

The Relation Between Theory of Mind Development  
And Gender-Typed Development in Early Childhood

by

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B.Sc., Pennsylvania State University, 2003

A Thesis Submitted in Partial Fulfillment of the  
Requirements for the Degree of

MASTER OF SCIENCE

in the Department of Psychology

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University of Victoria

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**Departmental Member****Abstract**

Theory of mind development and gender-typed development are two areas of children's social-cognitive development that have rarely been compared. The current study predicted that a relation between theory of mind and gender-typing would exist based on components from both areas of development sharing similar social-cognitive processing demands. Eight tasks examined 5- to 7-year-olds' understanding of social perspective taking, interpretive theory of mind, gender constancy, gender stereotypes, gender flexibility, and vocabulary. As predicted, children's knowledge of social perspective taking was related to gender constancy understanding over and above age, gender, and vocabulary. No relation was found between children's knowledge of social perspective taking and gender stereotype rigidity or between children's knowledge of interpretive theory of mind and gender flexibility. Implications for the findings and suggestions for future research are presented.

## Table of Contents

Title Page.....	i
Supervisory Committee.....	ii
Abstract.....	iii
Table of Contents.....	iv
List of Tables.....	v
List of Illustrations.....	vi
Acknowledgments.....	vii
Dedication.....	viii
Introduction.....	1
Theory of Mind Development.....	3
Gender-Typed Development.....	10
Theory of Mind and Gender-Typed Development Relation.....	14
Method.....	20
Participants.....	20
Procedure.....	21
Measures.....	21
Theory of Mind Measures.....	21
Gender-Typed Measures.....	26
Language Assessment.....	30
Results.....	31
Discussion.....	35
References.....	43
Appendix.....	47
Tables.....	52
Illustrations.....	60

## List of Tables

Table 1: <i>Means and Standard Deviations for Theory of Mind and Gender-Typed Measures by Age Group, Median Split Age, and Gender</i> .....	52
Table 2: <i>Performance and Descriptive Statistics for Theory of Mind Measures</i> .....	53
Table 3: <i>Performance and Descriptive Statistics for Gender-Typed Measures</i> .....	54
Table 4: <i>Descriptive Statistics for Language Assessment</i> .....	55
Table 5: <i>Zero-Order Correlations Between Age, Gender, Language Assessment, and Theory of Mind Measures</i> .....	56
Table 6: <i>Zero-Order Correlations Between Age, Gender, Language Assessment, and Gender-Typed Measures</i> .....	57
Table 7: <i>Zero-Order Correlations Between Age, Gender, Language Assessment, Theory of Mind Measures, and Gender-Typed Measures</i> .....	58
Table 8: <i>Summary of Hierarchical Regression Analysis for Variables Predicting Overall Gender Constancy</i> .....	59

List of Illustrations

Illustration 1: *Doodles Administered in the Doodle Interpretive Theory of Mind Task With Restricted Views in Dashed Windows*.....60

## Acknowledgments

I would like to thank my supervisor, Dr. Ulrich Müller, whose knowledge and guidance is always helpful. I also send kind regards to my committee members, Dr. Christopher Lalonde and Dr. Bonnie Leadbeater, for their sagacious and constructive advice. In addition, I thank all the schools and children who participated.

## Dedication

To my loving parents, Robert and Darla Miller, for their invaluable support, encouragement, and understanding.

## The Relation Between Theory of Mind Development And Gender-Typed Development in Early Childhood

Theory of mind (ToM) and gender-typing are well-established aspects of children's social development that have received considerable attention for the last twenty and forty years, respectively. In particular, whereas research on ToM has focused on children's understanding of false beliefs (Wellman, Cross, & Watson, 2001), gender-typed research has largely been devoted to the development of gender constancy, gender stereotypes, and gender-typed toy preferences (Ruble, Martin, & Berenbaum, 2006). For the most part, ToM and gender-typed research occur in isolation of each other, with the majority of studies exploring potential relations within each developmental area. This is unfortunate because examining developmental relations between both areas can provide information about whether and how advances in one area are linked to advances in the other, and whether similar processes are at work in both areas.

There have been a few attempts to transcend the narrow boundaries of ToM and gender-typing in order to link concepts in these areas to more general cognitive processes. For instance, research has looked at the relation between false belief understanding and executive functioning (Perner, Stummer, & Lang, 1999), and gender constancy has been linked to Piaget's concept of conservation (Marcus & Overton, 1978). However, studies measuring the relation between developmental areas are underrepresented in ToM and gender-typed research. Furthermore, empirical research specifically examining the relation between ToM development and gender-typed development is rare.

As far as the author is aware, only two published studies have assessed the relation between ToM development and gender-typed development. Trautner, Gervai, and Németh (2003) found a positive relation between children's performance on the appearance-reality distinction and gender constancy, whereas Bosacki and Moore (2004) found no significant relation between children's verbal expressions of emotion understanding and parents' perceptions of their children's gender stereotyped behaviour. Therefore, not only is there a dearth of research devoted to the relation between ToM development and gender-typed development, the current findings are mixed. More evidence is needed in order to determine the extent of the relation between ToM development and gender-typed development.

The goal of this thesis was to empirically examine the relation between ToM development and gender-typed development in order to determine if advances in one area are related to advances in the other. It was anticipated that a relation between specific levels of understanding in both areas does indeed exist because these levels of understanding engage similar social-cognitive processes and undergo major transitions that gradually progress throughout the early school years. Because so little previous research has directly tested this developmental relation, the main focus of this study was to empirically examine the relation between both areas through a battery of ToM and gender-typed measures.

Brief descriptions of major developmental milestones in ToM and gender-typing will follow. In addition, a rationale is presented for the particular ToM and gender-typed measures that are used in the study. Lastly, an analysis of the social-cognitive processing

demands posed by ToM development and gender-typed development provides the basis for the relation that is predicted between advances in both developmental areas.

### *Theory of Mind Development*

ToM is a continuous developmental process where a child gradually reaches an understanding that the self and others are capable of producing and acting upon intangible mental states. Research shows that children develop an understanding of mental states in a relatively consistent progression: Knowledge of desires and emotions occur as early as age 2; knowledge of perspective taking begins around age 3; false belief understanding takes place between 4 and 5 years of age; and a thorough understanding of interpretation is achieved between 7 and 8 years of age (Astington, 1993; Carpendale & Lewis, 2006; Perner, Leekam, & Wimmer, 1987). The most prevailing way to measure children's ToM development is through their knowledge of false beliefs (Wellman et al., 2001). Most studies have measured false belief understanding by asking children their beliefs about a container with unusual contents or about the location of a transferred object. In both cases, an object's true identity or location is unexpected, and children must realize that another person with less information will mistakenly form a false belief about the object. Because of its prevalent use, false belief understanding is frequently identified and generalized as ToM understanding (Wellman et al., 2001). However, while false belief understanding is a significant step in ToM development, important changes in children's ToM development extend beyond false belief understanding as well (Carpendale & Lewis, 2006; Lalonde & Chandler, 2002). This study hypothesized that children's ToM development is related to their gender-typed development because concepts in both areas engage similar social-cognitive processes that develop later and

are more complex than false belief understanding. This being the case, the current study measured ToM development with tasks that assessed knowledge of social perspective taking and interpretive ToM because it is expected that both concepts share similar social-cognitive processes with particular gender-typed concepts. Before the specific gender-typed concepts are introduced, social perspective taking and interpretive ToM will be further discussed.

*Social perspective taking.* Social perspective taking combines cognitive and affective skills, requiring children to assess both another person's knowledge and emotions (Chandler, 1973). Young children typically have trouble taking another person's perspective into account because they are likely to think egocentrically about the world, seeing things only in terms of their own perspective (Chandler, 1973). Egocentric thought can be socially stifling because it can lead children to misinterpret another person's actions and reactions that differ from their own. Social interaction has been shown to be very influential in gradually weakening children's egocentric thought, allowing them to broaden their views of perspective and infer other people's thoughts, attitudes, emotions, and intentions (Chandler, 1973; Kurdek, 1977; Kurdek & Rodgon, 1975). Being able to assess another person's perspective is a major developmental progression in children's ToM understanding that increases with age and experience in interacting with others (Carpendale & Lewis, 2004). For instance, 3-year-olds realize that a picture needs to be turned around for a facing person to see; 4-year-olds understand that a picture will look different for a person depending on the picture's orientation; and 5-year-olds recognize that another person can be misled by a false belief (Carpendale & Lewis, 2006). However, it is not until children are about 6 years of age that they begin to

fully understand the complex cognitive and affective nature of social perspective taking (Chandler & Greenspan, 1972).

In the current study, social perspective taking was measured with Chandler's (1973) bystander task. In the bystander task, participants are shown a cartoon series where the main character's resulting actions and feelings can only be determined through knowledge of antecedent events. Halfway through the cartoon, a bystander enters who witnesses the main character's resulting behaviour, but has no knowledge of the main character's prior actions. For example, one cartoon shows a little girl who is sad when her snowman melts. Later, the girl goes to the bakery and begins to cry when the baker offers her snowmen-shaped cookies. Participants are asked to explain the story from the bystander's perspective in order to see if they understand that the bystander has no knowledge of the antecedent event. In other words, participants must put aside the main character's fully informed perspective and understand that the bystander has a less informed perspective.

One might argue that Chandler's (1973) bystander task provides a similar measure of ToM performance to that of a standard false belief task because both tasks require children to distinguish between two different perspectives about the same situation. For example, consider the false belief task introduced by Wimmer and Perner (1983), where participants are told a story about a character named Maxi who puts a chocolate bar in the cupboard and then goes outside to play. While Maxi is away, his mother moves the chocolate from the cupboard to a new location. The mother then leaves the kitchen, and Maxi returns to eat his chocolate. Participants are asked where Maxi will look for the chocolate (i.e., the cupboard) and where the chocolate really is (i.e., the new

location). In order to understand Maxi's false belief about the chocolate, participants must take Maxi's less informed perspective and disregard their own fully informed perspective. Similarly, in the bystander task, participants must take the bystander's less informed perspective and disregard the main character's fully informed perspective. Despite the cognitive similarity between both tasks, children tend to have difficulty understanding social perspective taking for at least one year after achieving false belief understanding (Astington, 1993; Chandler & Greenspan, 1972). Social perspective taking may be more difficult than false belief understanding because of the amount of skill that the task demands. While both the social perspective taking task and the false belief task require similar cognitive skill (i.e., switching perspectives), the social perspective taking task requires additional affective skill (i.e., emotion understanding) that the standard false belief task lacks. Wellman and Liu (2004) found that children had greater difficulty with a false belief task that required judgment of how a person would feel than with a standard false belief task. Similarly, the affective nature of the social perspective taking task may account for its greater degree of difficulty over the standard false belief task.

