THE PHENOMENOLOGY OF ROLE PLAY:
ARE CHILDREN “THINKING-AS-IF” OR “BEHAVING-AS-IF”?

by

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Abstract

When children role play, they do things such as change their tone of voice or take on the character’s emotions or needs. These behaviours make it appear as though children adopt the mental perspective of the character they are pretending to be, which has led some researchers to argue that children “think-as-if” they are the character while role playing (e.g., Harris, 2000). However, it is questionable whether these sorts of behaviours can really be taken as strong evidence that children are “thinking-as-if”; children might simply be imitating the distinctive behavioural characteristics of the character they are pretending to be – or “behaving-as-if”. In two studies, I attempted to obtain better evidence that children “think-as-if” while role playing. To do this, I developed a novel paradigm called the Pretend Self-recognition (PSR) task that examines how children refer to photographs of themselves while they are pretending to be someone else. I reasoned that if children were truly “thinking-as-if”, they might see the photograph of themselves as a third person would, and thus refer to the photograph of themselves using their own proper name. In contrast, if children were simply "behaving-as-if", they might continue to refer to the photograph with the personal pronoun “me”. In Study 1, approximately half of 4-year-old children labeled their own photograph from the perspective of the character they were pretending to be, and thus showed evidence of "thinking-as-if". This finding was replicated when children were given the PSR task at two time points along with measures of theory of mind, executive functioning, pretense understanding, and narrative absorption. Results showed that PSR performance was stable across testing period, but was not related to any of the other constructs that were also measured. Taken together, the findings reported in this dissertation show that the PSR task is a reliable measure of...
perspective taking in role play, though the source of individual differences in the measure remains a target for future research. The lack of relation between individual differences might suggest that PSR performance is orthogonal to the other constructs and is something in its own right.
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Table of Contents

Abstract................................................................................................................................................ii
Acknowledgements......................................................................................................................................iv
Table of Contents......................................................................................................................................vii
List of Figures.............................................................................................................................................ix
List of Tables.............................................................................................................................................x
Chapter 1 Introduction..............................................................................................................................1
Chapter 2 Literature Review....................................................................................................................4
  2.1 Pretense as an Intentional Mental State ............................................................................................5
    2.1.1 The Mental Components of Pretense .......................................................................................5
    2.1.2 Children’s Pretense Understanding; Do Children Understand the Mental Components of Pretense? .................................................................................................7
  2.2 The Relationship Between Children’s Pretense Understanding and Their Engagement in Role Play .........................................................................................................................10
  2.3 Re-examining Harris’ Claim That Children “Think-as-If” While Role Playing.........................13
    2.3.1 Pretend Behaviours ....................................................................................................................13
    2.3.2 The Content of Children’s Role Play .......................................................................................14
  2.4 Re-examining the Research Outside the Role Play Literature That Suggests That Children May “Think-as-if” While Role-Playing ..............................................................16
    2.4.1 Narrative Absorption ................................................................................................................16
    2.4.2 Neurophysiological Research ....................................................................................................18
    2.4.3 Mirror Neurons ........................................................................................................................19
    2.4.4 Summary ..................................................................................................................................22
  2.5 The Present Research .......................................................................................................................22
Chapter 3 Study 1 ..................................................................................................................................25
  3.1 Method .............................................................................................................................................25
    3.1.1 Participants .................................................................................................................................25
    3.1.2 Design, Materials, and Procedure ............................................................................................25
    3.1.3 Coding ......................................................................................................................................31
  3.2 Results ..............................................................................................................................................33
3.2.1 Preliminary Analyses .........................................................................................33
3.2.2 Focal Analyses .................................................................................................37
3.3 Discussion .............................................................................................................46
Chapter 4 Study 2 .......................................................................................................52
  4.1 Method .................................................................................................................58
    4.1.1 Participants ....................................................................................................58
    4.1.2 Procedure ......................................................................................................58
    4.1.3 Measures .......................................................................................................59
  4.2 Results ................................................................................................................82
    4.2.1 PSR Task Analysis .........................................................................................82
    4.2.2 Exploring the Variability in Children’s Performance on the PSR task ..........98
  4.3 Discussion .........................................................................................................112
Chapter 5 Summary and Conclusion .........................................................................118
  5.1 Limitations .........................................................................................................121
  5.2 Future Directions ...............................................................................................123
  5.3 Conclusions .......................................................................................................126
References ..................................................................................................................127
Appendix A Script for the PSR Task Used in Study 1 ..............................................137
Appendix B Parent Questionnaire used in Study 1 ....................................................141
Appendix C Script for the PSR Task Used in Study 2 ...............................................143
Appendix D Stories Used in the Narrative Absorption Task ......................................147
Appendix E Parent Questionnaire Used in Study 2 ....................................................148
Endnotes ....................................................................................................................153
List of Figures

*Figure 1.* The proportion of children in each condition that referred to the photograph with a first-person response versus a third-person response (animal noises were included with the other third-person responses).................................................................39

*Figure 2.* The "Friend Finder" computer used in the modified PSR task......................60

*Figure 3.* Children’s performance on the executive functioning tasks (scores are standardized)......................................................................................................................................104
List of Tables

Table 1. Presentation Order of the Photographs, Hiding Spots, and Attached Clues .....29
Table 2. Examples of First-Person and Third-person Responses for Each of the Target Photographs ........................................................................................................................................................................32
Table 3. The Characters Children Impersonated .................................................................34
Table 4. Proportion of 4-year-old Children in Each Condition that Responded to each of the Target Photographs With a First-person Response or a Third-person Response .....36
Table 5. Proportions for Character Assignment, Characteristic Actions, Type of Character, and Pretend Actions ........................................................................................................................................................................41
Table 6. Proportions for Parent Questionnaire Items (N = 32) ........................................43
Table 7. Factor Loadings of Parent Questionnaire Items in Principle-Component Analysis ........................................................................................................................................................................45
Table 8. Summary of Binary Logistic Regression Analysis Predicting Children’s Performance on the PSR Task from Parent Questionnaire Items (N = 27) ........................................46
Table 9. Presentation Order of Photographs for Study 2 ..................................................63
Table 10. Actions and Descriptions Used in the Moe Task ................................................77
Table 11. Actions and Descriptions Used in the Fantasy Moe Task ................................78
Table 12. Animals and Actions Used in the Self-pretense Task .........................................79
Table 13. The Characters Children in the Pretend condition Impersonated at Time 1 and Time 2 ........................................................................................................................................................................83
Table 14. The Proportion of 4-year-old Children in Each Condition that Referred to the Target Photographs With a First-person Response, or a Third-person Response 85
Table 15. Proportions for Character Assignment, Characteristic Actions, and Type of Character ........................................................................................................................................................................89
Table 16. Independent sample t-tests for character assignment, characteristic actions, and type of character ........................................................................................................................................................................90
Table 17. Descriptive Data for Each of the Parent Questionnaire Items ..........................93
Table 18. Factor Loadings of Parent Questionnaire Items in Principle-Component Analysis ........................................................................................................................................................................95
Table 19. Raw correlations Between the PSR Task and Role Play Factors .........................96
Table 20. Mean Scores for Each of the Theory of Mind Tasks (Range 0-1) ..................100
Table 21. Mean Scores for Each of the Executive Functioning Tasks ......................102
Table 22. Percentage of Children who Passed the Executive Functioning Tasks
According to Age ........................................................................................................102
Table 23. Correlations Among the Executive Functioning Measures .......................103
Table 24. The Number of Children who Answered the Test Question Correctly for Each
Version of the Task ......................................................................................................108
Table 25. Mean Number of Responses as a Function of the Type of Response .........110
Table 26. Raw correlations Between the PSR Task and the Socio-cognitive Tasks ......112
Chapter 1
Introduction

Of all the remarkable developments that unfold in the first few years of life, one of the most fascinating is the emergence of pretend play. From the moment children use one object “as-if” it were another, a whole new world of possibilities begins. In the world of pretend, children are not bound by reality, but by the limits of their imagination. Ordinary objects can become extraordinary things, and fantastical transformations are within children’s reach.

As children enter the preschool years, their fantastical transformations are no longer confined to objects. Children begin to use pretend actions and utterances to act out imagined roles and situations. This form of elaborate pretend play, referred to as role play, is particularly striking because children appear to adopt the mental perspective of the person, animal, or creature they are pretending to be (Harris, 2000). In other words, when children role play, they seem to be “thinking-as-if” they are the character and experience the world from the character’s perspective.

This special connection to the mind – or “thinking-as-if” – has made role play especially interesting to developmental psychologists. Over the last 20 years, the majority of the empirical and conceptual work on children’s role play has focused on explaining the conceptual link between the capacity to “think-as-if” while role playing, and the capacity to understand others’ minds, referred to as theory of mind or “mind-reading” (e.g., Leslie, 1987; 1988; Lillard, 1993a, 2001a; 2001b; Nichols & Stich, 2000, 2003; Perner, Baker, & Hutton, 1994; Schwebel, Rosen, & Singer, 1999; Taylor & Carlson,
In particular, researchers have explored the possibility that understanding *how* children “think-as-if” while role playing will provide special insight into the cognitive mechanisms that underlie the fundamental capacity to “mind-read”. Consequently, much of the literature on this topic has been concerned with identifying - and debating - the cognitive mechanism that enable children to “think-as-if” while role playing.

One crucial assumption of this research, however, is that children are indeed “thinking-as-if” while role playing. A potential problem with this arises from the fact that there is scant empirical evidence to suggest that children adopt the mental perspective of the character they are pretending to be. Instead, researchers tend to assume that children are “thinking-as-if” because of their characteristic role playing behaviours. For instance, children do things such as change their tone of voice or take on the emotions or needs of the character they are pretending to be (Harris, 2000). While these sorts of pretend behaviours might make it appear as though children are experiencing the world from the character’s perspective, it is questionable whether it is really evidence that they have shifted perspectives. At issue is the possibility that children are simply imitating the actions or distinctive behavioural characteristics of the character they are pretending to be without necessarily taking on the character’s mental perspective. In other words, children might be “behaving-as-if” rather than “thinking-as-if” while role playing.

Not only does this characterization of role play question the rich interpretation of role play as “thinking-as-if”, it highlights the fact that the research in this area has been preoccupied with understanding *how* children “think-as-if”, when it is not clear that they even do. Understanding the phenomenology of role play is an important first step in
identifying the cognitive mechanisms that underlie this type of pretend play, as it is
difficult to explain the capacity to pretend without first knowing whether children are
“thinking-as-if” or “behaving-as-if”. Nonetheless, gaining evidence that children truly do
“think-as-if” is difficult to obtain. The challenge lies in finding a way to explicitly
measure the phenomenology of role play, because it is a mentalistic concept.

The two studies presented in this dissertation address this challenge by
introducing a novel paradigm for studying the phenomenology of role play, called The
Pretend Self-recognition (PSR) task. This new task examines whether children modify
their use of deictic terms while role playing so they become congruent with the
perspective of the character they are pretending to be, as opposed to their own. Doing so
provides persuasive evidence that children are indeed shifting perspectives. In the first
study, the PSR task was used to explore whether children referred to photographs of
themselves or their possessions with a first person (“That’s me”) or third-person (“That’s
Jennie”) term. The second study replicated and extended the findings of Study 1 using a
modified version of the task, and examined possible sources of variability in 4-year-olds’
PSR task performance. To provide the context for this work, the following chapter
reviews the theoretical and empirical evidence within the role play literature, as well as
from other areas of psychology, that suggest that children are “thinking-as-if” versus
“behaving-as-if” while role playing.
Chapter 2
Literature Review

As early as two years of age, children begin to engage in role play in which they enact the role of others by impersonating characters, personifying dolls and stuffed animals, or interacting with invisible characters as if the characters were real (Piaget, 1962). What differentiates these three ways of enacting a role is the way in which children choose to embody the character; children can either act out the character themselves, use a prop, or use nothing at all (Harris, 2000). This dissertation focuses on roles that children act out themselves. This form of role play is called impersonation, and is particularly intriguing because it involves setting aside one’s own identity in order to adopt the identity of the character you are pretending to be.

Harris (2000) suggests that impersonation - like all forms of role play – involves adopting the character’s mental perspective, or “thinking-as-if”. In order to do this, children must set aside their own needs, intentions, and desires. By doing so, children are able to experience the world “as-if” they are the characters they are impersonating, and determine how these characters would think and act in a given situation. What separates impersonation from other forms of role play is that it can involve embodying a character’s actions, in addition to their mental perspective. This is because the role is projected onto the self, rather than onto a separate entity.

Before I discuss the phenomenology of this form of role play any further, I will first discuss the mental components of pretense and the research on children’s understanding of these mental components. In doing so, I raise the question of whether
there is a necessary connection between children’s pretense understanding and their engagement in role play, and lay the groundwork for the argument that children’s role play may not be as mentally sophisticated as some researchers suggest.

2.1 Pretense as an Intentional Mental State

2.1.1 The Mental Components of Pretense

As an intentional mental state, pretense has two important mental components, the first of which is mental representation (Lillard, 1994). To engage in role play, children must have a mental representation of the character they are pretending to be. This means that they must be actively thinking about the character they are pretending to be while role playing, as well as be knowledgeable about the character they are enacting; after all, one cannot pretend to be something they know nothing about. It is not enough, however, to simply have a mental representation of the character you are enacting, the mental representation must then be projected onto some aspect of reality. In the case of role play, the mental representation is projected onto the self, a prop, or nothing at all – depending on how the child chooses to represent the character they are enacting (i.e., whether the child acts out the character or animal herself, uses a prop, or creates an invisible character).

This leads to the second mental component of pretense – the intention component. Pretense is not only intentional in the sense that it is “about” something (in the case of role play, that something is the character children are enacting; see Searle, 1983), it is also intentional in the sense that the pretender is actively trying to mentally represent one thing “as-if” it were another. According to Lillard (1994; 1998a), intention is seen in both
the planning and execution phases of pretense. It is what drives pretense; the pretender must plan the pretense in her mind before it can be acted out (prior intention, in Searle’s, 1983, terms). It is also involved in the enactment of the role, because when one is pretending, one is conveying the pretend situation “on purpose” – rather than accidentally (intention-in-action, in Searle’s, 1983, terms). For example, to impersonate a dog, a child must have the prior intention to enact a dog before the pretense begins (and plan things such as what the dog’s name will be, and where the dog is), as well as the intention-in-action to enact the dog while pretending. [adopt the dog’s mental perspective and/or enact the pretend behaviours associated with dogs (e.g., crawling on all fours) while pretending.]

Although pretending is primarily a mental process, it is often accompanied by actions (unlike other mental states such as thinking and remembering; Lillard, 1994). For example, when a child pretends to be a dog, she may crawl around on all fours in a way that resembles a dog. While actions such as these may augment children’s role play, it is important to clarify that they are neither a defining or diagnostic feature of pretense (Lillard, 1993a; 1994; 2001b; Nichols and Stich, 2000). All that is required for the child to pretend to be a dog is that she intentionally mentally represents herself as a dog inside her head (Lillard, 1996). Making that representation externally perceptible through the use of pretend actions is optional (e.g., children can pretend to be a dog while sitting still). Similarly, crawling around on all fours in a way that resembles a dog does not necessarily reflect pretense. In order for the child’s actions to be considered pretense, she must intend for her actions to reflect her mental representation of a dog – otherwise, she
is just “behaving-like” a dog, not pretending to be one. Thus, it is the mental components of pretense that are crucial.

In sum, enacting a role involves having a mental representation of the character or animal one is enacting, and projecting the mental representation onto an aspect of reality (in the case of impersonation, the mental representation is projected onto oneself). Doing so implies that the pretense is intentional, and that the pretender is at least at some level, aware of what they are doing when they pretend. There is however, continual debate over the level of that awareness. Next, I discuss whether or not children are explicitly aware of the mental components of pretense.

2.1.2 Children’s Pretense Understanding; Do Children Understand the Mental Components of Pretense?

Researchers are divided on whether children understand the mental components of pretense. Some researchers believe that young children conceptualize pretense as a mental state, and understand that pretense rests on mental representation and intention. For example, Bruell and Woolley (1998) found evidence to suggest that children have an early appreciation of the role of the mental representation in pretense. In their study, 3- and 4-year-old children were shown videotapes of two characters performing the same action (e.g., sitting on a table), but pretending to do different things (e.g., riding a horse and driving a car). Each character had a thought bubble depicting the corresponding pretend representation (e.g., a horse and a car) superimposed over their head. When asked what each character was pretending, the majority of children referred to the content in the character’s thought bubble. Similarly, Joseph (1998) found that most 4-year-olds
understand the intentional nature of pretense. In his study, children were presented with two dolls; one doll was described as pretending to sneeze, and the other doll was described as really sneezing. When asked which one was really sneezing, the majority of children responded correctly. While these and other studies provide some empirical evidence to support the view that children conceptualize pretense as a mental state (e.g., Aronson & Golomb, 1999; Custer, 1996; Davis, Woolley, & Bruell, 2002; Hickling et al., 1997), more recent research has left some researchers questioning whether children truly understand the mental components of pretense (e.g., Ganea, Lillard, & Turkheimer, 2004; Lillard, 2001a; Nichols & Stich, 2000). In brief, these researchers claim that preschoolers are, instead, behaviourists about pretense. They believe that children think of pretending as “behaving-like” a character, rather than a mental state. As a result, they conceptualize pretense as action, without any regard of its mental components.

Much of the evidence for this claim comes from Lillard’s (e.g., 1993b; 1996; 2001a) work on children’s pretense understanding. In her work, children are introduced to a troll doll named Moe who is hopping like a kangaroo. Children are told that Moe has never seen a kangaroo before and that he does not know that kangaroos hop (or alternatively, that Moe “isn’t thinking that he’s hopping like a kangaroo”). Lillard reasoned that if children understood that to pretend to be an animal, one must have knowledge of the animal (or be thinking about the animal), then they must have an appreciation of the role of mental representation in pretense. When asked whether Moe is pretending to be a kangaroo, most 4-year-olds (74%) report that Moe is pretending even though he has no knowledge of kangaroos (or was not thinking about kangaroos). This
suggests that most 4-year-olds do not understand that pretending involves mental representation. Likewise, when the Moe task is used to examine children’s understanding of the intentional component of pretense (in this variation of the task, children are told the Moe “is not trying to look like a kangaroo”; Lillard, 1998b, Experiment 2; Ganea et al., 2004), the results are similar.

Many researchers have criticized Lillard’s work arguing that the Moe task does not adequately tap children’s understanding of the mental components of pretense (e.g., Aronson & Golomb, 1999; Hickling et al., 1997, Joseph, 1998, Rosen, Schwebel, & Singer, 1997; Woolley, 1995). In particular, these researchers argue that children might mistakenly attribute pretense to Moe simply because: the task does not provide children with an alternative explanation for Moe’s actions, Moe’s actions are more salient than his mental state, and Moe’s actions contradict his mental state (see Lillard, 2001b). While variations of the Moe task that address these concerns do show that children can demonstrate an earlier understanding of pretense under certain facilitating conditions (e.g., emphasizing the intentional component of pretense by asking children about their own pretense rather than someone else’s, Mitchell & Neal, 2005; using forced-choice versus open-ended test questions; Aronson & Golomb, 1999; Davis et al., 2002), these highly supportive contexts are not typical of children’s early pretense (see Lillard, 2001b, Ganea et al., 2004).
2.2 The Relationship Between Children’s Pretense Understanding and Their Engagement in Role Play

Although much of the research on children’s pretend play has focused on children’s pretense understanding, its connection to children’s engagement in role play is not clear. A review of the literature on children’s pretense understanding suggests that preschool children have a limited understanding of the mental components of pretense (see Lillard, 2001b; Ganea et al., 2004). Considering this, an important question concerns how children are able to engage in pretend play – specifically role play, in which children are thought to adopt the mental perspective of the character they are pretending to be (Harris, 2000) - without fully understanding it. In order to engage in such a perspectival shift, it seems reasonable to suggest that children would have to have an explicit mentalistic understanding of pretense. That is, to “think-as-if” while role playing, children would need to understand that pretending is more than just “behaving-like” a character. The reason for this is that engaging in a perspectival shift requires children to explicitly compute the pretended mental states of the characters they are pretending to be. Engaging in such third-person rationalization implies that children appreciate the mental origins of pretense because they cannot do so without understanding that they are mentally representing the character’s perspective. Yet if this line of reasoning were true, it would mean that children could not engage in role play until they came to appreciate the mentalistic nature of pretense. This does not seem to be the case as children begin to role play as early as two years of age, long before they are successful on Lillard’s Moe task.
There are three possible explanations for the asymmetry between children’s pretense understanding and their engagement in role play. The first is that the Moe task – which is often treated as a “litmus test” for children’s pretense understanding – does in fact underestimate children’s knowledge of pretense (e.g., Aronson & Golomb, 1999; Hickling et al., 1997; Rosen et al., 1997; Woolley, 1995). As previously discussed, this possibility has been the focus of much of the empirical work on children’s pretense understanding, and continues to cause debate among researchers (see Lillard, 2001b for a review). While there is some evidence to suggest that children have a more precocious understanding of pretense in certain facilitating conditions, the consensus seems to be that young children’s role play does not involve thinking about pretense in a mentalistic way (see Lillard, 2001b; Ganea et al. 2004).

The second explanation for the asymmetry between children’s pretense understanding and their engagement in role play is that there is a developmental dissociation between what children know about pretense, and what they do when they role play. Simulation theory provides an explanation for how young children might engage in a perspectival shift while role playing whilst conceptualizing pretense as action. Proponents of this view claim that children “think-as-if” while role playing by “simulating” the character’s mental perspective, rather than theorizing the character’s pretend mental states (e.g., Gordon & Baker, 1994; Harris, 2000). In essence, simulation is “putting oneself in another’s shoes”. Doing so enables children to engage in a perspectival shift, and experience the world “as-if” they are the character they are pretending to be. Simulation theorists argue that children need not theorize or explicitly
understand the mental underpinnings of pretense. Instead, they believe that children simply imagine what the world is like from the character’s perspective, and reason from there. Consequently, simulation theory does not require that children know anything about the mental origins of pretense to engage in role play.

