



12-2014

Do Actions Speak Louder than Knowledge? Action Manipulation, Parental Discourse, and Children's Mental State Understanding in Pretense

Dawn Melzer

Sacred Heart University, melzerd365@sacredheart.edu

Laura J. Claxton

Purdue University

Follow this and additional works at: http://digitalcommons.sacredheart.edu/psych_fac



Part of the [Child Psychology Commons](#), and the [Developmental Psychology Commons](#)

Recommended Citation

Melzer, Dawn and Claxton, Laura J., "Do Actions Speak Louder than Knowledge? Action Manipulation, Parental Discourse, and Children's Mental State Understanding in Pretense" (2014). *Psychology Faculty Publications*. 62.

http://digitalcommons.sacredheart.edu/psych_fac/62

This Article is brought to you for free and open access by the Psychology Department at DigitalCommons@SHU. It has been accepted for inclusion in Psychology Faculty Publications by an authorized administrator of DigitalCommons@SHU. For more information, please contact ferribyp@sacredheart.edu.



ELSEVIER

Contents lists available at ScienceDirect

Journal of Experimental Child Psychology

journal homepage: www.elsevier.com/locate/jecp



Do actions speak louder than knowledge? Action manipulation, parental discourse, and children's mental state understanding in pretense



Dawn K. Melzer^{a,*}, Laura J. Claxton^b

^a Department of Psychology, Sacred Heart University, Fairfield, CT 06825, USA

^b Department of Health and Kinesiology, Purdue University, West Lafayette, IN 47906, USA

ARTICLE INFO

Article history:

Received 30 June 2013

Revised 18 June 2014

Keywords:

Mental state understanding

Pretend play

Parent–child communication

Mental state language

Preschoolers

Executive function

ABSTRACT

Studies on pretense mental state understanding in young children have produced inconsistent findings. These findings could potentially emerge from the confounding influences of action manipulation or the failure to examine possible influences on individual children's performances. To address these issues, we created a task in which 68 3- and 4-year-olds viewed two actors, side by side, on a monitor. Children were told that one actor was knowledgeable about a specific animal, whereas the other actor was not. The actors performed identical movements that were either *related* or *unrelated* to the animal they were mimicking or engaged in different behaviors *contradictory* to their knowledge. Saliency of action was also manipulated by presenting either dynamic images or a paused frame of the actors' behavior (i.e., the static condition). Children performed similarly on the dynamic and static conditions. Children selected the knowledgeable actor more often in the *unrelated* and *related* trials but were not as successful at selecting the knowledgeable actor when the actor's knowledge contradicted the actor's behavior. Therefore, by 3 years of age, some children may understand that pretend play involves mental representations and appreciate that the mind influences a pretender's behavior. To investigate the observed individual differences, we also examined children and parents as they engaged in reading and pretense activities prior to data collection. The frequency of parents' cognitive mental state utterances strongly predicted performance on the mental state task. Individual differences in performance as a result

* Corresponding author. Fax: +1 203 371 7998.

E-mail address: melzerd365@sacredheart.edu (D.K. Melzer).

of parental language and executive functioning abilities are discussed.

© 2014 Elsevier Inc. All rights reserved.

Introduction

Children accept the most extraordinary scenarios in their play. They pretend to be princesses and dragons living in elaborate moat-protected castles, and they find joy in tasks that adults go about begrudgingly (e.g., making dinner). There has been considerable research examining the cognitive mechanisms underlying pretense (Nichols & Stich, 2000; Schroeder & Matheson, 2006). Theories regarding these mechanisms differ on the subject of children's awareness of mental states during pretend play (e.g., manipulation and monitoring of the mind's content), especially before 5 years of age.

The two main views of young children's understanding of mental states during pretend activities are termed the *action hypothesis* and the *mental state hypothesis* (see Ganea, Lillard, & Turkheimer, 2004, for a review). The action hypothesis posits that children associate pretend play with actions before realizing the mind's involvement (Lillard, 1993; Perner, 1991). According to this hypothesis, young children do not appreciate the knowledge of a pretender as being important to the pretend play and instead focus on the action of the pretender (Lillard, 1993).

The key study supporting the action hypothesis is Lillard's (1993) "Moe" study. In this study, 4- and 5-year-olds were presented with dolls that acted out behaviors. For example, if "Moe" had never seen a rabbit and had no knowledge regarding rabbits but was hopping like a rabbit, children were asked whether or not Moe was pretending to be a rabbit. Most 4-year-olds responded that Moe was pretending to be a rabbit. Thus, they ignored the lack of information Moe possessed mentally in favor of concentrating on his actions.

In contrast to the action hypothesis, the mental state hypothesis of pretense posits that the understanding of mental state is a necessary component of pretense understanding (Leslie, 1987) and that young children appreciate the role of the pretender as being important to pretend play (Gottfried, Kickling, Totten, Mkroyan, & Reisz, 2003; Harris & Kavanaugh, 1993; Rakoczy, Tomasello, & Striano, 2004). This is illustrated by Bruell and Woolley (1998), who had 3- and 4-year-olds view images depicting two characters interacting with an object (e.g., a cardboard box). The characters performed the same actions with the box (e.g., touched the box as if pressing buttons), but a "thought bubble" appeared above each of their heads to indicate what each character was pretending the object to be. For example, one actor had a thought bubble containing a horse, and the other had a thought bubble containing a car. In subsequent questioning, children were asked what the actors were pretending the object should be and what the actors were actually doing with the object. Children performed well when given the thought bubbles. When the actor's thoughts were made salient in the thought bubble, even young children displayed an understanding of the mental representations in pretend play. Their findings support the mental state hypothesis that young children do possess the ability to understand that the mind is important when interacting with others during pretend play.

Perhaps the discrepancies between the action-based and mental state-based hypotheses are due to individual differences and environmental influences. Limited research has addressed the role of individual differences in children's understanding of mental states in their pretend play (Hughes & Dunn, 1997; Hughes, Ensor, & Marks, 2011; Lillard & Witherington, 2004; Sabbagh & Callanan, 1998). One possible factor contributing to individual differences on mental state tasks is the type of language caregivers and children use when engaged in pretend play.

The ability to appreciate that the mind of a pretender is important during pretense activities has been linked with increased use of mental state language by parents (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Taumoepeau & Ruffman, 2008). Parental use of mental state terms has been associated with the amount of time children are engaged in pretend play activities and the complexity of that pretend play (Nielsen & Dissanayake, 2000; Youngblade & Dunn, 1995). Jenkins,

Turrell, and Kogushi (2003) found that increased use of cognitive mental state speech by parents that references the mind by using terms such as “think” and “remember” during play and reading time was related to increased use of this type of speech by children and to mental state understanding. The role of parental language in children’s understanding of mental states during pretend play has not been explored.

