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GENDER DIFFERENCES IN ADVANCED THEORY OF MIND

AND SOCIAL COMPETENCE AMONG

SCHOOL-AGE CHILDREN

A Thesis

by

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GENDER DIFFERENCES IN ADVANCED THEORY OF MIND

AND SOCIAL COMPETENCE AMONG

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August 2010

ABSTRACT

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44 titles.

The present study explored gender differences in the development of theory of mind (ToM) and

social competence among school-age children. It was hypothesized that children's ToM ability

related to their social competence. Children, ages 6 to 12-years (N=62; 38 girls, 24 boys) were

administered 12 advanced ToM stories and a language assessment. Parents and teachers

evaluated the children's social skills (N=70; 40 girls, 30 boys), - using a 23 item social

competence inventory which consisted of positive behaviors and two forms of negative

behaviors: relational aggression and overt hostility. Results indicated positive associations

between children's ToM ability and positive social behavior. Separate gender analyses revealed

that girls scored significantly higher on positive social behavior than boys.

DEDICATION

The completion of my master thesis would not have been possible without out the love and support of my family. To my son, James, thank you for your patience and understanding. To my parents, thank you for always supporting and believing in my ability to succeed.

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CHAPTER I

INTRODUCTION

Theory of Mind and Social Competence

Theory of mind (ToM) refers to the understanding that mental states in terms of beliefs, desires, and feelings may differ from ones' own and that the actions are often the result of those mental states (Wellman, 1990). It has been suggested that this psychological understanding may help transform the manner in which children are able to make sense of another's mental state and is believed to facilitate social interactions (Watson, Nixon, Wilson, & Cage, 1999; Weimer & Guajardo, 2000). Given that boys and girls differ in social development, it seems likely that gender differences might exist in the relations between ToM and social interactions, as well**.** The present study aimed to examine whether there were gender differences in ToM performance, social behaviors, and the relationship between these two variables.

CHAPTER II

REVIEW OF LITERATURE

Theory of Mind Assessment

In order to predict and explain the motivations behind the behaviors of others, one must be able to understand that actions are based on beliefs. One measure of children's understanding are false belief tasks, which measure false belief understanding. False belief understanding is the ability to recognize that others can have a belief that is wrong. A child who attributes a false belief to another, understands that the other's belief is based on their knowledge that can differ from reality and that their behavior is based on their false knowledge (Perner & Wimmer, 1983).

Using false beliefs tests, researchers have found that normally developing children continue to develop and advance their ToM ability through a progression of stages that begins around 2 years of age. Children typically acquire full competency on first-order ToM tasks by 5 years of age (Wellman, Cross, & Watson, 2001). First-order belief requires the child to think about another person's thoughts. Children's ToM does not stop developing at the ages of 5 and 6; they most likely gain insight into the mind of others throughout their school-age years. What develops subsequently is the capability to utilize this perspective taking ability in a more flexible way in complex situations (Doherty, 2009). Children performing at ceiling on first-order ToM tasks at the age of 5 years prompted researchers to develop advanced ToM tests that require a child to perform higher mental state understanding skills. These advanced ToM skills are centered around the detection of humor, irony, and non-literal meanings (Happe, 1994).

Advanced levels include second-order beliefs. A child who can perform a higher-order belief is able to consider what people think about other people's thoughts and even what other people think of their own thoughts (Sutton, Smith, & Swettenham, 1999). For example, John believes that Mary will think that Jim knows to meet in the park. Normally developing children between the ages of 5 and 10 years should be able to pass these types of tasks (Perner & Wimmer, 1985).

Performances on higher-level ToM abilities have been related to the manipulation of behavior by means of deception. In particular, if one can cause someone to believe something is false (and the behavior-prediction ability is sound), then they may behave to one's advantage (Doherty, 2009). For example, a child who bullies another child might use deception with his teacher to avoid detection or punishment.

To assess ToM skills among children diagnosed with Autism, Happe (1994) devised twelve vignettes about everyday situations in which characters say things they do not literally mean. Referred to as "Strange Stories", Happe expected these vignettes presented with simple drawings would present a more naturalistic challenge to the participants than the acted out ToM tasks containing physical stimuli. The stories were fictional accounts concerned with reasons that lie behind everyday expressions that are not literally true. Consider the following scenario, the Forget story goes like this:

> Yvonne is playing in the garden with her doll. She leaves her doll in the garden when her mother calls her in for lunch. While they are having lunch, it starts to rain. Yvonne's mother asks Yvonne "Did you leave your doll in the garden?" Yvonne says "No, I brought her in with me, Mommy.

1. Is it true what Yvonne says?

2. Why does Yvonne say this?

Two questions followed the story. The first question involved comprehension, were the character's statements true or not and the second required the child to make mental state inferences about the speaker's attitude. A full and accurate mental state inference response would include the following "she thought she would get into trouble".

Participants' performance on the test battery is believed to reveal something about the cognitive development underlying their success or failure on conventional false belief tests. Happe's findings demonstrated stories regarding sarcasm and double bluff are at a level of difficulty that best reveals the autistic child's ability to attribute mental states. In contrast, stories about appearance/reality, and forgetting might be too easy.

Normative data utilizing a modified Happe's (1994) "Strange Stories" battery was obtained in a recent advanced ToM study conducted by O'Hare, Bremner, Nash, Happe, and Pettigrew (2009). Typically developing children, ages 5-12 years, were administered the battery to test their ability to infer mental state concepts when the ToM components were embedded in the naturalistic structure of the stories. The aim of the study was to normalize data with typically developing children and to see whether performance increased with age. They concluded that it is possible to measure an advanced ToM using a strange story format in typically developing children. First, results indicated between ages 5-6 years most children managed to achieve a third of the potential ToM total performance. The mental state concepts of sarcasm and persuasion were too difficult to answer correctly. Secondly, the total performance across the 12 stories did not reach ceiling even at the age of 12 years. A potential limitation of the study is that the children were not assessed for language comprehension.