While simulation theory may account for the asymmetry between children’s pretense understanding and their engagement in role play, it relies on the assumption that children “think-as-if” while role playing. As noted from the outset of this dissertation, there is actually scant empirical evidence to suggest that children adopt the mental perspective of the character they are pretending to be. Thus, it is possible that alternative explanations for children’s behaviour are possible. For example, children might simply be “behaving-as-if” they are the character while role playing. The characterization of role play as “behaving-as-if” offers a third explanation for the asymmetry between children’s pretense understanding and their engagement in role play, which is that children’s role play is not as mentally sophisticated as researchers such as Harris (2000) believe it to be. Unlike “thinking-as-if”, “behaving-as-if” while role playing does not require children to engage in a perspectival shift. Instead, children can enact the role simply by imitating the pretend behaviours that are associated with the character they are pretending to be. Consequently, children do not have to compute (or simulate) the character’s pretend mental states. By eliminating the need for third-person rationalization, “behaving-as-if” does not require that children have an explicit mentalistic understanding of pretense.

To explore the possibility that children are “behaving-as-if”, rather than “thinking-as-if” while role playing, the remainder of this chapter focuses on re-evaluating
the evidence researchers use to support the claim that children adopt the mental perspective of the character they are pretending to be.

2.3 Re-examining Harris’ Claim That Children “Think-as-If” While Role Playing

2.3.1 Pretend Behaviours

As mentioned above, Harris (2000) uses children’s pretend behaviour throughout the course of role play as evidence that children are “thinking-as-if”. Many children augment their pretend play with external manifestations such as actions or sounds. For example, when pretending to be a dog, a child might crawl around on all fours and bark, or make panting noises. Children also make various remarks when they role play, such as describing the characters’ perceptual experiences, or expressing the needs and emotions of the character they are enacting. While external manifestations such as these are not a defining or diagnostic feature of pretense (Lillard, 1993a; 1998a; 2001b; Nichols & Stich, 2000), Harris (2000) argues that they are evidence of a perspectival shift because it implies that children are experiencing the world from the character’s perspective – that is, a perspective that is different from their own.

While pretend behaviours might make it appear as though children are experiencing the world from the character’s perspective, it is questionable whether this is the correct explanation for their behaviour. Children could produce external manifestations (e.g., crawling on all fours and barking) by imitating the characteristic behaviours of the character they are enacting (i.e., “behaving-as-if” they were a dog), without necessarily adopting the character’s mental perspective. Similarly, the remarks
that children make while role playing (e.g., “give mommy a kiss” or “it’s time for our baby to take a nap”) might be a reenactment of dialogue that children have learned to associate with a particular role (e.g., mother), rather than the result of shifting perspectives. Thus, it is difficult to discern exactly what children are doing when they role play by simply examining their behaviour.

2.3.2 The Content of Children’s Role Play

Harris (2000) also uses the roles that children choose to enact, and the imagined scenarios in which they enact them, as evidence that children “think-as-if” while role playing. He argues that if children simply imitated the pretend behaviours that are associated with a particular character (i.e., behave-as-if”), their role play would be limited to situations and roles that they have experienced firsthand (e.g., relational roles such as mother and baby). While this may be true of the roles children enact when they first engage in role play (Fein, 1987; 1981), their pretend play becomes more elaborate in the preschool years and begins to include roles for which they presumably have no script (Garvey & Berndt, 1977; Harris, 2000). For example, children pretend to be characters or animals with whom they have never interacted (e.g., a dolphin), as well as fantastical creatures that do not exist in the real world (e.g., monster or goblin).

Harris (2000) also believes that the interpretation of role play as “behaving-as-if” can not account for the dynamic nature of children’s role play. He argues that if children simply reenact scripts, their pretend play would be similar from one pretend episode to the next. However, children’s role play is far from stereotypical – it is an unfolding drama, that is constantly changing and evolving. For this reason, Harris maintains that
children’s role play goes “beyond a fixed script with a well-rehearsed and remembered set of actions and remarks” (pg. 35). Instead of using a script to specify what to do next, children determine how the character will act and what the character will say by adopting the mental perspective of the character, and then reasoning from this pretend premise.

However, not everyone shares Harris’ (2000) view that scripts are too restrictive to account for the flexible and dynamic nature of children’s role play (e.g., Bretherton, 1984; Nelson & Gruendel, 1981, Schank & Abelson, 1977). According to these researchers, scripts are flexible mental structures that can be transformed by substituting different roles, objects, and events in novel, or sometimes paradoxical ways. In other words, scripts serve as a “skeletal framework” or guide, rather than a “well-rehearsed and remembered set of actions” (Schank & Abelson, 1977). This more flexible conceptualization of scripts allows for the interpretation of role play as “behaving-as-if”, because it explains how children can use scripts to enact roles and situations that they themselves have never experienced, or do not exist in real-life. Moreover, it does not reduce children’s role play to a set of character sketches in the way that Harris suggested. Instead, scripts are combined and reconstructed to allow for the dynamic nature of children’s role play (Nelson, 1981, Sawyer, 1997).
2.4 Re-examining the Research Outside the Role Play Literature That Suggests That Children May ‘Think-as-if’ While Role-Playing

2.4.1 Narrative Absorption

In addition to using children’s behaviour and the content of their role play as evidence that children “think-as-if” while role playing, Harris also points to evidence outside the role play literature to support his claim. In particular, he draws parallels between children’s role play and their narrative absorption (e.g., Harris, 2000; Rall & Harris, 2000). Studies have shown that when children listen to a narrative, they spontaneously adopt the mental perspective of the protagonist in the story (Rall and Harris, 2000; Ziegler, Mitchell, & Currie, 2005). In these studies, children are read stories that contain deictic verbs of motion (e.g., come, go, bring, and take). Unlike other motion verbs (e.g., walk, run, swim), deictic verbs of motion describe a movement to or from a particular reference point. For example, the word “come” is used to describe a movement towards a reference point, while the word “go” is used to describe a movement away from a reference point. To prompt children to use the protagonist as a reference point, each sentence in the story begins by identifying the spatial location of the protagonist (e.g., “Laura was sitting in the lounge looking at a picture book”). A movement is then described to or from that location using a deictic verb of motion (e.g., “when Tony came/went into the room”). The deictic verb used in the sentence determines whether the movement is described from the protagonist’s perspective. For example, the deictic verb came, describes Tony’s movement from Laura’s perspective (i.e., Tony would be seen
entering the lounge rather than leaving the adjacent room). When children are asked to recall the stories, they tend to correctly recall deictic verbs that describe the movement from the protagonist’s perspective, and substitute deictic verbs that do not describe the movement from the protagonist’s perspective with ones that do. These findings suggest that when children listen to a narrative, they step outside their own perspective and experience the fictional world from the protagonist’s perspective – similar to the way in which Harris claims children enact a role through “simulation”.

Harris (2000) claims that these studies provide support for the interpretation of role play as “thinking-as-if”, because they suggest that children are equipped with the ability to set aside what is real and adopt the mental perspective of another person. However, having the capacity to adopt the mental perspective of another person, or “think-as-if” – does not mean that children use this capacity to role play. Children could be doing something entirely different when they role play (e.g., “behaving-as-if”) than when they listen to a narrative. After all, there are notable differences between the two. For example, when children listen to a narrative, they do not decide on the plot, or choose how the characters act or what the characters will say. Instead, children become absorbed in the fictional world described by the author (Harris, 2000). In contrast, when children role play, they are the actor, director and playwright of their pretense (Bretherton, 1984; 1989; Fein, 1981). It is possible that the stage-managing and acting required by role play calls for a different skill set than listening to a narrative.

Another, perhaps more important dimension in which narrative absorption and children’s role play differ, concerns the distinction between imagining and pretending.
While both narrative absorption and role play engage children’s imagination, only role play involves pretending. On the surface, imagining and pretending may seem very similar in that they both involve mentally representing something different from reality (in the case of narrative absorption and role play, children mentally represent another person). However, there is an important distinction between the two – imagining only requires children to mentally represent “another person”, whereas pretending requires children to project "another person” onto reality (when children impersonate a character, they project the mental representation of the character onto themselves) (Lillard, 1993a; 1994; 2001b). The reason this distinction is important is because projection gives pretending overt consequences that imagining does not have (Harris, 2000). For example, when children enact a character they might produce pretend behaviours and utterances, but this is not the case if they are simply imagining a character.

2.4.2 Neurophysiological Research

Some of the most compelling evidence for the interpretation of role play as “thinking-as-if” comes from a neurophysiological study by Girodo, Deck, and Campbell (2002). The study used event-related potentials (ERP) to examine whether the brain activity that is associated with one’s own identity is suppressed when adults take on a new identity while role playing. Adults were first presented with statements that contained autobiographical information, and were asked to judge the accuracy of each statement (e.g., “My name is…”, “I was born in…”). They were then asked to “set aside who they really were” and enact one of three roles: a pre-law, pre-medical, or engineering student. While role-playing, adults were presented with the same autobiographical
statements as before and asked to judge the accuracy of the statements. The results showed that pretending to be someone else elicited ERPs similar to those elicited by information about one’s own identity.

While these findings provide some preliminary evidence that adults have the capacity to “think-as-if” while role-playing, there are two reasons to be cautious in generalizing these findings to children’s role play. First, Girodo et al. instructed participants to “set aside who they really were” while role-playing. This may have encouraged adults to “think-as-if” while role playing, when they may not have done so in the absence of such instructions. It would be interesting to examine whether manipulating the instructions (whether it is providing no instructions or asking them to “behave-as-if” they are the character) would change participants’ neurophysiological responses while role playing. Second, it is possible that when adults enact a role, they do so differently than children. We know from Lillard’s (e.g., 1993b; 1996) work on pretense understanding that children do not appreciate the mental aspect of pretense until the age of 6 or 7. Perhaps children’s conceptualization of pretense is not the only thing that changes as they get older; children might also change the way they pretend or enact a role.

2.4.3 Mirror Neurons

A more controversial piece of the evidence that children “think-as-if” while role playing comes from research on mirror neurons. Mirror neurons are a class of visuomotor neurons that respond to goal-directed motor actions (e.g., grasping an object) (Gallese & Goldman). They were first discovered in the ventral prefrontal cortex of macaque
monkeys (Gallese, Fadiga, Fogassi, & Rizzolatti, 1996; Rizzolatti, Fadiga, Gallese, & Fogassi, 1996), and also exist in humans (Fadiga, Fogassi, Pavesi, & Rizzolatti, 1995; Rizzolatti & Craighero, 2004). What is so intriguing about mirror neurons is that they not only fire when one performs a particular action, they also fire when one observes the same action being performed by someone else.

Gallese and Goldman (1998) have speculated that mirror neurons serve as “a cortical system that matches the observation and execution of motor actions” (pg. 495). In other words, mirror neurons allow humans to simulate other’s actions by matching the observed behaviour onto their own motor repertoire - without actually performing the action. The authors believe that this matching system enables humans to “think-as-if”, and infer the intentions of the observed agent. For this reason, it has been speculated that mirror neurons constitute the neural bases of “thinking-as-if” (e.g., Gallese & Goldman, 1998, Gallese, Keysers, & Rizzolatti, 2004). If true, it would suggest that children come biologically equipped with neural mechanisms that allow them to adopt the mental perspective of another person or “think-as-if”.

More recently, however, the function of mirror neurons has become the topic of much controversy. In particular, researchers have begun to question whether mirror neurons constitute the neural bases of “thinking-as-if”, claiming that there is a missing link between mirror neurons and the ability to “think-as-if” (e.g., Jacob & Jeannerod, 2005; Meltzoff & Decety, 2003). For instance, Jacob and Jeannerod (2005) argue that the mirror system only enables humans to represent the motor intentions of an agent (e.g., picking up an apple), because there is nothing about matching an observed action onto
one’s own motor repertoire that would enable humans to infer the agent’s social intentions (e.g., is the intention to eat the apple or to throw it away?). If this is the case, it is not clear how a mirror system in humans would give rise to the capacity to “think-as-if”.

While a number of alternative theories have been proposed to explain the missing link between mirror neurons and “thinking-as-if”, the most relevant to the present discussion is a theory proposed by Meltzoff and Decety (2003). They propose that the missing link is imitation. That is, imitation, rather than mirror neurons, enables children to make connections between the observation and execution of actions. By imitating others’ actions, they believe that infants come to understand that others are “like me”. This insight enables infants to use their own experiences with mental states and behaviours to make inferences about the social intentions of others. In other words, Meltzoff & Decety believe that infants come to “think-as-if” by imitating the behaviour of others. It is important to clarify that Meltzoff and Decety do not claim that mirror neurons underlie the ability to imitate. After all, monkeys have mirror neurons and they do not imitate (Tomasello & Call, 1997; Byrne, 2002; Whiten, 2002). Rather, the authors posit that mirror neurons help infants see that others are “like me” when they imitate. This insight – not mirror neurons per se, is what enables infants to infer the mental states of others because they begin to understand that others have the same mental experiences as they do.
2.4.4 Summary

In this chapter I reviewed the existing evidence from both within the role play literature, as well as from other areas of psychology, that suggest that children are “thinking-as-if” while role playing. While it is commonly believed that children “think-as-if” they are the character they are enacting, I have argued that much of the evidence used to support this claim is weak, and based on little, if any, empirical evidence. This leaves open the possibility that children might be doing something else when they enact a role. One possibility is that children might simply be “behaving-as-if” they are the character while role playing, without necessarily taking on the character’s mental perspective. Considering this, the present research explores whether children are “thinking-as-if” versus “behaving-as-if” while role playing.

2.5 The Present Research

To investigate the extent to which children adopt the mental perspective of the character they are pretending to be, I examined children’s use of deictic terms while role playing. Deictic terms are words whose referential meaning changes depending on the context in which they are used. These terms of reference indicate the deictic center – or point of view of the speaker (Ziegler et al., 2005). Examples of deictic terms include personal pronouns such as “I”, “he” or “me”. The exact referent of each of these terms depends on the person who is speaking. Thus, I reasoned that children might evidence that they are “thinking-as-if” they are the characters if they modify their use of deictic terms while role playing so they become congruent with the character’s perspective, as opposed to their own.
To do this, I examined how children referred to photographs of themselves while they impersonated a character. Under normal circumstances (i.e. not pretending), children aged 4-years and older typically refer to a photograph of themselves with the personal pronoun “me”, as this is the deictically appropriate term for self-reference (Povenelli & Simon, 1998). I reasoned that if children were truly “thinking-as-if” they were the character, they might see the photograph of themselves as a third-person would, and thus refer to the photograph of themselves using their own proper name (e.g., “That’s Chris.”). In contrast, if children were simply "behaving-as-if" they were the character without taking on the character’s mental perspective, they might continue to refer to the photograph with the personal pronoun “me” (e.g., “That’s me”).

To characterize the extent of children’s deictic shifts during role play, I also examined children’s use of deictic terms when referring to a photograph of a toy they brought into the lab, a photograph of their parent, and their reflection in a mirror. Following the same logic as children’s own photograph, I hypothesized that children would respond to the photograph of their toy, and the photograph of their parent like a third person would, if they were truly “thinking-as-if” while role playing. The mirror was included to examine whether children engaged in a within-task deictic shift. Mirrors, unlike photographs, represent the “present” self— a self that is currently pretending. Thus, I did not expect children who were “thinking-as-if” to respond to their mirror in the same way they did to the photographs. Finally, parents were asked to fill out a questionnaire on children’s role play that assessed children’s interest in fantasy and their
engagement in role play. Our hypothesis was that children who were high fantasy, or engaged in more role play, would be more likely to “think-as-if” while role playing.
3.1 Method

3.1.1 Participants

The participants in this study were 81 children ($M = 4;9$; range: 4:0-5:11; 40 boys); 60 4-year-olds ($M = 4;6$; range: 4:0-4:11; 32 boys) and 21 5-year-olds ($M = 5;4$; range: 5:0-5:11, 9 boys). Forty 4-year-olds participated in the pretend condition of the PSR task ($M = 4;6$; range: 4:0-4:11; 21 boys), and 20 4-year-olds participated in the control condition ($M = 4;5$; range: 4:0-4:11; 11 boys). All 5-year-olds participated in the pretend condition of the PSR task. Children were primarily from Caucasian, middle class families and English was their primary language. Participants were recruited through a database comprised of families that had either participated in past studies or had been recruited from various locations in Kingston, Ontario, Canada. Six additional 4-year-olds participated but were removed from the final sample because they either did not comply with the experimenter, or they did not want to pretend.

3.1.2 Design, Materials, and Procedure

Pretend Self-Recognition Task

This study used a between-subject design in which participants were assigned to one of two conditions of the PSR task: the pretend condition or the control condition.

Preliminary preparation. Parents were asked ahead of time to bring their child’s favourite toy to the lab. When parents and children arrived at the lab, a female
experimenter played with children while parents read and signed the consent form. Once children were comfortable with the experimenter, children were told that the experimenter wanted to take a photograph of the toy they brought into the lab. A digital camera was used to take a photograph of the child’s toy, as well as a photograph of the child, and a photograph of their parent. After the photographs were taken, children were introduced to the experimenter’s “friend” who had also brought her favourite toys into the lab – a Mr. Potato Head™ figurine and a stuffed Elmo™ toy. The experimenter’s “friend” played with the children in the reception area of the laboratory while the experimenter downloaded the photographs into iPhoto (Apple, Inc.), and printed them onto 10.2 cm x 15.2 cm photo quality paper using a colour printer. The photographs were hidden in a small playroom along with six other photographs (a digital photograph of a Mr. Potato Head™ figurine, and a stuffed Elmo™ toy; and photographs of the cartoon characters Bob the Builder, Mickey Mouse, Winnie the Pooh, and Blue taken from various children’s websites) and a small plastic mirror. A small table and chair set, a side table, a poster of Winnie the Pooh, a book, two chairs, a small box, a shelving unit, a Kleenex® box, and a crate were used to hide the photographs. To help children find the hidden photographs, clues were printed on 12.5 cm x 14.5 cm sheets of white paper, laminated, and attached to the back of the photographs with adhesive tape.

Once the photographs were hidden, the experimenter asked children if they wanted to play some games with her in her special playroom. Parents were given the option to wait in the waiting room while the study was being conducted or to watch the play session through a one-way mirror in the adjoining room. As children entered the
playroom, the experimenter asked them to have a seat on the floor. When children were seated, the experimenter began the PSR task (see Appendix A for the entire script). The play session was videotaped through a one-way mirror using a video camera equipped with a wide-angle lens and a remote microphone to capture audio.

Pretend condition. Children assigned to the pretend condition were told that the playroom was the experimenter’s special pretending room and that she liked to pretend. To encourage children to pretend, children first participated in a warm-up task. The experimenter told children that her favourite thing to pretend to be was a dog, and asked children to show her how they pretended to be a dog. Next, the experimenter suggested that children continue to pretend to be a dog and that she would pretend to be the dog’s owner. While pretending to be a dog, children were addressed only by their pretend dog name and were asked to fetch a ball, shake a paw, roll over, and speak.

After the warm-up task was complete, children were asked what their favourite thing was to pretend to be. The experimenter suggested that children pretend to be their favourite character and to choose a character for the experimenter to impersonate. If children told the experimenter that they did not have a favourite thing to pretend to be, or did not choose a character for the experimenter to impersonate, the experimenter made suggestions until children decided on a character. Once the characters were agreed upon, proper names were assigned to each character so the experimenter could address children by their character’s name throughout the remainder of the experiment. For example, if children choose to be a bear named Ashley, they would be addressed as Ashley throughout the remainder of the play session as opposed to their proper name. Depending
on children’s choice of characters, the experimenter suggested a corresponding pretend context. For example, if children chose to impersonate a monkey, the experimenter would say “Let’s pretend we are at the zoo”, if children choose to impersonate Batman, the experimenter would say “Let’s pretend we are in the city”. Children were then told that a bunch of their friends were hidden in the room, and that they had to find them using some clues. Once children began to look for the clues, they were not explicitly reminded to continue to pretend at any point during the task. The experimenter directed children to the first clue which was hidden in a bin on the floor. The clue described where the next photograph and clue were hidden (e.g., this person is hidden behind a pillow). The experimenter read the clue aloud and guided children in their search for the corresponding photograph. When children found a hidden photograph, the experimenter asked a test question: if the photograph was of a character or a person, children were asked “Who did you find?”; if the photograph was of a toy, children were asked “Who did you find?” as well as “Who’s toy is that?”; and if children found the mirror, they were asked “Who do you see in that mirror”. After children responded to the test question, the experimenter read the clue attached to the back of the photograph, which described where the next photograph and clue were hidden. This sequence was repeated until children found the eight hidden photographs and mirror. The order in which children found the hidden items, and the places they were hidden were identical for all participants (see Table 1).
Table 1. *Presentation Order of the Photographs, Hiding Spots, and Attached Clues*

<table>
<thead>
<tr>
<th>Photograph</th>
<th>Hiding spot</th>
<th>Clue attached to next card</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Distracter (Bob the Builder)</td>
<td>Behind the pillow on the blue chair</td>
<td>This person is hidden underneath a Kleenex box.</td>
</tr>
<tr>
<td>2. Child</td>
<td>Underneath the Kleenex box on the side table</td>
<td>This person is hidden on the bottom of something black.</td>
</tr>
<tr>
<td>3. Distracter (Mickey Mouse)</td>
<td>Underneath the black chair</td>
<td>This person is hidden in a place that has 2 doors.</td>
</tr>
<tr>
<td>4. Toy</td>
<td>Inside the shelving unit</td>
<td>This person is hidden on the bottom of a table with a Kleenex box on it.</td>
</tr>
<tr>
<td>5. Distracter (Mr. Potato Head)</td>
<td>Underneath the side table</td>
<td>This person is hidden on the bottom of a chair that is friends with the table.</td>
</tr>
<tr>
<td>6. Distracter (Winnie the Pooh)</td>
<td>Underneath one of the small chairs</td>
<td>This person is hidden behind a dark blue chair.</td>
</tr>
<tr>
<td>7. Parent</td>
<td>Behind the blue chair</td>
<td>This person is hidden behind a poster.</td>
</tr>
<tr>
<td>8. Distracter (Elmo)</td>
<td>Behind the poster</td>
<td>This person is hidden in a purple box.</td>
</tr>
<tr>
<td>9. Distracter (Blue)</td>
<td>Inside the small box</td>
<td>This person is hidden in a book.</td>
</tr>
<tr>
<td>10. Mirror</td>
<td>Inside the book</td>
<td>No clue attached</td>
</tr>
</tbody>
</table>

*Note.* To begin the task, the experimenter read children the clue (“This person is hidden behind a pillow”), which was hidden in the crate.
Control condition. The control condition was the same as the pretend condition except that children assigned to the control condition were not asked to impersonate a character, or choose a character for the experimenter to impersonate. Therefore, children in this condition were told that the playroom was the experimenter’s special game room – rather than the experimenter’s special pretending room. Instead of finding “friends”, children were told that there were a bunch of photographs hidden in the room, and that they had to find them using some clues. Finally, children in this condition did not participate in the warm-up task because of a concern that some children might continue to pretend while they found the hidden photographs.