The goal of the current study was to explore which hypothesis—action or mental state—more accurately explains how 3- and 4-year-olds understand pretend play episodes by using both new and modified methodologies. It also aimed to investigate the possibility that individual differences in the type of language parents and children use during their interactions may account for the mixed results found in prior studies. Children completed a mental state task and were video-recorded with their parents during a reading and pretend play activity to look at the language used during that activity. The mental state task used a methodology similar to that used by Ganea and colleagues (2004). In their study, 3- and 4-year-olds were presented with two actors side by side on a screen. Children were told the intention of one of the actors (“I am going to fly like a bird now”) even though the actor was acting contradictory to that intention (e.g., he was jumping up and down). The second actor on the screen behaved appropriately for the animal used in the example (e.g., the actor behaved like a bird) but was not intending to be a bird. Both 3- and 4-year-olds selected the appropriately behaved actor more than the actor that intended to behave like a bird when asked which actor was pretending to be a bird. Children relied more on action when a comparison was presented between the appropriately and inappropriately behaved pretenders and ignored the intentions of the character.

The current study also presented children with a mental state task with two actors side by side on the screen, but in contrast to Ganea and colleagues’ (2004) study, children in the current study were provided with information regarding the actor’s knowledge instead of the actor’s intention when asked to decide which actor was pretending. This was due to the inconsistent findings of children’s understanding of intentions before 5 years of age (Harris & Kavanaugh, 1993; Mitchell & Neal, 2005; Rakoczy et al., 2004) and the fact that children have demonstrated an appreciation of knowledge as an important factor in pretend play activities by 3 years of age (Gottfried et al., 2003). In addition, previous research has employed knowledge and thought as the information presented to younger children in mental state tasks (Lillard, 1993; Sobel, 2004).

Most studies have not controlled for the potential confounding influences of action dynamism (Ganea et al., 2004; Lillard, 1993). In traditional trials, children could focus on either action or knowledge when deciding whether an actor was pretending. In the current study, during the mental state task, three presentation formats that manipulated the action and knowledge of an actor were presented to each child. In contrast to previous studies, one of these presentation formats eliminated the possibility that children could rely on action and instead forced children to select based on the actor’s knowledge (as articulated by the experimenter). In addition, if children view pretend play as action based (as according to the action hypothesis), increasing the saliency of an actor’s behavior would make it more difficult for children to appreciate the actor’s mental state because the action would be harder to ignore. To investigate this possibility, children in the current study saw two actors moving simultaneously on a television screen in a dynamic condition or saw only a paused frame depicting actors as if engaged in a particular behavior (i.e., the static condition).

Finally, studies have found evidence to support both the action-based and mental state-based hypotheses with only slight variations in methodology (Bruell & Woolley, 1998; Lillard, 1993; Sobel, 2004). Perhaps these differences are due to unexplored individual differences in children’s environments. Research has identified that mental state utterances by parents are related to mental state understanding in their children; therefore, this factor was investigated in anticipation that it would aid in explaining the variation in previous findings (Jenkins et al., 2003). To accomplish this goal, parents and children engaged in reading and pretend play activities before the children completed a mental state task, and their mental state utterances were recorded.

It was hypothesized that children would be less successful at selecting the knowledgeable actor as the one pretending if the actor’s behaviors did not appear to match the actor’s knowledge during the dynamic condition compared with the static condition because the children would have difficulty in overriding the information from salient actions. In support of the mental state hypothesis, the current hypotheses predicted an understanding of mental states in pretense activities earlier than that posited

by the action hypothesis. It was also predicted that parents who place more emphasis on using words that highlight mental states, specifically cognitive terms, would have children who were more successful at selecting a knowledgeable actor compared with an unknowledgeable actor during the mental state task (Jenkins et al., 2003).

Method

Participants

The participants were 73 3- and 4-year-old children from the Amherst and Springfield communities of Massachusetts in the northeastern United States. Children's names and contact information were obtained from town hall birth records, birth announcements, and parental responses to flyers distributed to local preschools. Of the original sample, five participants were excluded due to an inability to complete the protocol. Therefore, 68 participants (33 girls and 35 boys) were included in the final analyses: 39 3-year-olds ($M_{\text{age}} = 40$ months, range = 37–42) and 29 4-year-olds ($M_{\text{age}} = 51$ months, range = 48–56). Children were predominantly of Caucasian ethnicity and from middle- to upper middle-class backgrounds. Procedures were approved by the university institutional review board.

Materials

A digital video camera was used to record the entire session for later offline coding. To encourage parent-child interactions, a number of objects designed to promote pretend play were available in the testing room during the pretend play activity. A bucket containing kitchenware, stuffed animals, plastic figures, and dress-up clothing and hats (e.g., ballerina outfit, fireman hat, construction hat) was available to participants. Two books were used during the reading activity. *Rainy Day* by Anna Milbourne was selected because it included vibrantly colored pictures, had few written words, and discussed topics interesting to children. *I Just Forgot* by Mercer Mayer was selected for its references to the mind and for the popularity of the little critter character with preschool-age children.

For the mental state task, 12 different animal-appropriate actions produced by actors (7 females and 5 males) were videotaped (Table 1). The animal-appropriate actions were determined during pilot testing. Videos of the actors engaged in actions were shown to 15 preschool-age children. The children were asked what animal they believed the person was imitating. The animals selected were the ones the children correctly identified the actors as portraying 85% to 95% of the time during pilot testing. The animals were further separated into two groups. The six animals for which children had the highest percentage of correct responses (bunny, dog, elephant, chicken, monkey, and frog) were placed in Group A, and the six animals with the lower percentage of correct responses (snake, fish, crocodile,

Table 1
Animal identities and actor's associated behaviors used during mental state task.

| Animal identity | Actor's behavior |
|-----------------|---|
| Bunny | Hopping, standing upright, hands curled in front of body |
| Dog | Crawling on hands and knees |
| Elephant | Waving one arm up and down in front of face (like trunk movement) |
| Chicken | Arms on hips, elbows flapping in synchronous motion |
| Monkey | Arms outstretched and uneven on sides, moving up and down in a synchronous motion |
| Frog | Hopping up and down in crouching position |
| Fish | Swimming arms at shoulder height in synchronous motion |
| Bird | Arms outstretched, waving up and down in synchronous motion |
| Spider | Wiggling fingers up and down next to face |
| Crocodile | Opening and closing both arms in front of face (a biting action) |
| Snake | Slithering on stomach on floor |
| Penguin | Waddling back and forth while standing upright |

penguin, spider, and bird) were placed in Group B. Children were placed into one of two groups. The first group received the A animal identities, and the second group received the B animal identities. This was done to rule out animal identity as a confounding factor in children's performance and to make it easier to interpret the results if differences were found between the higher and lower response groups.

Actors did not display emotion (e.g., smiling, frowning) or facial behavioral cues associated with the animals (e.g., did not suck in cheeks if acting like a fish). Actors used body motion only to demonstrate animal behaviors.