*Interpretive theory of mind.* Interpretive ToM requires that children understand that two or more different people can reach different conclusions even when provided with the same information (Carpendale & Chandler, 1996; Chandler & Lalonde, 1996). For instance, children with an interpretive understanding of mind recognize that two people can look at the same abstract painting in a museum and arrive at different ideas about the painting's meaning. Past ToM research has occasionally made claims that children with an understanding of false belief also have an understanding of interpretation (Perner & Davies, 1991). However, a distinction between false belief knowledge and

interpretive ToM knowledge is necessary because a qualitative difference in cognitive complexity exists between the two concepts. Standard false belief tasks do not *fully* assess knowledge of interpretation because, in a standard false belief task, one party lacks information of which another party is aware. Once again, consider Wimmer and Perner's (1983) false belief task about Maxi. To pass the task, a participant must realize that Maxi has a false belief about the location of the chocolate because, unlike the participant, Maxi does not have the required information to answer correctly. In other words, Maxi and the participant end up forming different beliefs about the location of the chocolate because their answers are based on differing amounts of information. If both parties were provided with the same information, then they would most likely reach the same conclusion about the chocolate (i.e., it is at the new location). Therefore, standard false belief tasks measure the understanding that different beliefs about a situation result because the parties involved have differing amounts of information. Interpretive ToM, however, is *only* acquired when children understand that different beliefs about a situation can result between parties that are privy to the *same* information (Carpendale & Chandler, 1996; Chandler & Lalonde, 1996). Presumably, because interpretive ToM tasks require more complex perspective taking skills, they are found to be more difficult than standard false belief tasks. The majority of 5-year-olds understand false belief, but children are not consistently successful at interpretive ToM tasks until 7 to 8 years of age (Carpendale & Chandler, 1996; Lalonde & Chandler, 2002). False belief understanding may even be considered a prerequisite for interpretive ToM understanding, especially since one way interpretive ToM has been measured in young children is through their

ability to assign two different false beliefs to two different characters who witness the same event (Lalonde & Chandler, 2002).

The current study measured children's interpretive ToM understanding with two different measures. The first interpretive ToM measure was adapted from Carpendale and Chandler's (1996) ambiguous figure task where two puppets make different interpretations of the same abstract picture. In the ambiguous figure task, children are asked if both puppets' interpretations about the picture make sense and what a third person may think the picture looks like. Interpretive ToM was also assessed using Lalonde and Chandler's (2002) interpretive task. In this second task, two puppets are separately shown a small portion of a larger picture, and children are asked to explain what each puppet will think of the picture. Those children who provide different beliefs for each puppet are considered to have an understanding of interpretive ToM.

*Developmental differences between similar theory of mind tasks.* Research shows that children acquire false belief understanding by 5 years of age, but have greater difficulties understanding social perspective taking and interpretive ToM (Astington, 1993; Chandler & Greenspan, 1972; Lalonde & Chandler, 2002). Social perspective taking tasks are similar to standard false belief tasks because both require children to understand that people with differing amounts of information will have different beliefs about the same situation. However, while the social perspective taking task requires cognitive and emotional reasoning, the standard false belief task only requires cognitive reasoning. Therefore, the affective nature of the social perspective taking task is suggested to account for its greater degree of difficulty over the standard false belief task.

The difference between knowledge of social perspective taking and knowledge of interpretive ToM lies in the amount of information that is shared between parties: In the social perspective taking task, the main character is privy to more information than the bystander, whereas in the interpretive ToM tasks, both puppets are privy to the same information. In social perspective taking tasks, participants must understand that a character with full knowledge of past events and a bystander with no knowledge of past events will reach different conclusions about the character's resulting emotional behaviour (Chandler, 1973). In interpretive ToM tasks, participants must understand that two equally informed people could reach different conclusions about the same object or picture (Carpendale & Chandler, 1996; Lalonde & Chandler, 2002). Therefore, to correctly answer the social perspective taking task, participants are required to shift from the main character's fully informed perspective to the bystander's less informed perspective, whereas in interpretive ToM tasks, participants are required to shift between two puppets' equally informed perspectives. In both cases, participants must understand that two different conclusions need to be made, but this understanding is more salient in a situation where two people differ along lines of information (i.e., in the social perspective taking task).

For example, consider a situation where two people are looking at an abstract picture of a red rectangle. When both people have the same information about the picture, it requires more effort to construct or acknowledge two different ways in which each person may view the picture (e.g., as a box and as a book) than to think that both people would believe the picture looks like the same thing (e.g., a red rectangle). However, suppose that one of the two people painted the picture with the intention of painting a

box; the painter would now have more information about the picture than the other observer. It would now be easier to understand that the painter thinks the picture looks like a box, whereas the other observer thinks the picture looks like a red rectangle. In other words, additional information makes it easier to understand that two different people can reach different conclusions about the same situation. According to this line of reasoning, an understanding of interpretive ToM appears to be more cognitively complex than understanding social perspective taking. However, research also shows that there is greater variability in performance on social perspective taking tasks than on interpretive ToM tasks. While children tend to develop interpretive ToM understanding between 7 and 8 years of age (Carpendale & Chandler, 1996; Lalonde & Chandler, 2002), children develop an understanding of social perspective taking between 6 and 10 years of age (Chandler, 1973; Chandler & Greenspan, 1972). Therefore, individual differences in ToM development can create difficulties in predicting the developmental progression of social perspective taking and interpretive ToM understanding. The present study attempted to account for individual differences in development by basing hypotheses on specific social-cognitive processes involved within social perspective taking and interpretive ToM rather than on age alone.

#### *Gender-Typed Development*

Gender-typing is a continuous developmental process where children gradually gain an understanding of gender-relevant knowledge pertaining to the self and others. Gender-typing is not the same as gender differences, which are how females and males differ in terms of behaviour, traits, and abilities (Ruble et al., 2006). Thus, gender differences may arise in gender-typed development, but gender-typed development does

not exist solely in terms of gender differences. The current study is concerned with the process of gender-typed development and not gender differences. Furthermore, while the term “sex” traditionally refers to the biological categories of female and male, the term “gender” traditionally refers to judgments or inferences about females and males that are influenced or learned by the environment (Shields, 2002). For the sake of clarity, this study describes both biological and learned aspects of females and males with the term “gender.” However, in most cases, concern is with learned judgments of femininity and masculinity.

Similar to ToM development, children develop gender-typed concepts in a relatively consistent progression: Gender identity understanding (categorically labeling self and other as female or male) occurs as early as 2 years of age; gender stability understanding (one’s gender is constant across time) transpires between the ages of 3 and 5 years; gender constancy understanding (one’s gender remains constant with superficial changes in appearance or activity) develops between 5 and 7 years of age; gender stereotypes (widely held beliefs about females and males) are generally well-developed by 5 to 6 years of age; and gender flexibility (leniency of gender stereotypes) begins to increase between 7 and 8 years of age (Hetherington, Parke, & Locke, 1999; Lobel & Menashri, 1993; Ruble et al., 2006). It is important to recognize the progressive nature of gender-typed development. Moreover, multiple tasks measuring different aspects of gender-typing are needed in order to properly measure gender-typed development. This study hypothesized that children’s gender-typed development is related to their ToM development on account of similar social-cognitive process being involved in the acquisition of particular concepts in both areas. Thus, gender-typed development was

measured with tasks that assessed gender constancy, gender stereotypes, and gender flexibility because it is anticipated that these concepts share similar social-cognitive processes with social perspective taking and interpretive ToM. Gender constancy, gender stereotypes, and gender flexibility will be further addressed before the specific relations between the two developmental areas are presented.

*Gender constancy.* Gender constancy is acquired when children understand that one's gender will not change in light of superficial alterations to one's appearance or choice of activity (Martin & Halverson Jr., 1983). Prior to gender constancy, children categorically identify gender (gender identity) and understand that gender is fixed across time (gender stability). Through this stage-like progression of gender constancy, children come to a gradual understanding of the permanency of gender that allows them to become increasingly aware of gender-typed information (Kohlberg, 1966; Ruble et al., 2006). To illustrate the different aspects of gender constancy, consider the following hypothetical statements that might be made by a little boy: "*I am a boy and not a girl*" (gender identity), "*When I grow up, I will be a daddy, but not a mommy*" (gender stability), "*If I were to put on a dress for the school play, I would still be a boy and not a girl*" (gender constancy).

A majority of past studies have assessed gender constancy with either Slaby and Frey's (1975) self-assessment of gender constancy or Emmerich, Goldman, Kirsh, and Sharabany's (1977) perceptual transformation task (e.g., Lobel & Menashri, 1993; Marcus & Overton, 1978). The self-assessment measures gender constancy in the form of a verbal question-and-answer interview, whereas the perceptual transformation task measures gender constancy with the aid of a flipbook that allows the experimenter to alter

the hairstyles and clothing of the people in the pictures. Traditionally, the self-assessment assesses children's gender constancy understanding as it relates to the self, and the perceptual transformation task assesses children's gender constancy understanding in relation to others. The current study used a combination of Slaby and Frey's (1975) self-assessment and Emmerich et al.'s (1977) perceptual transformation task in order to provide a thorough measure of gender constancy that included children's projections of both the self and other.