Parent Questionnaire

While children participated in the PSR task, parents were asked to fill out a brief questionnaire adapted from Taylor and Carlson’s (1997) parent interview, which assesses children’s interest in fantasy and their engagement in role play (see Appendix B).

Children’s favourite activities. In the first part of the questionnaire, parents were asked a number of questions about their child’s favourite play activities. Parents’ responses were coded as either “fantasy-oriented” (e.g. teddy bear), which received a score of 1, or “reality-oriented” (e.g. building blocks), which received a score of 0.

Children’s engagement in pretend play. This section of the questionnaire asked parents to indicate whether or not their child engaged in particular forms of role play, and to report the frequency of a number of pretend behaviours. For yes/no questions, children received a score of 1 if their parent responded “yes”, and a score of 0 if their parent responded “no”. For frequency questions, children received a score ranging from 0-4; 0 =
if the parent responded “never”; 1 = if the parent responded “once or twice”; 2 = if the parent responded “occasionally”; 3 = if the parent responded “frequently”; 4 = if the parent responded “everyday”.

In addition to filling out the questionnaire, parents were asked whether their child was familiar with the name of the cartoon characters that were hidden in the room during the PSR task.

3.1.3 Coding

Children’s Responses to the Target Photographs

Children’s responses were coded when they found: 1) their own photograph, 2) the photograph of their toy, 3) the photograph of their parent, and 4) their reflection in the mirror. Preliminary coding of the data revealed that some of the 4-year-olds in the pretend condition responded to the test question with an animal noise (e.g., barking, meowing). Consequently, another coding category was added, and children’s responses were coded into one of three categories: 1) first-person responses, 2) third-person responses, 3) animal noises (see Table 2 for examples of first-person and third-person responses).
Table 2. Examples of First-Person and Third-person Responses for Each of the Target Photographs

<table>
<thead>
<tr>
<th>Photograph</th>
<th>First-person</th>
<th>Third-person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child</td>
<td>“me”</td>
<td>“[child’s name]”</td>
</tr>
<tr>
<td></td>
<td>points to self</td>
<td>“a boy/girl”</td>
</tr>
<tr>
<td>Child’s toy</td>
<td>“mine”</td>
<td>“[child’s name]’s toy”</td>
</tr>
<tr>
<td></td>
<td>points to self</td>
<td>“I don’t know”</td>
</tr>
<tr>
<td>Parent</td>
<td>“my mom/dad”</td>
<td>parents’ proper name</td>
</tr>
<tr>
<td></td>
<td>“mom/dad”</td>
<td>“[child’s name]’s mom/dad”</td>
</tr>
<tr>
<td>Mirror</td>
<td>“me”</td>
<td>“[child’s name]”</td>
</tr>
</tbody>
</table>

**Character choice and use of pretend actions**

In order to examine whether children’s character choice or use of pretend actions distinguished children who gave first-person versus third-person responses during the PSR task, children’s role play was coded for the following:

*Character assignment.* Children received a score indicating if they chose the character they impersonated, or if the experimenter chose the character.

*Characteristic actions.* Children received a score indicating if they impersonated
a character that has characteristic actions that can be physically acted out in the context of the game (e.g., a dog), or if they impersonated a character that does not have characteristic actions (e.g., Dora the Explorer).

*Type of character.* Children received a score indicating if they impersonated an “exotic” character (e.g., Batman), or if they impersonated an “ordinary” character (e.g., a cat) (see Lillard & Sobel, 1999; Sobel & Lillard, 2001).

*Pretend actions.* Children received a score indicating if they augmented their role play with pretend actions at any point during the Pretense Self-recognition task (e.g., crawling on all fours, meowing), or if they did not use pretend actions at all. To ensure reliability, a second coder was trained on the coding categories and randomly coded 20% of the data (*agreement = 100%*).

### 3.2 Results

#### 3.2.1 Preliminary Analyses

Table 3 shows the characters children impersonated in the pretend condition of the PSR task. Seven children (two 4-year-olds, five 5-year-olds) were excluded from the final analyses because it was ambiguous whether the physical appearance of the characters they chose to impersonate (e.g., princess, nurse, ninja) were different than children’s own appearance. In these cases, even if children were “thinking-as-if”, they still might have referred to their photograph with a first-person response if the physical appearance of the character they were impersonating was identical to their own. One additional 4-year-old was excluded because he chose to impersonate a machine (e.g.,
It was not expected that children would “think-as-if” when pretending to be a machine as machines do not have a mental perspective.

Table 3. The Characters Children Impersonated

<table>
<thead>
<tr>
<th>Age</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-year-olds</td>
<td>cat (9), Dora, horse, monkey, mouse,</td>
<td>Batman, bear, Bob the Builder, cat (3),</td>
</tr>
<tr>
<td></td>
<td>pony, princess (2), rabbit, Tigger,</td>
<td>Cookie Monster, detective\textsuperscript{ii},</td>
</tr>
<tr>
<td></td>
<td>unicorn</td>
<td>dinosaur, Fred from Scooby-Doo, giraffe,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>goblin, lion, monkey, Ninja Turtle,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dog, Spiderman, Tigger, train, Winnie the Pooh,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>wolf</td>
</tr>
<tr>
<td>5-year-olds</td>
<td>bird, bunny, cat (2), cheetah, Daphne from</td>
<td>alien, bear, horse, Legolus, mouse,</td>
</tr>
<tr>
<td></td>
<td>Scooby-Doo, duck, ladybug,</td>
<td>ninja, nurse, Shaggy from Scooby-Doo,</td>
</tr>
<tr>
<td></td>
<td>princess (3), teacher</td>
<td>Doo, Spiderman</td>
</tr>
</tbody>
</table>

Note. Number of children are shown in parentheses.

The goal of Study 1 was to examine whether children were more likely to refer to the target photographs with a third-person response in the pretend condition compared to the control condition. Preliminary analyses revealed that only two out of 16 5-year-olds (13%) in the pretend condition responded to the test questions with a third-person response (one child responded to all the photographs and the mirror with a third-person response, the other child only responded to their own photograph and the mirror with a
third-person response). Therefore, a control condition was not run for this age group, and no further analyses were done.

The remaining analyses for Study 1 focus on 4-year-old children’s performance on the PSR task. Table 4 shows the proportion of 4-year-old children in each condition who responded to each of the test questions with a first-person response, or a third-person response.
Table 4. Proportion of 4-year-old Children in Each Condition that Responded to each of the Target Photographs With a First-person Response or a Third-person Response

<table>
<thead>
<tr>
<th>Photograph and condition</th>
<th>Type of response made</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First-person</td>
<td></td>
<td>Third-person</td>
</tr>
<tr>
<td></td>
<td>Proportion</td>
<td>$n$</td>
<td>Proportion</td>
</tr>
<tr>
<td>Child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretend</td>
<td>.59</td>
<td>20</td>
<td>.41</td>
</tr>
<tr>
<td>Control</td>
<td>.85</td>
<td>17</td>
<td>.15</td>
</tr>
<tr>
<td>Child’s Toy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretend</td>
<td>.83</td>
<td>24</td>
<td>.17</td>
</tr>
<tr>
<td>Control</td>
<td>1.00</td>
<td>18</td>
<td>.00</td>
</tr>
<tr>
<td>Parent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretend</td>
<td>.88</td>
<td>30</td>
<td>.12</td>
</tr>
<tr>
<td>Control</td>
<td>1.00</td>
<td>20</td>
<td>.00</td>
</tr>
<tr>
<td>Mirror</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretend</td>
<td>.91</td>
<td>31</td>
<td>.08</td>
</tr>
<tr>
<td>Control</td>
<td>.85</td>
<td>17</td>
<td>.15</td>
</tr>
</tbody>
</table>

*Note.* Number of participants ranged from 29 to 34 due to some missing data.
Twenty-six out of the 37 children (70%) in the pretend condition impersonated an animal, and of these children, 15% responded to at least one of the test questions with an animal noise, rather than with a first-person or third-person response. The fact that children responded “in character” suggests that this type of response should not be coded as a first-person response. What is not clear, however, is whether this type of response can truly be taken as evidence that children are “thinking-as-if”. On the one hand, it might be argued that children respond with an animal noise because they have adopted the mental perspective of the character they are enacting, and as such, have begun to experience the world “as-if” they are the character. On the other hand, it might be argued that children are simply imitating the sounds they know to be associated with the character they are enacting (e.g., dogs bark, cats meow). Because both interpretations are plausible, I chose to analyze the data in two ways; first in a less conservative manner in which I coded animal noises as a third-person response, and second, in a more conservative manner in which I excluded children who responded to the test questions with an animal noise from the analyses.

3.2.2 Focal Analyses

*Condition Differences in Children’s Third-person Responses*

To explore condition differences in children’s third-person responses to their own photograph, the photograph of the toy they brought into the lab, the photograph of their parent, and their reflection in the mirror, a series of 2 (condition: pretend and control) x 2 (response: first-person versus third-person) chi-squares and Fisher’s exact tests were
conducted. Because these analyses were conducted on a relatively small sample, I chose to maintain a per comparison alpha of .05 rather than correct for multiple comparisons.

Third-person responses including animal noises. When animal noises were included with the other third-person responses, condition differences were found in children’s third-person responses to their own photograph ($\chi^2(1, N = 57) = 5.46, p < .05$), the photograph of the toy they brought into the lab (Fisher’s exact test, $p < .05$), and the photograph of their parent (Fisher’s exact test, $p < .05$) (see Figure 1).

Significantly more children in the pretend condition referred to each of the photographs with a third-person response than children in the control condition. This condition difference was not found for children’s responses to their reflection in the mirror (Fisher’s exact test, $p = 1$).
Figure 1. The proportion of children in each condition that referred to the photograph with a first-person response versus a third-person response (animal noises were included with the other third-person responses).

*Third-person responses excluding animal noises.* When children who responded with animal noises were excluded from the analyses, the condition difference in children’s third-person responses to their own photograph remained significant, $\chi^2 (1, N = 54) = 4.00, p < .05$. Even in this conservative analyses of the data, 41% of children in the pretend condition referred to their photograph with a third-person response. This was not
the case for the photograph of the toy children brought into the lab (Fisher’s exact test, \( p = .14 \)) or the photograph of their parent (Fisher’s exact test, \( p = .29 \)). As with the above analysis, a condition difference was not found for children’s responses to their reflection in the mirror (Fisher’s exact test, \( p = .66 \)).

**Evidence of a Within-task Deictic Shift**

Next, I looked for evidence of a within-task deictic shift by comparing children’s responses to their own photograph and their mirror image in the pretend condition of the PSR task. Children who responded with an animal noise were included in this analysis. Twelve (71%) of the children who responded to their own photograph with a third-person response showed evidence of a within-task deictic shift when responding to their reflection in the mirror (i.e., they responded with a first-person response). None of the children showed the reverse pattern (McNemar binomial, \( N = 36, p = .00 \)).

**What Distinguished Children Who Gave Third-person Responses While Pretending?**

I conducted several analyses to see whether children’s character choice, use of pretend actions, or any of the parent questionnaire items made a difference in how children approached the PSR task. Preliminary analyses showed that children’s third-person responding was not related to either age-in-months or gender.

*Character choice and use of pretend actions.* Table 5 shows the proportion of children who chose the character they impersonated (character assignment), impersonated a character that could be physically acted out in the context of the game (characteristic actions), impersonated an “exotic” (versus an “ordinary”) character (type of character), and augmented their pretend play with pretend actions and/or sounds (pretend actions).
To determine whether any of these variables made a difference in how children approached the PSR task, a series of Fisher’s exact tests were conducted. Children who responded with an animal noise were excluded from this analysis because several of these variables were confounded with this type of response (e.g., characteristic actions, pretend actions). The only variable that made a difference in how children approached the task was that children who augmented their pretend play with actions were more likely to refer to each of the photographs with a third-person response rather than a first-person response.

Table 5. Proportions for Character Assignment, Characteristic Actions, Type of Character, and Pretend Actions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type of response made</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First-person</td>
</tr>
<tr>
<td>Character assignment (child)</td>
<td>.82</td>
</tr>
<tr>
<td>Characteristic actions (has)</td>
<td>.76</td>
</tr>
<tr>
<td>Type of character (exotic)</td>
<td>.35</td>
</tr>
<tr>
<td>Pretend Actions (used actions)</td>
<td>.12</td>
</tr>
</tbody>
</table>

*Note. N = 29. Four participants were excluded from these analyses due to missing data.*

** Fisher’s exact test, p < .01

*Parent questionnaire items. The results of each of the questionnaire items are*
shown in Table 6. In order to determine whether any of these variables distinguished children who gave third-person responses from children who gave first-person responses, a logistic regression was conducted. Before doing so, however, a principal component analysis of the eight questionnaire items was performed to determine if factors might emerge that would allow us to create a battery of scores. The variables “favourite TV show” and “pretend to be an animal” were not included in these analyses because all parents responded to these questions with the same response.
Table 6. *Proportions for Parent Questionnaire Items (N = 32)*

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>Type of response made</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First-person</td>
</tr>
<tr>
<td>Favourite activity with others (fantasy)</td>
<td>.56</td>
</tr>
<tr>
<td>Favourite activity alone (fantasy)</td>
<td>.44</td>
</tr>
<tr>
<td>Favourite story (fantasy)*</td>
<td>.86</td>
</tr>
<tr>
<td>Favourite toy (fantasy)</td>
<td>.82</td>
</tr>
<tr>
<td>Favourite TV show (fantasy)</td>
<td>1.00</td>
</tr>
<tr>
<td>Pretend with toys (yes)</td>
<td>.88</td>
</tr>
<tr>
<td>Have/had an imaginary companion (yes)*</td>
<td>.17</td>
</tr>
<tr>
<td>Pretend to be an animal (yes)</td>
<td>1.00</td>
</tr>
<tr>
<td>Pretend to be a different person (yes)</td>
<td>.69</td>
</tr>
<tr>
<td>Pretend to be a machine (yes)</td>
<td>.50</td>
</tr>
</tbody>
</table>

\*N = 28. \^N = 29 due to missing data.

\*p < .05

The principle component analysis yielded four factors with eigen values greater
than one. Visual analysis of the data suggested that a 2-factor solution was most interpretable and accounted cumulatively for 41% of the variance of the eight questionnaire items. The first factor was interpreted as an indicator of children’s engagement in collaborative forms of fantasy and play (favourite activity with others, pretend with toys, have/had an imaginary companion, pretend to be a different person), and the second as an indicator of children’s engagement in more solitary forms of fantasy and play (favourite activity alone, favourite storybook, favourite toy, pretend to be a machine) (see Table 7 for factor loadings). The results of the logistic regression are summarized in Table 8, and no responses emerged as significant predictors of children’s performance on the PSR task.
Table 7. *Factor Loadings of Parent Questionnaire Items in Principle-Component Analysis*

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Factor 1, Solitary Play</th>
<th>Factor 2, Collaborative Play</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favourite activity with others</td>
<td>.216</td>
<td>.759</td>
</tr>
<tr>
<td>Favourite activity alone</td>
<td>.501</td>
<td>.276</td>
</tr>
<tr>
<td>Favourite story</td>
<td>.464</td>
<td>-.429</td>
</tr>
<tr>
<td>Favourite toy</td>
<td>.726</td>
<td>.206</td>
</tr>
<tr>
<td>Pretend with toys</td>
<td>-.371</td>
<td>.377</td>
</tr>
<tr>
<td>Have/had an imaginary companion</td>
<td>6.47 E-02</td>
<td>.381</td>
</tr>
<tr>
<td>Pretend to be a different person</td>
<td>-.352</td>
<td>.602</td>
</tr>
<tr>
<td>Pretend to be a machine</td>
<td>.641</td>
<td>.115</td>
</tr>
</tbody>
</table>
Table 8. Summary of Binary Logistic Regression Analysis Predicting Children’s Performance on the PSR Task from Parent Questionnaire Items (N = 27)

<table>
<thead>
<tr>
<th>Questionnaire items</th>
<th>Wald $\chi^2$</th>
<th>B</th>
<th>SE</th>
<th>Odds ratio</th>
<th>Confidence interval</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solitary Play</td>
<td>.02</td>
<td>.07</td>
<td>.52</td>
<td>1.07</td>
<td>.39-2.95</td>
<td>.90</td>
</tr>
<tr>
<td>Collaborative Play</td>
<td>1.9</td>
<td>.48</td>
<td>.35</td>
<td>1.61</td>
<td>.82-3.2</td>
<td>.17</td>
</tr>
</tbody>
</table>

Model $\chi^2_{(1)} = .34, p = .53$

3.3 Discussion

The goal of this first study was to use a novel task - the PSR task - to assess whether children take the mental perspective of the characters they impersonate during role play. Specifically, I was interested in whether during role play, children referred to photographs of themselves or their possessions with a first person (“That’s me”) or third-person (“That’s Jennie”) term. Use of the third-person term would be strong evidence that children had adopted the mental perspective of the character they impersonated.

Results showed that approximately half of 4-year-old children referred to the target photographs from the perspective of the character they were pretending to be, and thus provided evidence that they had adopted the mental perspective of the character they were pretending to be. On the whole, these third person responses were much more common to children’s own photographs as opposed to photographs of their possessions.
It is unclear as to why this was the case, though there are several possibilities. For example, with respect to the photograph of children’s toys, these items might have been considered a bit strange in the context of finding photographs of friends. With respect to children’s responses to their parent’s photograph, most children are not used to referring to their parents’ by their proper name, and in some cases it might be explicitly prohibited. Given this, it is possible that even though children were engaged in a pretend context, the motivation to provide a third-person response was not sufficiently strong to override this standard prohibition. Nonetheless, on the whole, these findings provide strong evidence that approximately half of the 4-year-olds provided third person responses to target items in the PSR task, thereby providing evidence of mental perspective taking during role play.

Results from the control condition, in which children participated in an analogue of the PSR task without role playing, showed that these findings were not likely attributable to children’s baseline tendencies to provide third-person responses to target photographs in the task. This claim is bolstered by our analysis of children’s responses to their reflection in the mirror in the pretend condition of the PSR task. While roughly half of the 4-year-olds responded to their photograph with a third-person response, only 29% responded similarly to their reflection in the mirror while pretending. This difference is important because, although both are images of the child, the mirror provides information about the present self (i.e., when children are role playing), whereas the photograph provides information about the self at an earlier point in time (i.e., when children first arrived at the laboratory and were not role playing) (Moore, 2006). The fact that roughly
half the 4-year-olds demonstrated a within-task deictic shift provides some compelling evidence that at least these children were truly perspective taking during role play.

While roughly half of the preschoolers gave some evidence for perspective taking during role play, a much smaller proportion of five-year-olds did the same. There are several possible reasons for this reverse developmental trend. One possibility is that 5-year-olds were too self-conscious to pretend in front of the experimenter. Between the ages of 4 and 5, children develop a better understanding of the self and are better able to think of the self from an objective point of view (Rochat, 2003). As children become more aware of themselves as individuals, they become more sensitive to the ways people might see them, and begin to experience emotions that are elicited from being the focus of another’s attention (e.g., embarrassment, self-consciousness) (Lewis, Sullivan, Stanger, & Weiss, 1989). Children’s awareness of themselves might have been exacerbated by the one-way mirror that was installed in the room for observation. Five-year-olds, but not 4-year-olds, were generally tall enough to see their reflection in the one-way mirror. Another possibility is that the PSR task is not age-appropriate for 5-year-olds. Some of the photographs of cartoon characters that children found in the task did not complement the characters that the children were pretending to be. For example, if a child pretended to be Legolas from Lord of the Rings, it might not have made much sense for him to then find a picture of Bob the Builder during the game. Of course, one could argue that this concern would apply broadly; it is not particularly natural for children pretending to be a dog to find a picture of Bob the Builder either. Yet, anecdotally speaking, many of the 5-year-olds commented that it was “weird” to find certain cartoon
characters or looked confused when the photograph was incongruent with the pretend context. Such comments seemed more rare for the 4-year-olds, which may be an indication that 4-year-olds were more amenable to participating in the task than were 5-year-olds.