A DVD player and a 26-inch television were used to present the six pairs of static or dynamic stimuli given to each child on the mental state task. Using Final Cut Pro, the individual movies were spliced together to create a split screen effect. Two actors, side by side, appeared in the clip moving according to the animal behavior they were assigned. In the static condition, a specific frame from the original video depicting the actor in the middle of one of the activities (e.g., arms at shoulder height as if flapping them up and down) was captured and paused to create a still image of the actor's behavior.

Design and procedure

For each participant, parent–child interaction activities (pretend play and storybook) were completed first, followed by the mental state task. The interaction activities were placed before the mental state task to increase the child's comfort level in the laboratory setting. For the mental state task, each child was assigned to one of four groups: (a) animal identities A/static group, (b) animal identities A/dynamic group, (c) animal identities B/static group, or (d) animal identities B/dynamic group. Within these conditions, the child was presented with two trials of each presentation format (Same Related Action, Contradictory Action, and Same Unrelated Action) for a total of six trials.

Parent–child interaction

At the start of the session, the experimenter explained the procedure for either the pretend play or storybook phase of the experiment and then left the room. The order of the parent–child interaction activities was counterbalanced. For the pretend play segment, the parent was instructed to improvise and use as many or few of the toys as desired in order to engage the child in pretend play activities for approximately 10 min.

For the storybook reading activity, the experimenter presented the parent with the two books and instructed the parent to read to the child as the parent would do in his or her own home. This activity took 10 min to complete as well. Parents were instructed to reread the books if they finished before the 10-min time period had elapsed.

After completing both the pretend play and storybook activities, the parent was given a brief survey asking about parental education. The parent was also asked about the child's familiarity with the animals and the associated behavioral actions being used in the mental state task. For example, the parent was given the word "fish" and then the accompanying behavioral action (e.g., swimming arms at shoulder height) and was asked to indicate if the child was familiar with the animal and the associated behavior. Parents of all 68 participants indicated that their children were familiar with the listed terms used for the animals except for "crocodile." Because five of the children were more familiar with "alligator," that term was substituted during the mental state task trial involving that animal.

Mental state task

Following the parent–child interactions, the experimenter removed the books and toys from the room and brought in art supplies that the experimenter and child used to create the "pretend hat." A forced-choice paradigm was used in the current study to limit the need for the child to respond verbally to questions. Instead, the child indicated the actor he or she believed to be pretending by placing a small hat on the actor's head. This hat was referred to as the pretend hat. By using a forced-choice paradigm, we eliminated the possibility that children might reply "I don't know" or "neither" because they did not need to respond verbally when asked to select which actor was pretending to be the animal.

After creating the child's hat, the child and experimenter put the hats on and then engaged in a pretend play activity (e.g., pouring "water" into a cup) to emphasize that pretend play occurred while

wearing the hats. Then the experimenter showed the child a smaller version of the pretend hat that would be used during each of the mental state task trials. The small pretend hat was made of construction paper with a small piece of double stick tape so that it could be attached to the television. The experimenter then explained to the child how the pretend hat would be used: “Look at what I have here. I have a little pretend hat just like our pretend hats, and one of these boys is going to wear it.” The experimenter then demonstrated how each actor on the television screen could wear the pretend hat by attaching it to each of the actor’s heads. “When someone is pretending, they get to wear a pretend hat just like the one we are wearing while we pretend.”

After the introduction of the pretend hats, children began the mental state task. Children participated in either the static or dynamic condition for all six trials of the mental state task. In both conditions, two actors appeared on a screen at the same time using the split screen image while the experimenter labeled and pointed to them. Children in each static group were shown pairs of actors paused on the screen displaying an animal behavior on each trial. Children in each dynamic group were shown the same pair of actors, but after 5 s each actor simultaneously began his or her behaviors. The static image or the dynamic sequence of movement continued to be visually available to children until the mental state questions were answered.

There were three presentation formats within the mental state task: Same Related Action, Contradictory Action, and Same Unrelated Action. The Same Related Action and Contradictory Action trials were based on [Ganea and colleagues' \(2004\)](#) study. All children were presented with two trials of each presentation format. For each of the presentation formats, the knowledgeable actor had knowledge of an animal he was pretending to be (e.g., knows about frogs), whereas a second actor, side by side with the first actor, had knowledge of a non-animal-related activity (e.g., playing soccer).

For Same Related Action trials, both actors visible on the split screen were engaged in the same action. However, one actor was described as possessing knowledge about an animal consistent with the action that was portrayed and one actor was described as possessing knowledge inconsistent with the action. For example, even though both actors were exhibiting the same behavior appropriate for an animal (e.g., they were both crawling around on their hands and knees like a dog), one actor was knowledgeable about the animal (e.g., dog), whereas the other actor was not knowledgeable about the animal. To avoid the issue of children selecting an actor as the one pretending based on the association with an animal label, each actor was described as having or not having knowledge of the animal and a non-pretend activity. For example, the actor who was knowledgeable about dogs was not knowledgeable about swimming, and the actor who was not knowledgeable about dogs was knowledgeable about swimming. Which actor was knowledgeable about the animal during this presentation format was counterbalanced. The child was told the following:

“This is Bill. This is James.” [The experimenter points to each character on the screen.] (The position of frames and order of descriptions were counterbalanced.) “Both Bill and James are crawling around on their hands and knees. But they are different because Bill knows about dogs. He has a dog and reads about dogs [pointing to Bill]. James is from far away and has never seen a dog. He has never read about dogs and does not know what a dog is [pointing to James]. There is something Bill does not know about, though. He does not know about swimming. He has never read about swimming and has never seen anyone swim [pointing to Bill]. James does know about swimming. He reads all about swimming and has seen people swim [pointing to James]. One boy is pretending to be a dog, and one boy is swimming. Can you point to the boy pretending to be a dog so we can give him a pretend hat just like our hat?”

If the child did not point, the experimenter prompted the child by saying, “You are such a great pretender, and I cannot figure out which of these boys should wear a hat like ours. The boy pretending to be a dog should get it. Which one do you think it is?” After the child selected the actor to place the pretend hat on, the experimenter praised the child’s effort regardless of whether the child chose the knowledgeable or unknowledgeable actor.

If the child understood that only someone who had knowledge of a dog was able to pretend to be a dog, the child should choose Bill. In contrast, if the child did not understand that knowledge was important in pretend play and instead based his or her response on the behavior of the actors, the child should be equally likely to choose either Bill or James.

The Contradictory Action trial instructions were the same as the Same Related Action trial instructions, but for this presentation format the two actors were exhibiting different behaviors. The experimenter informed the child of the actor's knowledge regarding an animal, but that actor performed actions that did not support that knowledge. In contrast, the actor who had no knowledge of the appropriate behavior associated with that animal nevertheless produced actions consistent with knowledge of that animal. For example, the actor who was behaving appropriately for the animal used in the example (e.g., was slithering around on the floor like a snake) was not knowledgeable about snakes and instead was knowledgeable about a different activity (e.g., gymnastics). The actor who was knowledgeable about snakes was acting inappropriately for a snake (e.g., was flapping her arms up and down) but was not knowledgeable about a different activity (e.g., gymnastics).

