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Social Skills as Predictors of Theory of Mind Development Among Children

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SOCIAL SKILLS AS PREDICTORS OF THEORY OF MIND DEVELOPMENT AMONG CHILDREN

A Thesis

by

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ABSTRACT

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The present study examined relationships among social skills including deceptive behavior, socioeconomic status, and theory of mind development in 98 predominantly Hispanic 3- to 7-year-old children residing in the Rio Grande Valley of Texas. Measures were of vocabulary, deceptive ability, true belief, and false belief understanding. Children's interactions with others were also measured through observational methods and parental data was obtained to compute socioeconomic status and validate social skills information. It was hypothesized that social skill development, including deception would emerge along with theory of mind understanding in this population, and that children from households of lower socioeconomic status would acquire less ToM. Neither hypothesis was supported. Findings suggest that cultural factors might play an important role in social and cognitive development.

DEDICATION

I dedicate the completion of my master's thesis to my wonderful parents, Ernesto and Sandra Salinas. It has been with their unconditional love, unfailing support, and utmost encouragement that I have been able to achieve the goals I have set out for myself. They embody the perfect examples of strength, dedication, and love, and I am incredibly blessed to have them as my best friends, confidantes, and parents. I love you two more than you will ever know.

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TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER I

INTRODUCTION

Theory of mind refers to the ability to attribute such mental states as beliefs, desires, and intentions, to oneself and other people, as a way of making sense of and predicting behavior (Premack & Woodruff, 1978). The most popular task used to assess ToM in children is the false belief (FB) task. The false-belief task assesses a child's ability to reason about the behavioral consequences of holding a mistaken belief (Milligan, Astington, & Dack, 2007). In connection with ToM false belief development is first-order reasoning, which is defined as the realization that it is possible to hold false beliefs about events in the world (Miller, 2009). A more advanced development is second-order reasoning, which is defined as the realization that it is possible to hold false beliefs about someone else's belief (Miller, 2009). Many researchers have described this development as predictive of the onset of socially significant behaviors. Among those behaviors, lie-telling has received increased attention in recent years (Talwar & Lee, 2008). Deceptive behavior, also known as lie-telling behavior, in children has been shown to develop in close proximity as the emergence of ToM, which contributes to many other social aspects of development. The present study will examine the relationship between ToM development and deceptive behavior among socially diverse young children.

Language

Language development has been shown to be a key factor in assisting children acquire ToM. ToM is necessary for communication through language and language might in turn offer a way to learn about ToM (Miller, 2006). Language acquisition provides a method for thinking and verbally illustrating mental states. For example, young children are exposed to conversations in which people predict and explain behavior in terms of beliefs, desires and feelings, which assist in children using terms such as *think* and *know* (Miller, 2006). The role of language in the development of false belief understanding is crucial for two main reasons. First, it provides a method for representing false belief regardless of the conflicting system of evidence in reality and second, language provides children the means to become aware of beliefs, thoughts, and desires (Astington, 2001).

Milligan, Astington, and Dack (2007) recently published a meta-analysis that found language ability and false belief are strongly related regardless of children's age. The studies reviewed measures of general language ability, semantics, syntax, memory for complements, and receptive vocabulary. In terms of ToM, it was found that only receptive vocabulary was weakly related to false belief understanding, as the receptive vocabulary measure is designed to assess a more limited and specific language ability. Moreover, the results showed that false belief understanding develops as a result of linguistic ability as well as providing a tool for promoting further language development. Most research suggests language skills support and develop ToM, but there is not sufficient research or an agreement regarding just how ToM develops.

Social Behavior and Theory of Mind

Current research has shown a connection between social behavior and ToM development. Nelson, Adamson, and Bakeman (2008) proposed that a child possesses coordinated joint attention with others, which is defined as active sharing of an object or event with a social partner. They conducted a longitudinal study focused on the connection between joint attention with infants ranging in age from 18-66 months and theory of mind understanding. The study followed the development of 42 participants (57% female). During the first phase of the study, assessments of joint-attention were provided during five visits (at three month intervals between 18 and 30 months). The Peabody Picture Vocabulary Test was administered at the 30-month mark, and false belief tasks were given at the 42-, 54-, and 66-month visits. The joint attention sessions lasted for two hours, and the mothers of the children were told to follow cue cards for a semi-structured play where the child was the center of attention, and the mother served as the supporting actress. These play sessions encouraged skills such as requesting, interacting, and commenting. At the play's completion, demographic information was collected and standardized tests were given. In order to code the level of engagement in joint attention between the child, mother, and/or object, four codes were used. Theses codes ranged from the most basic level of the child interacting with a toy the mother has given to him/her without acknowledging the mother, to the child engaging with the mother and the object while alternating gazes. After visits where joint attention was measured, two standardized false belief tasks were administered: the Changed Location Task and Misleading Container Task. These tasks were employed to measure children's understanding of others' beliefs and desires and included pass or fail criteria. The results of this study showed a statistically significant correlation between joint attention and ToM.