Language

Language development appears to help children acquire a ToM. ToM is necessary for communication through language; and language might in turn offer a way to learn about ToM (Miller, 2006). The acquisition of language provides a system for talking and thinking about mental states. Children's ability to use mental state terms in an appropriate manner, such as "know" and "think", may be the first indication that they understand mental state concepts (Doherty, 2009). Internal activities such as knowing and thinking do not have consistent behavioral associations; therefore, language is an essential source of information that helps to define mental state terms (Gleitman, 1990). For example, young children listen and participate in conversations in which people predict and explain behavior in terms of beliefs, desires and feelings (Miller, 2006). The role of language in the development of false belief understanding is important for different reasons. First, it provides the means for representing false belief by disregarding the evidence in reality and secondly, language provides children the means to become aware of beliefs (Astington, 2001).

Recently, Milligan, Astington, and Dack (2007) published a meta-analysis, concluding that language ability and false belief are strongly related, independently of children's age. Reviewed studies included measures of general language ability; semantics, syntax, memory for complements, and receptive vocabulary. With ToM, Milligan et al. (2007) found that only receptive vocabulary was weakly related to false belief understanding, most likely due to the fact that the receptive vocabulary measure is designed to access a more narrow and specific language ability. Furthermore, the results revealed that false belief understanding develops as a result of linguistic ability as well as promotes further language development. Many researchers agree that

language skills grow and support a developing ToM, however, there is not a consensus regarding just how ToM develops.

Theories of Theory of Mind

Three contemporary theories have been proposed to elucidate the development of children's knowledge of mental states (Flavell & Miller 1998; Gopnick &Wellman 1994). Theory theory claims that children develop an understanding of others' mental states through a reasoning process (Gopnik, 1996; Perner, 1991; Wellman, 1993). Theory theorists believe that experiences provide children with information that cannot be accounted for by their present ToM (Flavell, 1999). Through everyday conversations children acquire ideas of how experiences, perceptions, beliefs, and desires interact with each other and with behavior. When children's initial ToM is challenged by opposing information, they will incorporate and accommodate the new information into their own cognitive structure, resulting in a new theory (Lillard, 1998).

Modularity theorists believe that the acquisition of ToM does not develop from social interaction, but through an innate maturational process. Leslie (1987) proposed that humans are hardwired with an innate processor that he identifies as the Theory of Mind Mechanism (ToMM). At input, this mechanism takes in information of people's behavior, and then uses the information to compute their probable mental states. It outputs descriptions of the mental states in the form of propositional attitudes. Propositional attitudes are mental states such as pretending that, believing that, imagining that and desiring that. The theory was first based on the concept of pretence. For example, if the child's mother holds a banana to her ear and starts to speak into it, the watching child's ToMM will out put the propositional attitude statement: Mother pretends the banana that "it is a telephone". Additional innate learning mechanisms have been theorized in

the acquisition of ToM. For example, according to Flavell (1999), improved information-processing and linguistic skills enable and facilitate ToM development.

Similar to theory theory, simulation theory is based on the concept of role taking-simulating (Harris, 1995). Social cognition skills are said to develop by way of simulating another's circumstances, pretending to be another person. Children who are aware of their own mental states can then use that awareness to infer mental state to others (Lillard, 1998). Both theory theorists and simulations theorist presume that experiences in role taking through either assimilating or simulating another's circumstances plays an important role in developing a ToM. As opposed to modularity theorists that propose that ToM development is an innate process that requires information to be obtained which is then used to compute the mental state of others. In general, for all of the three major theories, the development of social understanding largely takes place within the child.

Another theoretical position prescribes that environmental and social factors play a major role in children's acquisition of ToM. The sociocultural theory emphasizes ToM acquisition through social processes (Bruner, 1990; Dunn, 1988). This viewpoint focuses on how sociocultural acts, such as interaction with family and peers, help shape children's perceptions together with internal factors to construct the mind. Children who live in such an environment, have the opportunity to benefit from a ToM will acquire such a theory more quickly than children with less of an opportunity. Family and peer interactions can provide the psychological and social foundation for the development of moral and cognitive conflicts, language and ToM. Therefore, a rich environment which provides positive social interactions may be a kind of training for the child trying to understand other people's minds (Badenes, Estevan, & Bacete, 2000). All of the theoretical positions attend to the processes in which children acquire mental

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state understanding and the ability to explain and predict the behaviors of others. Similarly, theory theory, simulation, and sociocultural theory posit that children develop a ToM through everyday experiences in which they interact with others to imagining other's thoughts which allows them to shape and adjust their cognitive structure. Thus, both language and social interactions seem important to ToM development. In particular social competence has been found to be related to ToM ability.

Theory of Mind and Social Competence

The term social competence is used to describe a child's social effectiveness, referring to the emotional, cognitive, and social skills children need for successful peer relationships (Krasnor, 1997). Reviewing previous research by examining the different distribution of social behaviors among boys and girls, Krasnor (1997) found boys' activities tend to be extensive, involve multiple role interactions, and direct competition with friends, while girls' activities tend to be intensive, intimate, and involve single role play, indirect competition, and conversation. Similarly, Greener and Crick (1999) investigated what types of prosocial behaviors third through sixth grade children consider to be normative according to gender and found that the majority of the children cited that initiating and maintaining friendships were considered as normative for their peer groups.