Instructions for the Same Unrelated Action trials were the same as those described above for the other two presentation formats in that the experimenter informed the child of the actors' knowledge. However, now both actors behaved in a similar manner that was unconventional for the animal the experimenter was referring to in their story. For example, both actors were engaged in the same activity (e.g., crawling on their hands and knees), but the child was told that one actor was knowledgeable about birds but not knowledgeable about swimming and that the other actor was knowledgeable about swimming but not about birds. Distinct from other research, in this study children needed to ignore the action of both actors because neither actor was behaving in accordance with the pretend animal's identity.

Correct responses were the same for all three presentation formats. If the child understood that only someone who had knowledge of the animal was able to pretend to be that animal, the child would choose the actor knowledgeable about the animal. In contrast, if the child did not understand that knowledge was important in pretend play and instead based his or her response only on the behavior of the actors, the child either would choose the appropriately behaved actor, during the Contradictory Action trials, or would be equally likely to choose either one of the actors in the Same Unrelated Action or Same Related Action trials. See Table 2 for further explanation of each presentation format. To collect further information about the child's rationale, the child was asked why he or she chose the actor for the pretend hat.

Data scoring and analysis

Parent–child interactions

The parent's and child's mental state utterances from the videotape recordings obtained during each of the 10-min pretend play and storybook phases of the experiment were examined by a primary coder. The criterion selected for scoring mental state utterances was based on previous approaches developed by Jenkins and colleagues (2003) and Ruffman, Slade, and Crowe (2002). Accordingly, mental state talk was divided into four categories: desire, emotion, cognitive, and modulations of assertion.

To ensure reliability, a trained secondary coder viewed 20% of the interactions for mental state talk. Agreements were categorized as the same word labeled by both coders as a mental state term.

Table 2

Example of animal behavior associated with each presentation format and correct answer expected from children during trial.

| | Same related action | Same unrelated action | Contradictory action |
|--|---|---|---|
| Behavior of actor on right of screen who is <i>knowledgeable about birds</i> but not knowledgeable about swimming | Exhibits appropriate behavior—Arms waving up and down | Exhibits inappropriate behavior—Crawling on hands and knees | Exhibits inappropriate behavior—Crawling on hands and knees |
| Behavior of actor on left of screen who is NOT knowledgeable about birds but is <i>knowledgeable about swimming</i> | Exhibits appropriate behavior—Arms waving up and down | Exhibits inappropriate behavior—Crawling on hands and knees | Exhibits appropriate behavior—Arms waving up and down |
| Correct response to question: "Can you point to the boy pretending to be a bird so we can give him a pretend hat just like our hat?" | Child points to the actor on right of screen who is knowledgeable about birds | Child points to the actor on right of screen who is knowledgeable about birds | Child points to the actor on right of screen who is knowledgeable about birds |

Disagreements were considered as those where one coder believed the utterance to be a mental state term and the other coder did not, and these were resolved through further discussion until a consensus was achieved. The inter-rater reliability was found to be $\kappa = .85$ ($p < .001$), 95% confidence interval (CI) [.81, .89].

Mental state task

Each trial of the mental state task was scored on the basis of whether the child picked the actor whose knowledge permitted the opportunity to engage in pretense. The maximum number of points a child could obtain for the mental state task was six (two for each presentation format). To assess reliability, a secondary coder viewed 25% of the mental state tasks. The inter-rater reliability was found to be $\kappa = .922$ ($p < .001$), 95% CI [0.77, 1.07].

Mean length utterances

Mean length utterances (MLUs) were calculated to control for language ability. Past research has supported the use of MLUs as an indicator of verbal competencies for children as old as 7 years (Rice et al., 2010). The MLU is calculated by counting the number of morphemes in the first 100 utterances of the child. The total number of morphemes is then divided by 100, resulting in the child's MLU. In the current study, trained research assistants calculated the MLUs from the transcription of the parent-child pretend play and reading interactions according to criteria established by Williamson (2009). To assess reliability, a secondary coder assessed 20% of the transcripts. Percentage agreement regarding participants' MLU scores between coders was 92%. Agreement between coders regarding participants' MLU scores was highly positively correlated, $r(12) = .98$, $p < .001$. Disagreements were further discussed until a consensus was achieved.

Results

Performance on mental state trials

A preliminary analysis was carried out to examine possible confounding effects of the actor's gender, animal identity, and order on overall performance across presentation formats (six trials total) using a 2 (Gender) \times 2 (Animal Identity Group: A or B) \times 3 (Order of Trials) analysis of variance (ANOVA). In addition, these factors were also examined in relation to performance on each presentation format (two trials each) using a 2 (Actor's Gender) \times 2 (Animal Identity Group) \times 3 (Order of Trials) \times 3 (Presentation Format: Contradictory Action, Same Related Action, or Same Unrelated Action) repeated measures ANOVA. There were no significant main effects or interactions involving any of these factors; therefore, the data were collapsed over these factors.

Table 3 shows the distribution of children's responses for each presentation format. A 2 (Age) \times 2 (Child's Gender) \times 2 (Action Saliency: static or dynamic) ANOVA did not reveal any effects of age,

Table 3

Distributions and means of scores for different presentation formats of mental state task.

| | Number of correct trials | | | M |
|------------------------------|--------------------------|----|----|-------------|
| | 0 | 1 | 2 | |
| <i>Same related action</i> | | | | |
| 3-year-olds | 5 | 21 | 13 | 1.20 (0.65) |
| 4-year-olds | 1 | 11 | 17 | 1.55 (0.57) |
| <i>Same unrelated action</i> | | | | |
| 3-year-olds | 3 | 15 | 21 | 1.46 (0.64) |
| 4-year-olds | 2 | 8 | 19 | 1.59 (0.63) |
| <i>Contradictory action</i> | | | | |
| 3-year-olds | 14 | 12 | 13 | 0.97 (0.84) |
| 4-year-olds | 5 | 12 | 12 | 1.24 (0.74) |

Note. Standard deviations are in parentheses.

gender, or saliency of action of the pretender on the overall performance of the children. A 2 (Age) \times 2 (Child's Gender) \times 2 (Action Saliency) \times 3 (Presentation Format) repeated measures ANOVA did not reveal main effects or interactions for age, gender, or action saliency but did reveal a main effect of presentation format, $F(2, 128) = 7.35$, $p = .001$, $\eta_p^2 = .10$. Post hoc tests using the Bonferroni correction revealed that, overall, children performed better on the Same Unrelated Action and Same Related Action trials compared with the Contradictory Action trials ($p < .001$ and $p = .045$, respectively). No significant difference was found for performances on the Same Related Action versus Same Unrelated Action trials.