The relationship between ToM understanding and children's peer-related social competence was examined (Walker, 2005). The participants included 111 3- to 5-year-old children who were given two false belief tasks: a standard unexpected location task and a first-order false belief task. Teachers were asked to rate children's peer-related social behavior including prosocial behavior, aggression, disruptive behavior, and shy or withdrawn behavior. The tool used to measure social skills was an adapted version of the Profile of Peer Relations. Results indicated that, after controlling for age, ToM understanding was significantly correlated with aggressive or disruptive behavior for males, and prosocial behavior for females. There was also evidence that ToM related to lower scores of shy or withdrawn behavior in males. ToM has been shown to relate strongly to aspects of social behavior, including prosocial behavior.

Lie-telling Behavior in Children

With the emerging intrigue of lie-telling ability as a way of understanding children's social-cognitive development, recent studies have focused on its relationship to ToM development. Talwar and Lee (2008) attempted to find the relation between children's lie-telling behavior and their social and cognitive development. Children's conceptual moral understanding of lies, executive functioning, and ToM were also assessed. Previous research had shown that in order for a child to successfully maintain the initial lie told when asked follow-up questions, second-order false belief understanding must be developed since this development requires creating a false belief in the mind of another (Wimmer & Perner, 1983). This phenomenon is referred to as *semantic leakage control*, defined as the child's ability to sustain the transgression and act appropriately. Research has shown that a child with thriving semantic leakage control is usually around the age of six years, while the first-order beliefs, such as identifying false beliefs

about the environment, are seen to develop around three years of age (Talwar & Lee, 2002a). They used a temptation resistance paradigm to measure lying among 150 children (80 boys) between three and eight years of age. This is a scenario in which a child must identify a toy that plays a sound (e.g. Barney sings the “I Love You” song), without turning around to peek at the toy. Results showed that most 82% of preschool children would in fact lie about peeking at the toy, but were not able to maintain their transgression when asked follow-up questions. Five ToM tasks were used including the unexpected contents first-order false belief task, two unexpected location first-order false belief stories, and two unexpected location second-order false belief stories. For the unexpected contents tasks each child was presented with a box of Band-Aids in which some unexpected contents (i.e., crayons) were placed. The child was shown the Band-Aid box and asked what they thought was in the box. Following the child’s answer, the box was opened to reveal a set of crayons. Upon showing the child that the actual contents, the box was closed and the child was asked two questions about the contents of the box. First, the child was asked, ‘‘Before you looked inside, what did you think was in the box?’’ The child was then introduced to a puppet Max and asked, ‘‘What does Max think is in the box?’’. Each child was given 1 point for correctly answering each question. This procedure gave a possible score of 2. The unexpected location tasks involved two scripts. One story involved Mark who puts his chocolate in one location before going out to play. His mother moves the chocolate to a second location while he is away. Each child was asked, ‘‘Where will Mark look for his chocolate bar?’’ The second story was the Sally-Ann story where Ann moves Sally’s toy car while she is absent. Each child was asked, ‘‘Where does Sally think her toy car is?’’ For each story, the child received a score of 1 point for correctly attributing a false belief to the protagonist, for a total possible score of 2. Results showed that there exists a relationship between lie-telling and

children's first-order belief understanding. Children's lie-telling behavior and second-order belief understanding also were related.

Lee, Cameron, Doucette, and Talwar (2002) investigated whether young children are gullible and readily deceived by another's lies. The specific examination of this study was whether young children believe a lie teller's statement when the statement violates their developing knowledge of distinction between reality and fantasy. Subjects were 293 children ranging from three to six years of age, all from middle-income families. Three separate experiments were performed in which the child was presented with either a story or a live staged event. In each story an individual made an implausible statement about a misdeed (claiming that a ghost jumped out of a book and broke a glass). These experiments had two story scenarios one in which a story was told about a young girl who breaks a glass in her home and alleges to her mother that a ghost jumped out and broke the glass. The second scenario was a fantasy story in which the girl has a friend who is a ghost and she claims that the ghost had been the one to break the glass. The vital piece of this puzzle was that the child had to understand that ghosts are not real. Several control questions were asked throughout the experiment to solidify the child's understanding of reality and fiction. In these three experiments, a significant age effect was obtained whereby five- and six-year olds reported that the individual who made the implausible statement had actually committed the misdeed, while three- and four- year olds tended to accept the claim of the main character. The fourth experiment focused directly on the *Human Power Hypothesis*. Specifically, the procedure of this experiment was the same as the others yet involved two confederates, one that told an implausible statement and one that told a plausible one. The child's response was based on their understanding of the fantasy-reality distinction and the detection of implausibility in the confederate's statement. The implications in the scenario for

the child were that humans are more powerful than ghosts, hence the name of the hypothesis. This experiment involved the same story scenario from the first three experiments, but included two confederates and a question was asked as to whether humans were more powerful than ghosts. The results revealed that 43 five- and six- year olds not only disbelieved the implausible statement, but also inferred that the individual was lying and had a deceptive intent. The findings of this study suggest that 5- and 6- year olds are not as gullible as previously thought, and that they use their well-developed real-world knowledge to detect scapegoating lies. In contrast, many younger children tend to believe another's implausible lies, possibly due to the fact that the knowledge needed to detect lies has not yet been strengthened.

