a machine was negatively related to theory of mind in the stepwise regression analysis. A closer examination of the theory of mind composite scores showed that children who said they sometimes pretended to be a machine (48% of our sample) tended to score lower than children who did not, especially in the 4-year-old age group: $M(\text{"yes"}) = 7.2, SD = 3.7; M(\text{"no"}) = 8.8, SD = 3.9; t(93) = 1.9, p < .06$. Thus, the insight into other minds derived from impersonation appears to be limited to the impersonation of living beings, such as people and animals.

Other Findings

Television viewing. We were interested in the relation between television viewing time and fantasy/pretense because Singer and Singer (1990) found that children who watched less television were more

measures that were significantly related to the first unrotated principal component for fantasy (see Table 8). The partial correlations between these scores and composite theory of mind scores (controlling for age and verbal intelligence) were essentially the same as when using factor scores derived from all 20 measures: total sample $r = .16, p < .04$; 4-year-olds $r = .24, p < .02$; nonsignificant for 3-year-olds.

Table 9 Correlations and Standardized and Raw Regression Weights of the Fantasy Measures with the Theory of Mind Composite Scores

Fantasy Measure	<i>r</i>	Standardized (Beta)	Raw (B)
Pretend actions (self-directed)	.26**	.24	.88
Free play with blocks	.23**	.19	1.04
Impersonation (our criteria)	.22**	-.27	-2.74
Impersonation of person (according to parent)	.21**	.34	3.81
Imaginary companion (our criteria)	.20*	.21	1.87
Impersonation of animal (according to parent)	.17*	.20	3.28
Favorite TV program (Session 1) (according to child)	-.14	-.19	-2.61
Impersonation of machine/vehicle (according to child)	-.14	-.17	-1.45
Pretend actions (object-directed)	.13	-.08	-.39
Impersonation of animal (according to child)	-.11	-.09	-.96
Favorite play activity (alone) (according to parent)	.11	.03	.27
Favorite TV program (according to parent)	-.10	-.04	-.46
Toy preference	.09	.03	.10
Favorite toy (Session 1) (according to child)	.08	.10	.94
Imaginary companion (according to parent)	.08	-.12	-1.04
Singer's IPP (Session 1)	.07	.03	.12
Free play with hats	-.05	-.05	-.34
Favorite story (according to parent)	-.03	-.01	-.12
Favorite play activity (with others) (according to parent)	.02	-.06	-.57
Impersonation of person (according to child)	.01	.03	.28

Note: $N = 152$.

* $p < .05$; ** $p < .01$.

imaginative than children who watched a great deal of television. We asked parents to estimate the number of hours per day their child watched television (1, 2, or 3 or more hours). Our results were consistent with previous findings. For the 4-year-olds, children in the High Fantasy group watched less television ($M = 1.7$, $SD = .6$) than did children in the Low Fantasy group ($M = 2.0$, $SD = .5$), $t(93) = 2.73$, $p < .01$. In

addition, there was an inverse relation between television viewing time and theory of mind performance in which children who watched less television scored higher on the theory of mind tasks. This was true for the 4-year-olds, $r(93) = -.35$, $p < .01$, as well as the total sample of children, $r(149) = -.24$, $p < .01$.

Perhaps the finding that children who watched more television tended to obtain lower fantasy scores

Table 10 Raw and Standardized Regression Weights of the Fantasy Measures That Best Predicted Theory of Mind Composite Scores: Stepwise Regression

Step and Fantasy Measure	Multiple <i>R</i>	Standardized (Beta)	Raw (B)
1. Pretend actions (self-directed)	.26	.26	.92
2. Free play with blocks	.33	.21	1.12
3. Favorite TV program (Session 1) (according to child)	.37	-.17	-2.31
4. Impersonation of machine/vehicle (according to child)	.41	-.17	-1.44
5. Impersonation of person (according to parent)	.44	.17	1.86

Note: $N = 152$.

can help explain the finding that naming a fantasy television show as one's favorite was inversely related to theory of mind. It is possible that even when children view mainly fantasy-oriented material, the very act of watching TV is not conducive to imaginative play and, indirectly, theory of mind development. On the flip side, reality-based programs contain relationship conflicts and resolutions involving cognitive and emotional perspective taking that are more relevant for children's everyday understanding in this domain than the situations portrayed in more fantasy-oriented shows.