Of particular interest in this study was the difference in performance on the different presentation formats between children who did relatively well on the mental state task, and therefore demonstrated a greater understanding of mental states during pretend play (high-scoring), compared with children who scored lower on the task (low-scoring). The high-scoring group (13 3-year-olds and 15 4-year-olds) successfully selected the knowledgeable actor as the one pretending on five or six of the six mental state trials ($n = 28$). The low-scoring group (26 3-year-olds and 14 4-year-olds) correctly selected the knowledgeable actor on four or fewer of the six trials ($n = 40$).

A 3 (Presentation Format) \times 2 (Performance Level: high or low) mixed design ANOVA revealed a significant main effect of performance level, $F(1, 66) = 137.28$, $p < .001$, $\eta_p^2 = .10$, and a significant interaction between performance level and presentation format, $F(1, 66) = 6.16$, $p = .016$, $\eta_p^2 = .05$. The high-scoring group was more likely to select the knowledgeable actor over the non-knowledgeable actor ($M = 5.43$, $SD = 0.50$) compared with the low-scoring group ($M = 2.93$, $SD = 1.05$). Paired t tests were conducted to investigate differences in performance across the presentation formats according to performance group (high or low) using a Holm–Bonferroni adjusted alpha to control for Type I error. The high-scoring group performed significantly better on Same Unrelated Action trials ($M = 1.96$, $SD = 0.19$) in comparison with the Same Related Action trials ($M = 1.71$, $SD = 0.46$), $t(27) = 2.55$, $p = .017$, $d = 1.74$, and the Contradictory Action trials ($M = 1.75$, $SD = 0.44$), $t(27) = 2.27$, $p = .031$, $d = 0.63$. The low-scoring group performed similarly on the Same Related Action ($M = 1.10$, $SD = 0.63$) and Same Unrelated Action ($M = 1.20$, $SD = 0.65$) trials, but was significantly less successful on the Contradictory Action trials ($M = 0.63$, $SD = 0.67$) as compared with the Same Related Action and Same Unrelated Action trials, $t(39) = 3.32$, $p = .002$, $d = 0.73$, and $t(39) = 3.80$, $p < .001$, $d = 0.87$, respectively.

At the end of each mental state trial, the experimenter asked child why they had selected a specific actor as the one pretending. The high-scoring group that concentrated on the knowledge of each actor used mental state terms in their explanations (e.g., because he knew about birds) on 45 of 180 trials (25%) but used behavioral explanations (e.g., because he was flapping his arms) on only four of 180 trials (2%). For the remaining 131 trials, children provided no response to the open-ended question or responded with “I don't know.” Children who focused on action instead of knowledge in the low-scoring group used mental state terms in their explanations on only 17 of 258 trials (6%) and used behavioral explanations on 23 of 258 trials (9%). On the remaining 218 trials, children were unable to provide a response.

Language use and its relationship to mental state task performance

One participant was excluded from the parent–child interaction analyses due to speaking a foreign language during interactions. All children participated in the study with their mothers except for one child accompanied by his father. Parents had varied education levels, with the majority having finished college and many having advanced degrees (completed education levels for mothers: six high school, 10 some college, 18 college, 21 master's degree, and 12 post-master's degree; completed education levels for fathers: one GED, nine high school, 14 some college, 14 college, 15 master's degree, and 12 post-master's degree).

No child gender or order effects of presentation were found, and the data were collapsed over these conditions. The means for each of the mental state categories used by children and parents during the parent–child interactions for the reading and pretend play periods can be found in Table 4. The total number of mental state terms used by parents was correlated with children's performance on the mental state task, $r(65) = .321$, $p = .019$; children who scored higher on the mental state task had

Table 4

Mean numbers of mental state utterances (and standard deviations) for reading and pretend play activities for parents and children.

| | Desire | | Emotion | | Cognitive | | Modulation of assertion | | Total | |
|------------------------|----------------|----------------|----------------|----------------|-----------------|----------------|-------------------------|----------------|-----------------|-----------------|
| | Read | Play | Read | Play | Read | Play | Read | Play | Read | Play |
| 3-year-olds | 1.68 (1.60) | 3.14 (2.70) | 0.68 (1.00) | 0.32 (0.80) | 0.62 (0.70) | 1.50 (1.80) | 0.19 (0.60) | 0.32 (0.80) | 3.20 (2.60) | 5.20 (4.70) |
| 4-year-olds | 1.68 (1.40) | 3.80 (3.50) | 0.73 (1.00) | 0.37 (0.80) | 1.13 (1.20) | 2.13 (3.70) | 0.53 (0.70) | 0.27 (0.60) | 4.10 (5.10) | 6.60 (4.90) |
| Parents of 3-year-olds | 4.97 (3.90) | 7.65 (3.80) | 1.70 (1.80) | 1.12 (1.60) | 10.40 (5.70) | 6.24 (3.90) | 1.50 (1.50) | 1.50 (1.80) | 18.60 (7.90) | 16.50 (7.40) |
| Parents of 4-year-olds | 4.10 (2.60) | 9.10 (4.20) | 1.50 (1.70) | 1.00 (2.20) | 11.30 (0.80) | 7.37 (4.70) | 1.43 (1.70) | 1.47 (1.60) | 18.30 (9.30) | 18.90 (9.50) |

parents who produced more mental state utterances than children who scored lower. There was no significant correlation between the total words uttered by parents and children's performance on the mental state task, $r(65) = .19$, $p = .18$. Therefore, it was not the number of utterances but rather the number of mental state utterances used by parents during their interactions that resulted in better performance by their children. As can be seen in Table 5, when correlations with different types of mental state terms are considered, the strongest indicators of a higher score on the mental state task were use of modulations of assertion and cognitive language by parents during the interaction periods, $r(65) = .27$, $p = .028$, and $r(65) = .28$, $p = .024$, respectively.

Children's total number of mental state utterances was not correlated with their performance on the mental state task, but their use of cognitive utterances during the reading task was, $r(65) = .27$, $p = .03$. Children's modulations of assertion utterances were related to their performance, $r(65) = .26$, $p = .034$. MLU was correlated with performance on the mental state task, $r(65) = .26$, $p = .04$, and with children's production of cognitive mental state terms, $r(65) = .45$, $p < .001$.

Regression analyses

A series of hierarchical regression analyses were carried out to assess what factors were predictive of children's mental state task performance. Children's MLUs and parents' modulations of assertion were not significant predictors and were removed from the analyses.

Child's age emerged as a significant predictor of the total number of successful trials on the mental state task, $\beta = .838$, $t(66) = 2.44$, $p = .018$; in addition, maternal education was also found to be a significant predictor at Step 1, $\beta = .16$, $t(66) = 3.08$, $p = .003$. The change in R^2 for this step was significant ($R = .43$, $R^2 = .19$, $F = 7.30$, $p = .001$). This model indicated that approximately 16% of the variance of the mental state task performance in the sample could be accounted for by age of the children and years of education of their mothers.