Talwar and Lee (2002b) also examined white-lie telling behavior in 98 three- to seven-year olds. Children were examined using a Reverse Rouge task. In this experiment, the children were asked to take a photograph of the experimenter. The experimenter would ask the question, "Do I look okay for the photo?". In the experimental condition, the experimenter's nose had a visible mark, and in the control condition it did not. The results showed that most of the children in the experimental condition did in fact tell white lies, defined as untruthful statements told without malignant or malicious intent. These lies are considered to have positive rather than negative values attached to them. Undergraduates were recruited to see if they could differentiate the white-lie tellers from the truth tellers. Undergraduates who saw videotaped responses could not discriminate the white-lie tellers from the control non-liars. The results of this study suggested that children are not always honest truth tellers, and are able to use facial expressions as well as verbal display rules to tell white lies in politeness situations.

Socioeconomic Status and Theory of Mind

In the area of social development, research has been done to determine whether social factors might be linked to deceptive behavior (Cole & Mitchell, 1998). Fifty-seven children ranging in age from 4 to 5 years of age were assessed for their ability to be convincing in an act of deception, and also for their understanding that minds are susceptible to deception (ToM). The mothers of 34 of the participants completed a questionnaire which provided information on socioeconomic status, parenting style, parental stress, and family structure. The child was tested on two different tasks: a facial management task and a ToM test battery including false belief, representational change, and appearance reality. A puppet was brought along during the experiment in order to test the false belief task. For the expressive deception task, "nice" and "nasty" puppets were introduced to the child, containing the villain Scar from the Lion King, and Father Christmas. The child was asked to identify the nice and nasty characters, and the puppet was again brought out. The child was asked to tell the puppet certain characteristics of the nice and nasty characters, and they were tested on their facial expressions when they responded to the puppet with something untrue about the characters. The results revealed significant associations with family background and deceptive ability. It was found that socioeconomic status is a predictor of understanding ToM in correlation with deceptive behavior.

Purpose

As research has expanded, there has been more of an emphasis on social behavior, including deceptive behavior, and socioeconomic status as factors that affect ToM development. As social skills are shown to promote the expansion of ToM understanding, lie-telling behavior

has been shown to emerge when children grasp the understanding of the thoughts, beliefs, and desires of others.

The current study focused on how social, cognitive, and socioeconomic factors affect ToM development among 3- to 7- year old children. The variables observed include social skills and deceptive behavior. Socioeconomic data also were collected through parental reports. It was specifically hypothesized that:

1. Children in households with lower socioeconomic status would acquire less ToM understanding than children from higher socioeconomic statuses.
2. ToM would positively relate with prosocial behavior and understanding of deception.

CHAPTER II

METHODOLOGY

Participants

The non-random sample for the study included 98 predominantly Hispanic children (89 Hispanic, seven Caucasian, one African-American, and one Filipino), 47 boys (*M*= 5.27, *SD*= 13.26) and 51 girls (*M*= 5.23, *SD*= 13.96) ranging from the ages of 3 to 7 years (*M*= 5.25, *SD*=13.56) of typical development recruited from childcare centers, public schools, and private families through word of mouth residing in the Rio Grande Valley area. These participants were recruited by word of mouth and included seven children from a Head Start program, 24 from local childcare centers, 65 children attending a local public elementary school, and two children from families residing in the local area previously known to the researchers. The children's parents were predominately Hispanic (*N*=164; 146- Hispanic, 14-Caucasian, two-African-American, and two-Filipino). Demographic data was collected on the children's parental education level and total household income. Parents were asked to answer what the highest educational level they had completed, and data was coded as: 1= grade school, 2= high school/GED, 3= vocational/technical school, 4= A.A. degree, 5= B.A./B.S. degree, 6= Masters or Professional degree, and 7= Ph.D./ M.D./ J.D. Demographics found that 28% of mothers and

21% of fathers held a bachelor's and/or an advanced degree. The mean total household income was between $30,000 and 40,000 (*SD* = $3,280).

Table 1

Means and Standard Deviations of Children's Age, Parental Education, and Total Income for Entire Sample.