Children who have developed a ToM may exhibit more enhanced social competence skills, allowing them to interact with others and maintain better peer relationships compared to children with less ToM understanding. Astington and Jenkins (1995) investigated the possibility that children who have well-developed ToM interact with others in different ways than children of similar age and linguistic competence. ToM tasks were administered along with an empathy measure using a peer nomination procedure for preschoolers. The amount of pretend play was

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measured by means of a video that recorded the children as they played in groups for approximately ten minutes. Findings revealed that children with higher levels of false belief understanding are more likely to make cooperative joint requests in pretend play. Accordingly, they found that children with a more developed ToM will be more aware that their play partners may have different beliefs about an imaginary pretend world. However, they did not find a relation between empathy and false belief understanding, speculating that the nomination method was an inadequate measure for determining the levels of children's empathetic sensitivity for others. Previous studies have included multiple raters of children's behaviors, particularly the child's teachers. Teachers have sometimes been viewed as more sophisticated judges of the children's behaviors but may be subjected to relational biases compared to research observers (Ladd & Profilet, 1996).

ToM ability has been found to positively relate with teacher-rated social skills (Capage, Watson, 1997; Watson, Nixon, Wilson, & Capage 1999; Weimer & Guajardo, 2005). Capage and Watson (1997) examined the relationship between ToM skills, aggression, and social competence using teacher questionnaires with young children. Results indicated that false belief understanding and social competence ratings were positively and significantly related to both language comprehension and age, and significantly negatively correlated with the aggression rating. Similarly, Cassidy, Werner, Rourke, and Zubernis (2003) examined preschoolers' social behaviors assessed by multiple sources: teachers, parents, and observations of behaviors in the classroom. They found that age and language ability significantly related to children's performance on the ToM tasks and most measures of social competence. In concurrence, Watson et al. (1999) reported false-belief understanding assessed with ToM tasks was a significant

predictor of teacher ratings of young children's positive social skills after age, peer

communication, and language comprehension were controlled for.

In recent research, Liddle and Nettle (2006) examined the effects of individual

differences in ToM functioning on social competence among ten and eleven year-old children.

Higher-order ToM tasks were developed to assess the children's perspective taking ability on

four levels of inference performance. To rate the pupils' social competencies, the Social

Competence Rating Questionnaire (SCRQ), a 14-behavioral item (half positive and half

negative) questionnaire was developed for teachers to complete. Items deemed to be

characteristic of positive social skills included behaviors such as "the child accepts others for

who they are", and "the child is warm and caring". Items described as negative included

behaviors such as "the child has no knowledge of rules and norms in human relations" to "the

child is disruptive while in class." Results indicated a significant positive correlation with ToM

scores and teachers ratings from the SCRQ. Overwhelmingly, children mastered first and second

level inferences, while their performance on advanced levels was slightly better than chance or at

chance. Therefore, data suggest that ToM abilities continue to develop through the school years.

Interestingly, in examining gender differences in ToM performance they found that boys tended

to do better than girls. Conclusions are limited because the ToM measures involved syntactic

complexity tasks; therefore, ToM scores were likely affected by the participant's language

ability. Secondly, the forced-choice format of the ToM questions allowed for guessing, thus,

complicating the interpretation of the assessment.

In contrast with previous findings, Bosacki and Astington (1999) found no significant

links with teacher's social competence rating and ToM performance. These researchers

investigated whether preadolescents' (age 11) ability to understand thoughts and emotions

related to their social competence. Two brief ToM vignettes were administered to assess the specific concepts of role-taking, empathy, alternative thinking, and the ability to understand another's perception of a situation. Social competence was defined in terms of both effective social interactions skills and peer popularity. Teachers rated the child's overall global social behaviors based on peer-related social-interaction skills and peer popularity. Vocabulary ability was assessed with a 45-item questionnaire completed by the pupils. Further findings indicated that vocabulary was related to ToM total score, and also a significant positive correlation was found between linguistic competency and peer ratings of both social interaction and peer likability. Further, findings indicated that social understanding is related to social competence. Partial correlational analyses revealed that general language ability and ToM was associated with some, but not all acts of social competence. Analysis of gender effects revealed that girls were better at judging story characters' motivations and feelings than were boys. Girls were also rated as more socially-skilled and popular by their peers. No gender effects were found with regards to language skills. Interestingly, a marginal effect between the gender of the teacher and the pupil revealed that girls rated by male teachers obtained high empathy scores and boys with female teachers obtained low empathy scores as assessed with the ToM measures. Although Bosacki and Astington (1999) found significant gender effects, findings were limited by the lack of a memory or a general intelligence measure and their sample was ethnically homogeneous. Suggestions for future research include conducting longitudinal studies that involve boys and girls from various cultures and determining other social factors that are important to the development of ToM.

ToM abilities do not necessarily facilitate social competence behaviors. When interacting with others, children need to identify and understand the feelings and needs of others to

effectively engage in that interaction. Moreover, children who have acquired a ToM may not choose to use their knowledge of others in a positive manner (Cassidy et al., 2003).

Theory of Mind and Intentional and Relational Aggression

ToM abilities and aggressive behavior have been linked to bullying. Differing hypotheses have been proposed to explain bullying acts, a child who is lacking social skills (Crick & Dodge, 1994) or a child who is cold and manipulative (Sutton, Smith, & Swettenham, 1999). Children lacking social skills are perceived not to process social information accurately. These children might fail to understand the feelings and intentions of other people, and have little awareness of what other children think of them (Randall, 1997).