In Step 2, parents' cognitive mental state term utterances were entered and a significant increment in the prediction arose, $\beta = .04$, $t(66) = 2.08$, $p = .042$; the change in R^2 for this step was also significant

Table 5

Correlations between mental state utterances and children's performance on mental state task for play and reading activities.

| | Correlations of parent utterances with mental state task | | | Correlations of child utterances with mental state task | | |
|--------------------------|--|------|-------|---|------|-------|
| | Read | Play | Total | Read | Play | Total |
| Cognitive | .21 | .23 | .28* | .27* | .12 | .17 |
| Desire | .13 | .13 | .13 | .07 | .01 | .04 |
| Modulations of assertion | .19 | .21 | .27* | .28* | .12 | .26* |
| Emotion | .12 | -.03 | .06 | -.01 | -.04 | -.04 |

* Correlation is significant at the .05 level (two-tailed).

Table 6

Summary of hierarchical regression analysis for variable predicting children's performance on mental state task.

| Variable | Step | |
|-------------------------------|-------|-------|
| | 1 | 2 |
| Age | .84* | .75* |
| Maternal education | .16** | .16** |
| Parents' cognitive utterances | | .04* |
| ΔR^2 | .19** | .05* |
| R^2 | .19 | .24 |

Note. Values are unstandardized regression coefficients.

* Correlation is significant at the .05 level (two-tailed).

** Correlation is significant at the .01 level (two-tailed).

($R = .49$, $R^2 = .24$, $F = 4.32$, $p = .042$). The results of these analyses are presented in Table 6. Children's use of cognitive language during the reading activity and overall modulations of assertion did not add significantly to the prediction of children's performance on the mental state task, $\beta = .152$, $t(66) = 0.50$, $p = .62$, and $\beta = 2.0$, $t(66) = 1.15$, $p = .26$, respectively. These results reveal that parents' cognitive mental state language contributed significantly to the prediction of children's performance on the mental state task over and above age and maternal education. These predictors accounted for 20.2% of the variance.

Discussion

The current study explored the role of action saliency in children's understanding of mental states during pretense activities and investigated the role of mental state utterances in mental state understanding. We found that young children did not exclusively pay attention to action information when deciding about mental states. Saliency of action (dynamic vs. static) did not affect performance, but presentation format did. Children were equally as successful in selecting the knowledgeable actor as the pretender in the Same Unrelated Action and Same Related Action trials and were least successful in the Contradictory Action trials. Therefore, children had the most difficulty in focusing on the mental state of the actor when action conflicted with the knowledgeable actor's knowledge and the knowledgeable actor was presented side by side with the unknowledgeable actor who behaved more appropriately for the animal used in the example.

In regard to individual differences, parental cognitive mental state utterances were predictive of children's performance on the mental state task independent of children's age and maternal education. Importantly, these results indicate that understanding mental states may be influenced by environmental factors.

Understanding pretend mental states

Surprisingly, our findings did not fully support either the action-based or mental state-based hypothesis of pretend play (Lillard, 1993; Perner, 1991). In essence, if action was an important contributing factor in how children viewed pretend play activities, the dynamic trials should have interfered with children's performance because actions would be more difficult to ignore compared with the static condition. Although static images do communicate information about movement, the saliency of action is different between a still image and a moving image. As mentioned by Sobel (2007), a video of a moving image may focus children on the "overt action" of the actor versus the mental state of the actor. When combined with the findings that some children ignored salient action and contradictory action information, our results cannot be fully explained using the action-based hypothesis.

On the other hand, whereas saliency of movement did not affect performance, manipulating action in the three different presentation formats did. Similar to the Contradictory Action trials in the current study, children in Ganea and colleagues' (2004) study had a difficult time in selecting an actor whose behaviors were contradictory to his or her intentions when presented side by side with an actor whose

behavior more closely resembled those intentions. The current finding demonstrates that even when provided with information about the actor's knowledge as opposed to the intention, action still played a role in how some children view pretend play. Thus, our findings are also not explained using the mental state hypothesis.

Furthermore, high-scoring children selected the knowledgeable actor more often on the novel Same Unrelated Action trials, compared with the other trials, when both actors behaved in a similar manner that was unconventional for the animal to which the experimenter was referring. This finding indicates that it may be easier for children to focus on what the actor knows when they do not need to attend to multiple forms of information such as knowledge and behavior. When an appropriate action was eliminated as a basis for making a judgment about mental state, as on the Same Unrelated Action trials, it was necessary for children to rely on the actor's knowledge.

An interesting finding that further supports the idea that children are able to ignore action information is that the high-scoring group for the mental state task performed similarly on the Same Related Action and Contradictory Action trials. This group of 3- and 4-year-olds ignored salient atypical behavior and correctly chose the knowledgeable actor as pretending equally often as when no contradictory information was given. Thus, even some 3-year-olds demonstrated an appreciation of the mind during the pretend activity. This finding has not been reported in other studies using similar contradictory behavior trials (Ganea et al., 2004).

Furthermore, many children in this high-scoring group (6 3-year-olds and 12 4-year-olds) responded using mental state terms (e.g., "she knew") when asked why they selected the correct knowledgeable actor. Overall, the high-scoring group used mental state terms for 25% of the trials. In Lillard's (1993) study, 35% of 4-year-olds correctly responded that Moe was not pretending if he did not have knowledge regarding bunnies. In the current study, 41% of children selected the knowledgeable actor over the non-knowledgeable actor on at least five of the six mental state trials. Our high-scoring children included a number of 3-year-olds, children younger than those in Lillard's study. Successful children's performances should not be collapsed into the overall mean for all children because these children exhibited an understanding of the role of mental states in pretend play. It is critical that research explain the distinction between children who appear to have a more advanced mental state understanding (high) compared with other children (low). The question then becomes, why are some 3-year-olds better at this understanding than others? It might have to do with parental language.

Role of language in pretend play mental state understanding

The current study revealed a relationship between the frequency of cognitive mental state language by parents and performance on a mental state task. Parents who expressed more cognitive mental state terms throughout the parent-child interaction had children who selected the knowledgeable actor on the mental state task more often compared with parents who uttered fewer cognitive terms.

We were interested in how cognitive mental state utterances used by parents influenced mental state understanding. Similar to earlier studies (Lillard, 1993), 41% of children selected the knowledgeable actor over the non-knowledgeable actor on at least five of the six mental state trials. In earlier studies, an emphasis was placed on average behavior, which usually indicated a lack of mental state understanding. However, a subset of children in the current study selected the knowledgeable actor as the one pretending. The relationship between parental language and mental state performance may explain the discrepancy between the high and low scorers.