Variables	*N*	*Min*	*Max*	*Mean*	*SD*
Male Age (Months)	47	38	89	63.27	13.26
Female Age (Months)	51	38	91	62.78	13.96
Mother's Education	90	1	7	3.06	1.74
Father's Education	79	1	7	3.01	1.65
Total Household Income	92	1	11	4.08	3.28

Figure 1

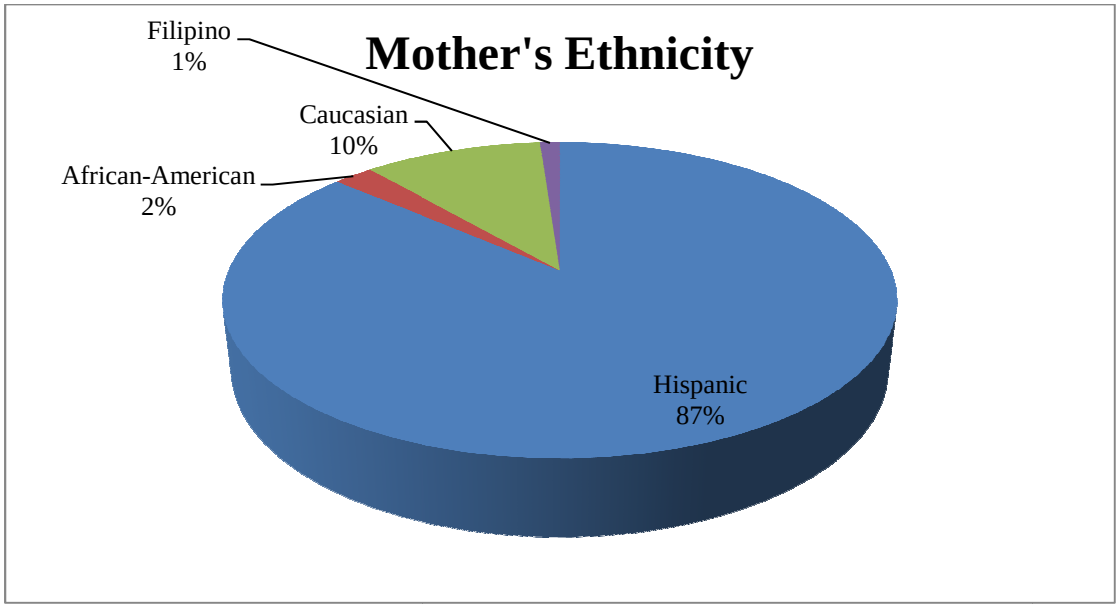
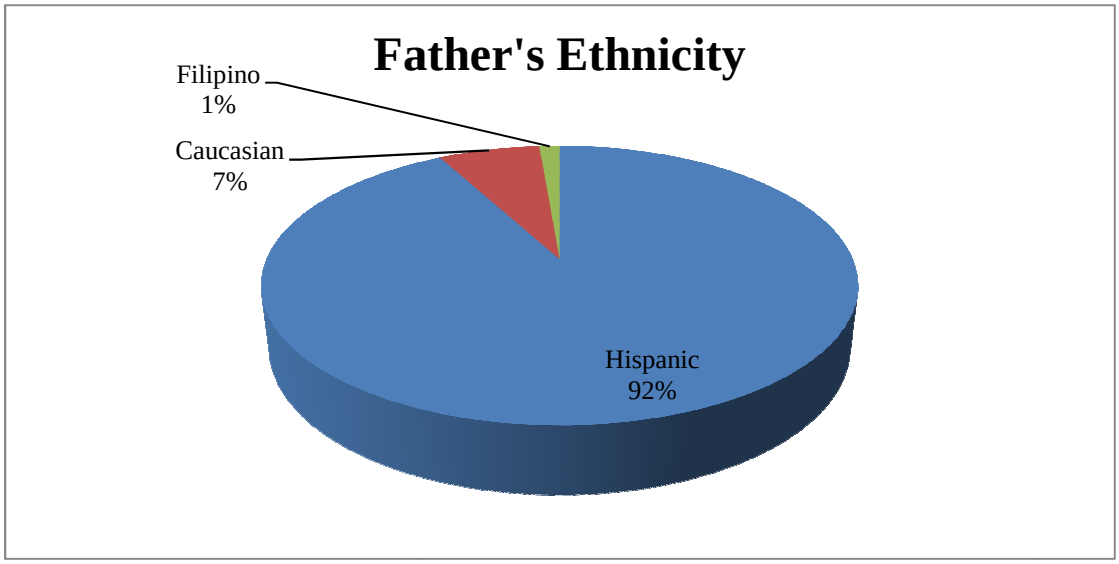


Figure 2



Measures and Procedures

The research team, which included undergraduate research assistants visited two childcare centers, two Head Start facilities, two public elementary schools, and two private homes throughout the Rio Grande Valley in order to acquire written permission from the directors of the facilities. Once written permission was given by the directors, packets were given to the teacher to distribute to parents; this packet included informed consent for the child as well as a demographic survey. All written forms were in English and Spanish. The translation process was adapted from Bullinger et.al (1998) which involved forward translations of the original U.S. - English questionnaire into Spanish by at least two translators who were native Spanish speakers.