Siblings. In past research, investigators have been interested in the relation between the number of children in the family and theory of mind. Among children with three or fewer siblings (primarily 0 or 1 sibling), Perner et al. (1994) found a positive correlation between the number of siblings and performance on a test of false belief. In contrast, we found no relation between number of siblings (0, 1, or 2) and theory of mind performance (composite scores) in either age group or for the total sample. There also was no correlation between the number of siblings and performance on the false belief tasks.

Eighty percent of the children in our sample had one or two siblings (*range* = 0 to 12 siblings). A *t* test comparing false belief performance of children with one sibling ($M = 1.1$, $SD = 1.3$) with the performance of children with two siblings ($M = 1.7$, $SD = 1.3$) was significant, $t(117) = 1.98$, $p = .05$, indicating that children with two siblings had less difficulty with the false belief tasks. This result was the only evidence we found of a relation between number of siblings and false belief performance. The reasons we did not replicate Perner et al.'s much stronger results are not obvious to us. We can only speculate that the differences could be due to the small number of only children in our sample (12.5%) or some other sample difference.

Summary of Results

In this study, the relation between individual differences in children's theory of mind development and their engagement in pretend play and fantasy was examined. Theory of mind was assessed with a composite score that combined measures of false belief, appearance-reality, representational change, and perspective taking. Children's performances on the four theory of mind tasks were significantly correlated with the effects of age and verbal intelligence statistically controlled. This finding adds to growing evidence of conceptual coherence in the development of children's understanding of mental state concepts

(Gopnik & Wellman, 1994; Slaughter & Gopnik, 1995).

Individual differences in fantasy were assessed in two different ways: (1) by determining if the children created imaginary characters in their spontaneous pretend play, and (2) by conducting a principal component analysis of 20 measures of fantasy and pretense (including the imaginary character and Singer's IPP measures as well as laboratory tasks, parent and child interviews, and free play observations) and deriving factor scores from the general fantasy factor emerging from this analysis. For the 4-year-olds, both ways of assessing individual differences showed that fantasy predicted children's theory of mind scores, and this relation was independent of children's age (in months) and verbal intelligence. We are not certain why this relation between fantasy and theory of mind was not found for the 3-year-olds. Perhaps our methods for assessing individual differences in fantasy were not as appropriate for younger children as for the older ones. This possibility is suggested by the finding that the High and Low Fantasy groups of 4-year-olds differed on diverse kinds of pretense/fantasy tasks (e.g., their preference for fantasy- over reality-oriented toys, the extent that they engaged in fantasy when playing with blocks), whereas the High and Low Fantasy groups of 3-year-olds were less coherent in that they did not show differences on these other kinds of fantasy measures. Acredolo, Goodwyn, and Fulmer (1995) have found that individual differences in fantasy play start to emerge as early as 11 months of age, but perhaps the forms that fantasy play take during the third and fourth year of life are particularly influential in developing insights about the mind, giving 4-year-olds an advantage because they are further along in building up these kinds of experiences. It is also possible that the findings for the High Fantasy group of 3-year-olds reflect the idiosyncracies that sometimes are found when the sample size is small.

DISCUSSION

The results of this study provide strong evidence that there is a relation between theory of mind development and pretend play in 4-year-old children. However, the nature of the relation cannot be determined from our correlational data, and inferences about causality are not warranted. It is possible that extensive fantasy experience promotes an understanding of mind, but it is also possible that children who have an early developing understanding of mind are more interested in fantasy play, or that some third factor underlies development in both areas.