These findings support what has been referred to as the social constructivist view of mental state understanding (Jenkins et al., 2003). According to this view, children who hear more cognitive mental state terms will be more focused on the mind as a pivotal indicator in assessing other people's behavior (Jenkins et al., 2003). Thus, parents may use scaffolding techniques (e.g., explain the relationship between mental states terms and the mind until children can use them independently) to further encourage their children's understanding of mental states (Bruner, 1981). Parents who expose their children to more mental state terms may have children who understand mental states earlier than parents who do not challenge their children's mental state understanding. Consequently, as found in the current study, these children might also possess an earlier understanding of the role of mental

states in pretense. This result highlights the impact of environmental factors on children's development of mental state understanding and underscores the need for researchers to explore individual differences in development as an explanation for varied performance on certain tasks.

Alternative account of understanding mental states in pretense

Overall, performance differences across the three presentation formats provide only limited support for the action-based and mental state-based accounts of understanding pretend play. In general, when an appropriate action was eliminated as an indicator of an actor's intentions in the Same Unrelated Action trials, children relied on the actor's knowledge when making their decision about who was engaged in pretend activities. However, when action was more difficult to ignore in the Contradictory Action trials, children's performance declined. Given that children appear to rely on or ignore action information based on the context of the situation and the discovery of individual differences in performance, we propose an alternative theory of understanding pretense that incorporates both action and knowledge. Perhaps it is not that young children are responding only on the basis of action, as suggested by Lillard (1993), but rather they have difficulty in maintaining an appreciation of the importance of mental knowledge in the face of certain behavioral actions. Therefore, it might not be the saliency of action that makes it more difficult; instead, it might be the degree to which the action conflicts with knowledge that children must ignore. Thus, poor performance is due to children's inability to inhibit action information during the mental state task—a skill associated with executive function.

Given that executive function is related to the ability to appreciate others' perspectives, it is reasonable to believe that it would also play a role in how children evaluate mental states (Carlson & Moses, 2001; Carlson, Moses, & Breton, 2002). Previous research has documented a relation between pretend play and executive function, although findings are inconsistent (see Lillard et al., 2013, for a review). An executive function-based theory of understanding mental states in pretense would not lend support or opposition to this previous research but rather would posit that a more developed executive function system may be necessary for an individual to determine the underlying factors associated with pretend play. The maintenance of information and inhibition of behavioral information may explain why children were more likely to select the knowledgeable actor on the Same Unrelated Action trials compared with the other presentation formats (although significantly different only for high-scoring children). The Same Related Action trials required children to maintain information regarding the mental state of both actors on the screen. Children also needed to inhibit processing of behavioral information because that information was not providing them the information needed to correctly select the actor who was pretending. The Same Unrelated Action trials, on the other hand, required maintenance of mental state information but did not require inhibition of behavioral information; therefore, they were not as taxing to the underdeveloped executive function system. Given the current speculation that executive function abilities may be responsible for performance on the mental state task, future studies should explore the causal relation between these factors.

Limitations and alternative explanations

As with most developmental studies that attempt to understand the mental state of children using behavioral research, there are multiple interpretations of the resulting data. Although previous studies (Lillard, 1993; Sobel, 2004) have used the word "knowledge" to categorize the mental state understanding of children, it is conceivable that children were not using the knowledge provided to them for each actor in the way we intended. For example, it is possible that children were selecting the actor with the positive association with the animal (e.g., the actor who knew about dogs) when asked who was pretending to be a dog. In essence, children might not have appreciated the actor's knowledge of dogs. In addition, children might not have associated the knowledge provided by the experimenter with a pretend play activity. Because it is odd for someone knowledgeable about dogs to pretend to be a dog by flapping his arms up and down, children might not have connected the information presented by the experimenter about the actor's knowledge with the actor's mind during pretend play; rather, they may have selected the actor who the experimenter said was positive for knowing dogs.

Our interpretations are based on the assumption that children were assigning knowledge to each of the actors based on the information presented by the experimenter. If, on the other hand, children were not thinking about the mental state of the actor, our interpretations of the current data would be inaccurate. If children were simply selecting the actor who was positively paired with the animal, the current findings do not provide information about mental state understanding in pretense but instead provide information about how children apply information supplied by experimenters in studies.

It is also important to consider that children in our study may have been confused by the odd scenarios presented to them (e.g., an actor who is behaving similarly to a dog is really knowledgeable about bunnies) and, therefore, might not have appreciated what the experimenter was telling them about the knowledge of each actor. Although the scenarios presented to children may appear to be strange, previous studies have demonstrated children's willingness to accept as pretending a person who does not act like or look appropriate regarding the identity he or she is pretending to be (Ganea et al., 2004; Sobel, 2004). Research also suggests that children at the age we tested are quite susceptible to labels provided by an adult, especially when the adult is confident and clearly expresses his or her intent (Gelman & Markman, 1986; Jaswal, 2004; Sabbagh & Baldwin, 2001). For example, Gelman and Markman (1986) presented children with a picture of a dolphin and a fish. A third picture was perceptually more similar to a dolphin, but the experimenter labeled it as exhibiting the behaviors associated with the fish. When asked what the animal was, children responded according to the label presented by the experimenter—that it was a fish—and not according to their own previous knowledge. Similarly, Jaswal, Lima, and Small (2009) found that children presented with contradictory information about an object did not necessarily change their perception of that object but instead were more likely to comply with what the researcher said was the correct label while in the structure of the experimental setting. Therefore, it is not unreasonable to believe that children will defer to the adult in the novel situation created by the current study and to trust the information the adult is telling them in regard to the actor's behavior even if it contradicts what the children previously believed.

In addition, it is possible that some of our knowledge scenarios might not have been considered as plausible by children. For example, children might not have been able to conceive that an adult did not know about dogs or had never seen a dog. As mentioned earlier, research has found that children are willing to accept what an adult labels something as even if it contradicts preexisting knowledge (Jaswal, 2004). Many children responded that the actor was silly for not knowing what a dog was and commented that they themselves knew. Thus, children seemed willing to play along for the purposes of the game we were playing, as has been demonstrated in other studies (Gelman & Markman, 1986; Jaswal, 2004; Sabbagh & Baldwin, 2001). To eliminate this possible issue, a fictitious animal could be used in future studies; therefore, children would not have any preexisting ideas regarding the animal they would need to ignore when listening to the researcher.

Finally, it is interesting that children's performance did not deteriorate more in the dynamic condition compared with the static condition as hypothesized. The current interpretation of this finding is that young children are not affected by increasing action saliency, and it is only when faced with contradictory action knowledge that their mental state abilities falter. In the future, it would be interesting to present both types of condition to each child to see whether the comparison of action information presented in static versus dynamic conditions influenced children's appreciation of the mental state of the pretender.