Completed packets were collected from the parents by the teacher and returned to the research team. The informed consent form also included permission for the child to be video

recorded during the interview with the researcher. If the child obtained a language score sufficient enough to determine that they were proficient in either English or Spanish (e.g. understanding six words or more), the researcher proceeded with two ToM tasks as well as the Temptation Resistance Paradigm (Talwar & Lee, 2008). There were three children excluded from the study due to insufficient language scores. The ToM tasks were administered in random order with the Temptation Resistance Paradigm always given second in order to separate the two similar tasks by time. After the session, the child received an age-appropriate book for participating in the study.

Demographic Information Survey

The parent(s) completed a demographic form consisting of information regarding income, educational level and occupation, which was used to infer socioeconomic status (See Appendix A). Depending on the primary language the child spoke according to the parental survey as well as the initial observation of the child, the child was interviewed by the researcher in either English or Spanish. If the child was bilingual, the tasks were administered in the language used more frequently. There were 60 children tested in English and 38 tested in Spanish.

Language Assessment

To assess expressive vocabulary, children were administered the picture vocabulary subtest of the Woodcock-Munoz Language Survey-Revised (WMLS-R; Woodcock, Munoz-Sandoval, Ruef & Alvarado, 2005) and required to be minimally proficient in either English or Spanish. The task involved asking the child to identify pictured objects. The instrument had 59 pictured items that increased with difficulty, and each item was scored in a binary manner, 1=

pass, 0= fail, for a potential raw score of 6 to 59. Scoring was completed according to standardized procedures: raw scores were converted to scale scores with a mean of 100 and a standard deviation of 15. Furthermore, the children's parent(s) were asked to provide responses for two different language questions on the demographic survey. The first question was: "Which language(s) does the child speak"?", and secondly, "Which language(s) does the child understand better?". In the instances where the parent indicated the child was bilingual, the teacher was asked which language the child was more comfortable in, and those children were coded as bilingual.

Theory of Mind Tasks

Two tasks were used to assess ToM: a first-order false belief task and a first-order true belief task. The first-order false belief task was administered once, and used to test the child's ToM understanding. It was an updated task developed by Fabricius, Boyer, Weimer, and Carroll (2010) where a child is shown a box of crayons that contains some other object (i.e., a penny). The other object was returned to the box, and the child was introduced to a doll, and asked if the doll would know the contents of the box without looking inside the box. A justification question followed which asked the child, "Why would the child think that is inside the box?". The second ToM task was a first-order true belief task which was administered once during the same session as the Temptation Resistance Paradigm and false belief task. This task was very similar to the first task in which a child was shown a box of cookies and revealed that some other object was inside (i.e., a marker). The marker was then replaced by the actual cookies belonging to the box in plain sight of the child. The child was then introduced to a doll and asked if the doll would know the contents of the box without looking inside the box. A justification question followed which asked, "Why would the child think that is inside the box?".

The coding of these tasks was separated into three categories: belief reasoning (BR), reality reasoning (RR), and perceptual access reasoning (PAR). Children using the belief reasoning (BR) approach should reason that the other person will think that the container holds crayons because it is a crayon box. Children using the reality reasoning (RR) should infer that the other person will think that the container holds a penny as opposed to crayons because there is actually a penny inside. Perceptual access reasoning (PAR) has two defining guidelines: (1) seeing, or perceptual access, leads to knowing, while not seeing leads to not knowing; and (2) knowing results in acting correctly, and not knowing results in acting incorrectly. Children who responded with PAR should infer that another person will not see the contents and therefore will not know that crayons are inside, and as a result will be mistaken and say the container holds a penny. If the child does not give a response to the justification question or if the answer is completely out of context, it was also coded under PAR.

Children who use RR should pass the true belief task and fail the false belief task. Children who use PAR should fail the true belief task and pass the false belief task. Those who use BR should pass both. Although this method does not require classifying justifications, it does presuppose consistency of strategy use across true and false belief tasks. Thus, both children's passing/failing scores and justifications for responses were used to code ToM reasoning level in the present study.

Lie-telling Behavior Task

The temptation resistance paradigm was used to examine children's lying behavior (Lewis, Stanger & Sullivan, 1989). This task was administered between the two ToM tasks so the child would be less likely to remember the previous task. In this paradigm, the child was

brought into a room with a researcher. In this room, each child and the researcher played a guessing game. Children were asked to turn around in their chair so their backs were to the researcher while the researcher played a sound from a toy. They were instructed not to break the rules by turning around in their chair to peek at the toy during the game, only when they were instructed by the researcher to do so. Upon hearing the sound of the toy, the child was asked to guess the identity of the toy. All of the toys were from familiar movies or cartoons (e.g., Elmo, Dora the Explorer, and Barney) and were presented in random order for each child. Throughout the game, the child was reminded repeatedly of the rule to not peek at the toy. This was a major modification of the task by Talwar & Lee (2008) which found that asking children to tell the truth when asked about peeking to see the toy was critically important. After identifying two toys, the researcher was called out of the room and the child was told that a toy would be playing a sound while the researcher was gone. The toy was a familiar toy with an unrelated sound, so that the child was unable to guess the correct identity of the toy with the sound given. The child was being video-recorded while the researcher was out of the room. After approximately a minute had elapsed, the researcher returned and asked the child to promise to tell the truth on whether or not the child peeked at the toy. The researcher asked: “When I was gone, did you peek at the toy?” and a follow-up question, “Who do you think the toy is?” Children who gave correct answers on the identity of the toy were asked the justification question, “How did you know who the toy was?”.