*Gender stereotypes and gender flexibility.* Gender stereotypes represent widely held, rigid beliefs about appropriate social, mental, and physical characteristics of females and males (Templeton, 1998). Gender flexibility refers to children's acceptance or understanding of information, attitudes, and behaviours that are inconsistent with widely held gender beliefs (Lobel & Menashri, 1993). Gender stereotypes and gender flexibility can be considered opposite ends of the gender-typed spectrum. That is, the more rigid a particular gender belief, the less flexible that belief will be; and the more flexible a particular gender belief, the less rigid that belief will be. For example, a boy with rigid beliefs about gender specific toys will not want to play with a doll because he holds to the gender stereotype that dolls are for girls. However, a boy with flexible beliefs about gender specific toys might be comfortable playing with dolls, even though he knows that playing with dolls is a stereotypically female activity. In most cases, understanding gender flexibility requires greater cognitive complexity than understanding gender stereotypes because one must be aware of gender stereotypes before acknowledging that flexibility exists.

The current study measured gender stereotypes and gender flexibility with two different tasks. The first measure was adapted from Martin's (1989) gender judgment task where participants are provided with examples of children who behave in a gender-consistent, gender-inconsistent, or neutral fashion. Gender beliefs are measured by asking participants to rate and justify their liking of the example children and gender specific toys. Secondly, gender stereotypes and gender flexibility were measured with a gender flexibility interview adapted from Lobel & Menashri (1993). In the gender flexibility interview, participants listen to a short story about a child who enjoys playing with gender-inconsistent toys, but whose parents wish the child to play with gender-consistent toys. Upon hearing the short story, participants are asked to explain and justify a series of open-ended questions concerning gender beliefs about the child's gender-inconsistent behaviour.

#### *Theory of Mind and Gender-Typed Development Relation*

A relation is anticipated between specific levels of understanding in ToM development and gender-typed development because it is expected that these levels of understanding engage similar social-cognitive processes. Throughout the early school years, children's active engagement in social interaction with adults, siblings, and peers provides the opportunity for them to learn and development ToM and gender-typed concepts. Currently, prevailing ToM theories propose that children are baby scientists who create and alter their own theories about mental state awareness and use introspection and imagination in order to reason about mental states (Gopnik & Meltzoff, 1997; Harris, 2000). In addition, prevailing gender-typed theories propose that children passively internalize and observe gender-typed concepts (Fagot, Rodgers, & Leinbach,

2000; Kohlberg, 1966). However, before a child can even begin to reason about or internalize mental concepts and gender-typed concepts, social interaction is needed in order to instruct the child about the *meanings* of mental states and gender-typed concepts (Carpendale & Lewis, 2004). Children are raised in a social context in which they learn through interaction with their parents, siblings, peers, and teachers. The majority of ToM and gender-typed theories place specific focus on the child's private developmental understanding without attributing enough importance to the social elements that exist in the child's environment. Learning is not a private experience, but is aided through communication with others. Mental state talk and gender-typed talk take place in a specific socio-cultural context in which meaning is based on the shared practices that children co-construct with other people (Bussey & Bandura, 2004; Carpendale & Lewis, 2004). Two relevant theories that place emphasis on learning through experiences with others are social-constructivist theory of ToM and gender schema theory.

Social-constructivist theory claims that knowledge of mental states is achieved through children's active social interaction with others (Carpendale & Lewis, 2004). Attachment style, sibling and peer interaction, parent-child talk, and other social processes in a child's social environment have been consistently correlated with ToM development (Carpendale & Lewis, 2006). Engaging in these social processes on an everyday basis provides children with the opportunity to construct an understanding of how the mind works. By interacting and communicating with other people, children actively gain knowledge about mental states and learn that others have desires, beliefs, and perspectives that often differ from their own. Children do engage in private mental state reasoning experiences, such as introspection and imagination, but mental state

meaning must first be learned through interaction with others in the social environment. Therefore, social-constructivist theory states that a gradual understanding of ToM begins from constructive learning experiences that take place in social situations.

Gender schema theory is a constructivist approach to gender-typed development that combines elements of social learning theory (e.g., modeling and reinforcement) and cognitive development theory (e.g., active thinking of the social world). Through experiences with others, children actively form and organize gender schemas: multidimensional cognitive structures of gender-relevant knowledge, beliefs, and attitudes manifested in everyday behaviour (Liben & Bigler, 2002). Gender schemas are used to guide the way gender-typed information is selected, interpreted, and remembered for a child (Templeton, 1998). Generally, children are better able to remember gender-consistent information, and they misinterpret or alter gender-inconsistent information in order to make it gender-consistent (Liben & Signorella, 1993). With increased social interaction and experience, children become motivated to acquire information that is considered socially acceptable and gender-consistent.

Unfortunately, like the majority of gender-typed theories, gender schema theory provides little to no explanation as to why children's gender flexibility increases about 2 years after gender stereotypes become well-developed at 5 and 6 years of age (Trautner et al., 2005). It may be that gender flexibility increases between 7 and 8 years of age because children begin to actively set personal standards on their gender-typed knowledge (Bussey & Bandura, 2004). In other words, social interaction provides children with the opportunity to learn and construct gender schemas, but through cognitive development, children may actively alter gender beliefs to fit their personal

standards. Therefore, a child can personally acknowledge gender flexibility while at the same time choose to behave in a gender stereotypical fashion.

In summary, children are likely to make connections between different aspects of their social lives (Carpendale & Lewis, 2006). Children's ToM development and gender-typed development are aided through the skilled efforts of others in their social network. Social-constructivist theory and gender schema theory both emphasize the importance of active social interaction with others in children's understanding of ToM and gender-typing. Important milestones in the development of ToM and gender-typing are achieved because children participate in shared social interactions in the early school years. It is proposed that this is no coincidence, but that the relation between ToM and gender-typed development is based on similar social-cognitive processes and aspects that are involved in specific transitions in both areas.

The current study predicted three specific developmental relations between ToM development and gender-typed development: 1) Children's knowledge of social perspective taking is related to their understanding of gender constancy; 2) Children's knowledge of social perspective taking is negatively related to their gender stereotype rigidity; 3) Children's knowledge of interpretive ToM is related to their gender flexibility. These relations are expected to hold even after controlling for age, gender, and vocabulary level. That is, the relation between ToM development and gender-typed development should not be reducible to a child's age, gender, or common language demands. Rationale for each hypothesis is separately considered below.

1) A positive relation between children's knowledge of social perspective taking and gender constancy performance was expected because both concepts require children

to inhibit an incorrect, prepotent response in favour of a correct, but weaker response. In order to correctly answer a social perspective taking task, children must disregard the main character's previous actions and understand that the bystander never witnessed the antecedent event. In this case, children must inhibit their fully informed account of the main character and report the bystander's less informed account. Similarly, in order to correctly answer a gender constancy question, children must ignore interference from a picture or a statement and report the underlying gender of the person in the picture. For example, when shown a picture of a girl wearing boys' clothing, children need to inhibit the tendency of responding to the immediate outward appearance (i.e., boy) and realize that the picture still essentially represents a girl. In this case, children must inhibit a less informed perspective (i.e., the picture looks like a boy) and report their fully informed perspective (i.e., the picture is really a girl). Therefore, children must inhibit a better informed perspective over a less informed perspective for the social perspective taking task, whereas they must inhibit a less informed perspective over a better informed perspective for gender constancy questions. In both cases, children fail because they are unable to disregard interfering information that leads them to an incorrect answer.

2) A negative relation between children's knowledge of social perspective taking and gender stereotype rigidity performance was expected because gender stereotype rigidity is due to a lack of perspective taking and results in children making biased social judgments that are caused by their inability to recognize or disregard their own thoughts and feelings (Chandler, 1973). Thus, higher gender stereotype rigidity was expected to negatively relate to children's ability to consider another person's perspective. Children who fail the social perspective taking task do so because they are unable to ignore their

own prejudicial (i.e., fully informed) account of a situation when determining how the less informed bystander will react. Similarly, children who adhere to gender stereotypes are prejudiced against actions and behaviours that contradict the very gender beliefs they hold. For instance, if told that it is okay for boys to play with dolls, children with rigid gender stereotypes will be less inclined to agree because their strict adherence to gender stereotypes allows for little gender flexibility. In both cases, children think egocentrically and are unable to ignore their own biased beliefs in order to make a clear understanding of the present situation.

3) A positive relation between children's interpretive ToM understanding and gender flexibility was expected because both concepts require the ability to flexibly integrate conflicting beliefs in a situation where multiple solutions potentially exist. On an interpretive ToM task, children must understand that an object may have particular meaning, but that two people can reach different conclusions about the object. For example, two people can look at a cube, and one person may think that the cube is a box while the second person thinks the cube is a small table. Similarly, to acknowledge gender flexibility, children must understand that a rigid gender belief is traditionally relevant for one gender, but can be applicable to both females and males. For instance, a girl with gender flexibility will understand that playing with toy cars is a stereotypically male activity, but that it is also okay for girls to play with toy cars as well. Therefore, both interpretive ToM tasks and gender flexibility questions require children to extensively think about situations where one answer will suffice, but more than one correct answer is possible.

While these three hypotheses are strongly based on children's cognitive development, active social engagement with others introduces children to the meanings of mental state concepts and gender-typed concepts. Through social interaction, children are inevitably involved in perspective taking with the person or persons they are currently engaged with. As children acknowledge multiple perspectives, they are more likely to consider another person's perspective rather than solely consider their own egocentric perspective. In addition, with increased social interaction, children will come to see that people are generally female or male, remain female or male over multiple encounters, and can imitate the other gender without permanent consequences. Social interaction also guides the way children actively accept, reject, and interpret knowledge and attitudes about gender beliefs. Children are only able to reason about ToM concepts and gender-typed concepts once the other people in their social environment have presented the meanings of these concepts.