Sutton et al. (1999) argue that context and skills of bullying are based on the ability to understand and manipulate the mind of others. Indirect forms of bullying include social exclusion that requires some understanding on the part of the bully of who will be prepared to join in making the victim feel left out. Bullies may be part of a highly structured social group, negotiating for member loyalty, maintaining power positions, and getting members to obey orders. They may also engage in strategies to avoid detection, or may choose the most effective time and method for maximizing the victim's vulnerability and minimizing their chances of getting hurt. Aggressive acts of bullying are expressed either indirectly or directly. Direct acts of bullying include physical violence and attacks. Relational aggression, a form of indirect bullying, consists of verbal attacks, more specifically, name calling, threats, and teasing; social exclusion includes acts of social isolation, intimidation, manipulation and malicious gossiping. This form of relational aggression is most commonly found among females and most damaging to self-

esteem, while boys are more likely to rely on overt forms of physical and verbal aggression (Crick & Grotpeter, 1995).

Gini (2006) examined the performance of 8 to11- year-olds with ToM and emotion understanding tasks in the relation to their participant role in bullying. Children nominated boys and girls in their class who fit each of behavioral descriptions of bullying situations. Children also completed tasks of social cognition (ToM), emotion, and moral stories. Some of the social cognition stories were translated from Happe's (1994) original "Strange Story" battery. They predicted children who were nominated by their peers as the Bully group performed better than other students on the ToM tasks. Although data revealed that bullies did not perform better than other nominated roles on ToM performance, the Bully role was positively correlated with the total social cognition score and with the cognitive and the emotion scores.

Gender Issues

In previous research, mixed findings have been reported on gender differences in ToM performance and social skills. Charman, Ruffman, and Clements (2002) reported a post-hoc analysis examining gender effects on false belief performance from two large datasets which included a total of 1,468 children (741 girls, 727 boys) between the ages of 2.33 years and 6.17 years. In order to compare gender effects independently across both data sets, gender effects on ToM performances were split into cumulative age quartiles. They predicted that if an advantage for girls was to be found, they would expect it at only one age point because of different socialization experiences. Boys would be expected to catch up once they had acquired sufficient quality and quantity of social experience. Results indicated a significant but weak female advantage for false belief performance over both datasets, although girls performed better than boys, the gender advantage was weak and considerably weaker than the effect of age. Given the

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very large numbers of children tested, these effects are likely representative of genuine gender differences. Yet conclusions are limited because one ToM task was measured per dataset. And although children correctly answered the belief question (test) and the three memory (control) questions to be scored as 'pass', there was no direct measure of language. Given the importance of linguistic skills in any female advantage on false belief performance, future studies should employ extensive testing of language abilities to investigate gender differences in ToM understanding.

In examining gender differences in the relationship between young children's peer-related social competence skills and ToM, Walker (2005) found a significant positive relationship between boys' ToM ability and aggressive and disruptive behaviors, and a negative relationship between ToM abilities and shy or withdrawn behavior. This suggests that boys who were more proficient on ToM tasks were more likely to display aggressive or disruptive behavior as rated by teachers. For girls, the data revealed a significant positive relationship between ToM skills and prosocial behavior. Teachers indicated that girls who were more likely to display prosocial behavior were more proficient on the ToM tasks. Although results indicated gender differences in ToM and social skills, findings are limited since the study did not include a measure of receptive language. There is increasing evidence of a strong correlation between the ability to pass ToM tasks and oral language competency (Cutting & Dunn, 1999), possibly demonstrating the reason for girl's better performance on ToM tasks in this study.

Girls and boys show a different distribution in their social behaviors. Based on gender roles, females are generally expected to be more empathetic, sympathetic, responsive, and prosocial than are males, whereas males are more achievement-orientated and relatively independent (Eisenberg & Fabes, 1996). Possible explanations can be attributed to the female

advantage performance on ToM tasks. First, the nature of the relationship between parenting is different for boys and girls; parental warmth (supportive and emotional) is especially most important for girls, while parental discipline is more salient for boys (Hughes, Deater-Deckard, & Cutting, 1999). Secondly, ToM development has been hypothesized to be advanced compared to boys because of their increased social competence during preadolescents and adolescents (Bosacki & Astington, 1999). Through a maturational process, girls may be predisposed to attend and respond more closely to the needs of others (Hastings, McShane, Parker, & Ladha, 2007). Lastly, girls might develop ToM somewhat earlier than boys (Charman, Ruffman, & Clements, 2002).

To conclude, previous research has established the relationship between ToM abilities, social behaviors, and language proficiency among children younger than 6 years of age. Few investigators have assessed children with ToM tasks in relation to their social competence in an older cohort of children. Prior studies have investigated children's conventional positive behaviors such as saying "thank you" and "please" as opposed to the their social competence which incorporates the child's emotions, cognitive skills, and positive behaviors. As children age their peer relationships become more salient. Continuous social interactions among their peer groups may enhance their ToM abilities and social competence skills. Much empirical evidence on ToM performance and its correlates has been based on studies focusing on toddlers and young children. Few investigators have specifically examined gender differences in ToM acquisition and its relation to social competence among children older than 6 years of age. This present study aimed to investigate the following:

1) Does ToM relate to children's positive and negative social behavior, independently of age and vocabulary? It was expected that ToM, positive and negative social behavior, age, and

vocabulary will all significant positively relate. Furthermore, ToM and social behavior will relate independently of age and language.