In addition to explaining 5-year-olds’ failure to use third person responses in the task, an important question concerns why only half of the 4-year-olds provided third-person responses. One possibility is that the finding may be attributed in part to some of the same factors I believe affected 5-year-olds’ performance. For instance, perhaps half of the 4-year-olds were too self-conscious to pretend, or found the task too odd. However, I think that these explanations are unlikely as the 4-year-olds did not make the same sorts of comments the 5-year-olds did, nor did they provide any other evidence that they were feeling overly self-conscious. An alternative explanation for this finding is that only half of the 4-year-olds engaged in a perspectival shift while role playing. For instance, children who responded with a first-person response might have physically acted like the character, without necessarily taking on the character’s mental perspective (i.e., they were “behaving-as-if”).

I conducted several analyses in an attempt to see what predicted children’s third-person responding in the PSR task. Unfortunately, these results were largely uninformative. That is, I found no evidence that children’s performance was related to several pretend-related variables, including the exoticness of the characters they pretended to be, their parents’ report of interest in fantasy-oriented activities, everyday role playing habits, or having an imaginary companion. It is difficult to conclude
anything from a null effect; indeed, it is worth noting that most parents reported very high levels of involvement and interest in everyday role play and fantasy activities, and very low proportions of imaginary companions. Thus, there may have been ceiling and floor effects on the questionnaires that affected our abilities to detect relations between PSR task performance and these pretend-related variables. To help parents differentiate common, everyday impersonation that most preschool children engage in from more elaborate, sustained impersonation that only some children assume (e.g., imaginary companions) a revised parent questionnaire is used in Study 2.

Intriguingly, the one thing that did distinguish children who gave third-person responses from children who gave first-person responses was their use of pretend actions. Specifically, children who referred to their own photograph with a third-person response were more likely to augment their role play with pretend actions. In fact half (7 of the 14) of the children who showed evidence of “thinking-as-if” used pretend actions. This finding is interesting for several reasons. As Harris (2000) initially claimed, pretend actions may be evidence that children are experiencing the world from the character’s perspective (i.e., a perspective that is different from their own). The fact that pretend actions were associated with PSR performance might be taken to strengthen that claim. Relatedly, third person responding in the PSR task and the use of pretend actions might be related to how absorbed or “into” the pretend children were. In other words, it could be that the more absorbed children are in the pretense, the more likely they are to adopt the mental perspective of the character.
While these findings regarding the relation between pretend actions and PSR task performance seem promising, there are several reasons they need to be followed up before they are strongly interpreted. First, given the large number of tests I carried out, it is possible that they are simply attributable to chance. Second, the pretend action coders were not blind to the purpose of the study. This was partly attributable to the fact that the purpose of the study was apparent in the videotapes themselves (i.e., it was obvious that children were pretending and that I was asking them questions about photographs of themselves), and because these measures were exploratory in this initial study, I elected not to engage in the time consuming task of selectively editing the relevant parts of the video. However, because the measure emerged as a potentially important one, I took the necessary steps to ensure blind coding in Study 2. A final limitation with the present method of coding children’s pretend actions is that children were categorized as either “used pretend actions” or “did not use pretend actions”, based on their use of pretend actions throughout the entire task. Yet, it became clear when coding the videos that this simple distinction was too coarse; some children only used pretend actions at the beginning of the task, while others used pretend actions throughout the entire task. Thus, in Study 2, I chose to look at children’s use of pretend actions at three different points throughout the task, rather than simply categorizing children based on their pretend actions throughout the entire task.
Study 2 had two aims. The first aim of Study 2 was to replicate and extend the findings of Study 1 by exploring the variability in children’s performance on the PSR task. In essence, there are three main explanations for the variability I saw in 4-year-olds’ PSR task performance, each of which I will attempt to explore in the present study. The first possibility is that performance in the PSR task is simply not a reliable measure of perspective taking in role play. To be sure, the task makes many demands on children, including maintaining a role played character in an unfamiliar setting with an unfamiliar experimenter. Although I was highly successful in eliciting role play, it may have been that some of these characteristics of the task added noise to children’s performance and made it less likely that they would reveal their skills at any given point. I will explore this in the present study by testing a new group of children at two time points. This will allow me to both replicate the findings of the present study with respect to the proportions of children who show third-person responding, and assess the test-retest reliability of the measure.

A second possibility is that the PSR task makes additional cognitive demands that may have affected children’s tendencies to respond appropriately. For example, as I showed in the control condition, children most commonly used a first-person (“It’s me”) response when they found a photograph of themselves. Thus, successfully providing a third person response requires children to overcome the prepotent tendency to provide a first person response. It could be that children who did not provide third person responses
were unable to exert sufficient executive control required to overcome the prepotent tendencies to respond appropriately. If this is true, then I might expect that third person responding in the PSR task is associated with better performance on tasks that measure executive control in preschoolers. I will test this hypothesis in the second study.

There are other peripheral cognitive demands that might have precluded third-person responding in the PSR task. For instance, it is possible that children’s ability to attribute mental states to others - referred to as “theory of mind”, might be associated with children’s performance on our task (e.g. Flavell & Miller, 1998). Theory of mind is fundamental to social functioning because it allows children to more accurately take the perspective of other people. The link between theory-of-mind and performance on the PSR task seems relatively straightforward. Specifically, in order to “think-as-if” while role playing, children need to be able to make accurate judgments about the mental states of the character they are pretending to be. Perhaps, then, children who are better at making accurate judgments about others’ mental states would be better able to “think-as-if” they are the characters they are pretending to be during role play. These better abilities to “think-as-if” may, in turn, be related to third-person responding on the PSR task. This will be explored in Study 2 by adding a small battery of theory-of-mind tasks that are designed to assess children’s abilities to make judgments about others’ mental states.

Finally, a third and perhaps most intriguing possibility, is that performance on the PSR task indexes what I might call different styles of role play in children. At present, I can see two possible ways in which these different styles might be characterized. One possibility is that children differ in the degree to which they engage in pretend scenarios.
That is, contrary to the widely-held assumption that role play is itself a sign of mental perspective taking in young children (see e.g., Harris, 2000), individual children may differ in their approach. On this proposal, it is possible that children who become sufficiently engaged in a pretense task provide third-person responses in the PSR task. Some evidence for this possibility might be seen in our finding that children who augmented their pretend play with pretend actions were more likely to give third-person responses in the PSR task. Insofar as augmenting pretend play with pretend actions is a sign of engagement in the pretend play, this finding could provide some preliminary evidence in favor of the possibility that children’s role play styles can be characterized largely in terms of the degree of engagement. In Study 2, I will further explore this by adding additional measures of children’s engagement with the pretend scenarios (e.g., “into it coding”).

A second possibility is that the role playing styles are related to perspective taking, per se. That is, perhaps it is the case that some children are susceptible to adopting the mental perspective of the characters they pretend to be, whereas other children are not. Of course, it is difficult to measure children’s tendencies to take another’s perspective in pretend or fantasy settings. One promising approach, however, comes from research on narrative absorption, which examines children’s (and adults’) tendency to adopt the mental perspective of the protagonist while listening to a narrative (Rall and Harris, 2000; Ziegler et al., 2005). The important finding from this research is that there are individual differences in the extent to which children show evidence that they take the mental perspective of the protagonist in the stories. That is, although everyone ostensibly
can take a story character’s perspective, only a subset spontaneously do. It seems possible that this tendency to become absorbed in fantasy scenarios may be one personality-like individual differences variable that might account for third-person responding in the PSR task. That is, children who show evidence for taking the mental perspective of characters in narrative absorption tasks may be the ones who are more likely to provide third-person responses in the PSR task. In Study 2, I test this hypothesis by adding two narrative absorption tasks.

The second aim of Study 2 was to explore whether children who responded with a third-person response truly “put themselves in the character’s shoes” in the way that proponents of simulation theory suggest. In other words, did children who showed evidence of “thinking-as-if” really imagine the world from the character’s perspective and respond to the target photographs as the character would? An alternative explanation is that these children proceeded in a more “reflective” or “theory-like” manner, in which they explicitly computed the pretended mental states of the characters they were role playing (i.e., “Right now I am pretending to be Batman, so that is not me in the photograph, that’s Chester”). Unlike simulation which is first-person centered, responding reflectively involves third-person rationalization (Jarrold, Carruthers, Smith, & Boucher, 1994). Thus, children have to theorize about the character’s perspective in order to answer the test question.

Differentiating between reflective and simulative responses, however, is tricky because behaviourally they look the same (i.e., in both cases, children respond to the test question with a third-person response). However, there is some reason to believe that the
two processes might be distinguished in a reaction time analysis. Specifically, I reasoned that if “thinking-as-if” is a reflective process, it may require more cognitive resources – or mental effort for children to refer to their own photograph with a third-person response compared to a first-person response. The reason for this being that responding to the test question with a third-person response requires children to theorize about the character’s mental state, or reflect on how they should answer (e.g., I am pretending to be Batman, therefore I am supposed to act like I am no longer myself). If this is the case, it is likely that reaction times would be relatively longer for children who gave third-person responses.

Simulation, in contrast, eliminates the need for third-person rationalization. Thus, it seems reasonable to suggest that responding to the test question with a third-person response would require the same mental effort as responding with a first-person response – as both ways of responding are first-person centered. If children respond to the test question as fluidly with third-person responses as they do with first-person responses (i.e., there are no reaction time differences), it is likely that children are “putting themselves in the character’s shoes”, rather than reflecting on the character’s mental state. In order to test this hypothesis, the PSR task was modified in Study 2 to include a reaction time measure. Instead of finding hidden photographs, children found floppy disks that could be inserted into the “Friend Finder” – a computer that showed children who they found. Having children view the photographs on a computer screen enabled tight control of the presentation and the timing of the test question. The addition of a
reaction time measure also provides a more implicit measure of children’s performance on the PSR task by examining condition differences in children’s reaction times.

If third-person responding does indeed require children to theorize about the character’s mental state - rather than simulate the character’s perspective - children’s tendencies to respond appropriately in the PSR task might depend on what children understand about pretense more generally. As noted from the outset, pretense is inherently a mental state whereby children intentionally act on the world in a pretend way: If children are not intentionally acting “as-if”, they are not pretending, but rather “behaving-like”. While children show evidence of engaging in role play prior to the preschool years, it appears that for the majority of children, a more mentalistic understanding of pretense does not emerge until around 4- to 5-years of age. With respect to the present discussion, it is possible that an explicit mentalistic understanding of pretense is a necessary precursor for third-person responding in the PSR task. That is, third-person responses might be possible only if children understand that pretending is more than just “behaving-like” a character. If this is the case, children’s tendencies to give third-person responses in the PSR task might hinge on their explicit understanding of the mentalistic nature of pretense. This will be explored in Study 2 by adding a small battery of tasks that are designed to assess children’s mentalistic understanding of pretense.
4.1 Method

4.1.1 Participants

Eighty-four typically developing 4-year-old children participated in this study. Participants were recruited using the same database as Study 1. Parents were contacted by phone and were given a brief description of the study’s two sessions. Each participant received $15 and a small toy at the end of the first session, and a $10 gift certificate to Chapters and another small toy at the end of the second session. Participants’ age in months was calculated from their birth date at the time of the first session. Parents reported that all participants were born within two weeks of their original due date and were developing typically. Five children were excluded from the final sample because their scores on the PPVT were 1.5 times the IQR below the first quartile – which may be indicative of a language delay or difficulty attending to the task. Another five children were excluded because they either did not comply with the experimenter or they did not want to pretend. Therefore, the final sample consisted of 74 children ($M=4;5$; range: 4:0-4:11; 34 boys). Of these children, 57 participated in the pretend condition of the PSR Task ($M=4;6$; range: 4:0-4:11; 25 boys) and 17 children participated in the control condition ($M=4;4$; range: 4:0-4:11; 9 boys).

4.1.2 Procedure

Children were tested individually in two videotaped sessions that lasted approximately 90 minutes each, and occurred within two weeks of each other. The measures for this study included a modified version of the PSR task, a theory of mind
battery, an executive functioning battery, a pretense understanding battery, a narrative absorption task, a test for verbal ability, and a parent questionnaire on children’s role play. A description of all the tasks, as well as information on how each task was scored, follows in the subsections below. Children participated in three additional tasks that were not part of the present study; an EEG recording and two False-Sign tasks (Location False-Sign and Contents False-Sign; Sabbagh, Moses, & Shiverick, 2006). In both sessions, the tasks were presented to children in a fixed order, and children were given a short break before participating in the PSR task. The order of the tasks in Session 1 was EEG recording, Theory of Mind Scale, Grass/Snow, Location False-Sign, PSR task (Time 1), Moe, and Narrative Absorption. While children participated in the tasks, parents were asked to fill out the parent questionnaire. The order of Session 2 was Bear/Dragon, Location False-Belief, Card Sort, Contents False-Sign, Appearance-Reality, PSR task (Time 2), Self-pretense, Fantasy Moe, Less is More, and Peabody Picture Vocabulary Test - Third Edition (PPVT-III). At the beginning of each session, the experimenter took a photograph of children, their parents, and the toy children brought with them to the lab. Parents were asked to wait in the waiting room while the study was being conducted and were able to watch the entire play session on a closed-circuit television monitor.

4.1.3 Measures

4.1.3.1 PSR Task

Participants were assigned to one of two condition of the PSR task: the *pretend condition* or the *control condition*. The procedure was identical to the one described in
Study 1 up to the introduction of the first clue. Instead of finding the first clue in a bin on the floor, the experimenter introduced children to her “Friend Finder” computer – a 15” LCD monitor and the casing of an external CD drive (see Figure 2). The Friend Finder was positioned on a shelving unit so that the computer monitor was eyelevel with children, and the external CD drive could be reached by children while standing or kneeling on the floor. The CD drive was covered in black foam, and a cutout of a question mark was attached to the top.

Figure 2. The "Friend Finder" computer used in the modified PSR task.

Children were told that they could use the Friend Finder to find their hidden friends (in the pretend condition), or find the hidden photographs (in the control
condition). The experimenter showed children a 3 ½ inch floppy disk with a cutout of a question mark on the front (identical to the one on the Friend Finder), and said “When you find a disk like this, you put it in my Friend Finder and it shows us who you found”. She then demonstrated how to put the disk in the Friend Finder (the floppy disks were inserted into the casing of the CD drive), and a photograph appeared on the computer screen. Although it looked like the experimenter had made the photograph appear by inserting a disk into the Friend Finder, the experimenter controlled the presentation of the photographs and clues on the computer screen by creating a slideshow in Microsoft PowerPoint® 2004 for Mac, and using a wireless remote control. A screenless Mac Powerbook® was used so it could be placed on top of the shelving unit and be out of sight to children. After the experimenter had shown children how the Friend Finder worked, children were handed a disk and given a chance to try it. The experimenter then explained that the Friend Finder also gives them clues so they would know where to find their friends (in the pretend condition), or where to find the other photographs (in the control condition). The first clue then appeared on the computer screen, and the experimenter read it aloud. When children found the hidden disk, they were instructed to put it in the Friend Finder. The experimenter then asked the test question and the photograph appeared on the screen. If children did not answer the test question within 5 seconds, it disappeared from the screen. The experimenter repeated the question, and the photograph reappeared (if children did not respond to the test question after three presentations, the experimenter proceeded to the next clue). After children responded to the test question, the next clue appeared on the screen and the experimenter read it aloud.
This sequence was repeated until children found the nine hidden disks (see Table 9 for the order in which children viewed the photographs). In session 2, the procedure for the PSR task was the same, except that the experimenter did not demonstrate how the Friend Finder worked, and children were not given a practice trial (see Appendix C for the entire script).
Table 9. *Presentation Order of Photographs for Study 2*

<table>
<thead>
<tr>
<th>Time 1</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demonstration Trial (The Little Mermaid)</td>
<td>1. Distracter photo (Bob the Builder)</td>
</tr>
<tr>
<td>2. Practice Trial (Tigger)</td>
<td>2. Photograph of child</td>
</tr>
<tr>
<td>3. Distracter photo (Mickey Mouse)</td>
<td>3. Distracter photo (Boots)</td>
</tr>
<tr>
<td>4. Photograph of child</td>
<td>4. Photograph of toy</td>
</tr>
<tr>
<td>5. Distracter photo (Dora)</td>
<td>5. Distracter photo (stuffed Ernie toy)</td>
</tr>
<tr>
<td>6. Photograph of toy</td>
<td>6. Distracter photo (Snow White)</td>
</tr>
<tr>
<td>7. Distracter photo (Mr. Potato Head figurine)</td>
<td>7. Photograph of parent</td>
</tr>
<tr>
<td>8. Distracter photo (Winnie the Pooh)</td>
<td>8. Distracter photo (stuffed Barney toy)</td>
</tr>
<tr>
<td>9. Photograph of parent</td>
<td>9. Distracter photo (Clifford)</td>
</tr>
<tr>
<td>10. Distracter photo (stuffed Elmo toy)</td>
<td>—</td>
</tr>
<tr>
<td>11. Distracter photo (Blue)</td>
<td>—</td>
</tr>
</tbody>
</table>

4.1.3.1.1 Coding

*Children’s Responses to the Target Photographs*

*Behavioural responses.* For each of the target photographs, children were given a score of 0 for a ‘first-person response’ and a score of 1 for a ‘third-person response’.

Children’s scores at Time 1 and Time 2 were added together to create a score ranging
from 0-2 indicating the number of third-person responses they used (0 for ‘no third-person responses’, 1 for ‘a third-person response at Time 1 or Time 2’, or 2 for ‘a third-person response at Time 1 and Time 2’).

**Reaction time coding.** A sound clip of a ‘click’ sounded each time the photographs appeared on the “Friend Finder” computer screen. Reaction time was scored from the loudest part of the click until children responded to the test question. If children were not looking at the computer screen at the time of presentation, reaction time was scored from when children first looked at the computer screen until they responded to the test question (children’s eye gaze was determined by reviewing the digitized recordings from a second camera that was mounted above the computer screen). Some children responded to the test question by pointing to themselves, rather than responding “that’s me” or “mine”. For these children, reaction time was scored until children first moved their arm to point. Finally, if children answered the test question after the photograph disappeared from the screen- that is, between the second or third presentation of the photograph, their reaction time was coded as 5 or 10 seconds, respectively. To ensure reliability, 20% of the data was randomly chosen and coded by a second coder (*agreement =* 97.22%). Reaction time was coded for Time 1 only.

**Character Choice**

The coding of children’s character choice was identical to Study 1. Character assignment was only coded at Time 1 because the experimenter introduced the PSR task at Time 2 by reminding children of the character they impersonated at Time 1 and asking them if they wanted to “do that again”. Although some children still chose to impersonate
a different character at Time 2, it is possible that the experimenter’s instructions encouraged children who might have otherwise chosen a different character to impersonate, to choose the same character as they did in at Time 1. Characteristic actions and type of character were coded at both time sessions.

“Into It” Coding

Pretend actions. Children’s use of pretend actions was coded at three different points throughout the PSR task (when children found the first three disks, the second three disks, and the last three disks). At each time point, children were given a score from 0-3; 0 if they did not use pretend actions (i.e., they were not “into” the pretense), a score of 1 if they used some pretend behaviours (i.e., they were somewhat “into” the pretense), a score of 2 if they used pretend actions most of the time (i.e., they were mostly “into” the pretense), and a score of 3 if they used pretend actions the entire time (i.e., they were clearly “into” the pretense). To ensure blind coding, children’s responses were edited out of the videos, and the coder was blind to the purpose of the study. Twenty percent of the data was randomly chosen and coded by a second coder to evaluate reliability (agreement = 83%).

Friend Finder game. Children were also assigned a score from 0-3 indexing how “into” the Friend Finder game they were during the PSR task (for e.g., were children fooling around or distracted, how excited were they to find the hidden disks and/or view the photographs on the computer screen). Twenty percent of the data was randomly chosen and coded by a second coder to evaluate reliability (agreement = 88%).

Preliminary analyses revealed a strong correlation between children’s scores at Time 1
and Time 2, $r (48) = .51, p < .01$. As a result, children’s scores were added together to create a total score ranging from 0-6.

4.1.3.2 Theory-of-mind Task Battery

Children’s theory of mind understanding was assessed using Wellman and Liu’s (2004) Theory of Mind Scale, a Location False-belief task (Wimmer & Perner, 1983), and two Appearance-Reality tasks (Flavell, Green, & Flavell, 1986).

*Theory of Mind Scale*

The Theory of Mind Scale validated by Wellman and Liu (2004) consists of five tasks that form a Guttman scale. This allows for the developmental assessment of theory of mind understanding between the ages of 3-5, such that children progress from succeeding on a single task (i.e., reasoning about desires) to successively succeeding on incremental tasks. For this reason, the tasks are usually administered in order of difficulty. However, in the present study, children participated in the Contents False-Belief task first, followed by the remaining four tasks. Because false-belief understanding is believed to develop around 4 years of age, children’s performance on tasks designed to measure this understanding may be particularly important. Thus, I choose to administer the Contents False-belief task first to ensure that performance on this task was not affected by participating in other tasks in the scale (see Neu, 2006).

*Diverse Desires task.* The Diverse Desires task assessed children’s understanding that other people can have desires that differ from their own. In this task, children were introduced to Big Bird (puppet) and shown a picture of two different snacks; an apple and
a cookie. The experimenter told children that it was snack time and that Big Bird wanted a snack. Children were first asked which of the two snacks they liked best. The experimenter told children that Big Bird didn’t like the snack they had chosen; he preferred the other snack. Children were then asked which snack Big Bird would choose to eat (test question). Children passed the task if they choose the snack that Big Bird preferred, rather than the snack they liked best (score: 0-1).

*Diverse Beliefs task.* The Diverse Beliefs task assessed children’s understanding that other people can have beliefs that differ from their own. In this task, children were introduced to Cookie Monster (puppet) and shown a picture of two different hiding places; a garage and a tree. The experimenter told children that Cookie Monster wanted to find his cat, and that his cat could be hiding in the tree, or it could be hiding in the garage. Children were asked where they thought the cat was hiding. The experimenter told children that Cookie Monster didn’t think his cat was hiding in the location they choose, he thought it was hiding in the other location. Children were then asked where Cookie Monster would look for his cat. Children passed the task if they told the experimenter that Cookie Monster would look for his cat in the place where he believed it to be (score 0-1).