Peeking Behavior. The video-recording session was reviewed by research assistants in order to determine whether the child did in fact peek at the toy when the researcher was out of the room as well as the latency of when the child turned to look at the toy, if he/she did glance at it.

Lie-telling Behavior. Once collected, data were coded categorizing children into three categories: lie-tellers, confessors, and non-peekers. The categorization was dependent upon how the child answered the initial question: "When I left the room, did you peek at the toy?" If the child answered this question with a "no" but did in fact peek, they were categorized as lie-tellers, if they answered "yes", they were considered confessors, and if they answered "no" and did not turn around to peek, they were considered non-peekers.

Semantic Leakage Control. If the child was categorized as a lie-teller, his/her response to the question: "Who do you think the toy is?" was examined and coded. If the response was correct (the child answered with the correct identity of the toy), the follow-up question "How did you know who the toy was?" was examined and coded into two categories: a plausible lie (e.g. "My sister has that toy" or "I heard Barney sing that song on TV"), or implausible lie (e.g. "Because he is purple" or "I don't know"). These responses were analyzed in order to further examine children's ability to maintain their initial lie.

Social Behavior Data

Researchers observed the participants from a distance during a free-play or recess period for 10 minutes. Data was obtained by using a frequency count method as well as recording the duration the child spent in particular types of play. The items that were observed included: play time alone, play time with peers, initiating play with peers, accepting a social invitation, and inactivity alone. The researchers used a stopwatch to determine the amount of time the child spent in each particular activity for the 10 minute observation period. Once the frequency and duration data was obtained, researchers completed an evaluative questionnaire consisting of three questions: "This child talked with others", "This child played alone", and "This child played with

others”. Response options included: Frequently, Moderately, and Minimally. The children were observed at different times by two different researchers in order to ensure reliability. Once collected, the duration data was analyzed by category and descriptive statistics were obtained. Duration data from the social category “Played with Others” was excluded from analyses due to unreliable data (interrater reliability >.60). The remaining categories were aggregated and analyzed. See results section for intercorrelations among these.

CHAPTER III

RESULTS

Preliminary Analyses

Descriptive statistics are reported for the social behavior and ToM reasoning variables in Table 2. Independent sample *t* –tests were conducted to examine gender differences in social behavior, ToM, and vocabulary. There were no significant differences across these variables.

Table 2

Means and Standard Deviations for Social Behavior Variables and ToM.

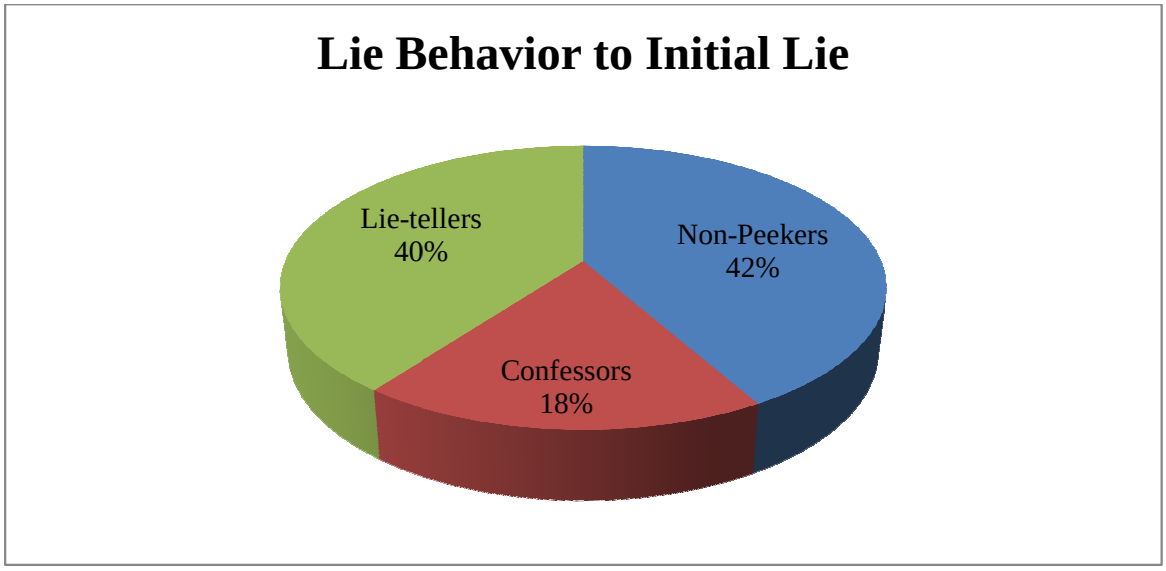
Variables	*N*	*Min*	*Max*	*Mean*	*SD*
Social Observation Evaluation-Child Talked with Others	91	1	3	2.24	.68
Social Observation Evaluation-Child Played Alone	91	1	3	2.43	.58
Social Observation Evaluation-Child Played with Others	91	1	3	2.24	.73
Social Observation Duration (Seconds)- Play Alone	67	10	600	251.61	163.14
Social Observation Duration (Seconds)- Initiated Play with Others	62	5	504	166.27	134.06
Social Observation Duration (Seconds)- Accepts Social Invitation	39	5	600	149.97	144.40
ToM Reasoning	97	1	3	1.48	.75