#### Method

##### *Participants*

Twenty 5-year-olds (12 females;  $M = 65$  months,  $SD = 3.10$ , range = 60 to 71 months), fifteen 6-year-olds (8 females;  $M = 77$  months,  $SD = 2.92$ , range = 73 to 83 months), and nine 7-year-olds (3 females;  $M = 89$  months,  $SD = 4.07$ , range = 84 to 95 months) participated in the study for a total of forty-four children (23 females;  $M = 74$  months,  $SD = 9.95$ , range = 60 to 95 months). Participants were recruited from preschools, private schools, and after-school programmes in a metropolitan area of southwestern Canada. Formal demographic information was not collected, but the sample was representative of school populations that were primarily white and of middle-class

socioeconomic status. Informed consent was obtained from supervisors or principals of participating centres and from all parents of participating children. The experimenter also sought additional assent from each child before the start of the test session by asking, “*Is it all right for me to show you some pictures and ask you some questions?*” No children declined consent. Each test session was audio taped and lasted approximately 30 minutes.

#### *Procedure*

Participants were tested individually at their corresponding preschools, schools, or after-school programmes by one male experimenter. Care was taken to conduct the procedure in a quiet space in order to discourage distraction for both the participant and the other children at the centre. Eight empirical tasks were administered in the following fixed order: social perspective taking task (a), perceptual gender constancy interview, ambiguous figure interpretive ToM task, gender judgment task, social perspective taking task (b), gender flexibility interview, doodle interpretive ToM task, and the Peabody Picture and Vocabulary Test, 3<sup>rd</sup> edition (PPVT-3). Complete scripts for all of the tasks (excluding the PPVT-3) can be found in the Appendix.

A fixed task order was chosen in order to separate tasks of similar cognitive demand and, thereby, reduce practice effects while hopefully conserving participants’ attention and interest in the tasks. Task order was not counterbalanced or randomized because the study was interested in the relations between variables rather than individual mean differences (for further justification, see Carlson & Moses, 2001).

#### *Measures*

##### *Theory of Mind Measures*

*Social perspective taking task.* The social perspective taking task was adapted from Chandler (1973). Materials for the task included an eight-frame cartoon where a character's resulting behaviour was determined by and fully understood only in terms of the preceding events that took place. For example, one cartoon consisted of a little girl who built a snowman, but became sad once the snowman started to melt. The girl then walked to a bakery where the baker (i.e., bystander) brought out cookies shaped like snowmen. Upon seeing the snowmen cookies, the little girl began to cry because the cookies reminded her of her snowman that had melted earlier that day. In order to successfully pass the task, children had to understand that even though they themselves knew that the girl was reminded of her melted snowman, the baker had no such knowledge.

Participants were first asked to go through each frame of the cartoon and explain the events, making sure particular attention was paid to how the main character was feeling. If participants did not explain the appropriate cause for the main character's resulting behaviour (e.g., "The girl is sad because of her melted snowman"), then that detail was specifically brought to their attention by the experimenter. Next, participants were asked to describe the cartoon as told by the late-arriving bystander, who witnessed the main character's resulting behaviour, but remained uninformed of the antecedent events. Participants were then asked to provide a possible explanation for the main character's resulting behaviour as determined by the bystander. A second cartoon about a little boy playing baseball succeeded the gender judgment task and was administered in the same format as described above (see Appendix). The order of the two social perspective taking tasks was counterbalanced.

Responses to the bystander's explanation were scored in terms of egocentric intrusion, modifying the original 5-point scale developed by Chandler (1973) to a more conservative 3-point scale. A score of "0" was assigned to participants who accredited the bystander with clear knowledge of the antecedent event (e.g., "The baker thinks she's crying because the cookies remind the girl of her snowman"). A score of "1" was assigned to participants who accredited the bystander with probable knowledge of the antecedent event (e.g., "The baker would *probably* think she is reminded of her snowman") or who accredited the bystander with knowledge of the antecedent event along with non-egocentric alternatives (e.g., "The baker would say that she doesn't want a cookie, or that she is reminded of her snowman, or something"). A score of "2" was assigned to participants who made clear non-egocentric statements (e.g., "The baker would think that she doesn't have any money, or he doesn't know why she's sad").

*Ambiguous figure interpretive theory of mind task.* The ambiguous figure interpretive ToM task was adapted from Carpendale and Chandler (1996). Materials for the task included three puppets and an 8½ in. by 11 in. picture of a red, three-dimensional rectangle. Two of the puppets were introduced as friends who were at a museum looking at the picture of the red rectangle. One puppet thought that the picture looked like a book, whereas the second puppet thought that the picture looked like a box. Participants were first asked to state and explain if it was okay for the two puppets to have different opinions about the picture (explanation question). The experimenter then repeated both puppets' beliefs about the picture, and participants were asked what a non-present, mutual friend of the two puppets would think about the picture (prediction question). If participants answered the prediction question with either "book" or "box," then they were

asked a follow-up question explaining how they could tell what the friend would think. If participants responded with "I don't know" to either the prediction question or the follow-up question, then they were asked why it was hard to tell what the friend would think. For a control question, a third puppet was introduced who thought that the picture looked like a telephone, and participants were asked to state and explain if the third puppet's opinion about the picture was valid (deviant interpretation).

Participants received a pass (1) or fail (0) score for the explanation question, the prediction question, and the deviant interpretation. Correct responses to the explanation question stated that both puppets' interpretations were suitable due to the picture's ambiguity (e.g., "Because the picture looks like both of those things"). Failed responses to the explanation question did not explain that the difference in interpretation was due to the ambiguous nature of the picture or declared that it was impossible for both puppets to have different interpretations. Participants passed the prediction question if they responded in one of the following three ways: 1) They stated and explained why they did not know what the friend would think; 2) They said that both choices (i.e., book and box) were acceptable; 3) They responded with a unique interpretation that differed from both puppets' interpretations. Participants failed the prediction question when they said that the friend would think the picture was a book, a box, or were unable to explain why a distinct choice could not be made. The deviant interpretation was used as a control item to ensure that participants understood the ambiguous nature of the task. Participants received a passing score if they said that the deviant interpretation did not make sense and then went on to explain the puppet's lack of reason (e.g., "Telephones aren't square, so it couldn't be that"). Participants failed the deviant interpretation when they claimed

that the puppet's response was valid or were unable to explain why the puppet's response did not make sense.

*Doodle interpretive theory of mind task.* Adapted from Lalonde and Chandler (2002), materials for the doodle interpretive ToM task included two puppets, two 8½ in. by 11 in. cover papers, and two black and white 8½ in. by 11 in. doodles. Originally created by cartoonist Roger Price (1953), doodles are drawings that are initially ambiguous until the viewer is provided with further context in order to discern the picture's true meaning. In this task, a doodle consisted of a small snapshot of a full-size drawing (see Illustration 1). The task began with the introduction of the two puppets. It was explained that when the puppets were under the table, they could not hear nor see what was happening above the table. When the experimenter was confident that participants understood the laws of the task, both puppets were placed under the table, and participants were asked to describe a full-size doodle (e.g., a drawing of a pig). If participants failed to adequately describe the part of the doodle that would later be visible for the puppets (e.g., the pig's snout), then the experimenter specifically made reference to that particular part of the doodle. The doodle was then covered with a piece of paper that contained a 1 in. by 1 in. window through which a small section of the full-size doodle could be viewed. All participants were administered the same restricted view, which did not provide enough visual information for an outside observer to make an accurate prediction of the hidden full-size doodle. The first puppet was then brought above the table. Participants were told that the puppet was seeing the doodle for the first time, and then they were asked to state what the puppet would think about the doodle. The experimenter repeated participants' answers aloud. The first puppet was then placed

back under the table, and the same procedure was followed for the second puppet. A second doodle of a boot immediately followed the pig doodle and consisted of the same procedure as described above. The order of the pig and boot doodles was counterbalanced.

Responses were coded as false beliefs, reality errors, or contamination errors. False belief was assigned to responses that provided no obvious connection to the unrestricted view of the doodle (e.g., "The puppet will think it [i.e., a pig] is a bottle on its side"). A response was coded as a reality error when an obvious connection to the unrestricted view was made (e.g., "The puppet will think it [i.e., a pig] is a pig"). If a response made no obvious connection to the unrestricted view, but still had some sort of connection to the unrestricted view, it was coded as a contamination error (e.g., "The puppet will think it [i.e., a pig] is an animal's nose"). Participants who provided a unique false belief response for both puppets were classified as having an interpretive ToM and given a score of "1." Identical false belief responses and responses coded as reality errors or contamination errors were classified as non-interpretive and given a score of "0."

#### *Gender-Typed Measures*

*Perceptual gender constancy interview.* The gender constancy interview was adapted from Emmerich et al. (1977) and included three self-gender constancy questions from Slaby and Frey (1975). Materials for the perceptual gender constancy interview included five 5 in. by 8 in. drawings of a girl and five 5 in. by 8 in. drawings of a boy whose motives, actions, clothing, and hairstyles were modified to resemble stereotyped characteristics of boys and girls, respectively. For example, one drawing depicted a girl wearing boys' clothes, and participants were asked if wearing boys' clothes would make

her a girl or a boy. All participants received a 5-question girl stimulus, a 5-question boy stimulus, and a 3-question self-stimulus (see Appendix). The order of the girl stimulus and boy stimulus was counterbalanced, and the self-stimulus was always administered last.

Participants received three stimuli set scores. Responses that represented a clear understanding of gender constancy were given a passing score of "1." For example, when shown the picture of a girl wearing boys' clothes, participants had to say that she would still be a girl in order to receive a passing score. All other unclear responses received a failing score of "0." The first two questions of the self-stimulus consisted of a question and a counter question, both of which had to be answered correctly in order to receive a passing score.

*Gender judgment task.* The gender judgment task was adapted from Martin (1989) and used in order to measure children's knowledge of gender stereotypes and gender flexibility. Materials for the task included four 5½ in. by 8½ in. target pictures (2 girls, 2 boys), four 5½ in. by 8½ in. pictures of gender specific toys (2 feminine, 2 masculine), and an 8½ in. by 11 in. rating chart. All target descriptions began with a standard introduction that provided the target's name, age, and gender. The age of the target always corresponded to the age of the participant. After the standard introduction, participants were given a description of the target that was gender-consistent, gender-inconsistent, or neutral (see Appendix). The gender-consistent description specified the target as having a same-gender best friend and interest in a gender-consistent toy (e.g., "Tommy's best friend is a boy, and Tommy likes to play with toy cars"). The gender-inconsistent description classified the target as having an opposite-gender best friend and

interest in a gender-inconsistent toy (e.g., "*Tommy's best friend is a girl, and Tommy likes to play with dolls*"). The neutral description consisted of only the standard introduction. The majority of participants received all three of the target descriptions in one of the following four counterbalanced orders: 1) Male consistent, female neutral, male inconsistent; 2) Male inconsistent, female neutral, male consistent; 3) Female consistent, male neutral, female inconsistent; 4) Female inconsistent, male neutral, female consistent. Because the decision to use the four counterbalanced orders resulted after testing had already begun, four participants ended up receiving randomized target orders. The four counterbalanced orders were chosen in order to conserve task time and provide a balance between gender stereotypes and gender flexibility.