*Knowledge Access task.* The Knowledge Access task assessed children’s understanding that whether or not someone knows something depends on whether they have had access to the relevant information. In this task, children were shown a closed box and were asked what they thought was inside. The experimenter opened to box to reveal that it contained a toy elephant. The box was closed and the experimenter and
children were again asked what was inside the box. After reporting “elephant”, children were introduced to Tiger (puppet), and were told that that Tiger had never seen inside the box. Children were then asked whether Tiger knew what was inside the box (test question) and whether Tiger had seen inside the box (control question). Children passed the task if they told the experimenter that Tiger did not know what was inside the box, and that Tiger had never seen inside the box (score: 0-1). If children answered the control question incorrectly, their data was coded as missing regardless of how they answered the test question.

*Contents False Belief task. The Contents False Belief task assessed children’s understanding that people can hold beliefs that are false. In this task (Gopnik & Astington, 1988; Perner, Leekam, & Wimmer, 1987), children were shown a Smarties box and asked what they thought was inside. The experimenter then opened the box to reveal that it did not contain the expected contents inside (i.e, Smarties), but rather pencil crayons. After the true contents of the Smarties box was revealed, children were again asked what was inside. Children were then introduced to a Mickey Mouse doll and were told that he had never seen inside the box. The experimenter then asked children what Mickey Mouse thinks is inside the box (test question) and whether Mickey had never seen inside the box (control question). Children passed the task if they told the experimenter that Mickey Mouse thought there were Smarties in the box, and that Mickey Mouse had never seen inside the box (score: 0-1). If children answered the control question incorrectly, their data was coded as missing regardless of how they answered the test question.*
Real-Apparent Emotion task. The Real-Apparent Emotion task assessed children’s understanding that a person can feel one thing, but express a different emotion. In this task, children are shown a picture of three different faces; a sad, neutral and happy face. The experimenter checked to make sure that children knew each emotional expression and set the picture aside. Children were then shown a picture of a boy name Matt who had his back turned so that his facial expression could not be seen. Children were told that the experimenter was going to ask them some questions about how Matt really felt inside and how he looked on his face. The experimenter explained to children that Matt might feel one way inside, but look a different way on his face – or that he might feel the same way inside as he looks on his face. Next, children were told a story about Matt. In the story, Matt and his friends were playing together when one of the older children told a mean joke about Matt, and everybody laughed. Matt was hurt by the joke, but he didn’t want the other children to see how he really felt because they would call him a baby. So, Matt tried to hide how he felt. After hearing the story, children were asked two control questions (“What did the other children do when Rosie told a mean joke about Matt?” and “What would the other children do if they know how Matt felt?”). At this point, the experimenter pointed to the picture of the three faces, and asked children a question about Matt’s real emotions (“How did Matt really feel when everyone laughed?”) and a question about Matt’s apparent emotions (“How did Matt try to look on his face when everyone laughed?”) Children passed the task if they told the experimenter that Matt felt more negative than he looked on his face (i.e., he felt sad inside, but tried to look happy on his face) (score: 0-1).
**Location Change False-Belief Task**

Like the Contents False-belief task, this task assessed children’s understanding that people can hold beliefs that are false. The experimenter placed a small box and a toy bed on a table, and introduced children to two dolls named Heidi and Andy. The two dolls were shown playing together with a toy plane until Heidi announced that she was hungry and wanted to get something to eat. Heidi put the plane under the bed and left the room to go find something to eat. While Heidi was gone, Andy decided to play with the plane some more, so he took the plane out from under the bed and played with it. Next, Andy announced that he wanted to watch some TV, so he put the plane inside the box and left the room. When Heidi finished eating, she returned to the room, and children were asked 2 questions: “Where does Heidi think the plane is?” (test question) and “Where is the plane really?” (control question). Children passed the task if they told the experimenter that Heidi thought the plane was under the bed even though it was really inside the box (score: 0-1). If children answered the control question incorrectly, their data was coded as missing regardless of how they answered the test question.

**Appearance-Reality Task**

The Appearance-Reality task assessed children’s ability to distinguish appearance from reality. In this task, children were shown two objects with misleading appearances (i.e., they look like one thing, but are really another).

*Sponge/Rock*. The first object was a piece of sponge that was painted to look like a rock. Children were asked what they thought the object looked like. After reporting “a rock”, the experimenter squeezed the object to show children that it was actually a
sponge. Children were then asked two test questions: “When you look at this right now, does it look like a sponge or like a rock?” (appearance question) and “What is this really and truly, a sponge or a rock?” (reality question).

*Castle.* The second object was a picture of an orange castle. The experimenter demonstrated that placing a blue filter on the orange castle made it appear black, even though the castle was really orange. Next, the blue filter was placed on the castle, and children were asked two test questions: “When you look at the castle right now, does it look orange or black?” (appearance question) and “What colour is the castle really and truly, orange or black?” (reality question).

For each object, children passed if they answered both the appearance and the reality questions correctly (score: 0-1).

4.1.3.3 Executive Functioning Task Battery

Children’s executive functioning skills were assessed using the Grass/Snow Stroop task (Carlson & Moses, 2001), the Bear/Dragon task (Reed, Pien, & Rothbart, 1984), the Dimensional-Change Card Sort (Frye, Zelazo, & Palfai, 1995), and Less is More task (Carlson, Davis, & Leach, 2005).

*Grass/Snow*

Grass/Snow is a stroop-like task that was used to assess children’s ability to inhibit a prepotent response. In this task, children were shown a black board that had a white card attached to the upper left corner, and a green card attached to the upper right corner (both cards were made of foam). Centered beneath the cards were two felt cutouts shaped like a child’s hands. The experimenter began by verifying that children knew the
colours of grass and snow. After responding correctly, children were told that they were going to play a “silly” game with the experimenter. Children were instructed to place their hands on top of the felt hand cutouts, and to point to the white card when the experimenter said “grass”, and to point to the green card when the experimenter said “snow”. Children were given two practice trials (one grass, one snow). If children pointed to the incorrect card, the experimenter repeated both rules, starting with the rule children got wrong. The practice trials were repeated until children pointed to the correct cards. If children continued to fail on the sixth try, the experimenter proceeded to the next task. The practice trials were followed by 16 test trials, presented in a fixed random order. The order of the trials was: Grass, Snow, Snow, Grass, Snow, Grass, Grass, Snow, Grass, Snow, Grass, Grass, Grass, Snow, Grass, Snow. No feedback was given on the test trials, but if children hesitated to respond, the experimenter asked, “What card do you point to for this one?” Children’s scores were the proportion of correct responses (score: 0-1). If children made multiple responses on a single trial, only their first response was coded.

*Bear/Dragon*

Like Grass/Snow, Bear/Dragon was used to assess children’s ability to inhibit a prepotent response. In this task, children were asked to do some “silly” things with the experimenter: stick out your tongue; touch your ears; touch your teeth; touch your eyes; clap your hands; touch your feet; touch your head; touch your tummy; touch your nose; and wave your hand. After children performed the actions, they were praised by the experimenter and shown two puppets; a bear and a dragon. Children were told that they were going to play a game with the puppets. The experimenter introduced the bear puppet
by saying, “This puppet is a nice bear. When he talks to us, we will do what he tells us to do.” Next, the dragon puppet was introduced, “This puppet is not very nice. This puppet is a dragon. So when he talks to us, we won’t listen to him. If he tells us to do something, we won’t do it.” Children were then given two practice trials (one bear, one dragon). In both practice trials, children were asked to perform an action (‘touch your nose’ and ‘touch your tummy’) and were reminded of the rules. Children passed if they did what the bear told them to do, and ignored the commands of the dragon. The practice trials were repeated until children passed both the bear and the dragon trial. If children continued to fail on the sixth try, the experimenter proceeded to the next task. After the practice trials, children were given one last rule check with feedback. Children then recieved 10 test trials; 5 bear trials and 5 dragon trials, alternating order. The actions children were asked to perform in the test trials were the same actions they did at the beginning of the task. Children were reminded of the rules half way through the test trials regardless of their performance, but no feedback was given at any point during the test trials.

On each dragon trial, children received a score ranging from 0-4: 0 = completed the action; 1 = partially completed the action; 2 = performed an incorrect action; 3 = did not perform the action, but used a strategy to help them avoid performing the action (e.g., shook head, sat on hands); 4 = did not perform the action. The scores were then added together, for a total score of 0-20.

*Dimensional-Change Card Sort Task*

The Dimensional-Change Card Sort task assessed children’s cognitive flexibility. In this task, the experimenter placed 2 trays on the table. One tray had a picture of a red
rabbit attached to it and the other tray had a picture of a blue boat attached to it. Next, children were shown a stack of cards. Each card had one of four pictures on it: a red rabbit, a blue rabbit, a red boat, or a blue boat. The experimenter told children that they were going to play a game called the shape game. In this game, children were instructed to place all the rabbits in the tray with the picture of the red rabbit on it, and place all the boats in the tray with the picture of the blue boat on it. The experimenter began by demonstrating with two cards (a blue rabbit and a red boat). Children were then asked to sort five cards in the following order: blue rabbit, red boat, blue boat, red rabbit, and blue rabbit. Before handing children a card, the experimenter repeated the rules, and announced the shape and colour of the card (e.g., “This is a blue rabbit, where does it go?”). Children were praised if they sorted the cards correctly. If children put the card in the incorrect tray, the experimenter repeated the rule and moved the misplaced card to the correct tray.

After children correctly sort 5 consecutive cards according to shape, the experimenter said, “Now we are going to switch. We are not going to play the shape game any more. We are going to play the colour game”. In this game, children were instructed to place all the red cards in the tray with the picture of the red rabbit on it, and place all the blue cards in the tray with the picture of the blue boat on it. Then, children were asked to sort five cards; two cards were compatible with the old sorting rules (trial 3, blue boat; trial 4; red rabbit), and three cards were incompatible (trial 1, blue rabbit; trial 2, red boat; trial 4, blue rabbit). The rules were repeated before each trial, but no feedback was given. For each incompatible trial, children received a score of 1 if they
sorted the card according to the new rule (colour), and a score of 0 if they sorted the cards according to the old rule (shape), for a total score of 0-3.

*Less is More*

Less is More is a “hot” executive functioning task, used to assess the more affective or motivational aspects of executive functioning (Zelazo & Müller, 2002). In this task, children were asked to choose between two treats (Smarties or Jelly Beans). The treat they chose was used for the remainder of the task. Children were presented with two trays: one contained a large amount of treats (i.e., 5 treats), and one contained a small amount of treats (i.e., two treats). Children were asked, “Which amount do you prefer?” The majority of children (87%) chose the larger amount. If children chose the smaller amount, the question was rephrased: “Which amount do you prefer to eat?” All children indicated that they preferred to eat the larger amount.

Next, children were introduced to a monkey (puppet), “This is naughty monkey, and his name is Chris. He likes to get all the treats for himself. That is why he is naughty.” Then, the experimenter placed an empty cup next to children, and another next to Chris, and explained the rules of the game, “Every time you point to a tray, Chris gets the jelly beans in that tray, and they’ll go into his cup, and you’ll get the jelly beans in the other tray, and they’ll go into your cup.” To practice, children were asked to choose between the two trays. When children pointed to a tray, the experimenter placed the treats from that tray into Chris’ cup, and the treats from the other tray into children’s cup. Children were then given a rule check, “So, when you pick a tray, who gets those treats?
Does Chris get them or do you get them?” The experimenter gave children feedback and then repeated the question until children responded correctly (up to three times).

The practice trials were followed by 16 test trials. The number of treats placed in each tray was L-R counterbalanced. To control for side biases, Chris was placed on children’s right-hand side for the first 8 trials, and children’s left-hand side for the last 8 trials. Children were reminded of the rules half way through the test trials regardless of their performance, but no feedback was given at any point during the test trials. Children were given a score of 2 if they pointed to the smaller amount of treats; a score of 1 if they hovered over the larger amount of treats but pointed to the smaller amount, and a score of 0 if they pointed to the larger amount of treats (score: 0-2).

4.1.3.4 Pretense Understanding Battery

Children’s pretense understanding was assessed using the Moe task (Lillard, 1993b), the Fantasy Moe task (Sobel & Lillard, 2001), and Mitchell and Neal’s (2005) Self-Pretense task.

Moe Task

The Moe task assessed children’s understanding of others’ pretense. In this task, children were shown a troll doll with green hair, and were told, “This is Moe, and he is from the Land of Trolls far away from Earth.” Moe then performed an action (e.g., hopping) that resembled the actions of an animal (e.g., kangaroo). The experimenter told children that Moe had no knowledge of the animal he was acting like, nor had he ever seen the animal before. Children were then asked two control questions, counterbalanced for order: whether Moe had knowledge about the animal he was acting like, and whether
Moe was acting like the animal. If children did not answer the control questions correctly, the experimenter reminded children that Moe was from the Land of Trolls and has never heard of the animal he was acting like. Once children answered the control questions correctly, the experimenter asked children if Moe was pretending to be the animal he was acting like (test question). There were four versions of this task; in each version Moe performed a different action (see Table 10 for the actions and descriptions used in this task). Children were given a score of 1 if they told the experimenter that Moe was not pretending, and a score of 0 if they did not, for a total score of 0-4.

Table 10. *Actions and Descriptions Used in the Moe Task*

<table>
<thead>
<tr>
<th>Action</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hopping</td>
<td>Kangaroo</td>
</tr>
<tr>
<td>Wiggling</td>
<td>Worm</td>
</tr>
<tr>
<td>Rolling</td>
<td>Pig</td>
</tr>
<tr>
<td>Climbing</td>
<td>Monkey</td>
</tr>
</tbody>
</table>

*Fantasy Moe Task*

Like the Moe task, the Fantasy Moe task assessed children’s understanding of others’ pretense. However, it focused on a specific type of pretense - one that involves a high fantasy component. The procedure and scoring of this task was identical to the Moe task with two exceptions: 1) the troll doll used in the task had pink hair and was named Luna, and, 2) Luna’s actions resembled fantasy characters instead of animals (for e.g., Lion King; see Table 11 for the actions and descriptions used in this task).
The self-pretense task assessed children’s understanding of their own pretense. In this task, children were asked to perform an action (e.g., lift arms up and down) that resembled the characteristic actions of a particular animal (e.g., bird). After children performed the action, the experimenter asked them what they were thinking about when they performed the action. Children typically answered, ‘nothing’ or, ‘I don’t know.’ If children indicated that they were thinking of the animal whose action the experimenter intended to compare children’s action to (i.e., bird), the experimenter replaced it with a different animal that could plausibly perform the action (e.g., seal). Next, the experimenter asked children whether they were trying to look like the animal their actions resembled. If children said ‘yes’, the experimenter asked them if they were trying to look like another animal that would plausibly perform the action (e.g., seal, butterfly, or bat), until children said ‘no’. If children continued to answer ‘yes’ to several suggested animals, the experimenter moved to the next task because the test question could not be asked (and their data was coded as missing). Then, children were asked if they were

Table 11. Actions and Descriptions Used in the Fantasy Moe Task

<table>
<thead>
<tr>
<th>Action</th>
<th>Fantasy character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running</td>
<td>Lion King</td>
</tr>
<tr>
<td>Swimming</td>
<td>Sebastion</td>
</tr>
<tr>
<td>Leaping</td>
<td>Bambi</td>
</tr>
<tr>
<td>Bouncing</td>
<td>Tigger</td>
</tr>
</tbody>
</table>

Self-pretense Task

The self-pretense task assessed children’s understanding of their own pretense. In this task, children were asked to perform an action (e.g., lift arms up and down) that resembled the characteristic actions of a particular animal (e.g., bird). After children performed the action, the experimenter asked them what they were thinking about when they performed the action. Children typically answered, ‘nothing’ or, ‘I don’t know.’ If children indicated that they were thinking of the animal whose action the experimenter intended to compare children’s action to (i.e., bird), the experimenter replaced it with a different animal that could plausibly perform the action (e.g., seal). Next, the experimenter asked children whether they were trying to look like the animal their actions resembled. If children said ‘yes’, the experimenter asked them if they were trying to look like another animal that would plausibly perform the action (e.g., seal, butterfly, or bat), until children said ‘no’. If children continued to answer ‘yes’ to several suggested animals, the experimenter moved to the next task because the test question could not be asked (and their data was coded as missing). Then, children were asked if they were
pretending to be the animal their actions resembled (test question). There were four versions of this task; in each version children were asked to perform a different action (see Table 12 for the animals and actions used in this task). Children were given a score of 1 if they told the experimenter that they were not pretending, and a score of 0 if they claimed they were, for a total score of 0-4.

Table 12. *Animals and Actions Used in the Self-pretense Task*

<table>
<thead>
<tr>
<th>Animal (alternative animals)</th>
<th>Action performed</th>
<th>Characteristic action of the animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snake (worm, caterpillar, dolphin)</td>
<td>Move hand in s-shape</td>
<td>Move their bodies</td>
</tr>
<tr>
<td>Bird (seal, butterfly, bat)</td>
<td>Lift arms up and down</td>
<td>Flap their wings</td>
</tr>
<tr>
<td>Fish (gorilla, camel, owl)</td>
<td>Open and close mouth</td>
<td>Move their mouths</td>
</tr>
<tr>
<td>Rabbit (frog, grasshopper, horse)</td>
<td>Hop up and down</td>
<td>Hop</td>
</tr>
</tbody>
</table>

4.1.3.5 Narrative Absorption Task

Children’s proneness to adopt the perspective of others in pretend or fantasy scenarios was assessed using the Narrative Absorption task (Black, Turner, & Bower, 1979; Rall & Harris, 2000). In this task, children were read two short stories adapted from Ziegler et al. (2005; see Appendix D). Each story was comprised of 5 sentences: four test sentences that contained the deictic verbs come and go, and one sentence that did not contain a deictic verb (to complete the story). In each test sentence, the spatial
location of the protagonist was identified (e.g., “One day, Laura was sitting in the bedroom reading a book”) and a movement was described either to or from that location using the deictic verbs come and go (e.g., “when Tony came in and asked if she’d like to play baseball”). The deictic verbs in the first three sentences were consistent with the protagonist’s perspective (to give children time to become absorbed in the narrative) and the deictic verb in the fourth sentence was inconsistent with the protagonist’s perspective. The stories were presented in a fixed order; children were read the story about David and Kate first, followed by the story about Tony and Laura.

The experimenter began the task by telling children that they were going to hear two stories. Children were asked to listen carefully because they would be asked to tell the same story back to the experimenter. The experimenter then showed children a picture book that contained 9 illustrations of the story. The experimenter opened the picture book to the first page, and began the story. After each sentence, children were given a prompt to recall the story (e.g., When Laura was sitting in the bedroom reading a book, what did Tony do?). If children responded by saying ‘I don’t know’, ‘I don’t remember’, or with an unrelated response, the experimenter repeated that section of the story (e.g., “Now remember…”). Once children repeated the sentence, the experimenter turned to the next page in the picture book and continued the story.

For each test sentence, children’s responses were coded into one of four mutually exclusive categories: 1) verbatim - when children used the same deictic verb as the experimenter, 2) perspective-shift - when children replaced the deictic verb the experimenter used with its deictic verb-pair partner, 3) neutral - when children replaced
the deictic verb with a non-deictic verb (e.g., “Tony walked in and asked if she’d like to play baseball”) or 4) no response - when children failed to remember that part of the story or remembered it incorrectly.

4.1.3.6 Verbal Ability

Children’s verbal ability was assessed using the Peabody Picture Vocabulary Test – Third Edition (PPVT-III; Dunn & Dunn, 1997). In this task, children were shown a series of picture sets. The experimenter said a word that corresponded to one of four pictures on the page, and children were asked to point to the picture of that word. There were nine sets in total, and 12 words in each set. The vocabulary items in each successive set increased in difficulty level. The test began with two warm-up trials, in which children were given feedback. Testing proceeded until children made eight or more errors within a set – referred to as the ‘ceiling set’. Children’s scores were calculated by subtracting the total number of errors from the number of the last item in the ceiling set (range: 0 to 108).

4.1.3.7 Parent Questionnaire

In session 1, parents were asked to fill out a questionnaire adapted from Taylor, Maring, Shawber, & Mannering’s (2005) parent interview. The questionnaire assessed children’s engagement in sustained forms of role play such as having an imaginary companion or a pretend identity (see Appendix E). The coding of the parent questionnaire was identical to Study 1.
4.2 Results

4.2.1 PSR Task Analysis

4.2.1.1 Children’s Performance on the PSR Task

4.2.1.1.1 Preliminary Analyses

The characters children impersonated in the pretend condition of the PSR task are shown in Table 13. The majority of children (79%) choose to impersonate the same character at both time sessions. Intriguingly, all of the children who chose to impersonate a different character at Time 2, chose to impersonate the same kind of character they impersonated at Time 1 – both in terms of whether the character was ordinary or exotic (type of character), and whether the character had or did not have characteristic actions (characteristic actions).
Table 13. *The Characters Children in the Pretend condition Impersonated at Time 1 and Time 2*

<table>
<thead>
<tr>
<th>Time Session</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td>Bratz, cat (15), chipmunk, dog (5), elephant, horse (2), lion, princess (4), zebra</td>
<td>Batman, bird, Bob the Builder, Buzz Lightyear, cat (7), dog (4), dinosaur (2), elephant, fish, frog, lion, policeman, Shaggy from Scooby-Doo, Spiderman, Superman, tiger</td>
</tr>
<tr>
<td>Time 2</td>
<td>Bratz, cat (14), chipmunk, dog (8), elephant, horse, princess (3), zebra</td>
<td>Batman, bird, Bob the Builder, Buzz Lightyear, cat (5), dog (6), dinosaur (2), elephant, frog, lion (2), policeman, shark, Spiderman (2)</td>
</tr>
</tbody>
</table>

Like Study 1, some children chose to impersonate a princess. As discussed earlier, it is ambiguous whether the physical appearance of a princess is different from the child’s own appearance. As a result, I chose to exclude these children from the final analyses. Two additional children were excluded because they did not return for their Time 2 session. Therefore, a total of 69 children were included in the final analyses.