Lie-telling Behavior

To examine the relationship between children's lie-telling behavior and the different social measures, a series of preliminary analyses were conducted. First, descriptive statistics regarding children's peeking and lie-telling behavior were computed. Second, descriptive statistics were also obtained to report the length of time before a child peeked from the video-recordings of the children. Lastly, children who were classified as lie-tellers were further examined with their lie response, and descriptive statistics were obtained for this data as well.

Lie-telling and Peeking Behavior. Of the 98 children who participated in the study, there were 41 non-peekers, 18 confessors, and 39 lie-tellers. Of the lie-tellers, 25 answered incorrectly or gave no answer to the follow-up question and 15 gave plausible answers about the identity of the toy. Overall, 58% of the children (57), peeked at the toy in the experimenter's absence, and on average, children peeked 15.48 seconds after the experimenter left the room (*SD*= 16.87).

Figure 3



Social Behavior

Intercorrelations among the social variables were computed to ensure reliability of the observational data and are shown in Table 3 below. This table also shows the intercorrelations among age, vocabulary assessment, total household income, the three social behavioral survey items, and the three social behavioral duration items.

Table 3

Intercorrelations among Age, Vocabulary, and Social Observation Variables for Entire Sample.

Variables		1	2	3	4	5	6	7	8	9
1. Age (Months)	Pearson Correlation		.19	-.08	.15	.06	.00	-.07	-.16	.18
	N		98	92	91	91	91	67	62	39
2. Vocabulary	Pearson Correlation			.11	.22*	.25*	.23*	-.07	.00	-.06
	N			92	91	91	91	67	62	39
3. Total Household Income	Pearson Correlation				.07	.15	.15	.12	.07	.16
	N				85	85	85	62	59	35
4. Social Observation Evaluation- Child	Pearson Correlation					.58**	.86**	-.59**	.45**	.04
Talked with Others	*N*					91	91	67	62	39
5. Social Observation Evaluation- Child	Pearson Correlation						.71**	-.14	.31*	-.16
Played Alone	*N*						91	67	62	39
6. Social Observation Evaluation- Child	Pearson Correlation							-.50**	.40**	-.03
Played with Others	*N*							67	62	39
7. Social Observation Duration (Seconds)-	Pearson Correlation								-.19	.02
Played Alone	*N*								43	31
8. Social Observation Duration (Seconds)-	Pearson Correlation									.13
Initiated Play with Others	*N*									32
9. Social Observation Duration (Seconds)-	Pearson Correlation									
Accepts Social Invitation	*N*									

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Critical Analyses

Critical analyses were then conducted to test the two hypotheses. To test Hypothesis 1, which was that children in households with lower socioeconomic status would acquire less ToM development than children from higher socioeconomic statuses, the relationship between total household income and children's ToM reasoning was examined. Table 4 shows the intercorrelations among age, vocabulary, income, and ToM. Although ToM was positively and significantly correlated with age (r =.37, p < .01) and vocabulary (r = .23, p < .05), it was not significantly related to income (r = .12). Thus, Hypothesis 1 was not supported.

Table 4

Intercorrelations among Age, Vocabulary, Total Household Income, and ToM Reasoning.

Variables		1	2	3	4
1. Age (Months)	Pearson Correlation		.19	-.08	.36**
	N		98	92	97
2. Vocabulary	Pearson Correlation			.11	.23*
	N			92	97
3. Total Household Income	Pearson Correlation				.12
	N				91
4. ToM Reasoning	Pearson Correlation				
	N				

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

To examine the first part of Hypothesis 2 (ToM will positively relate with prosocial behavior), correlations between ToM and all social variables were computed and are shown in Table 5. There was no significant relationship between ToM and any social variable.

Table 5

Correlations among Social Observation Variables and ToM Reasoning.