After the description of each target, participants were asked to rate and justify the target on the following three accounts of popularity: participant's own liking of the target, how much other boys would like the target, and how much other girls would like the target. Participants rated the targets by pointing to a chart that depicted three drinking glasses with corresponding levels of liquid labeled "not at all", "a bit", and "a lot." Participants' justifications were also recorded. The full description of the target was then repeated, and participants were asked to rate and justify how much the target liked to play with the following four toys pictured on separate cards: car, train engine, sewing machine, and doll. Although the toys were not formally pre-tested for gender specificity, Martin (1989) previously found that a majority of 4- to 7-year-olds classified the car and train engine as masculine toys and the sewing machine and doll as feminine toys. Participants rated the toys with the same chart that was used to rate the targets, and justifications were once again recorded. This procedure was repeated for all three targets.

Coding for participants' answers was conducted in the same fashion as Damon (1977) determined for his gender flexibility interviews. Responses were scored on one of three levels ranging from 0 to 2. Level 0 answers conformed to participants' own desires, where no rule or convention of gender beliefs was stated. For example, a Level 0 answer consisted of the following: *How much do you like [target's name]?* "A bit." *Why?* "Because I just do." Level 1 answers conformed to gender stereotypical rules and conventions. A Level 1 answer for the gender-inconsistent condition was similar to the following: *How much do you like [target's name]?* "Not at all." *Why?* "Because he (she) does girl (boy) things." Level 2 answers reflected understanding that social regulations about gender stereotypes do not always have to be compulsory. An example of a Level 2 answer for the gender-inconsistent condition was: *How much do you like [target's name]?* "A lot." *Why?* "Because it is alright for him (her) to like girl (boy) things; he (she) does what he (she) likes to do." To summarize, Level 0 responses were classified as neutral, Level 1 responses favoured gender stereotypes, and Level 2 responses acknowledged gender flexibility.

*Gender flexibility interview.* The gender flexibility interview was based on interviews conducted by Damon (1977) and was similar to the gender flexibility interview administered by Lobel and Menashri (1993). Materials for the interview consisted of three 8½ in. by 11 in. pictures of a boy with stereotypically female toys and three 8½ in. by 11 in. pictures of a girl with stereotypically male toys. To begin, male participants were told a brief story about a boy who liked to play with dolls, but whose parents wished him to play with toy trucks and model airplanes. Female participants were told a similar story about a girl who liked to play with toy trucks, but whose parents

wished her to play with dolls (see Appendix). As the story was told, three descriptive drawings were shown to participants so that the information in the story could be easily remembered. The three drawings remained in front of participants as a set of five open-ended questions were asked concerning the story character's appropriate means of action and behaviour regarding the choice of toys. For example, male participants were asked, "What will happen to [boy character] if he keeps playing with dolls?"

Participants' responses were scored on one of three levels ranging from 0 to 2 and interpreted in the same manner as the gender judgment task above (Damon, 1977). Level 0 answers once again conformed to participants' own desires, where no rule or convention of gender beliefs was stated. For example, a Level 0 answer consisted of the following: *What should Greg do?* "Play with dolls." *Why?* "Because he wants to." Level 1 answers conformed to gender stereotypical rules and conventions. A Level 1 answer was similar to the following: *What should Greg do?* "He should stop playing with dolls." *Why?* "Because he should not play with girls' toys." Level 2 answers reflected understanding that social regulations about gender stereotypes do not always have to be compulsory. An example of a Level 2 answer was: *What should Greg do?* "He should play with both sets of toys." *Why?* "Because he likes girls' toys, but he doesn't want to upset his parents either." Once again, Level 0 responses were classified as neutral, Level 1 responses favoured gender stereotypes, and Level 2 responses acknowledged gender flexibility.

#### *Language Assessment*

*Peabody Picture and Vocabulary Test, 3<sup>rd</sup> Edition.* To control for language development, participants were administered the PPVT-3 as developed by Dunn and

Dunn (1997). The PPVT-3 has been shown to correlate highly with ToM performance (Cutting & Dunn, 1999) and full-scale verbal intelligence measures, such as the revised Wechsler Preschool and Primary Scales of Intelligence (Carvajal, Parks, Logan, & Page, 1992). The procedure consisted of the experimenter reading aloud a word, whereby participants were asked to select one picture out of four that best represented the word. Participants were administered 12-word sets that gradually increased in vocabulary difficulty. The task ended when participants made 8 errors on any one 12-word set. Participants' raw vocabulary scores were used for the analyses. Raw scores were computed by subtracting the total number of overall errors from the ceiling item on the last completed set.

### Results

This thesis examined the following three hypotheses about the developmental relation between ToM development and gender-typed development: 1) Children's knowledge of social perspective taking is related to their understanding of gender constancy; 2) Children's knowledge of social perspective taking is negatively related to their gender stereotype rigidity; 3) Children's knowledge of interpretive ToM is related to their gender flexibility. Each hypothesis will be addressed following the presentation of descriptive statistics of the data and correlations among, on the one hand, ToM measures, and, on the other hand, gender-typed measures.

Table 1 displays means and standard deviations for ToM and gender-typed measures by age group, median age split, and gender. For the sample as a whole, performance and descriptive statistics are displayed for ToM measures in Table 2 and for gender-typed measures in Table 3. Table 4 displays descriptive statistics for language

assessment by age group and the sample as a whole. Zero-order correlations among ToM measures are presented in Table 5, and zero-order correlations among gender-typed measures are presented in Table 6.

Social perspective taking was measured with the snowman task ( $M = 0.95$ ,  $SD = 0.99$ ) and the baseball task ( $M = 1.14$ ,  $SD = 0.91$ ). Due to a significant positive correlation between both social perspective taking tasks ( $r = .50$ ,  $N = 44$ ,  $p < .01$ , two-tailed), an aggregate score for social perspective taking was created ( $M = 1.07$ ,  $SD = 0.79$ ). Participants who failed both social perspective taking tasks received an aggregate score of "0." Participants who passed one social perspective taking task, but failed the other received an aggregate score of "1." Participants who passed both social perspective taking tasks received an aggregate score of "2."

The ambiguous interpretive ToM task consisted of an explanation question ( $M = 0.64$ ,  $SD = 0.49$ ), a prediction question ( $M = 0.59$ ,  $SD = 0.50$ ), and a deviant interpretation control question ( $M = 0.98$ ,  $SD = 0.15$ ). One 5-year-old participant failed the deviant interpretation by agreeing that the picture looked like a telephone without providing a reason as to why. This participant was dropped from analyses involving ambiguous interpretive ToM scores. A bivariate Pearson correlation analysis found a significant positive relation between the explanation question and prediction question ( $r = .43$ ,  $N = 43$ ,  $p < .01$ , two-tailed). Thus, the explanation question and prediction question were aggregated to create an overall ambiguous interpretive ToM score ( $M = 1.23$ ,  $SD = 0.84$ ). Participants who failed both the explanation and prediction questions received an aggregate score of "0." Participants who passed only the explanation question (i.e., failed the prediction question) or only the prediction question (i.e., failed the explanation

question) received an aggregate score of “1.” Participants who passed both the explanation and prediction questions received an aggregate score of “2.” In addition, the doodle interpretive ToM task consisted of a pig doodle ( $M = 0.52$ ,  $SD = 0.51$ ) and a boot doodle ( $M = 0.64$ ,  $SD = 0.49$ ). Because a significant positive correlation was found between the two doodle examples ( $r = .60$ ,  $N = 44$ ,  $p < .01$ , two-tailed), both doodle example scores were aggregated to create an overall doodle interpretive ToM score ( $M = 1.16$ ,  $SD = 0.89$ ). Participants who failed both doodle examples received an aggregate score of “0.” Participants who passed one doodle example, but failed the other received an aggregate score of “1.” Participants who passed both doodle examples received an aggregate score of “2.” Surprisingly, no significant correlation was found between the overall ambiguous interpretive ToM score and the overall doodle interpretive ToM score ( $r = .14$ ,  $p > .05$ ). Because both interpretive ToM tasks were not significantly related, both tasks were analysed separately.

The perceptual gender constancy interview consisted of a girl stimulus ( $M = 3.45$ ,  $SD = 1.80$ ), a boy stimulus ( $M = 3.20$ ,  $SD = 1.86$ ), and a self-stimulus ( $M = 2.16$ ,  $SD = 1.10$ ). Significant positive correlations were found between all three stimuli sets ( $r$  (girl, boy) =  $.92$ ,  $N = 44$ ,  $p < .01$ ;  $r$  (girl, self) =  $.79$ ,  $N = 44$ ,  $p < .01$ ;  $r$  (boy, self) =  $.75$ ,  $N = 44$ ,  $p < .01$ ), and scores were added to create an overall gender constancy score ( $M = 8.82$ ,  $SD = 4.49$ ). Table 7 displays zero-order correlations between aggregate ToM scores and aggregate gender-typed scores.