4.2.1.1.2 Focal Analyses
The first aim of Study 2 was to replicate and extend the findings of Study 1. Table 14 shows the proportion of 4-year-old children at Time 1 and Time 2 who referred to each of the photographs with a first-person response or a third-person response. A similar proportion of children in Study 2 referred to their own photograph with a third-person response as Study 1. This was not the case, however, for the photograph of the toy children brought into the lab, or for the photograph of their parent.
Table 14. *The Proportion of 4-year-old Children in Each Condition that Referred to the Target Photographs With a First-person Response, or a Third-person Response*

<table>
<thead>
<tr>
<th>Photograph, time session and condition</th>
<th>Type of response made</th>
<th>First-person</th>
<th></th>
<th>Third-person</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Proportion</td>
<td>n</td>
<td>Proportion</td>
<td>n</td>
</tr>
<tr>
<td>Child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretend</td>
<td></td>
<td>.67</td>
<td>31</td>
<td>.33</td>
<td>15</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td>.88</td>
<td>14</td>
<td>.13</td>
<td>2</td>
</tr>
<tr>
<td>Time 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretend</td>
<td></td>
<td>.64</td>
<td>29</td>
<td>.36</td>
<td>16</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td>.94</td>
<td>16</td>
<td>.06</td>
<td>1</td>
</tr>
<tr>
<td>Child’s Toy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretend</td>
<td></td>
<td>.87</td>
<td>41</td>
<td>.13</td>
<td>6</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td>1.00</td>
<td>15</td>
<td>.00</td>
<td>0</td>
</tr>
<tr>
<td>Time 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretend</td>
<td></td>
<td>.91</td>
<td>43</td>
<td>.09</td>
<td>4</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td>1.00</td>
<td>17</td>
<td>.00</td>
<td>0</td>
</tr>
</tbody>
</table>
Parent

Time 1

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretend</td>
<td>.98</td>
<td>45</td>
</tr>
<tr>
<td>Control</td>
<td>1.00</td>
<td>15</td>
</tr>
</tbody>
</table>

Time 2

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretend</td>
<td>.97</td>
<td>44</td>
</tr>
<tr>
<td>Control</td>
<td>1.00</td>
<td>17</td>
</tr>
</tbody>
</table>

Note. Six participants had missing data for one or more of the target photographs.

Like Study 1, a high proportion (82%) of children in the pretend condition impersonated an animal, and of these children, 16% responded to at least one of the test questions with an animal noise, rather than with a first-person or third-person response (this was true of both time sessions). This is roughly the same proportion of children that responded with an animal noise in Study 1.

Time 1/Time 2 Comparison

Inspection of Table 14 shows that the proportions of responses for each of the target photographs were remarkably stable from Time 1 to Time 2. To gain further insight into this stability in responding, I conducted a correlation analysis investigating the relation between individual differences in third-person responses across testing sessions. Consistent with the similar proportions, this analysis showed a strong correlation between third-person responding across time points, \( r(56) = .70, p < .01 \).

The finding of strong correlations across time sessions is important in that it shows that children’s performance is not especially affected by task demands that might
vary from session to session (i.e., novelty of the apparatus and paradigm). This gives some confidence that the measure is indeed indexing children’s tendencies to take the mental perspective of the characters they are role playing. Perhaps more important, the strong correlations suggest that collapsing children’s scores across the time points would result in a stable, internally reliable measure of children’s performance in the task. This combined measure would also have stronger psychometric characteristics (i.e., parametric variability) for use in the focal individual differences analyses. For these reasons, I chose to collapse Time 1 and Time 2 data for all subsequent analyses.

*Condition Differences in Children’s Third-person Responses*

Next, I explored condition differences in children’s third-person responses. Given the low proportion of children who responded to the photograph of their toy, and the photograph of their parent with a third-person response, I elected to focus subsequent analyses on children’s responses to their own photograph. The data was analyzed the same way as Study 1; first in a less conservative manner in which I coded animal noises as a third-person response, and second, in a more conservative manner in which I excluded children who responded to the test questions with an animal noise from the analyses.

*Third-person responses including animal noises.* When animal noises were included with the other third-person responses, a significant condition difference was found in children’s third-person responses to their own photograph, $t (64) = 2.62, p < .01$, replicating the findings of Study 1. On average, children in the pretend condition gave more third-person responses ($M = .80, SD = .90$) than did children in the control
condition \((M = .19, SD = .40)^x_i\).

**Third-person responses excluding animal noises.** Like Study 1, the condition difference in children’s third-person responses to their own photograph remained significant when children who responded with animal noises were excluded from the analyses, \(t(57) = 2.04, p < .05\). Even in this conservative analyses of the data, children in the pretend condition gave more third-person responses \((M = .65, SD = .87)\) than did children in the control condition\(^x_i\).

**What Distinguished Children who Gave Third-person Responses While Role Playing?**

I also conducted several analyses to see whether children’s character choice, use of pretend actions, or any of the parent questionnaire items predicted third-person responding to children’s own photograph. Preliminary analyses showed that children’s third-person responding was not related to either age-in-months or gender.

**Character choice.** Table 15 shows the proportion of children who chose the character they impersonated (character assignment), impersonated a character that could be physically acted out in the context of the game (characteristic actions), and impersonated an “exotic” (versus an “ordinary”) character (type of character). To determine whether any of these variables made a difference in how children approached the PSR task, a series of independent samples t-tests were conducted. Like Study 1, children who responded with an animal noise were excluded from these analyses. Results of these analyses showed no significant differences between children who responded with a third-person response versus a first-person response in character assignment, characteristic actions, or type of character (see Table 16).
Table 15. *Proportions for Character Assignment, Characteristic Actions, and Type of Character*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Proportion</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character assignment (child)*</td>
<td>.86</td>
<td>44</td>
</tr>
<tr>
<td>Characteristic actions (has)</td>
<td>.94</td>
<td>49</td>
</tr>
<tr>
<td>Type of character (exotic)</td>
<td>.12</td>
<td>7</td>
</tr>
</tbody>
</table>

*Note.* The proportions were identical for these variables at both time sessions because all children who impersonated a different character at Time 2 chose to impersonate the same *kind* of character they impersonated at Time 1.

*Two participants were excluded from this analysis because their data could not be coded due to an experimental error.*
Table 16. *Independent sample t-tests for character assignment, characteristic actions, and type of character*

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD)</th>
<th>t</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character assignment</td>
<td>Child</td>
<td>0.89 (1.23)</td>
<td>1.17 (1.84)</td>
</tr>
<tr>
<td></td>
<td>Experimenter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristic actions</td>
<td>Has</td>
<td>0.87 (1.26)</td>
<td>2.00 (2.00)</td>
</tr>
<tr>
<td></td>
<td>Does not have</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of character</td>
<td>Exotic</td>
<td>1.67 (1.97)</td>
<td>0.83 (1.18)</td>
</tr>
<tr>
<td></td>
<td>Ordinary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Pretend actions.* In Study 1, the only variable that was found to distinguish children who gave first-person and third-person responses was pretend actions; children who gave third-person responses were more likely to augment their role play with pretend actions and/or sound. Before I explored whether this finding replicated in Study 2, I examined the relation between individual differences in pretend actions across testing sessions. Children’s pretend action scores at each time point of the PSR task were added together to create a total score for each time session (ranging from 0-9), and a Pearson correlation was conducted. Four children were excluded from this analysis because their pretend actions could not be coded due to a technical problem with the video camera. The
results revealed a strong correlation between children’s pretend actions at Time 1 and Time 2, $r(41) = .80, p < .01$. This analysis suggests that children were consistent in their use of pretend actions across both time sessions. As a result, I chose to collapse Time 1 and Time 2 data.

Next, I examined whether children used pretend actions consistently throughout the PSR task. The purpose of this analysis was to determine whether children used pretend actions throughout the entire task, or whether they only initially used pretend actions when impersonating the character. While pretend actions are neither a defining or diagnostic feature of pretense, it seems reasonable to suggest that for children who augment their role play with pretend actions, a decrease in such behaviour might indicate that they are no longer impersonating the character. Although children’s pretend action scores were correlated at each time point, $rs(41) = .92, .77, .86, ps < .001$, a repeated measures ANOVA revealed a significant decrease in children’s pretend actions throughout the PSR task, $F(2, 80) = 14.49, p < .001^{\text{xii}}$. Children augmented their role play with pretend actions significantly more when they found the first three disks ($M = 1.01, SE = .12$) compared to the second three disks ($M = .84, SE = .14$), and the second three disks significantly more than the last three disks ($M = .65, SE = .11$) (Fisher’s LSD, $p < .05$).

Given that children did not use pretend actions consistently throughout the PSR task, I examined whether pretend actions were related to third-person responding at any of the three time points. Children who responded with an animal noise were excluded from this analysis because the variable of interest confounded with this type of response.
Unlike Study 1, no relationship was found between third-person responding and children’s use of pretend actions and/or sounds, this was true at each of the three time points, $rs(40) = -.21, .24, -.09, ps = .19, .14, .57$, and for the entire task, $r(39) = -.03, p = .86$.

Finally, an independent sample $t$-test was conducted using the same pretend action coding criteria as Study 1 (i.e., children augmented their role play with pretend actions at any point during the Pretense Self-recognition task or did not use pretend actions at all). Again, no significant difference was found in children who responded with a third-person response versus a first-person response in their use of pretend actions, $t(38) = .09, p = .93$.

**Parent questionnaire items.** The descriptive data for each of the parent questionnaire items are shown in Table 17. A multiple regression analysis was performed to explore whether any of the items distinguished children who gave third-person responses from children who gave first-person responses. Before doing so, however, a principal component analysis of five of the questionnaire items was performed to determine if factors might emerge that would allow us to create a battery of scores (only one parent reported that their child had a pretend identity, therefore, it was not included in the analysis). Unlike the previous analyses, children who responded with an animal noise were included in the analysis.
Table 17. Descriptive Data for Each of the Parent Questionnaire Items

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>$M$</th>
<th>Range</th>
<th>$N$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have/had an imaginary companion</td>
<td>.27 (.45)</td>
<td>0-1</td>
<td>51</td>
</tr>
<tr>
<td>Have/had a pretend identity</td>
<td>.00 (.00)</td>
<td>0-1</td>
<td>52</td>
</tr>
<tr>
<td>Interact with invisible characters when playing alone</td>
<td>.96 (.88)</td>
<td>1-4</td>
<td>50</td>
</tr>
<tr>
<td>Interact with toy characters when playing alone</td>
<td>1.72 (.90)</td>
<td>1-4</td>
<td>50</td>
</tr>
<tr>
<td>Pretend to be a different person or animal when playing alone</td>
<td>1.32 (.84)</td>
<td>1-4</td>
<td>50</td>
</tr>
<tr>
<td>Pretend to be a different person or animal when playing with others</td>
<td>1.69 (.85)</td>
<td>1-4</td>
<td>48</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations are shown in parentheses. Number of participants ranged from 48 to 52 due to missing data.

The principle component analysis yielded a 2-factor solution that accounted cumulatively for 55% of the variance of the five questionnaire items. The first factor was interpreted as an indicator of children’s engagement in role play with invisible characters (have/had an imaginary companion, interact with invisible characters when playing...
alone), and the second as an indicator of children’s engagement in role play with a tangible character – be it children themselves or a prop such as a toy (interact with toy characters when playing alone, pretend to be a different person or animal when playing alone, pretend to be a different person or animal when playing with others) (see Table 18 for factor loadings). A multiple regression was then performed with both factors entered simultaneously. The analysis revealed that children’s performance on the pretend condition of the PSR task was not related to either factor $F(2, 47) = .25, p = .78, R^2 = .01$ (see Table 19 for raw correlations).
Table 18. *Factor Loadings of Parent Questionnaire Items in Principle-Component Analysis*

<table>
<thead>
<tr>
<th>Questionnaire Item</th>
<th>Factor 1, Invisible Character</th>
<th>Factor 2, Tangible Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have/had an imaginary companions</td>
<td>.74</td>
<td>8.88E-02</td>
</tr>
<tr>
<td>Interact with invisible characters when playing alone</td>
<td>.68</td>
<td>.50</td>
</tr>
<tr>
<td>Pretend to be a different person or animal when playing alone</td>
<td>-2.17E-02</td>
<td>.74</td>
</tr>
<tr>
<td>Pretend to be a different person or animal when playing with others</td>
<td>-.44</td>
<td>.38</td>
</tr>
</tbody>
</table>
Table 19. *Raw correlations Between the PSR Task and Role Play Factors*

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PSR task(^a)</td>
<td>.10</td>
<td>.01</td>
</tr>
<tr>
<td>2. Invisible Characters</td>
<td></td>
<td>.16</td>
</tr>
<tr>
<td>3. Tangible Characters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) N=48 due to missing data.

4.2.1.2 Reaction Time Analyses

4.2.1.2.1 Preliminary Analyses

Preliminary analyses revealed that 13.73% of the reaction times for the photograph of Mickey Mouse lay more than 1.5 times the IQR above the third quartile or 1.5 times the IQR below the first quartile. Because these outlying reaction times are most likely associated with inattention, and, thus are not reflective of the cognitive processes being studied, this variable was excluded from the analyses. The remaining reaction times were submitted to a natural log transformation.

The internal reliability of the other distracter photographs (Dora, Winnie the Pooh, Blue) was calculated using Cronbach's Alpha. The photographs had an alpha of 0.75 (N = 42), indicating good internal consistency. For this reason, I chose to create an aggregate score for the distracter photographs by averaging the reaction time of the three photographs\(^\text{xiii}\). To explore the relationship between reaction times for children’s own
photograph and the distracter photograph aggregate, a Pearson correlation was performed. The analysis revealed that the reaction times were significantly correlated, \( r(42) = .47, p < .01. \)

4.2.1.2.2 Focal Analyses

*Is “Thinking-as-if” a Reflective Process?*

The first goal of the reaction time analyses was to explore whether children who show evidence of “thinking-as-if” are simulating the character’s perspective, or whether it is a reflective process. In order to differentiate between these two ways of responding, I examined reaction time differences in children’s first-person (“That’s me”) and third-person (child’s name) responses. A one-way ANOVA was performed with reaction time as the dependant variable, and children’s responses to their own photograph as the predictor variable. The analysis revealed that reaction time differences could not be predicted by children’s responses, \( F(1, 38) = .35, p = .56. \) Children who gave first-person \( (M = .67, SD = .76) \) and third-person \( (M = .81, SD = .66) \) responses responded to their own photograph with similar reaction times.

*Condition Differences in Reaction Times*

The second goal of the reaction time analyses was to examine condition differences in children’s reaction times. This analysis was restricted to children who responded to their own photograph with the first-person response “That’s me”. I was interested in whether condition differences in reaction times would provide a more implicit measure of whether children are “thinking-as-if” versus “behaving-as-if”. For example, a hesitation in responding “That’s me” could indicate an intermediate response
between first-person and third-person responding. Even if children do not go so far as to refer to the photograph of themselves with a third-person response, a hesitation might suggest that there is something different in how they respond to the photograph of themselves while pretending. To explore this possibility, a repeated measures ANOVA with condition (pretend; control) as a between-subjects factor, and photograph (child; distracter) as a within-subject factors was performed. This analysis revealed no main effect of photograph, $F(1, 41) = .83, p = .37$, no main effect of condition $F(1, 41) = 1.26, p = .27$, nor a photograph by condition interaction, $F(1, 41) = .38, p = .54$. One possible explanation for the absence of a condition difference is that some of the children in the pretend condition might not have been pretending. While pretend actions often accompany pretense, pretending does not require using pretend actions continuously or even at all (see Lillard, 1993a; Nichols & Stich, 2000). Thus, it was difficult to discern whether children who did not augment their role play with pretend actions were actually pretending throughout the PSR task. To address this issue, another repeated measures ANOVA was performed, however this time, the analysis was isolated to children who augmented their role play with pretend actions (i.e., received a score $>1$ for the first part of the PSR task). Again, however, there was no main effect of photograph, $F(1, 22) = .01, p = .94$, no main effect of condition, $F(1, 22) = 2.97, p = .10$, nor a photograph by condition interaction, $F(1, 22) = .04, p = .85$.

4.2.2 Exploring the Variability in Children’s Performance on the PSR task

4.2.2.1 Preliminary Analyses

Theory of Mind Analysis
Mean scores for each of the theory of mind tasks are shown in Table 20. As expected, children’s performance on the false-belief tasks was correlated, $r(63) = .49, p < .01$, even when controlling for age and PPVT scores, $r(58) = .43, p < .01$. Children’s performance on the appearance-reality tasks, however, was not correlated, $r(53) = .12, p = .41$. Children’s scores were significantly higher on the Castle Appearance-reality task ($M = .91$, $SD = .3$), than on the Sponge/Rock Appearance-reality task ($M = .75$, $SD = .43$), $t(52) = 2.22, p < .05$. This finding is not in line with previous research (e.g., Carlson & Moses, 2001) that has found that performance on these tasks is related.
Table 20. *Mean Scores for Each of the Theory of Mind Tasks (Range 0-1)*

<table>
<thead>
<tr>
<th>Theory of Mind Measures</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory of Mind Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diverse Desire</td>
<td>.95</td>
<td>.23</td>
</tr>
<tr>
<td>Diverse Belief</td>
<td>.72</td>
<td>.45</td>
</tr>
<tr>
<td>Knowledge Access</td>
<td>.76</td>
<td>.43</td>
</tr>
<tr>
<td>Contents False Belief</td>
<td>.49</td>
<td>.50</td>
</tr>
<tr>
<td>Real-Apparent Emotion</td>
<td>.36</td>
<td>.48</td>
</tr>
<tr>
<td>Location False Belief</td>
<td>.73</td>
<td>.45</td>
</tr>
<tr>
<td>Appearance Reality Tasks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sponge/Rock</td>
<td>.67</td>
<td>.48</td>
</tr>
<tr>
<td>Castle</td>
<td>.91</td>
<td>.29</td>
</tr>
</tbody>
</table>

*Calculation of Theory of Mind aggregate score.* For each task in the Theory of Mind Battery, children were given a score of 1 if they passed and a score of 0 if they did not. To create an aggregate score for Theory of Mind, children’s scores on the Knowledge Access task, the False Belief Contents task, the False Belief Location task, and Sponge/Rock Appearance-reality task were standardized, and averaged. Children’s scores on the Diverse Belief task and Real-Apparent Emotion task were not included in the aggregate score because inspection of the data suggested that children’s performance
did not follow the predicted developmental progression. Preliminary analyses also revealed ceiling level performance and low battery correlation for the Diverse Desire task and the Castle Appearance-reality task. For this reason, these tasks were also excluded from the aggregate score.

Scale reliability analyses showed that the theory of mind aggregate had moderate internal consistency (alpha = .547). The aggregate also showed the expected correlation with age, $r (74) = .30, p < .01$, and PPVT scores, $r (69) = .31, p < .01$, but sex was unrelated to theory of mind performance, $r (74) = -.07, p = .58$. These findings are consistent with previous research and provide confidence that the data included in the theory of mind aggregate score is typical.

*Executive Functioning Analysis*

Mean scores for each of the executive functioning tasks are shown in Table 21. To make the data comparable to those provided in Carlson (2005), I created Table 22 which shows the percentage of children who passed executive functioning tasks according to age (younger versus older 4-year-olds) using Carlson’s passing criterion. In most cases, children’s performance is roughly comparable or slightly higher than the age trends reported in Carlson (2005).
Table 21. *Mean Scores for Each of the Executive Functioning Tasks*

<table>
<thead>
<tr>
<th>Executive Functioning Measures</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass Snow</td>
<td>79.02</td>
<td>25.92</td>
<td>0-100</td>
</tr>
<tr>
<td>Bear Dragon</td>
<td>19.21</td>
<td>1.75</td>
<td>12-20</td>
</tr>
<tr>
<td>Dimensional-Change Card Sort</td>
<td>2.26</td>
<td>1.23</td>
<td>0-3</td>
</tr>
<tr>
<td>Less is More</td>
<td>78.58</td>
<td>26.15</td>
<td>0-100</td>
</tr>
</tbody>
</table>

Table 22. *Percentage of Children who Passed the Executive Functioning Tasks According to Age*

<table>
<thead>
<tr>
<th>Task</th>
<th>Pass Criterion</th>
<th>Young 4</th>
<th>Older 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass Snow</td>
<td>12/16</td>
<td>67.5 (40)</td>
<td>75.76 (33)</td>
</tr>
<tr>
<td>Bear Dragon</td>
<td>16/20&lt;sup&gt;a&lt;/sup&gt;</td>
<td>84.21 (38)</td>
<td>100 (32)</td>
</tr>
<tr>
<td>Dimensional-Change Card Sort</td>
<td>3/3</td>
<td>71.05 (38)</td>
<td>70 (30)</td>
</tr>
<tr>
<td>Less is More</td>
<td>75/100&lt;sup&gt;b&lt;/sup&gt;</td>
<td>62.16 (37)</td>
<td>80 (30)</td>
</tr>
</tbody>
</table>

*Note.* Sample sizes are shown in parentheses.

<sup>a</sup>16/20 is equivalent to Carlson’s passing criterion of 4/5 for the Bear/Dragon task.

<sup>b</sup>75/100 is equivalent to Carlson’s passing criterion of 12/16 for the Less is More task.

As shown in Table 23, not all of the executive functioning measures were intercorrelated. While this finding is not in line with previous research that has found that performance on these tasks is related (e.g., Carlson & Moses, 2001), it is important to
note that this study only includes 4-year-old children (as opposed to 3- and 4-year-old children). By 4 years of age, the majority of children pass the executive functioning tasks used in this study. Thus, there is less variability in children’s performance at 4 years of age as there is at 3 years of age. Visual inspection of the data shows that data for each of the executive functioning data is negatively skewed (see Figure 4). It is possible that the lack of significant relation between the tasks is due to the lack of variability within the tasks.