2) Are there gender differences in children's ToM, positive and negative social behavior, and vocabulary, independent of age? It was expected that girls will have an advantage over boys in vocabulary, ToM, and positive and negative social behavior, independent of age.

3) Does the association between ToM and *negative* social behavior differ between boys and girls, independently of age? It was expected that both boys and girls with high ToM scores will be rated more highly on items of *positive* behavior; however, the relationship between ToM and *negative* social behavior will differ across boys and girls. Girls will be rated more highly on relational aggression items compared to boys, who will be rated more highly on physical aggression items, regardless of their ToM performance. Thus, the relationship between ToM and negative social behavior will differ for boys and girls such that girls' ToM will positively relate to relational aggression, whereas among boys, ToM will positively relate to physical aggression.

Possible relations found among these factors in question help to elucidate ToM development in an older cohort of children. In addition, this study will extend past research on gender role differences and influences on social behaviors and linguistic ability.

CHAPTER III

METHODOLOGY

Participants

The participants in this study consisted of 70 children ages six to twelve years

($M = 9:1$, $SD = 17.94$), forty girls ($M = 9:1$, $SD = 17.55$) and thirty boys ($M = 8:11$, $SD = 18.66$).

Sixty two children completed all measures and thus were included in all analyses. Eight children

only had complete social and demographic data, so were excluded from some analyses. Children

were recruited from one public elementary school in South Texas. The children's parents were

predominately Hispanic ($N=138$; 85- Hispanic, 7-White, 46-Unknown). A total of 17 teachers,

(15 females and 2 males) participated in the study by evaluating the children's behavior.

Demographic data was collected on the children's parental education level and total household

income. Parents were moderately educated, 17% of mothers and 8.6% of fathers held a

bachelor's and/or an advanced degree. The mean total household income was higher than

average ($M = \$48,000$, $SD = \$2,952$) for the community in which they were sampled.

Design and Procedure

Parents who had provided agreement for their children to participate in this study

complete a parent-version of the Social Competence Rating Questionnaire (SCRQ; Liddle

&Nettle, 2006) and provided demographic information such as parental age and education level,

ethnicity, and total household income. Prior to the task administration, with the children,

researchers introduced themselves and the child was read a child assent form.

After they agreed to participate in the study, each child's vocabulary ability was assessed using a subset of the Woodcock-Munoz Language Survey-Revised (WMLS-R; Woodcock, Munoz-Sandoval, Ruef, & Alvarado, 2005). If the child obtained a sufficient vocabulary score, the researcher proceeded with administering in random order a modified script version of Happe's "Strange Stories" Advanced Theory of Mind (ToM) Battery (O'Hare, Bremner, Nash, Happe, & Pettigrew, 2009). Each session took approximately twenty minutes to properly administer the advanced ToM battery. Following the session, the child received an age-appropriate book for taking part in the study. Subsequent to the session with the child, teachers completed a teacher version of the Social Competence Rating Questionnaire (Liddle & Nettle) and were compensated for their time.

Measures

Language Assessment

Children's expressive vocabulary ability was assessed using a subset of the Woodcock-Munoz Language Survey-Revised. Scoring was completed according to standardized procedures (WMLS-R; Woodcock, Munoz-Sandoval, Ruef, & Alvarado, 2005). The WMLS-R Picture Vocabulary Subtest was utilized to access the child's English proficiency. Test 1, Spanish Picture Vocabulary was utilized to assess 7 children's language ability. (These children were initially tested in English and failed to pass the minimum requirements to proceed with the testing of the subsequent tasks.) This assessment measured oral language, language development, and lexical knowledge. The task involved asking the child to identify pictured objects. The instrument had 59 pictured items that increased with difficulty. Each item was scored in a binary manner, 1= pass, 0= fail, for a potential raw score of 6 to 59. The raw scores were converted to scale scores with a mean of 100 and a standard deviation of 15. In addition,

before the language assessment began, each child was asked whether they spoke Spanish. Lastly, for comparison purposes, the children's parent(s) and teacher were asked whether the child spoke Spanish. Parents provided responses for three different language questions. The first question was: "Which language(s) does the child speak"?" Second, "Which language(s) does the child understand better"?" And lastly, "Which primary language(s) is spoken in the household"?" The child's teacher was asked, "How well does the child speak English and/or Spanish"?"

"Strange Stories" Advanced Theory of Mind Battery

A total of 62 children completed the advanced ToM battery. Fifty- five children were tested with the English version and seven were tested with a Spanish translated version of the stories. The ToM performance scores from the 7 children tested with the Spanish version were retained for use in subsequent analyses, since the children did not differ with the English speaking children in terms of parental education levels and total household income. The advanced ToM battery consisted of twelve short age-appropriate vignettes. The order of the tasks was counterbalanced across children. The written stories were presented to the children, accompanied by simple drawings that related to the story. Two test questions for each vignette assessed children's understanding of lies, white lies, a double bluff scenario, sarcasm, persuasion, misunderstanding, appearance/reality, pretense, forgetting, a joke, a contrary emotion, and a figure of speech. The following is sample item, "White Lie Story"

One day Aunt Jane came to visit Peter. Now Peter loves his aunt very much, but today she is wearing a new hat; a new hat which Peter thinks is very ugly indeed. Peter thinks his aunt looks silly in it, and much better in her old hat. But when Aunt Jane asks Peter, "How do you like my new hat?" Peter says, "Oh, it's very nice".

Q (1). Is it true what Peter said?

Q (2). Why does he say it?