For the gender judgment task, responses were coded as neutral ( $M = 6.18$ ,  $SD = 3.74$ ), favouring gender stereotypes ( $M = 10.07$ ,  $SD = 3.43$ ), or acknowledging gender flexibility ( $M = 4.73$ ,  $SD = 2.19$ ). In addition, participants received one of four

counterbalanced target orders. A bivariate Pearson correlation analysis found no significant relation between target order and neutral responses ( $r = .03, p > .05$ ), gender stereotyped responses ( $r = -.07, p > .05$ ), and gender flexibility responses ( $r = .04, p > .05$ ), suggesting that target order did not influence a specific gender response. Responses on the gender flexibility interview were also coded as neutral ( $M = 1.20, SD = 1.00$ ), favouring gender stereotypes ( $M = 1.20, SD = 1.41$ ), or acknowledging gender flexibility ( $M = 2.59, SD = 1.60$ ). Although equivalent responses on the gender judgment task and the gender flexibility interview were significantly correlated (i.e., neutral with neutral, stereotyped with stereotyped, and flexibility with flexibility), significant relations between neutral, gender stereotyped, and gender flexibility responses differed between the gender judgment task and the gender flexibility interview (see Table 6). For example, while a significant negative correlation existed between stereotyped responses and flexibility responses on the gender flexibility interview, a similar significant relation was not found on the gender judgment task. Because equivalent relations between responses were not found on the gender judgment task and the gender flexibility interview, both tasks were analysed separately.

The first hypothesis addressed whether children's knowledge of social perspective taking is related to their understanding of gender constancy. First, a bivariate Pearson correlation analysis found a significant positive relation between overall gender constancy and overall social perspective taking ( $r = .36, N = 44, p < .05$ ). In order to further examine this relation, a hierarchical regression analysis was conducted. Age, gender, and vocabulary level were entered in the first block, overall social perspective taking was entered in the second block, and overall gender constancy was used as the

dependent variable. The results of the analysis are presented in Table 8. As predicted, the final model was significant,  $F(4, 38) = 4.66, p < .05, R^2 = .17$ . In addition, there was a 10% change in  $R^2$  for the final model after the control variables were entered. Moreover, the adjusted  $R^2$  of the final model indicated that overall social perspective taking accounted for 8% of the variance in overall gender constancy.

The second hypothesis addressed whether children's knowledge of social perspective taking is negatively related to their gender stereotype rigidity. A bivariate Pearson correlation analysis found no significant relation between overall social perspective taking and gender judgment stereotyped responses ( $r = .02, p > .05$ ) or gender interview stereotyped responses ( $r = -.16, p > .05$ ). Because significant correlations were not found, further analyses were not conducted.

The final hypothesis addressed whether children's knowledge of interpretive ToM is related to their gender flexibility. Regarding overall ambiguous interpretive ToM, no significant correlations were found between gender judgment flexibility responses ( $r = .04, p > .05$ ) or gender interview flexibility responses ( $r = .15, p > .05$ ). Furthermore, no significant correlations were found between overall doodle interpretive ToM and gender judgment flexibility responses ( $r = -.03, p > .05$ ) or gender interview flexibility responses ( $r = -.00, p > .05$ ). Because significant correlations were not found, further analyses were not conducted.

## Discussion

This study paired particular ToM and gender-typed concepts in order to empirically examine the developmental relation between both areas. The few studies that have focused on the relation between ToM and gender-typing have produced mixed

results (Bosacki & Moore, 2004; Trautner et al., 2003). The current study attempted to clarify the developmental relation between ToM and gender-typing by administering multiple tasks in each area. Three specific hypotheses were tested: 1) Children's knowledge of social perspective taking is related to their understanding of gender constancy; 2) Children's knowledge of social perspective taking is negatively related to their gender stereotype rigidity; 3) Children's knowledge of interpretive ToM is related to their gender flexibility. While the first hypothesis was supported, the latter two hypotheses were not. Findings pertinent to the three hypotheses will be discussed in turn. Future research and limitations of the current study will then be considered.

In support of the first hypothesis, the main finding of the present study was that children's knowledge of social perspective taking predicted gender constancy performance. This finding is consistent with Trautner et al.'s (2003) finding that children's knowledge of the appearance-reality distinction is related to gender constancy understanding. Moreover, social perspective taking accounted for 8% of the variance over and above age, gender, and vocabulary level. That is, this finding suggests that the relation between social perspective taking and gender constancy is not reducible to a child's age, gender, or common language demands. Instead, it has been proposed that the relation between social perspective taking and gender constancy is due to the fact that both social perspective taking and gender constancy require children to actively inhibit an incorrect, prepotent response in favour of a correct, weaker response. In the social perspective taking task, children must inhibit their fully informed account and report another person's less informed account. In the gender constancy interview, children must inhibit the superficial outward appearance or activity of a person and report the

underlying gender of that person. Future studies should assess the viability of this proposal by including a measure of inhibition. If the proposal is correct, then inhibition should at least partially mediate the relation between social perspective taking and gender constancy.

Moreover, it is suggested that children's gradual cognitive understanding of social situations additionally structures the relation between social perspective taking and gender constancy. Social interaction is influential in gradually weakening children's egocentric thought, thereby fostering social perspective taking performance (Carpendale & Lewis, 2004; Kurdek & Rodgon, 1975). Children also form cognitive schemas about gender constancy through social interaction with others (Liben & Bigler, 2002). In other words, children rely on social experiences in order to cognitively assess gender constancy understanding. Thus, children's gender constancy understanding is likely to increase with increased social interaction. ToM and gender-typing may be distinct developmental areas, but both are contained in the broad category of children's social lives. Therefore, advances in one area of development have the potential to promote advances in the other area through the common bond of social interaction. In addition to separately studying developmental areas, the relation between social perspective taking and gender constancy provides empirical support for the importance in considering how multiple developmental areas are connected in fostering children's overall social understanding.

It might be useful for future studies to examine the importance of the emotional component of social perspective taking in its relation to gender constancy understanding. It is suggested that the affective nature of the social perspective taking task adds to its difficulty in comparison to a standard false belief task. While both ToM tasks measure

the understanding that two parties with differing amounts of information will reach different conclusions, the social perspective taking task requires an additional aspect of emotion understanding. Therefore, the emotional component of social perspective taking may account for its relation to gender constancy understanding. Future studies might further examine this expectation by testing for a relation between false belief and gender constancy. Such a relation may suggest that emotion understanding is not necessary for gender constancy understanding.

In contrast to the second hypothesis, children's knowledge of social perspective taking was unrelated to their gender stereotype rigidity. A negative relation was originally expected on account of children's inability to disregard their own biased, egocentric beliefs, but this was not the result for stereotyped responses on both the gender judgment task and the gender flexibility interview. Although this finding was unexpected, it does support Bosacki and Moore's (2004) finding that children's emotion understanding is unrelated to gender stereotype reports. In the current study, participants provided their own gender stereotyped responses, whereas Bosacki and Moore (2004) relied on parental reports of their children's gender stereotypes. Therefore, both child and parent reports of gender stereotype rigidity have not been linked to children's ToM development. Future studies might be interested in measuring the correlation between child and parent reports of gender stereotype rigidity.

One reason for the lack of a relation between social perspective taking and gender stereotype rigidity may be linked to a difference between gender belief knowledge and gender belief attitude. Gender belief knowledge implies that an understanding of a particular gender belief (i.e., gender stereotype or gender flexibility) exists, whereas

gender belief attitude implies one's personal acceptance of a particular gender belief (Ruble et al., 2006). Thus, one can be knowledgeable about gender flexibility while at the same time personally accepting of gender stereotype. For example, a girl can understand that it is okay for girls to play with toy cars (gender flexibility *knowledge*), but personally refuse to play with a toy car on account that it is a stereotypically male toy (gender stereotype *attitude*). It may be the case that gender belief attitudes were not fully assessed by the gender judgment task and the gender flexibility interview because the majority of the questions concerned a story character's gender beliefs rather than participants' own gender beliefs. Therefore, participants' gender stereotyped scores may have been inadvertently based on gender stereotype knowledge instead of gender stereotype attitudes. Furthermore, gender belief knowledge and gender belief attitudes may potentially progress along separate developmental paths rather than one developmental path. That is, children's level of gender belief knowledge may not necessarily reflect their level of gender belief attitudes. Future research should be cautious of this distinction and include questions concerning both knowledge and attitudes of gender beliefs.

The current study's lack of questions concerning gender belief attitudes may also be the reason for why, in contrast to the third hypothesis, a relation was not found between interpretive ToM understanding and gender flexibility. The original justification for a positive relation was based on the account that both interpretive ToM and gender flexibility require children to flexibly incorporate conflicting beliefs in a situation where multiple solutions potentially exist. However, neither interpretive ToM task was significantly correlated with participants' gender flexibility responses on either the gender judgment task or the gender flexibility interview. For one, the insignificant

relation between interpretive ToM and gender flexibility may be due to a lack of gender-typed questions concerning gender belief attitudes. Another reason may be related to inconsistent measures of interpretive ToM because a significant correlation was not found between overall ambiguous interpretive ToM and overall doodle interpretive ToM. This is especially surprising because both tasks acknowledged the same definition of interpretive ToM and have previously found that children achieve an interpretive understanding of the mind by 7 to 8 years of age (Carpendale & Chandler, 1996; Lalonde & Chandler, 2002). In the current study, children performed better on the ambiguous interpretive ToM task ( $M = 1.23$ ,  $SD = 0.84$ ) in comparison to the doodle interpretive ToM task ( $M = 1.16$ ,  $SD = 0.89$ ), but the difference was not significant ( $t = .40$ ,  $p > .05$ , two-tailed). All in all, the lack of correlation between both interpretive ToM tasks may be due to the low number of 7-year-old participants who would have most likely performed better and more consistently on the interpretive ToM tasks in comparison to younger participants. Future research should be conducted in order to fully determine the reliability and validity between the ambiguous interpretive ToM task and the doodle interpretive ToM task.

Unfortunately, the current study is not without limitations. For one, the small sample size may have produced results that were not representative of the population as a whole. Moreover, the low number of 7-year-olds recruited in comparison to 5- and 6-year-olds might have limited the results in terms of developmental progression in each area. Rather than recruiting from preschools, private schools, and after-school programmes, a more consistent sample population might have been obtained through public school recruitment. Findings are also based on cross-sectional data, which creates

difficulty in assessing development because children are only tested at one point in time, and measures are compared across cohorts. Future studies might consider replicating the current study with a longitudinal design, which would allow for an accurate measure of development across time as well as within individuals. The current study may also have been limited by the fact that one male experimenter conducted all of the test sessions. Thus, participants' responses, particularly to the gender-typed measures, may have been influenced by the experimenter's gender. However, this is unlikely because the majority of the gender-typed questions did not personally concern the participants themselves, but rather their opinions about story characters. Therefore, participants were likely to answer gender-typed questions without their own attitudes affecting their responses, regardless of the experimenter's gender. It is suggested that future gender-typed studies include questions that measure both gender belief knowledge and gender belief attitudes, while also counterbalancing the gender of the experimenter.