Although the data from this study do not distinguish among these alternatives, our intuition is that extensive fantasy experiences help children develop an understanding of mind. Although we did not control for all possible third factors in this study, we did include a measure of verbal intelligence, which *a priori* would be considered to be a prime candidate as a mediating factor because of its relation to pretense and to false belief understanding. However, the relation between fantasy and theory of mind was independent of the relation of verbal intelligence to both variables. It is possible that some other third factor accounts for the relation between theory of mind and fantasy. Frye et al. (1994) have argued that theory of mind development reflects the development of more general cognitive skills, and have found some support for the hypothesis that the ability to represent nested relations underlies development in both theory of mind and tasks that do not involve mentalistic concepts. However, there is no evidence that this general ability is related to children's interest in or predisposition to engage in pretend play. In addition, Perner et al.'s (1994) results argue against an understanding of mind as primarily dependent on general cognitive maturity or intelligence because the positive relation between family size and false belief obtained by Perner et al. is the opposite of the well-documented relation between family size and intelligence (i.e., only and first-born children tend to score higher on IQ tests than do later-born children; Zajonc & Markus, 1975). Perner et al. interpreted their results, combined with the findings of Dunn et al., as suggesting that pretend interactions with siblings help children understand false belief.

Although we prefer the hypothesis that individual differences in fantasy lead to individual differences in theory of mind, it is possible that children who have an early grasp of false belief might become more engaged in fantasy play. This hypothesis is discussed by Lillard (1994), who speculates that children who have special insight into false beliefs might be more interested in engaging in dramatic play, or might be more capable of negotiating dramatic pretend play with other children. Although we cannot rule out this possibility, it is difficult to integrate this account with the very different developmental timetables that are typical for pretense and understanding of mind. Children start to pretend at the tender age of 12 to 18 months. Although social referencing and other social cognitive abilities emerge during infancy, the most dramatic changes in theory of mind development seem to occur during the period from 3 to 5 years of age. One might be able to construct an account of how early-developing social cognitive skills lead to both an interest in pretend play and the early mastery

of false belief, but the view that engagement in fantasy promotes theory of mind development seems more parsimonious. In fact, a variety of authors have discussed pretense as a possible precursor to an understanding of mind (e.g., Gopnik et al., 1994; Perner, Ruffman, & Leekam, 1994).

We suspect that engaging in pretend play develops children's understanding that mental representations may not constitute an accurate reflection of the external world. This insight should be more obvious in the domain of fantasy than in the domain of belief: Whereas beliefs are representations of the external world, fantasy often has no counterpart in real life (e.g., a story about pink elephants who take ballet lessons). Children might first appreciate the possibility of a mismatch between mental representations and reality in the domain of fantasy and only subsequently master the related insights concerning belief. On this view, pretense is an early developing component of mental state understanding, and the insights that develop in this part of a theory of mind lead to changes in other parts of the theory (see Slaughter & Gopnik, 1996, for a discussion of how development within a theory might proceed). Our finding of a relation between individual differences in theory of mind development and in pretend play is consistent with this interpretation. However, to go beyond speculation about a causal relation between pretense and theory of mind development, it is necessary to determine if training in pretend play affects children's understanding of mind. Dockett (1994) has conducted such a study and found that children in the training condition outperformed children in a control group on theory of mind tasks.

There are many kinds of experience that fall under the general heading of fantasy or pretense. We have not identified exactly which kinds of experiences are most likely to promote an understanding of mind. Some researchers have stressed the importance of cooperative play involving other children (e.g., Schwebel, Rosen, & Singer, 1997). Although we do not wish to suggest that this kind of play activity is unimportant, the measures in this study tended to focus more on private kinds of fantasies that do not necessarily involve other children. The imaginary character measure of fantasy involved a mostly solitary type of play, and even though the fantasy factor scores included some measures of the children's engagement in pretend play with other children, most of the items concerned pretend play activities that tend to occur when children are alone. Our results indicate that it is not just cooperative play with other children that is related to early development in children's understanding of mind. In future research, it would be interesting to determine if children who en-

gage in cooperative play with other children also tend to engage in fantasy activities while alone, and if each type of play makes an independent contribution to children's developing understanding of mind.

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