Following the stories, the child was asked open-interviewed questions that referred to the character's mental states. Questions were comprised of one linguistic comprehension question that did not require an inference about the character's mental states and one justification question that required the child to make an inference about the character's mental states and actions. Responses to the linguistic comprehension questions were coded in a binary manner (either "yes" or "no") and were scored as either a pass or fail, 0 = fail and 1 = pass. Responses to the justification responses were assigned a score of 2- for mental state understanding which included an explanation that involves thoughts, feelings and desires, 1- for partially-correct, and 0- for an incorrect response. Potential scores ranged from 0- 24. An incorrect response involved errors about the facts of the story, or inappropriate reasons for the story character's remarks. For example, in the White Lie story, a score of zero involved a physical state response such as "he did like the hat, he liked the old one". A score of 1 included a partial psychological state response such as "he thought it was ugly, but Aunt Jane thought it was pretty". For a child to receive a score of 2, they needed to provide an accurate mental state understanding response, such as "he did not want to hurt his aunt's feelings".

Social Competence Rating Questionnaire (SCRQ)

To measure social competence skills, the child's teacher and parent(s) evaluated the child's behaviors via the SCRQ (Liddle & Nettle, 2006). The SCRQ is a 14- item screening tool that requires parents and teachers to report on the accuracy of the children's behavior on seven positive and seven negative items. Positive items included behaviors such as "is good at dealing with others" and "is warm and caring". Negative behaviors consisted of items such as "is

disruptive in the classroom and "doesn't stick to tasks". The final 'positive' social behavior scores were computed by reverse coding negative items and totaling these with positive items to create one composite score for use in subsequent analyses. Two additional social functioning subscales from the McArthur Health and Behavior Questionnaire (HBQ) were added to the inventory to measure externalizing symptoms of overt hostility and relational aggression (Essex et al., 2002). The overt hostility subscale consisted of 4 externalizing behaviors such as "gets into many fights" and "does things to annoy others". The relational aggression subscale consisted of 5 behaviors such as "tries to get others to dislike a peer", and "when mad at a peer, keeps that peer from being in the play group". However, the item "tells a peer that they won't be invited to his/her birthday party unless that peer does what he/she wants" which is a part of the original subscale was not included in the present study, as the researcher felt that that teacher could not accurately rate this item. Items were rated on a 5 point Likert rating scale from 1-Very Inaccurate, 2-Moderately Accurate, 3-Neither Accurate nor Inaccurate, 4-Moderately Accurate and 5- Very Accurate. Teachers and parent(s) indicated how accurate each of the 23 statements was for each child. Separate reliability analyses were conducted for teacher and parent child behavior evaluations to examine the internal consistency of each of the three social behavior factors, labeled, positive, relational aggression, and overt hostility, all demonstrated high internal consistency (teachers; Cronbach's α = .85, .94, .90; and parents; Cronbach's α =.73, .87, 82).

CHAPTER IV

RESULTS

Descriptive statistics are reported in table 1 for the following variables: mean and age

ranges of participants, mean and range of scores on ToM control and justification questions

(ToM performance), standardized language scores, and positive, relational aggression and overt

hostility behaviors.

Table 1

Means and Standard Deviations of Children's Age, Theory of Mind Questions, Vocabulary
Assessment and Social Behavioral Measures for Total Sample

Variables	N	Min	Max	Mean	SD
Female Age (Months)	40	78	146	109.85	17.85
Male Age (Months)	30	80	141	107.53	18.66
ToM (1) Control	62	4	13	11.15	1.86
ToM (2) Justification	62	2	20	10.32	4.65
Vocabulary	62	47	126	99.50	14.05
Positive Social	70	-12	24	11.52	8.51
Relational Aggression	70	4.5	19	7.75	3.80
Overt Hostility	70	3	16.5	6.09	3.12

Preliminary Analyses

The first ToM task question (1) served as a control for children's comprehension of the

story, only the pass/fail rates were recorded. The double bluff story included two control

questions; the remaining eleven stories included one control. The mean passing performance

across the 13 control questions was $M = 11.15$, $SD = 1.86$. The second ToM question served as the justification response to the story. Two independent judges coded the children's justifications responses in English; inter- rater reliability was high (Kappa =.92) across the 12 items. Similarly, two independent Spanish-speaking judges coded the children's justification responses in Spanish with high agreement (Kappa =.86). All discrepancies among raters were resolved through discussion and English and Spanish ToM justifications were subsequently combined into one composite ToM score (overall Kappa =.91). Teachers' and parents' ratings of the children's social behavioral measures were significantly positively correlated for positive behaviors ($r = .46$, $p < .01$; for relational aggression $r = .39$, $p < .05$); and for overt hostility ($r = .32$, $p < .01$). Thus, subsequent analyses used three separate aggregated social behavior scores collapsing across teachers and parents: positive and two types of negative behaviors: relational aggression and overt hostility. Teachers', parents' and child's ratings of language spoken, preference and usage were reported as percentages. Teachers' reported that 62.5% of the children spoke mostly English, 25% spoke both languages equally well, 7.8% spoke mostly Spanish, 1.6% spoke Spanish very well and 3.1% spoke some Spanish. Parents reported that 47.3% spoke English, 36.5% spoke both languages, and 21.2% spoke Spanish. To the question two, "Which language(s) does the child understand better?", parents' reported that 54.9% understood English better, 9.8% understood both English and Spanish, and 35.3% understood Spanish better. For the final language question, "Which primary language(s) is spoken in the household", parents' reported that 48.1% Spanish was the primary language used in the household, 48.1% English was the primary language and only 3.8% reported that both languages were spoken in the household.