Overall, the current study provided evidence that a relation exists between children's knowledge of social perspective taking and gender constancy understanding that is not reducible to age, gender, or common language demands. This relation counters prevalent ToM and gender-typed theories that claim that advances in children's social-cognitive development is specific to one particular area of development. Rather, findings support social-constructivist theory and gender schema theory, which both posit that children actively construct cognitive understanding through their everyday social interactions with other people (Carpendale & Lewis, 2004; Liben & Bigler, 2002). Furthermore, the findings from this study are consistent with Trautner et al.'s (2003) findings that children's knowledge of the appearance-reality distinction is related to

gender constancy understanding, and support Bosacki and Moore's (2004) findings that children's emotion understanding is unrelated to gender stereotype reports. However, more research specifically comparing ToM development to gender-typed development is needed to clarify the relation between both areas. It would be valuable to compare ToM and gender-typed development from the preschool years up through adolescence and beyond. Longitudinal research is also needed in order to provide a better understanding of inter- and intra-individual change across both developmental areas. Most importantly, because ToM and gender-typing are both developmental processes with gradual, qualitative advances, future research should focus on testing multiple concepts along the developmental continuum in each area.

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Appendix

*Social Perspective Taking Task*

Snowman cartoon frames:

1. A little girl finishes making a snowman.
2. The little girl frowns as the sun begins to melt the snowman.
3. The little girl becomes progressively sadder as the sun melts the snowman further.
4. The little girl frowns as the snowman is completely melted.
5. The little girl approaches a bakery and smells the air.
6. The little girl walks into the bakery smiling, and the baker greets her.
7. The baker brings out cookies shaped like snowmen, and the little girl expresses shock.
8. The little girl starts crying, and the baker shrugs with a question mark above his head.

Baseball cartoon frames:

1. A little boy stands holding a baseball bat and ball.
2. The little boy swings the bat and hits the ball.
3. The little boy expresses shock as the baseball hits and breaks a car window.
4. The little boy runs home frowning and sweating.
5. The little boy looks worried as he stares out of his house window.
6. The boy's father enters the room and sees his son looking out of the window.
7. The little boy becomes visibly scared as a knock is heard at the door.
8. The little boy runs from the room as the father shrugs his hands in the air.

*Ambiguous Figures Interpreted ToM Task*

Introduce puppets and say, "Molly and Amy are at the museum looking at the picture. After awhile, Amy turns to Molly and says, 'This looks like a picture of a book.' Molly looks at the picture a little longer and then says, 'Hmm, I think this is a picture of a box.'" Ask the explanation question, "Is it okay for Amy to say the picture is a book and Molly to say it is a box? Why is it (isn't it) okay?" Ask the prediction question, "Amy says the picture is of a book, but Molly says it looks like a box. If we show one of their friends the

picture. do you think the friend will think it is a picture of a book, a box, or would you not know what the friend would think?" If the participant responds with either "book" or "box." then ask, "How can you tell what the friend will think?" If the participant answers, "I don't know." to either the prediction question or the follow-up question, then ask, "Why is it hard to tell what the friend will think?" Lastly, ask the deviant interpretation question. "Here is another person named Lisa. Lisa takes a look at the picture, and guess what? She thinks it looks like a telephone. Does it make sense for Lisa to say that, or does it not make sense? Why (Why not)?"

#### *Doodle Interpretive ToM Task*

Introduce puppets by saying, "Pretend that these puppets are real people like you and me. Their names are Fred and Betty. When Fred and Betty are under the table, they can't hear what we're saying, and they can't see what we're doing." Place puppets under the table and ask, "Can they hear us? Can they see us?" in order to verify that the participant understands. With the puppets still under the table, place the picture of the doodle on the table and ask, "What is this a picture of? How can you tell?" If the participant does not make specific reference to the part of the drawing that will later be visible for the puppets, then make sure to point this out to the participant. Continue by saying, "Both Fred and Betty have never seen this picture before. Let's get Fred up here and show him the picture, but we're going to show him the picture like this." Cover the doodle with a piece of paper and restrict the view. Bring the first puppet up from under the table and say, "Now Fred has never seen this picture before. What will Fred say this is?" Repeat the answer aloud and put the first puppet back under the table. Bring the second puppet up from under the table and say, "Now Betty has also never seen this picture before. What will Betty say this is?" Repeat the answer aloud.

#### *Perceptual Gender Constancy Interview*

*Girl stimulus* - With the aid of the girl drawings, the following five questions are asked:

1. If Emily really wants to be a boy, can she be?
2. If Emily played with trucks and did boy things, would she be a girl, or would she be a boy?

3. If Emily puts on boy clothes like this, would she be a girl, or would she be a boy?
4. If Emily has her hair cut short like this, would she be a girl, or would she be a boy?
5. If Emily has her hair cut short like this and wears boy clothes like this, would she be a girl, or would she be a boy?

*Boy stimulus* - With the aid of the boy drawings, the following five questions are asked:

1. If Johnny really wants to be a girl, can he be?
2. If Johnny played with dolls and did girl things, would he be a boy, or would he be a girl?
3. If Johnny puts on girl clothes like this, would he be a boy, or would he be a girl?
4. If Johnny lets his hair grow long like this, would he be a boy, or would he be a girl?
5. If Johnny lets his hair grow long like this and wears girl clothes like this, would he be a boy, or would he be a girl?

*Self-stimulus* - Participants are asked the following three questions about themselves:

1. If you wore [*opposite gender of participant, i.e., "boys" or "girls"*] clothes, would you be a girl or a boy? If you wore [*opposite gender of participant*] clothes, would you be a [*opposite gender of participant's first response*]?
2. If you played [*opposite gender of participant*] games, would you be a girl or a boy? If you played [*opposite gender of participant*] games, would you be a [*opposite gender of participant's first response*]?
3. If we aren't pretending, could you really be a [*opposite gender of participant*] if you wanted to be?

### *Gender Judgment Task*

*Gender-consistent male condition*: "Here is a picture of Tommy. Tommy is a 6-year-old boy who lives with his mother and father. Tommy's best friend is a boy, and Tommy likes to play with toy cars."

*Gender-inconsistent male condition*: "Here is a picture of Tommy. Tommy is a 6-year-old boy who lives with his mother and father. Tommy's best friend is a girl, and Tommy likes to play with dolls."

*Neutral male condition:* “Here is a picture of Tommy. Tommy is a 6-year-old boy who lives with his mother and father.”

*Gender-consistent female condition:* “Here is a picture of Beth. Beth is a 6-year-old girl who lives with her mother and father. Beth’s best friend is a girl, and Beth likes to play with dolls.”

*Gender-inconsistent female condition:* “Here is a picture of Beth. Beth is a 6-year-old girl who lives with her mother and father. Beth’s best friend is a boy, and Beth likes to play with toy cars.”

*Neutral female condition:* “Here is a picture of Beth. Beth is a 6-year-old girl who lives with her mother and father.”

After the description of the target, participants are asked to rate and justify the target on three accounts of popularity:

1. Participant’s own liking: “How much do you like [*Target*]? Why?”
2. Liking for boys: “How much do other boys like [*Target*]? Why?”
3. Liking for girls: “How much do other girls like [*Target*]? Why?”

Participants rate the target by pointing to a chart that depicts three glasses with corresponding levels of liquid labeled “not at all”, “a bit”, and “a lot.”

Participants are then asked to rate and justify how much the target likes to play with four gender-specific toys, which are pictured on separate cards:

1. How much would [*Target*] like to play with the car? Why?
2. How much would [*Target*] like to play with the sewing machine? Why?
3. How much would [*Target*] like to play with the train engine? Why?
4. How much would [*Target*] like to play with the doll? Why?

#### *Gender Flexibility Interview*

*Male participants:* “I want to tell you about a little boy named Greg. Greg likes to play with dolls, but his parents think it is silly to play with dolls, so they always tell Greg that only little girls play with dolls, not little boys. Greg’s parents bought him lots of other toys, like trucks and model airplanes, but Greg still likes to play with his dolls the best.”

*Female participants:* “I want to tell you about a little girl named Jenny. Jenny likes to play with toy cars, but her parents think it is silly to play with cars, so they always tell

Jenny that only little boys play with cars, not little girls. Jenny's parents bought her lots of other toys, like dolls, but Jenny still likes to play with her cars and trucks the best."

Three drawings are shown to participants so that the information in the vignette can be easily remembered. The first drawing depicts Greg (Jenny) with a doll (truck); the second drawing includes the parents with model airplanes and trucks (dolls); the third drawing shows Greg (Jenny) with numerous dolls (cars and trucks). The three drawings are left in front of participants as the following set of 5 questions are asked:

1. Why do people tell Greg (Jenny) not to play with dolls (trucks)? Are these people right?
2. What should Greg (Jenny) do? Why?
3. What will happen to Greg (Jenny) if he (she) keeps playing with dolls (trucks)?
4. What if no one ever sees Greg (Jenny) playing with the dolls (trucks); does he (she) have a right to play with dolls (trucks)?
5. Is it fair for Greg's (Jenny's) parents to punish him (her) for playing with dolls (trucks)?