Conclusions

Supporters of the action hypothesis may have overestimated the importance of action in how children view pretense activities. In the current study, many children under 5 years of age were capable of demonstrating an understanding of mental states during pretend play. However, action may play a more pivotal role for children when they have not yet developed a strong understanding of mental states or have limited executive function skills, making it more difficult for them to inhibit orienting their attention toward distracting irrelevant behavioral information. The individual differences exhibited by children in the current study, similar to those found in past studies, may be explained by the

relationship discovered between parents' use of mental state terms and their children's performance on the mental state task. Parents may play an important role in their children's mental state understanding. Thus, individual differences may play a larger role in pretense mental state understanding than has been credited in previous research.

Acknowledgments

We thank Marvin Daehler for his mentorship and guidance in designing the experiment and for comments on earlier drafts. We also thank Anne Reagan, Cori Palermo, and Christine Loscri for their assistance during data collection and analyses.

References

- Bruell, M. J., & Woolley, J. D. (1998). Young children's understanding of diversity in pretense. *Cognitive Development*, *13*, 257–278.
- Bruner, J. S. (1981). Intention in the structure of action and interaction. In L. P. Lipsitt (Ed.), *Advances in infancy research* (Vol. 1, pp. 41–56). Norwood, NJ: Ablex.
- Carlson, S. M., & Moses, L. J. (2001). Individual differences in inhibitory control and children's theory of mind. *Child Development*, *72*, 1032–1053.
- Carlson, S. M., Moses, L. J., & Breton, C. (2002). How specific is the relation between executive function and theory of mind? Contributions of inhibitory control and working memory. *Infant and Child Development*, *11*, 73–92.
- Dunn, J., Brown, J., Slomkowski, C., Tesla, C., & Youngblade, L. (1991). Young children's understanding of other people's feelings and beliefs: Individual differences and their antecedents. *Child Development*, *62*, 1352–1366.
- Ganea, P. A., Lillard, S., & Turkheimer, E. (2004). Preschoolers' understanding of the role of mental states in action in pretense. *Journal of Cognition and Development*, *5*, 213–238.
- Gelman, S. A., & Markman, E. M. (1986). Categories and induction in young children. *Cognition*, *23*, 183–209.
- Gottfried, G. M., Kickling, A. K., Totten, L. R., Mkroyan, A., & Reisz, A. (2003). To be or not to be a galaprock: Preschoolers' intuitions about the importance of knowledge and action for pretending. *British Journal of Developmental Psychology*, *21*, 397–414.
- Harris, P. L., & Kavanaugh, R. D. (1993). Young children's understanding of pretense. *Monographs of the Society for Research in Child Development*, *58* (1, Serial No. 231).
- Hughes, C., & Dunn, J. (1997). "Pretend you didn't know": Preschoolers' talk about mental states in pretend play. *Cognitive Development*, *12*, 381–403.
- Hughes, C., Ensor, R., & Marks, A. (2011). Individual differences in false-belief understanding are stable from 3 to 6 years of age and predict children's mental state talk with school friends. *Journal of Experimental Child Psychology*, *108*, 96–112.
- Jaswal, V. K. (2004). Don't believe everything you hear: Preschoolers' sensitivity to speaker intent in category induction. *Child Development*, *75*, 1871–1885.
- Jaswal, V. K., Lima, O. K., & Small, J. E. (2009). Compliance, conversion, and category induction. *Journal of Experimental Child Psychology*, *102*, 182–195.
- Jenkins, J. M., Turrell, S. L., & Kogushi, Y. (2003). A longitudinal investigation of the dynamics of mental state talk in families. *Child Development*, *74*, 905–920.
- Leslie, A. M. (1987). Pretense and representation: The origins of "theory of mind". *Psychological Review*, *94*, 412–426.
- Lillard, A. S. (1993). Young children's conceptualization of pretense: Action or mental representational state? *Child Development*, *64*, 372–386.
- Lillard, A. S., Lerner, M. D., Hopkins, E. J., Dore, R. A., Smith, E. D., & Palmquist, C. M. (2013). The impact of pretend play on children's development: A review of evidence. *Psychological Bulletin*, *139*, 1–34.
- Lillard, A. S., & Witherington, D. S. (2004). Mothers' behavior modifications during pretense snacks and their possible signal value for toddlers. *Developmental Psychology*, *40*, 95–113.
- Mitchell, R. W., & Neal, M. (2005). Children' understanding of their own and others' mental states: A Self-understanding precedes understanding of others in pretense. *British Journal of Developmental Psychology*, *23*, 175–200.
- Nichols, S., & Stich, S. A. (2000). A cognitive theory of pretense. *Cognition*, *74*, 115–147.
- Nielsen, M., & Dissanayake, C. (2000). An investigation of pretend play, mental state terms, and false belief understanding: In search of metarepresentational link. *British Journal of Developmental Psychology*, *18*, 609–624.
- Perner, J. (1991). *Understanding the representational mind*. Cambridge, MA: Bradford/MIT Press.
- Rakoczy, H., Tomasello, M., & Striano, T. (2004). Young children know that trying is not pretending: A test of the "behaving-as-if" construal of children's early concept of pretense. *Developmental Psychology*, *40*, 388–399.
- Rice, M. L., Smolik, F., Perpich, D., Thompson, T., Rytting, N., & Blossom, M. (2010). Mean length of utterance levels in 6-month intervals for children 3 to 9 years with and without language impairments. *Journal of Speech, Language, and Hearing Research*, *53*, 333–349.
- Ruffman, T., Slade, L., & Crowe, E. (2002). The relation between children's and mothers' mental state language and theory of mind understanding. *Child Development*, *73*, 734–751.
- Sabbagh, M. A., & Baldwin, D. A. (2001). Learning words from knowledgeable versus ignorant speakers: Links between preschoolers' theory of mind and semantic development. *Child Development*, *72*, 1054–1070.
- Sabbagh, M. A., & Callanan, M. A. (1998). Metarepresentation in action: 3-, 4-, and 5-year-olds' developing theories of mind in parent-child conversations. *Developmental Psychology*, *34*, 491–502.

- Schroeder, T., & Matheson, C. (2006). Imagination and emotion. In S. Nichols (Ed.), *The architecture of the imagination: New essays on pretence, possibility, and fiction* (pp. 19–39). New York: Oxford University Press.
- Sobel, D. M. (2004). Children's developing knowledge of the relationship between mental awareness and pretense. *Child Development*, 75, 704–729.
- Sobel, D. M. (2007). Children's knowledge of the relation between intentional action and pretending. *Cognitive Development*, 22, 130–141.
- Taumoepeau, M., & Ruffman, T. (2008). Stepping stones to others' minds. Maternal talk relates to child mental state language and emotion understanding at 15, 24, and 33 months. *Child Development*, 79, 284–302.
- Williamson, G. (2009). *Mean length of utterance (MLU)*. Retrieved from <<http://www.stinfo.com/wp-content/uploads/2014/01/mean-length-of-utterance.pdf>>.
- Youngblade, L. M., & Dunn, J. (1995). Individual differences in young children's pretend play with mother and sibling: Links to relationships and understanding of other people's feelings and beliefs. *Child Development*, 66, 1472–1492.