The majority of the (47.5%) children reported that they spoke Spanish. Thirty-nine percent reported that they did not speak Spanish, and 13.6% reported that they only spoke a little Spanish.

Critical Analyses

Hypothesis 1

To examine the associations found among children's ToM performance and positive and negative social behavior, Pearson's product moment correlation coefficients were computed. As expected, ToM and positive social behavior were significantly positively related ($r = .33$, $p < .05$); however contrary to other proposed hypotheses, ToM and negative social behavior were not significantly related (relational aggression, $r = -.16$, n.s.; and overt hostility, $r = -.12$, n.s.). The relationship among ToM, age, and vocabulary ability also was examined with a Pearson correlation. Only age and ToM were positively related,

($r = .57$, $p < .01$); whereas, ToM and vocabulary ability were not significantly related. Thus, a partial correlation was conducted to examine the relation between ToM and positive social behavior scores, over and above age; this was significant($r = .33$, $p < .05$). Thus as predicted, children who had greater ToM understanding, were more likely to demonstrate positive social behavior than those with less ToM knowledge, even after controlling for age. However, contrary to hypotheses, children with lower ToM insight were not likely to use this knowledge to engage in more frequent hostile or relationally aggressive behaviors.

Hypothesis 2

To examine the influence of gender on children's social behavior, a multivariate analysis of variance (MANOVA) was conducted to test the mean differences between the boys' and girls' ratings on the three social behaviors. Sex served as the between group variable and the dependent

measures consisted of the composite (parents and teachers combined) scores for positive, relational aggression, and overt hostility behaviors. Results are summarized in Table 2. The overall MANOVA was significant, [F (3, 66), = 4.29, η^2_p = .16, $p < .01$], but only the significant difference between boys' and girls' social scores was in positive behavior [F (1, 68) = 6.13, η^2_p = .08, $p < .05$]. Thus, while it was expected that girls had an advantage over boys in vocabulary, positive and negative social behavior, girls and boys did not significantly differ in vocabulary ability or negative social behavior.

Table 2

Means and Standard Deviations of Children's Scores on Theory of Mind Justification Question, Vocabulary Assessment and Social Behavioral Measures by Gender and Total Sample

		Female			Male			Total	
Variables	N	*M*	*SD*	N	*M*	*SD*	N	*M*	*SD*
ToM (2) Justification	38	10.37	4.65	24	10.25	4.76	62	10.32	4.65
Vocabulary	38	99.82	12.84	24	99.00	16.07	62	99.5	14.05
Positive Social	40	13.63	7.41	30	8.72	9.18	70	11.52	8.51
Rel Aggression	40	7.71	3.77	30	7.80	3.91	70	7.75	3.80
Overt Hostility	40	5.81	2.82	30	6.47	3.49	70	6.09	3.12

To test for overall gender differences in ToM performance, an independent *t*-test was conducted. Results indicated that there were no significant gender differences in ToM performance for girls (*M* = 10.37, *SD* = 4.65) and boys (*M* = 10.25, *SD* = 4.76); *t* (60) = .10, p > .05).

Hypothesis 3

Subsequent analyses to determine the influence of gender on ToM and negative social behaviors were not conducted since the previous analyses found no significant differences in girls and boys ToM performance, relational aggression and overt hostility.

CHAPTER V

DISCUSSION

The current study explored gender differences in ToM and examined the relations among vocabulary ability, ToM performance and social competence among school-age children. First, it was expected that children with increased ToM knowledge would obtain higher ratings of positive social behaviors, independently from their age and linguistic abilities. Secondly, it was expected that both boys and girls would relate differently on ToM performance, positive, and negative social behaviors. Both boys and girls with high ToM scores would be rated more highly on positive behavior. In addition, it was also proposed that girls who had higher levels of ToM would engage in more relationally aggressive behaviors than girls with lower levels of ToM scores, where as boys who had higher levels of ToM would engage in more physical aggression compared to boys with lower ToM scores. Lastly, it was expected that regardless of ToM performance, girls would engage in more relational aggression compared to boys, who would be rated more highly on overt hostility.

Theory of Mind and Language

Past research has demonstrated that language ability is important in ToM performance (Cutting & Dunn, 1999). It was expected that ToM would be related to children's vocabulary ability. Surprisingly, in this study, children's vocabulary ability did not correlate with their ToM

performance. This finding could suggest that the method used in this study had certain limitations. For example, perhaps, children's vocabulary skills did not adequately measure their capacity for expressive language. Given that the ToM stories increased in difficulty and were linguistically demanding, the finding that vocabulary did not relate to ToM performance is unexpected. Thus, future studies examining advanced ToM performance and its relationship to language ability should include a broader measure of language abilities including comprehension and focusing on the children's abilities to listen, read, and produce language. Another possible explanation for the lack of language and ToM association may lie in the purported mechanisms that are necessary for ToM acquisition. Opposing theories argue that ToM development exists as a result of either an innate learning mechanism or through social cognition. According to Modularity theorists, children develop a ToM through information processing and language abilities whereas, simulation theorists purport that children's ToM is acquired by simulating other's circumstances resulting in the child's ability to have access to his/her own mental states and then applying this understanding to others. This study's findings support the view that a child uses either role-taking approaches or accommodates and assimilates new information, and in turn, uses that information to understand the mental state of others.