Table 1

*Means and Standard Deviations for Theory of Mind and Gender-Typed Measures by Age Group, Median Split Age, and Gender*  
(*N* = 44)

Measure (Maximum Score)	5-year-olds ( <i>n</i> = 20)		6-year-olds ( <i>n</i> = 15)		7-year-olds ( <i>n</i> = 9)		Younger <sup>a</sup> ( <i>n</i> = 22)		Older <sup>b</sup> ( <i>n</i> = 22)		Females ( <i>n</i> = 23)		Males ( <i>n</i> = 21)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
<i>Social Perspective Taking</i>														
Snowman (2)	0.70	0.92	1.33	0.98	0.89	1.05	0.73	0.94	1.18	1.01	1.22	1.00	0.67	0.91
Baseball (2)	0.85	0.99	1.27	0.88	1.56	0.53	0.91	0.97	1.36	0.79	1.35	0.94	0.90	0.83
<i>Ambiguous Interpretive ToM</i>														
Explanation Question (1)	0.45	0.51	0.67	0.49	1.00	0.00	0.45	0.51	0.82	0.40	0.70	0.47	0.57	0.51
Prediction Question (1)	0.45	0.51	0.60	0.51	0.89	0.33	0.45	0.51	0.73	0.46	0.52	0.51	0.67	0.48
<i>Doodle Interpretive ToM</i>														
Pig Doodle (1)	0.40	0.50	0.53	0.52	0.78	0.44	0.36	0.49	0.68	0.48	0.57	0.51	0.48	0.51
Boat Doodle (1)	0.50	0.51	0.73	0.46	0.78	0.44	0.45	0.51	0.82	0.40	0.65	0.49	0.62	0.50
<i>Gender Constancy</i>														
Girl Stimulus (5)	3.05	2.04	3.40	1.72	4.44	0.88	3.14	1.96	3.77	1.60	3.30	1.82	3.62	1.80
Boy Stimulus (5)	2.90	1.89	2.93	2.02	4.33	1.12	2.95	1.81	3.45	1.92	3.04	1.89	3.38	1.86
Self-Stimulus (3)	2.00	1.17	2.07	1.22	2.67	0.50	2.05	1.13	2.27	1.08	2.22	1.00	2.10	1.22
<i>Gender Judgment</i>														
Neutral (21)	7.10	4.15	5.60	3.52	5.11	2.89	6.55	4.35	5.82	3.07	6.83	4.15	5.48	3.17
Stereotype (21)	9.85	3.77	10.20	3.30	10.33	3.16	10.32	3.91	9.82	2.94	9.22	3.38	11.00	3.30
Flexibility (21)	4.05	2.14	5.13	1.55	5.56	2.92	4.14	2.05	5.32	2.21	4.91	2.47	4.52	1.89
<i>Gender Interview</i>														
Neutral (5)	1.10	0.79	1.60	1.24	0.78	0.83	1.09	0.81	1.32	1.17	1.30	1.15	1.10	0.83
Stereotype (5)	1.60	1.54	1.00	1.37	0.67	1.00	1.59	1.53	0.82	1.18	1.04	1.49	1.38	1.32
Flexibility (5)	2.30	1.81	2.40	1.50	3.56	0.88	2.32	1.73	2.86	1.46	2.65	1.80	2.52	1.40

<sup>a</sup>60 months to 73 months; *M* = 65.86, *SD* = 3.75. <sup>b</sup>74 months to 95 months; *M* = 82.27, *SD* = 6.91.

Table 2

*Performance and Descriptive Statistics for Theory of Mind Measures (N = 44)*

Measure	0	1	2	M	SD	Min	Max
<i>Social Perspective Taking</i>							
Snowman	22	2	20	0.95	0.99	0	2
Baseball	15	8	21	1.14	0.91	0	2
Overall	12	17	15	1.07	0.79	0	2
<i>Ambiguous Interpretive ToM</i>							
Explanation Question	16	28		0.64	0.49	0	1
Prediction Question	18	26		0.59	0.50	0	1
Deviant Interpretation Question	1	43		0.98	0.15	0	1
Overall Ambiguous Interpretive ToM <sup>a</sup>	11	11	21	1.23	0.84	0	2
<i>Droodle Interpretive ToM</i>							
Pig Droodle	21	23		0.52	0.51	0	1
Boot Droodle	16	28		0.64	0.49	0	1
Overall Droodle Interpretive ToM	14	9	21	1.16	0.89	0	2

<sup>a</sup>N = 43.

Table 3

*Performance and Descriptive Statistics for Gender-Typed Measures (N = 44)*

Measure	0	1	2	3	4	5	6	7	8	9	10	11	12	13	M	SD	Min	Max	
<i>Gender Constancy</i>																			
Girl Stimulus	4	6	2	6	6	20									3.45	1.80	0	5	
Boy Stimulus	4	8	4	6	3	19									3.20	1.86	0	5	
Self-Stimulus	6	5	9	24											2.16	1.10	0	3	
Overall Constancy	2	3	0	4	0	3	1	4	0	2	5	1	2	17	8.82	4.49	0	13	
<i>Gender Judgment</i>																			
Neutral <sup>a</sup>															6.18	3.74	0	17	
Stereotype <sup>a</sup>															10.07	3.43	3	18	
Flexibility <sup>a</sup>															4.73	2.19	0	10	
<i>Gender Interview</i>																			
Neutral	12	15	15	0	2	0									1.20	1.00	0	4	
Stereotype	22	6	3	11	2	0									1.20	1.41	0	4	
Flexibility	6	7	6	10	10	5									2.59	1.60	0	5	

<sup>a</sup>Performance is not listed because the range was greatly varied.

Table 4

*Descriptive Statistics for Language Assessment*

	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max	Range
PPVT-3						
5-year-olds	20	90.05	10.86	70	110	40
6-year-olds	14	97.14	14.96	67	120	53
7-year-olds	9	109.00	7.50	98	119	21
Overall	43 <sup>a</sup>	96.33	13.66	67	120	53

<sup>a</sup>One 6-year-old refused to finish the assessment.

Table 5

*Zero-Order Correlations Between Age, Gender, Language Assessment, and Theory of Mind Measures (N = 44)*

Measure	1	2	3	4	5	6	7	8	9
1. Age	-	.56**	-.11	.21	.35*	.51**	.33*	.24	.23
2. Gender		-	-.05	.28	.25	.13	-.15	.09	.03
3. PPVT-3 <sup>a</sup>			-	.09	.34*	.40**	.28	-.07	.10
<i>Social Perspective Taking</i>									
4. Snowman				-	.50**	.06	-.04	.33*	.16
5. Baseball					-	.33*	.23	.04	.17
<i>Ambiguous Interpretive ToM</i>									
6. Explanation Question <sup>a</sup>						-	.43**	-.06	.02
7. Prediction Question <sup>a</sup>							-	.22	.24
<i>Doodle Interpretive ToM</i>									
8. Pig Doodle								-	.60**
9. Boot Doodle									-

<sup>a</sup>N = 43.\* $p < .05$ , two-tailed. \*\* $p < .01$ , two-tailed.

Table 6

*Zero-Order Correlations Between Age, Gender, Language Assessment, and Gender-Typed Measures (N = 44)*

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	-	.56**	-.11	.26	.25	.19	-.17	.02	.26	-.15	-.25	.31*
2. Gender		-	-.05	-.08	-.09	.06	.18	-.26	.09	.11	-.12	.04
3. PPVT-3 <sup>a</sup>			-	.15	.20	.12	-.38*	.23	.28	-.19	-.33*	.40**
<i>Gender Constancy</i>												
4. Girl Stimulus				-	.92**	.79**	.04	-.14	.14	-.14	-.23	.33*
5. Boy Stimulus					-	.75**	-.01	-.02	.05	-.14	-.27	.32*
6. Self-Stimulus						-	-.09	-.04	.21	-.18	-.29	.37*
<i>Gender Judgment</i>												
7. Neutral							-	-.81**	-.43**	.47**	-.09	-.22
8. Stereotype								-	-.18	-.40**	.33*	-.03
9. Flexibility									-	-.15	-.35*	.40**
<i>Gender Interview</i>												
10. Neutral										-	-.15	-.50**
11. Stereotype											-	-.79**
12. Flexibility												-

<sup>a</sup>N = 43.\* $p < .05$ , two-tailed. \*\* $p < .01$ , two-tailed.

Table 7

Zero-Order Correlations Between Age, Gender, Language Assessment, Theory of Mind Measures, and Gender-Typed Measures  
( $N = 44$ )

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	-	.56**	-.11	.35*	.49**	.27	.25	-.17	.02	.26	-.15	-.25	.31*
2. Gender		-	-.05	.26	-.01	.07	-.06	.18	-.26	.09	.11	-.12	.04
3. PPVT-3 <sup>a</sup>			-	.22	.42**	.02	.17	-.38*	.23	.28	-.19	-.33*	.40**
4. Overall Social Perspective Taking				-	.16	.18	.36*	.01	.02	-.07	-.02	-.16	.15
5. Overall Ambiguous Interpretive ToM <sup>a</sup>					-	.14	.20	-.05	.03	.04	-.14	-.07	.15
6. Overall Doodle Interpretive ToM						-	-.03	.05	-.04	-.03	.12	-.08	-.00
7. Overall Gender Constancy							-	-.01	-.08	.13	-.16	-.30	.36*
8. Gender Judgment Neutral								-	-.81**	-.43**	.47**	-.09	-.22
9. Gender Judgment Stereotype									-	-.18	-.40**	.33*	-.03
10. Gender Judgment Flexibility										-	-.15	-.35*	.40**
11. Gender Interview Neutral											-	-.15	-.50**
12. Gender Interview Stereotype												-	-.79**
13. Gender Interview Flexibility													-

<sup>a</sup> $N = 43$ .\* $p < .05$ , two-tailed. \*\* $p < .01$ , two-tailed.

Table 8

*Summary of Hierarchical Regression Analysis for Variables Predicting Overall Gender Constancy (N = 43)*

Variable	B	SE B	$\beta$	$\Delta R^2$
<i>Block 1</i>				
Age	0.10	0.09	.23	.07
Gender	-0.23	1.40	-.03	
PPVT-3	0.01	0.06	.04	
<i>Block 2</i>				
Overall Social Perspective Taking	2.05	0.95	0.36*	.10*

\* $p < .05$ . \*\* $p < .01$ .

Illustration 1

*Doodles Administered in the Doodle Interpretive Theory of Mind Task With Restricted Views in Dashed Windows*