Table 23. Correlations Among the Executive Functioning Measures

<table>
<thead>
<tr>
<th>Executive Functioning Task</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Grass Snow</td>
<td>.11 (.03)</td>
<td>.34** (.28)*</td>
<td>.13 (.03)</td>
</tr>
<tr>
<td>2. Bear Dragon</td>
<td>-.01 (-.10)</td>
<td></td>
<td>.12 (.03)</td>
</tr>
<tr>
<td>3. Card Sort</td>
<td></td>
<td></td>
<td>.40***(.34)**</td>
</tr>
<tr>
<td>4. Less is More</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Partial correlations controlling for age, gender, and verbal ability are shown in parentheses. Number of participants ranged from 67 to 73 due to missing data. All tests are two-tailed.

*p < .05, **p < .01, ***p < .001
Figure 3. Children’s performance on the executive functioning tasks (scores are standardized).

*Calculation of the executive functioning aggregate score.* Preliminary analyses revealed that children performed at ceiling on the Bear/Dragon task. The lack of variability associated with the ceiling effect rendered this task unsuitable for use in individual differences analyses. As a result, I choose not to include the Bear/Dragon data in the executive functioning aggregate score. Children’s scores on Grass/Snow, the
Dimensional-Change Card Sort, and the Less is More task were standardized and summed to create an aggregate score.

Although not all of the executive functioning measures were intercorrelated, the aggregate score showed moderate internal consistency (alpha = .544). The aggregate was also significantly correlated with children’s age, $r(71) = .25, p < .05$, and PPVT scores, $r(69) = .42, p < .05$, but sex was unrelated to executive functioning performance, $r(71) = .16, p = .17$. These findings are consistent with previous research and provide confidence that the data included in the executive functioning aggregate score is typical.

Pretense Understanding Analysis

*Moe task.* A Cochran’s $Q$ test revealed that there were no differences in the probabilities of correct responses across the four versions of the Moe task, $Q(3, N = 70) = 4.71, p = .19$, so children’s scores were summed. Overall, children’s performance on the Moe task was poor; only three children (4%) passed one or more versions of the task. While the majority of children do not pass this task until age 5, children’s performance was uncharacteristically low for children of this age. One possible explanation for children’s poor performance is that their participation in the pretend condition of the PSR task affected their performance on the Moe task. At both time sessions, the pretense understanding tasks were administered after the PSR task, and by a different experimenter than the theory of mind and executive functioning tasks. Because the pretend condition of the PSR task begins with the experimenter telling children that “this is my special pretending room”, it is possible that children in this condition associated second experimenter with “pretend games”. To explore this possibility, I examined
children’s performance on the Moe task as a function of condition. Two out of 16 children (13%) in the control condition passed two or more versions of the task, which is in line with previous research (e.g., Lillard, 1993b, experiment 2). In contrast, only one child (out of 52) in the pretend condition passed one version of the task. This suggests that children’s performance on the Moe task was influenced by their participation in the pretend condition children of the PSR task.

**Fantasy Moe task.** A Cochran’s $Q$ test revealed that there were differences in the probabilities of correct responses across the four versions of the Fantasy Moe task, $Q(3, N = 69) = 9.27, p < .05$. Judging from the frequencies, more children claimed (incorrectly) that Luna was pretending when her actions resembled the Lion King ($N = 7$) or Nemo ($N = 6$), than when her actions resembled Bambi ($N = 3$) or Tigger ($N = 2$). Given the more recent popularity of the movies *The Lion King* and *Finding Nemo*, it seems reasonable to suggest that children might be more familiar with the fantasy characters the Lion King and Nemo than they are with Bambi and Tigger. If children do not know that Bambi and Tigger are fantasy characters, one would not expect a boosting effect of fantasy given that these characters would be conceptually similar to the animals used in the Moe task for these children.

Like the Moe task, overall performance on the Fantasy Moe task was poor. Only nine children (13%) passed one or more versions of the task, which is not typical performance for children of this age. To examine whether participation in the pretend condition of the PSR task affected children’s performance on the Fantasy Moe task, I examined children’s performance as a function of condition. Three out of 14 children
In the control condition, 21% of children passed at least one version of the task, which is in line with previous research (e.g., Sobel & Lillard, 2001). In contrast, only six out of 56 children (11%) in the pretend condition passed at least one version of the task. This suggests that like the Moe task, children’s performance on the Fantasy Moe task was influenced by their participation in the pretend condition of the PSR task.

**Self-pretense task.** Preliminary inspection of the data revealed that 37% of children could not be asked the test question on at least one version of the task (because they continued to answer ‘yes’ when the experimenter asked them whether they were trying to look like the animal their actions resembled). Consequently, their data was coded as missing for that version of the task and a total score for the task (out of 4) could not be calculated. Like Mitchell and Neal (2005), only children who answered all four test questions were included in subsequent analyses.

I examined differences in correct responses across the four versions of the Self-pretense task using a Cochran’s $Q$ test for the 45 children who answered all the test questions. No differences were found in the probabilities of correct responses across the four versions of the Self-pretense task, $Q(3, N = 45) = 2.61, p = .46$. Table 24 shows the number of children who answered the test question correctly for each version of the task. Overall, children who answered all four test questions solved an average of 2.1 (51%). Because performance was at chance (50%), a chi-square goodness of fit test was conducted. The analyses indicated that the pattern of results was significantly different from what would be obtained if children were responding by chance, $\chi^2(4, N = 45) = 116.27, p < .001$. 

107
Table 24. The Number of Children who Answered the Test Question Correctly for Each Version of the Task

<table>
<thead>
<tr>
<th>The Animal Children’s Actions Resembled</th>
<th>Number correct/total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snake</td>
<td>25/57</td>
</tr>
<tr>
<td>Bird</td>
<td>28/55</td>
</tr>
<tr>
<td>Fish</td>
<td>29/61</td>
</tr>
<tr>
<td>Rabbit</td>
<td>29/57</td>
</tr>
</tbody>
</table>

To make the data comparable to those provided in Mitchell and Neal’s (2005), the data was categorized by the frequency of children who failed or passed the Self-pretense tasks. Children were categorized as “failing” if they got half or fewer of the test questions correct (i.e., had a total score between 0-2), and categorized as “passing” if they got more than half correct (i.e., had a total score between 3-4). The data are roughly comparable to Mitchell & Neal’s; approximately half of the children (53%) passed the Self-pretense tasks.

*Calculation of the pretense understanding aggregate score.* Because children’s performance on the Moe task and the Fantasy Moe was likely influenced by their participation in the pretend condition of the PSR task, an aggregate score could not be calculated for the pretense understanding tasks. Consequently, children’s pretense understanding was only measured by their performance on the Self-pretense task.

*Narrative Absorption Analysis*
Children were presented with six sentences in which the deictic verb was consistent with the protagonist’s perspective and two sentences in which the deictic verb was inconsistent with the protagonist’s perspective. Therefore, the maximum score for the consistent sentences was 6, and the maximum score for the inconsistent sentences was 2. To make the data comparable to those provided in Rall and Harris (2000) and Ziegler et al. (2005), children’s scores on the consistent sentences were averaged so that the maximum score was 2. Table 25 shows the mean number of responses as a function of the type of response. It is clear from the table that children had an overall tendency to give a “neutral” response when recalling the consistent and inconsistent sentences. This finding is not consistent with previous research (e.g., Rall & Harris, 2000; Ziegler et al., 2005) that has found that “neutral” responding is unaffected by verb consistency. One possible explanation for this unexpected finding is that all but two of the test sentences (the first sentence in the Kate/David story and the last sentence in the Laura/Tony story) contained additional information that was presented after the movement was described either to or from the spatial location (e.g., “when Tony came in and asked if she would like to play baseball”). When children were asked to recall the story, they often responded by simply repeating the last part of the sentence (e.g., “he asked if she would like to play baseball”) instead of repeating the sentence in its entirety. Rall and Harris and Ziegler et al. do not specify whether these types of responses were coded as “neutral” (as they were in the present study), or whether children were given a more specific prompt to recall the story. To explore whether additional information in the sentence was related to “neutral” responding, I compared the average number of “neutral” responses children
gave when recalling the test sentences that did and did not contain additional information.

A paired samples t-test revealed that children responded with more “neutral” responses when asked to recall test sentences that contained additional information ($M = .82, SD = .23$) than the test sentence that did not ($M = .24, SD = .43$). This analysis suggests that children’s tendency to respond with a “neutral” response was a result of the additional information provided in the sentences.

Table 25. Mean Number of Responses as a Function of the Type of Response

<table>
<thead>
<tr>
<th>Recall type</th>
<th>Consistent</th>
<th>Inconsistent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Verbatim</td>
<td>.44</td>
<td>.46</td>
</tr>
<tr>
<td>Perspective-shift</td>
<td>.04</td>
<td>.12</td>
</tr>
<tr>
<td>Neutral</td>
<td>1.45</td>
<td>.46</td>
</tr>
<tr>
<td>No response</td>
<td>.07</td>
<td>.16</td>
</tr>
</tbody>
</table>

*Note. N = 72.*

Next, a repeated measures ANOVA was conducted for each of the four response types to examine whether children’s responses were affected by verb consistency.

“Verbatim” and “neutral” responses were more frequent for consistent than inconsistent verbs, $F(1, 71) = 24.78, p < .001$ and $F(1, 71) = 12.53, p < .001$, respectively, whereas “perspective-shift” responses were more frequent for inconsistent than consistent verbs ($F(1,71) = 57.69, p < .001$). “No response” responses, however, were unaffected by verb
consistency, $F(1,71) = 3.35, p = .07$. Ignoring children’s “neutral” responses, the pattern of results for the other response types is comparable to both Harris and Rall and Ziegler et al.

4.2.2.2 Focal Analysis

Our final question concerns whether performance on the PSR task can be predicted by individual differences in theory-of-mind, executive functioning, pretense understanding, and narrative absorption. To address this question, I performed a multiple regression in which all variables of interest were entered simultaneously. The analysis revealed that children’s performance on the pretend condition of the PSR task was not related to their theory of mind or executive functioning aggregate scores, their performance on the Self-pretense task, or the extent to which they spontaneously take the perspective of others in pretend or fantasy scenarios (as measured by the mean number of “perspective-shift” responses children gave when recalling sentences that were inconsistent with the protagonist’s perspective), $F(4, 27) = .56, p = .69, R^2 = .08$ (see Table 26 for raw correlations).
<table>
<thead>
<tr>
<th>Tasks</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PSR task</td>
<td>-.01</td>
<td>.13</td>
<td>.21</td>
<td>-.09</td>
</tr>
<tr>
<td>2. Theory of Mind Aggregate</td>
<td>.36**</td>
<td>.35*</td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>3. Executive Functioning Aggregate</td>
<td>.20</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Self-pretense task</td>
<td></td>
<td></td>
<td>-.06</td>
<td></td>
</tr>
<tr>
<td>5. Narrative Absorption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. Number of participants ranged from 32 to 52 due to missing data. All tests are two-tailed.

*p < .05, **p < .01

4.3 Discussion

The first goal of Study 2 was to replicate the findings of Study 1 and explore the variability in children’s performance on the PSR task. I presented three possible explanations for the variability I saw in 4-year-olds’ PSR task performance, each of which I will now address in turn. The first explanation I explored was that the PSR task is simply not a reliable measure. To test this hypothesis, I tested a new group of children at two time points. Not only did I find that a similar proportion of children referred to their own photograph with a third-person response as Study 1, I found a strong correlation between third-person responding across time sessions. Taken together, these findings
suggest that children’s performance on the PSR task is stable, and thus an internally reliable measure of children’s performance in these scenarios.

Like Study 1, third person responses were more common to children’s own photographs compared to the photograph of their toy and the photograph of their parent. In fact, the proportion of children who responded to these photographs with a third-person response was even lower than Study 1. One possibility that I did not consider in the first study is that this difference could be attributed to the order in which the photographs were presented. Children’s own photograph was presented in the first part of the PSR task, when arguably children might be more “into” the role play. Conversely, the photograph of the toy children brought into the lab was presented in the second part of the task, and the parents’ photographs in the third part. Some evidence for this possibility might be seen in our finding that children’s use of pretend actions decreased over the course of the PSR task. Insofar as augmenting pretend play with pretend actions is a sign of engagement in the pretend play, a decrease in such behaviour might suggest that children are less “into” the role play later in the task.

The second possibility I explored to explain the variability in children’s performance on the PSR task is that the task makes additional cognitive demands that affect children’s tendencies to respond appropriately. I chose to focus my attention on two socio-cognitive skills I believed might preclude third-person responding - the ability to exert sufficient executive control, and the ability to attribute mental states to others. No evidence was found to suggest that either of these socio-cognitive skills were associated with children’s performance on the PSR task. It is difficult, however, to conclude
anything from a null effect; indeed it is worth noting that even though the data included in the aggregate scores were typical, a number of tasks from the executive functioning and theory of mind batteries were not included in the aggregate score because inspection of the data suggested that children’s performance either did not follow the predicted developmental progression, or was at ceiling. Thus, these analyses need to be replicated, using more age-appropriate tasks before I can conclude that the source of variability in children’s performance is due to the cognitive demands inherent in the PSR task.

The third possibility I explored to explain the variability in children’s performance on the PSR task is that the task might index different styles of role play in children. The first way I attempted to characterize these different styles was to suggest that children might differ in the degree to which they engage in pretend scenarios. In support of this hypothesis, I pointed to our finding from the first study that children who augmented their pretend play with pretend actions were more likely to give third-person responses in the PSR task. While this finding seemed promising, a number of limitations with the coding of pretend actions needed to be addressed before it could really be taken as evidence that children’s role play styles could be characterized in terms of their degree of engagement. When the relation between pretend actions and PSR task performance was re-examined in the present study, the finding did not replicate – even when I coded pretend actions using the same coding criteria as in Study 1. Children’s use of pretend actions did not distinguish children who gave third-person responses from children who gave first-person responses. In fact, I found no evidence that children’s performance on the PSR task was related to any of the pretend-related variables of interest, including
children’s characters choice, and parents’ report of children’s engagement in everyday and sustained forms of role play. In Study 1, I suggested that ceiling and floor effects on the parent questionnaire might have affected our abilities to detect relations between PSR task performance and these pretend-related variables. Given that the revised parent questionnaire was successful at obtaining variability in our measures, it is unlikely that this is the case in the present study.

The second way I attempted to characterize the different styles of role play was to suggest that they are related to perspective taking, per se. To examine this possibility I examined whether the tendency to become absorbed in fantasy scenarios – specifically a narrative - was related to third-person responding in the PSR task. Again, I found no evidence to suggest that the variability in children’s performance was related to children’s tendencies to take another’s perspective in pretend or fantasy settings. Although the null effect could imply that the two variables are not related, given that the narrative absorption data was not consistent with that of previous research (e.g., Rall & Harris, 2000; Ziegler et al., 2005), the possibility remains that some children are susceptible to adopting the mental perspective of the characters they pretend to be, whereas other children are not – and that this difference is related to children’s performance on the PSR task. Future research should focus on re-examining this relationship, ensuring that the test sentences used in the narrative absorption task only include the spatial location of the protagonist, and a description of the movement to or from the spatial location (e.g., “Laura was sitting in the lounge looking at a picture book, when Tony came in”). Excluding any additional information from the test sentences (e.g.,
“and asked if she would like to play baseball”) will encourage children to repeat each sentence in its entirety, as opposed to simply repeating the last part of the sentence (e.g., “he asked if she would like to play baseball”) – making it easier to categorize children’s responses.

To summarize, the results of the analyses aimed at replicating and exploring the variability in children’s performance on the PSR task suggest that the task is, indeed, a reliable measure of children’s tendencies to take the mental perspective of the characters they are role playing. Thus, it is unlikely that the variability I saw in children’s performance is a result of the many demands inherent in the task. While several analyses were conducted to explore other possible sources of variability, the results for the most part were largely uninformative. Nonetheless, the value of this study lies in its attempt to begin to discern the variability in children’s performance on the PSR task, as well as emphasize the need for further research.

The second aim of Study 2 was to explore whether children who responded with a third-person response were truly simulating the character’s perspective, or whether it was a more reflective process. In order to differentiate between these two ways of responding, I examined reaction time differences in children’s first-person and third-person responses. The results showed that children who gave first person and third person responses responded to their own photograph with similar reaction times. Although I can not conclude from the null effect that children who “think-as-if” are indeed “putting themselves in the character’s shoes”, it seems reasonable to suggest that if children were in fact reflecting on how they “should” answer the question, as opposed to simulating the
character’s perspective, reaction times would have been longer for those children who gave third person responses.

Because I found no evidence to suggest that third-person responding involves theorizing about the character’s mental state, it is not surprising that I found no evidence to suggest that children’s tendencies to respond appropriately in the PSR task depended on what children understand about pretense more generally. Again, it is difficult to conclude anything from a null effect. Thus, future research needs to re-examine this relation, and experiment with administering the pretense understanding tasks before the PSR task in an attempt to avoid the potential pretend carry-over effects found in the present study.

Finally, the addition of a reaction time measure in Study 2 provided us with a more implicit measure of children’s performance on the PSR task. I conducted several analyses to see if there were condition differences in children’s reaction times. No condition differences were found in children’s reaction times, even when the analyses were isolated to children who more clearly demonstrated that they were pretending by augmenting their role play with pretend actions. Children’s reaction times also did not differ depending on which photograph they were referring to.
Chapter 5
Summary and Conclusion

The goal of this dissertation was to better understand the phenomenology of role play. While it is commonly thought that children adopt the mental perspective of the character they are enacting - or “thinking-as-if” while role playing I have argued that much of the evidence used to support this claim is weak, and based on little, if any empirical evidence. This leaves open the possibility that children might do something else when they enact a role. I proposed that children might, instead, be “behaving-as-if” they are the character while role playing, without necessarily taking on the character’s mental perspective. The two studies presented in this dissertation explored this possibility using a novel paradigm called *The Pretend Self-recognition* task. Contrary to the widely-held assumption that children “think-as-if” while role playing, our findings suggest that only half of 4-year-old children adopt the perspective of the character they are pretending to be.

To our knowledge, the studies presented in this dissertation are the first to empirically investigate the phenomenology of role play. As noted from the outset, research on children’s role play has been preoccupied with understanding the capacity to pretend without first knowing whether children are indeed “thinking-as-if” while role playing. An important first step, however, in identifying the cognitive mechanisms that underlie this type of pretend play is understanding exactly what children are doing when they role play.
A second contribution of this dissertation is the creation of a novel paradigm in which to study the phenomenology of role play. Because pretending is a mentalistic concept, gaining evidence that children are “thinking-as-if” while role playing is not an easy task. The challenge was to create an explicit measure that would capture children’s point of reference, or deictic center, while pretending. The studies presented in this dissertation establish the PSR task as a reliable measure of children’s tendencies to take the mental perspective of the characters they are role playing.

Our findings also revealed that there are individual differences in children’s tendencies to take the mental perspective of the characters they are role playing. This finding contributes to the existing literature by providing evidence against the rich interpretation of role play as “thinking-as-if”. An important implication of this finding is that it questions role play’s special connection to the mind. Role play is believed to be related to the capacity to “mind-read” because it provides practice in taking the mental perspective of others (e.g., Aronson & Galomb, 1999; Flavell, 1988; Hickling, Wellman, & Gottfried, 1997; Taylor, 1999; Taylor & Carlson, 1997). For children who do not adopt the character’s mental perspective while role playing, an important question concerns how role play facilitates their capacity to understand others’ minds. One possibility is that these children are, instead, “behaving-as-if” they are the character, and it is through imitating others’ actions – rather than shifting perspectives - that they are able to make inferences about others’ minds. According to Meltzoff and Decety (2003), imitating the actions of others may help children come to understand that others are “like me”, and this insight enables them to use their own experiences with mental states and behaviours to
“mind-read”. If this is the case, role play might lead all children to a better understanding of other’s minds, the path children take to get there, however, might differ depending on whether they “think-as-if” while role playing.

Another implication of our findings is that they suggest there is, indeed, a dissociation between what children know about pretense and what they do when they role play. While simulation theory provides an explanation for how young children might engage in a perspectival shift while role playing whilst being a behaviourist about pretense, it presupposes that children “think-as-if” while role playing. Our findings, however, show that only half of children provide strong evidence that they actually adopt the mental perspective of the character they were pretending to be. Thus, simulation theory can only explain the dissociation for children who showed evidence of “thinking-as-if”. If children who did not adopt the mental perspective of the character are, indeed, “behaving-as-if” they are the character while role playing, it doesn’t matter whether they conceptualized pretense as action because they do not need to understand the mentalistic nature of pretense in order to imitate a character’s actions.

Although the analyses I conducted to explore the variability in children’s performance on the PSR task were largely uninformative, it is important to point out that if children were truly “thinking-as-if” in the way proponents of simulation theory suggest (i.e., by “putting oneself in another’s shoes”), children’s performance on the PSR task would not be expected to correlate with measures of their theory of mind, executive functioning, and pretense understanding. The reason for this is that imagining oneself as the character while role playing eliminates the need for third-person rationalization.
Consequently, children do not need to theorize about the character’s mental states, understand the mental underpinnings of pretense, or overcome the prepotent tendency to provide a first person response while pretending. Given that the simulation account predicts a null effect, gaining evidence that children’s performance on the PSR task is not related to any of the socio-cognitive skills that I measured is difficult to obtain, but might be just as interesting.