Theory of Mind and Social Competence

As expected, this study supported previous findings indicating a positive relationship between ToM and positive social behavior (Liddle & Nettle, 2006; Watson et al., 1999). Thus, teachers and parents do perceive children with ToM ability to be more socially competent. In contrast to what was hypothesized, neither parent or teacher evaluations of children's relational aggression and overt hostility were related to ToM performance. Past findings have indicated that young children's ToM performance was linked to aggressive or disruptive behavior (Walker,

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2005); however, given their young age, these children likely were experiencing one of their first group settings and still refining their prosocial skills. With increased negative social behavior overall, it is more likely that at least some negative behavior was linked with children's improving ToM understanding. In contrast, the current study included older children who had currently attended school for at least two or more years and who were not rated with frequent negative behaviors. Also, parents who allowed their child to participate in this study may have been particularly more involved in their children's cognitive and social development than parents who did not choose to enroll their child in the study. Therefore, future research on the relationship between ToM ability and relational and physical aggression should include children in a clinical setting to increase the likelihood of finding a sample with a broad range of negative social behaviors.

Gender Differences

The hypotheses regarding gender differences on ToM ability, vocabulary, and social competence was partially confirmed. As expected, girls were found to be significantly rated more highly on their positive social behavior compared to boys. Interestingly, no gender differences were found on ToM ability. This result adds to the mixed findings on gender differences on ToM ability. Some previous researchers have found a weak gender effect for a female (ages 2-6) advantage on ToM performance (Charman, Ruffman, & Clements, 2002); other researchers have found that boys (ages 10-11) perform better than girls on advanced ToM tasks (Liddle & Nettle, 2006) while others have found no gender differences on ToM ability (O'Hare et al., 2009).

The lack of sex differences apparent in this study's ToM performance may be attributable to several factors. Given that the present study differed in several ways from past research, it is

difficult to identify the exact reasons for the discrepancies. For example, the age and normality of the sample differed, as well as the methodology. Most previous findings on ToM were based on ToM tasks that included forced-choice questions with either very young or older children. The present study's sample included children 6-12 years of age, thus it is possible that gender differences in ToM occur only among younger or older children. In the current study, 65% of children were below the age of 10, with 15% being younger than 7. Future studies specifically examining gender effects on ToM will need to include an equally balanced age level sample. Boys and girls differences on ToM performance also has been demonstrated by assessing the child with a series of forced-choice questions, these questions may have provided prompts that the child then could use to produce his/her final answer. When children's ToM performance is assessed with open-interview questions, the child is able to demonstrate his/her capacity to understand the mental state of others without being guided to a particular response. In addition, studies that have indicated gender differences in an older sample of children involved ToM tasks that increased with syntactic complexity, possibly confounding ToM performance with linguistic abilities. Future studies examining gender effects on ToM performance should include a variety of ToM tasks that involve some forced-choice and some open-interview questions which would allow for a broader assessment of ToM ability.

No gender effects on vocabulary ability were found to be significant. This finding is consistent with some past research (Bosacki & Astington, 1999). Future research examining the differences between boys' and girls' verbal ability should include language proficiency measures that encompasses a broad spectrum of the child's language ability including listening, speaking, reading, writing, and comprehension skills.

In contrast to what was hypothesized, no significant gender differences were found among ToM and negative social behaviors. Previous researchers have indicated that false belief understanding was significantly negatively correlated with aggression (Capage & Watson, 1997) while others have found a significant positive relationship between boys' ToM ability and aggressive and disruptive behavior (Walker, 2005). Findings previously mentioned consisted of young typically developing children. Perhaps, as children grow and experience more social interaction, their capacity for understanding the mental state of others increase and in turn facilitates positive social interactions. Children who display negative behaviors may have difficulty in regulating those behaviors rather than failing to understand the mental states of others. This study included a normative sample, as opposed to, children who were characterized as having behavioral problems. Teachers and parents consistently rated the children with low levels of negative behaviors, with 67 % of the sample engaging in very little relational aggression and 69% engaging in very little overt hostility. Although some of the ToM tasks involved some characteristics of negative behavior such as lying, sarcasm, and persuasion, it is possible that children understand the negative behavior of others, but do not use that understanding to engage in relational or physical aggression towards others. Future research seeking to examine gender effects between ToM ability and negative social behaviors should include a clinical sample which may increase the likelihood of finding children who consistently engage in these behaviors.

Contributions

Findings from the present study reveal the importance of assessing children with a multitude of ToM tasks. Previous studies have often based findings on only a few ToM measures. Also, ToM tasks administered in this study included open interviewed questions

evaluating the child's inference to the character's mental states. Most ToM tasks rely on two-alternative forced-choice questions which allow a child to guess the character's mental state; making interpretation of children's genuine mental state understanding difficult. Multiple open-interviewed questions most likely better assesses children's overall ToM capacity.

In addition, this study used social behavior measures from multiple raters-teachers and parent(s). Most studies rely on a single-method, either teacher reports or a behavioral observation (Cassidy et al., 2003). Additionally, the participants came from families that were predominantly Hispanic, extending research on ToM and social behavior to include the Hispanic population. Linguistic ability was assessed; previous studies have supported that children's language abilities are an essential source of information that helps define mental state terms. Lastly, family background variables (i.e., parental education, income) were examined in relation to ToM and social competence.

Other Limitations

Although associations between ToM performance and social competence were expected to be found among an older cohort, the present study cannot provide insight about causality, given the correlational cross-sectional design. A ToM skill might facilitate social behaviors, or social behaviors might lead to changes in ToM.

Future Directions

Future research in this area will need to examine psychosocial factors such as family environment (i.e., parenting styles and attachment) that may influence the child's psychological understanding abilities and social behaviors.

Lastly, the role of children's of executive functioning abilities, in the relationship among language, social competency and ToM would add to current findings and provides a deeper understanding of how school-age children think and feel about themselves and others.

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