5.1 Limitations

There are several limitations of the studies presented in this dissertation. The first concerns the design of the PSR task. Studying pretend play in a laboratory setting requires a fine balance between maintaining tight control of behavioural measures and successfully eliciting pretend play in the lab. The result of this balancing act often means that behavioural measures cannot be as controlled as you would like. To elicit pretend play during the PSR task, I elected to have children choose the character they impersonated, as some children have particular characters that they like to pretend to be. However, the decision not to restrict children’s choice of characters resulted in the exclusion of participants (e.g., if children chose to impersonate a machine or a character whose physical appearance was similar to their own). It also meant that the experimenter could not impersonate the same character for each child, as the pretend context varied depending on the character children chose to impersonate. Because some children’s pretend play is more dependent on contextual support than others, it is possible that having different pretend contexts might have discouraged pretend play during the task, rather than encouraged it. It is also possible that certain characters and pretend contexts
lend themselves to eliciting pretend play more than others. This seems unlikely, however, given that the task was successful at eliciting role play, and no evidence was found to suggest that any of the pretend-related variables differentiated children who gave third-person versus first-person responses. To address this issue in future studies, children could choose the character they impersonate from a set of characters (e.g., bear, elephant, lion, and a tiger) that share a common theme (e.g., zoo animals) and are the same across the pretend-related variables (i.e., characteristic actions, type of character). This would allow the experimenter to impersonate the same character (e.g., zoo-keeper) and use the same pretend context (e.g., zoo) with each child, but at the same time would give children some choice in the character they impersonate.

A second limitation concerns the age-limits of the PSR task. While the PSR task was found to be a reliable measure of perspective taking in role play in 4-year-olds, this was not the case for 5-year-olds. Moreover, the PSR task cannot be used with younger children, given that the majority of children under the age of four typically refer to their own self-image with a third-person label (i.e., their proper name) rather than with the personal pronoun “me” (e.g., Povenelli & Simon, 1998). Thus, examining the phenomenology of role play in children younger and older than 4 years of age requires the creation of a new, more age-appropriate task. However, given the complexity of studying this phenomenon, I believe that the present paradigm provides a solid foundation for this next step.
5.2 Future Directions

There are a number of questions that emerge from our findings that warrant future investigation. One important question concerns whether responding to the target photographs with an animal noise is better characterized as a third-person response, or whether it is in fact, a distinct type of responding. As mentioned earlier, the fact that children respond “in character” suggests that this type of response is not a first-person response. What is not clear, however, is whether this type of response can truly be taken as evidence that children are responding from the perspective of the character they are pretending to be. Intriguingly, roughly the same proportion of children in Study 2 referred to each of the photographs with an animal noise, rather than with a first or third person response, as in Study 1. Unfortunately, the relatively small number of children who responded with an animal noise prevented us from conducting analyses aimed at determining whether these children differed in any way from children who responded with a third-person response. For example, future research with a larger sample size could examine reaction time differences in children’s animal noise and third-person (child’s name) responses, or explore whether this phenomenon is related to any of the pretend-related measures or socio-cognitive skills that I measured.

Another question that requires future investigation is whether the individual differences observed in the present study are specific to impersonation, or whether they can be generalized to other forms of role play. Impersonation is only one way in which children can act out the part of someone else. Children can also project the role of “another person” onto a prop (such as a stuffed toy or doll), or not rely on a prop at all,
and instead create an invisible character to interact with. While all forms of role play involve projecting "another person" onto reality, impersonation is different because children project the role onto themselves, rather than onto a separate entity. It is possible that projecting a role onto a separate entity (regardless of whether it is a prop or invisible) might encourage - or perhaps make it easier - for children to adopt the mental perspective of the character as they themselves are not acting out the character. Because the conceptual relationship between the different types of role play is not known, future work will need to create methodology for exploring the phenomenology of other forms of role play.

Another possible avenue for future research is to explore other cognitive demands that might affect children’s tendencies to respond appropriately in the PSR task. For example, it is possible that the ability to predict future events - referred to as “future-oriented thinking”, might be associated with children’s performance on our task. In order to anticipate what a given situation might be like, children have to picture themselves, in the future (e.g., Lemmon & Moore, 2001; Atance & O’Neill, 2005). That is, they must adopt the mental perspective of their future selves. It is in this way that future-oriented thinking involves “thinking-as-if”. In the case of role play, “thinking-as-if” results in children enacting how someone would act in a given situation, while future-oriented thinking results in children predicting how someone would act in a given situation (Harris, 2000). Given the similarity between the two, it is possible that children who are skilled at future-oriented prediction, would be better able to “think-as-if” they are the
characters they are pretending to be during role play. These better abilities to “think-as-if” may, in turn, be related to third-person responding on the PSR task.

Another possibility is that “thinking-as-if” is related to expertise in pretend play. However, if this were true, then I might expect children’s performance on the PSR task to be associated with their engagement in more sustained and elaborate forms of role play, such as having an imaginary companion. While I did not find this to be the case, it is important to consider the possibility that this was the result of the imaginary companion measure I chose to use. While the modified version of Taylor et al.’s (2005) role play interview used in Study 2 was aimed at getting a better measure of children’s sustained forms of role play, proportions are still likely to be a bit conservative given that they were solely based on parent report. Future research should utilize the multi-method approach developed by Taylor and her colleagues, in which both children and adults are interviewed, when gathering information on children’s imaginary companions (e.g., Taylor & Carlson, 1997; Taylor, Carlson, Maring, Gerow, & Charley, 2004; Taylor, Cartwright, & Carlson, 1993; Taylor et al., 2005).

Finally, future work should explore the possibility that the extent to which children take the perspective of the character they are pretending to be might be better characterized as a continuum, rather than something children do - or do not do - while role playing. Perhaps all children truly do “think-as-if” while role playing, but do so to varying degrees. That is, all children might adopt the mental perspective of the character, but not to the full extent that they respond “in character” while pretending. It is also possible that children differ in their proneness – or the ability - to “toggle” between
pretense to reality. Children who responded with a first person response might have adopted the mental perspective of the character but responded in this manner because they had switched out of a pretense mode when responding to the test question.

5.3 Conclusions

In summary, while it is commonly thought that children adopt the mental perspective of the character they are pretending to be, the results of the studies presented in this dissertation do not support this broad assumption. Instead, I found that only half of children show evidence of “thinking-as-if” while role playing. Not only does this finding question the rich interpretation of role play as “thinking-as-if”, it contributes to the existing literature by suggesting that there is indeed, a dissociation between what children know about pretense, and what they do when they role play. Future work should focus on understanding the variability in children’s tendencies to take the mental perspective of the characters they are role playing in order to better understand the phenomenology of role play.
References


Multiple perspectives on play in early childhood education (pp. 11 – 33). New York: SUNY Press.


Appendix A

Script for the PSR Task Used in Study 1

E = The experimenter, Italics = Unspoken actions.

Pretend condition

Warm-up Task

E asks the child to sit on the floor.

E: This is my special pretending room. What do you think I do in here?

If the child says “pretend”, E responds:

E: That’s right, I like to pretend when I’m in here.

If the child hesitates or says “I don’t know”, E responds:

E: I like to pretend when I’m in here.

E then asks the child:

E: Do you know how to pretend?

If the child says “yes”, E continues. If the child says “no”, E responds:

E: I think you know how to pretend.

E then tells the child:

E: You know what my favourite thing to pretend to be is? A puppy dog! Do you know how to pretend to be a puppy dog?

If the says “yes”, E asks:

E: Can you show me?
If the child says they do not know how to pretend to be a dog, E encourages them to try. If this does not work, E pretends to be a dog, and then asks the child:

E: Now can you show me how you pretend to be a dog?

After the child pretends to be a dog, E says:

E: Wow, you are great at pretending to be a dog! I have an idea, why don’t you pretend to be a dog, and I’ll pretend to be your owner? How does that sound? What do you want your dog name to be?”

If the child cannot think of a name, E makes suggestions until the child decides on a name. After the child chooses a name, E says:

E: Okay, Come here [name of the dog].

E asks the child to fetch a ball, shake a paw, roll over, and speak. While the child pretends to be a dog, E only addresses him/her by their pretend dog name.

Experimental Task

E: Wow, you are really good at pretending to be a dog! What else do you like to pretend to be?

If the child says “nothing” or “I don’t know”, E suggests a character or animal.

E: I have an idea. Why don’t you pretend to be [name of character/animal], and I’ll pretend to be someone too. Who should I pretend to be?

If the child does not suggest a character/animal for the E to impersonate, E suggests a character or animal. Once a character is agreed upon, E says:

E: Great. So you’re going to pretend to be [name character/animal], and I’m going to pretend to be [name of character/animal], and let’s pretend that we are [chosen context
based on the characters children choose]. You have to find a bunch of your friends that are hidden in this room, and I have some clues to help you find them! Oh, look [name of character/animal] here’s the first clue. The first clue says [read clue].

_E reads the child the first clue and says:_

_E: [Name of character/animal], where do you think your friend is?_

_If the child does not understand the clue, or starts to look in the wrong place, _E repeats the clue and directs the child to where the photograph is hidden._

_When the child finds a photograph, _E asks:_

_E: [Name of character/animal], who did you find?_

_If the photograph is of a toy, _E also asks:_

_E: And whose toy is it [name of character/animal]?_

_When the child finds the mirror, _E asks:_

_E: [Name of character/animal], who do you see in the mirror?_

_Control Condition_

_Experimental Task_

_E asks the child to sit on the floor._

_E: This is my special game room. What do you think I do in here?_

_If the child says “play games”, _E responds:_

_E: That’s right, I like to play games when I’m in here_

_If the child hesitates or says “I don’t know”, _E responds:_

_E: I like to play games when I’m in here._

_E then tells the child:_

139
E: I have a fun game for us to play today! You have to find a bunch of photographs that are hidden inside this room, and I have some clues to help you find them! Oh, look [child’s name] here’s the first clue. The first clue says [clue].

*E reads the child the first clue and says:*

E: [Child’s name], where do you think the picture is?

*If the child does not understand the clue, or starts to look in the wrong place, E repeats the clue and directs the child to where the photograph is hidden.*

*When the child finds a photograph, E asks:*

E: [Child’s name], who did you find?

*If the photograph is of a toy, E also asks:*

E: And whose toy is it [child’s name]?

*When the child finds the mirror, E asks:*

E: [Child’s name], who do you see in the mirror?

*The child is asked the test question up to 3 times. If the child does not respond or says “I don’t know”, E moves on to the next clue.*
Appendix B
Parent Questionnaire used in Study 1

Children’s Favourite Activities:

1. What is your child’s favourite play activity to do with other children?
   ______________________________________________________________________

2. What is your child’s favourite play activity to do when alone?
   ______________________________________________________________________

3. What is your child’s favourite storybook?
   ______________________________________________________________________

4. What is your child’s favourite toy?
   ______________________________________________________________________

5. What is your child’s favourite TV show?
   ______________________________________________________________________

Children’s Engagement in Pretend Play:

6. How often does your child engage in pretend play alone?
   ONCE OR TWICE / OCCASIONALLY / FREQUENTLY / EVERY DAY

7. How often does your child engage in pretend play with other children?
   ONCE OR TWICE / OCCASIONALLY / FREQUENTLY / EVERY DAY

8. Does your child pretend play with toys (e.g., stuffed animals or dolls)? YES / NO

9. Does/Has your child have/had an imaginary friend? YES / NO

10. Has your child ever pretended to be an animal? YES / NO
11. Has your child ever pretended to be a different person? YES / NO

12. Has your child ever pretended to be anything else like a machine, airplane, or something like that? YES / NO

*If parents responded ‘yes’ to questions 10-12, they were also asked:*

a. What does/did your child pretend to be? ______________________________

b. How often? ________________________________________________________

c. At what age? ______________________________________________________

d. For how long (e.g., a week, 2 months)? ________________________________

e. Does/Did your child use props when pretending (e.g., costume)? YES / NO
Appendix C
Script for the PSR Task Used in Study 2

E = The experimenter, Italics = Unspoken actions.

Pretend condition

Warm-up Task

Children participate in the same warm-up task as Study 1.

Experimental Task

E: Wow, you are really good at pretending to be a dog! What else do you like to pretend to be?

If the child says “nothing” or “I don’t know”, E suggests a character or animal.

E: I have an idea. Why don’t you pretend to be [name of character/animal], and I’ll pretend to be someone too. Who should I pretend to be?

If the child does not suggest a character/animal for the E to impersonate, E suggests a character or animal. Once a character is agreed upon, E says:

E: Great. So you’re going to pretend to be [name character/animal], and I’m going to pretend to be [name of character/animal], and let’s pretend that we are [chosen context based on the characters children choose]. You have to find a bunch of your friends that are hidden in this room. I’ve got an idea [name character/animal], come here.

E directs children to her Friend Finder.

E: We can use my special Friend Finder to find our friends. When you find a disk like this (E show the child a disk), you put it in my Friend Finder and it shows us who you
found. Watch this (*E puts disk in slot*). Look, I found the Little Mermaid! Why don’t you try?

*E gives the child a disk. If the child has difficulty putting the disk into the slot, *E helps him/her.*

*E:* Look, you found Tigger! My Friend Finder also gives us clues so we know where to find our other friends (*E makes clue appear on the computer screen*). This clue says [read clue]. [Name of character/animal], where do you think our friend is?

*If the child does not understand the clue, or starts to look in the wrong place, *E repeats the clue and directs the child to where the photograph is hidden.*

*When the child finds a disk, *E says:*

*E:* [Name of character/animal] bring the disk over here and we will put it in the friend finder.

*The child puts the disk in slot of the Friend Finder. *E makes the photograph appears on the computer screen, and asks:*

*E:* [Name of character/animal], who did you find?

*If the photograph is of a toy, *E also asks:*

*E:* And whose toy is it [name of character/animal]?

*If the child does not answer the test question in 5 seconds, the photograph disappears. *E will ask the test question(s) again and make the photograph reappear on the computer screen, up to 3 times.*

*Control Condition*

*Experimental Task*
E asks the child to sit on the floor.

E: This is my special game room. What do you think I do in here?

If the child says “play games”, E responds:

E: That’s right, I like to play games when I’m in here

If the child hesitates or says “I don’t know”, E responds:

E: I like to play games when I’m in here.

E then tells the child:

E: I have a fun game for us to play today! You have to find a bunch of photographs that are hidden inside this room. I’ve got an idea [child’s name], come here.

E directs children to her Friend Finder.

E: We can use my special Friend Finder to find the photographs. When you find a disk like this (E show the child a disk), you put it in my Friend Finder and it shows us who you found. Watch this (E puts disk in slot). Look, I found the Little Mermaid! Why don’t you try?

E gives the child a disk. If the child has difficulty putting the disk into the slot, E helps him/her.

E: Look, you found Tigger! My Friend Finder also gives us clues so we know where to find the other photographs (E makes clue appear on the computer screen). This clue says [read clue]. [Child’s name], where do you think the picture is?

If the child does not understand the clue, or starts to look in the wrong place, E repeats the clue and directs the child to where the photograph is hidden.

When the child finds a photograph, E asks:
E: [Child’s name], who did you find?

*If the photograph is of a toy, E also asks:*

E: And whose toy is it [child’s name]?

*If the child does not answer the test question in 5 seconds, the photograph disappears. E will ask the test question(s) again and make the photograph reappear on the computer screen, up to 3 times.*
Appendix D
Stories Used in the Narrative Absorption Task

David and Kate
1. One day, David was sitting on a chair in the living room, dreaming about going horseback riding with his friends, when Kate came into the room.
2. Kate said she needed some apples for the horses, so David got up from his chair, and went into the kitchen to look for some apples.
3. When David was in the kitchen, he saw some apples sitting on the kitchen table, so David went to the kitchen table and picked them up.
4. Kate was also in the kitchen, so she grabbed a handful of apples off the kitchen table too, and came into the backyard to find the horses.
5. The horses really liked the apples and were munching noisily.

Laura and Tony
1. One day, Laura was sitting in the bedroom reading a book, when Tony came in and asked if she’d like to play baseball.
2. Laura got up from her bed in the bedroom, and went into Tony’s room to find a ball.
3. When Laura was in Tony’s room, she saw a ball over by the bed, so Laura went over to the bed and picked it up.
4. Tony was also in the room, so he picked up the baseball bat, and came into the backyard.
5. Laura and Tony had fun playing baseball.
Appendix E
Parent Questionnaire Used in Study 2

Part A. Imaginary Companions

Many children enjoy pretending to interact with someone who is not real. For example, they might talk to an invisible character that they have created or that is based on a real person who is not actually present (e.g., a favorite cousin who lives far away). The pretend interactions might also be with a special stuffed animal or doll. For some children, this type of pretend play is frequent and the child is described as having an imaginary companion.

1. Does your child currently have an imaginary companion? yes □ no □
   If no, did your child have an imaginary companion in the past? yes □ no □

→ If your child has never had an imaginary companion, please skip to Part B, Pretend Identities.

→ If your child has ever had an imaginary companion, please continue.

2. Is the imaginary companion completely invisible or is it a toy? invisible □ toy □

   If the imaginary companion is a toy, does your child treat the toy primarily as a comfort object (i.e., she or he carries it around and/or sleeps with it) or does she or he treat it as if it was another person (e.g., talks to it, listens to what it says, describes its life to others, etc.).
Part B. Pretend Identities

Many children enjoy pretending to be someone else (a person or animal). For some children this type of play goes beyond occasional pretend games of “house” or “doctor.” For these children, the pretend play can be almost like having an alter ego or pretend identity. They act out a particular role on a regular basis.

3. Does your child have a pretend identity? yes ☐
   no ☐

   If no, did your child have a pretend identity in the past? yes ☐
   no ☐

→ If your child has never had a pretend identity, please skip to Part C. Other Pretending.

→ If your child has ever had a pretend identity, please continue.

4. Who does your child pretend to be? Name: _________________________________

   If your child pretends to be lots of different people or animals, which one does he or she pretend to be the most? _________________________________

   Does your child ask you to call him or her by that name? yes ☐
   no ☐

5. Is the pretend identity a person, animal, or something else?

   person ☐

   comfort object ☐

   another person ☐

   both ☐
animal □ (if so, what kind?) _________________________________
something else □ (if so, please describe) ______________________________

6. Does your child use any props or articles of clothing to enhance this role play (e.g., a mouse’s tail)?
   yes □
   no □

   If yes, please describe: _______________________________________________

7. Does your child talk or act in a special way when she or he is pretending to be the person/animal?
   yes □
   no □

   If yes, please describe: _______________________________________________

8. Does your child claim to be able to do special things (e.g. fly) or have special powers when she or he acts out the pretend identity?
   yes □
   no □

   If yes, please describe: _______________________________________________

9. During the period in which your child had a pretend identity, how often did/does your child pretend to be someone else?
   only once or twice □
   occasionally □
   frequently □
   almost every day □

Part C. Other Pretending
10. Some children do not have a particular character that they pretend to interact with regularly (like an imaginary companion), but they enjoy pretending to interact with lots of different imaginary others.

   a. To what extent does your child engage in pretend interactions with invisible characters when playing alone:
      only once or twice □
      occasionally □
      frequently □
      almost every day □

   b. To what extent does your child engage in pretend interactions with toy characters when playing alone:
      only once or twice □
      occasionally □
      frequently □
      almost every day □

11. Some children do not have a particular identity that they pretend to be on a regular basis, but they enjoy pretending to be lots of different identities. To what extent does your child pretend to be other people or animals when playing alone:
     only once or twice □
     occasionally □
     frequently □
     almost every day □

12. When your child plays with other children (i.e. siblings, friends), to what extent does the play involve pretending to be other people or animals?
only once or twice ☐
occasionally ☐
frequently ☐
almost every day ☐
Endnotes

i This is considered pretense because the child is projecting the role of “dog” onto some aspect of reality (in this particular case, the child is projecting the mental representation of the character onto themselves). If is the projection of the mental representation that separates pretending from imagining (which only requires children to mentally represent the role of “dog”).

ii The child who impersonated a detective was not excluded from the final analyses because he responded to at least one of the test questions with a third-person response. This suggests that the physical appearance of the character he impersonated was different from his own appearance.

iii Chi-square tests were conducted only if all expected frequencies were greater than five, otherwise Fisher’s exact probability tests were used (Siegel & Castellan, 1988).

iv Six children were excluded from this analysis; four from the pretend condition because they did not bring their favourite toy to the lab, and two from the control condition (one child did not bring their favourite toy to the lab, the other was excluded because of an experimental error).

v Removing outliers using this method has similar power to the method of calculating the median absolute deviation (MAD), and is a robust alternative to excluding participants two standard deviations above and below the mean (as the standard deviation is greatly influenced by outliers in the data, see Ratcliff, 1993).

vi Children’s raw PPVT scores ranged from 50 to 89, with an overall mean of 75.96 (SD = 9.58). PPVT scores were marginally related to age, $r(69) = .21$, $p < .09$, and boys (M = 76.32, SD = 10.69) and girls (M = 75.66, SD = 8.70) scores did not differ, $t(73) = .26$, ns.

vii In 4 cases, stickers were used instead of treats because of allergies.

viii Even though the experimenter introduced the PSR task at Time 2 by reminding children of the character they impersonated at Time 1 and asking them if they wanted to “do that again”, children were given the option to impersonate a different character.
The child who impersonated a policeman was not excluded from the final analyses because he responded to at least one of the test questions with a third-person response. This suggests that the physical appearance of the character he impersonated was different from his own appearance.

One of the children chose to be a princess at Time 1

Children’s scores ranged from 0-2 indicating the number of third-person responses they used.

For ease of interpretation, the values presented are the sphericity assumed values. However, for some analyses the assumption of sphericity was violated. In these cases, the sphericity not assumed values were used to assess significance levels.

Missing data was replaced with the mean of the other neutral photographs.

The expected frequencies used in the five cells (0, 1, 2, 3, and 4) for the chi-square analysis were 3, 11, 17, 11, and 3, respectively (see Ganea et al., 2004).

Ziegler et al. (2005) also reported that 4-year-olds in their study had difficulty recalling the story details.