Variables		ToM Reasoning
Social Observation Evaluation-Child Talked with Others	Pearson Correlation	0.103
	N	90
Social Observation Evaluation-Child Played Alone	Pearson Correlation	0.057
	N	90
Social Observation Evaluation-Child Played with Others	Pearson Correlation	0.01
	N	90
Social Observation Duration (Seconds)- Played Alone	Pearson Correlation	-0.05
	N	66
Social Observation Duration (Seconds)- Initiated Play with Others	Pearson Correlation	0.145
	N	62
Social Observation Duration (Seconds)- Accepted Social Invitation	Pearson Correlation	0.125
	N	39

To examine the second part of Hypothesis 2 (ToM will positively relate with understanding of deception), only those children categorized as lie-tellers were selected for analysis. The relationship between lying effectiveness and ToM was examined, and was not significant, ($r = .09$, $p > .05$). Patterns within the data were also examined, but there was no clear relationship between lying effectiveness and ToM. Table 6 depicts the relationship between the

lie-teller's response and the three different ToM reasoning categories. Most children who lied (24 of 40) during the Temptation Resistance Paradigm were classified as PAR, with only 7 of 40 classified as BR.

Table 6

Correlations of Lie-Tellers Responses and ToM Reasoning by Number of Participants.

Type of Response to Initial Lie	ToM Reasoning Codes			Total
	PAR	RR	BR	
Incorrect Response/ No Answer	16	5	4	25
Plausible lie	8	4	3	15
Total	24	9	7	40

CHAPTER IV

DISCUSSION

Theory of Mind and Lie-telling Behavior

While past research has found that children acquire ToM understanding around age 4 (Flavell, 1999), the results of the present study indicate that most children, even at an average age of 6.23 years, did not understand belief. In terms of lie-telling behavior, Talwar and Lee (2008) found that when given the opportunity, 64% of children would lie and attempt to maintain that lie. The present study found that 42% of the sample would resist the temptation to turn around and peek at the toy altogether. Thus, the results of the present study suggest that Hispanic children may have less ToM understanding, and more honesty than Australian children has indicated.

This study found a positive and significant correlation with age and ToM ($r = .36$, $p < .01$), and a positive and significant correlation with language and ToM ($r = .23$, $p < .05$). Previous research has supported these findings and has shown the strong relationships between age and language with ToM. This was a significant finding in the present study.

Social Behavior

In terms of the social observation variables, Cassidy, Werner, Rourke, and Zubernis (2003) found that mental state understanding was positively correlated with social behaviors measured by teacher ratings of social skills, behavioral observers' global rating of

social skills, as well as peer popularity. Their sample included 67 children ranging in age from 37-65 months. Results showed that ToM and teacher ratings of social skills were correlated as well as the global rating observation measure. They observed children for a total of 40 minutes. This study differed in that two 10 minute behavioral observation sessions were utilized in order to measure social skills among children. There were no other measures of social skills and behavior employed in this study. This study found that social measures defined by children's play behavior with others were not related to ToM. These findings could be due to limited social measures and shortened time during behavior observations along with only one tool used to measure the child's social skills. Behavior observation performed by researchers proved to be pertinent to the present study, but a more global and precise tool for measuring behavior could have been used along with the observation data in order to provide a more accurate gauge for children's social skills and social behavior. Teacher and parent surveys along with observation data needs to be utilized together in order to accurately measure the child in every social aspect.

Study Strengths

The present study had several strengths. As mentioned above, this study replicated previous findings in showing a positive and significant correlation between age and language with ToM. These results provide evidence for the idea that as children grow older and their language abilities develop, ToM develops as well. The population that was examined was predominantly Hispanic. Talwar and Lee (2008) examined ToM and children's deceptive behavior in a predominantly Caucasian population, therefore this study is beneficial in investigating these relationships among children from different races and ethnicities. However, results might not be generalizable to the majority as well as other minority groups. The Rio Grande Valley affords a unique sample that is not necessarily generalizable to other regions of

the world. Thus ethnic and cultural factors need to be further considered when conducting studies in this area.

Limitations and Future Research

The relationship between ToM and lie-telling behavior is one that requires further investigation. The coding system involving Perceptual Access Reasoning, Reality, and Belief reasoning proves to be more detailed in viewing ToM differences as opposed to placing them in the black and white categories of having a ToM or not having a ToM. Using this methodology though, there were very few children classified as belief reasoners. Thus, more ToM tasks should be employed in the future or the age range tested should be expanded upward.

Deception and social behavior measures should also be expanded to different environments in order to ensure a more global understanding of the child. Because of ethical considerations, measures used to study children's lying behavior only assessed minor types of lying, lies that are not considered severe and of great magnitude. It might be helpful to examine if the child's lying behavior would differ if the lie itself was of a greater weight.

In order to properly measure social skills, there should be feedback from teachers, parents, researchers, and the children themselves. These variables are crucial in truly understanding child development from cognitive and social perspectives, and future directions of this research will only benefit the field of psychology.

REFERENCES

Astington, J. W. (2001). The future of theory-of-mind research: Understanding motivational states, the role of language, and real-world consequences. *Child Development, 72*, 685-687.

Bullinger M., Alonso, J., Apolone, G., Leplège, A., Sullivan, M., Wood-Dauphinee, S., Gandek, B., Wagner, A., Aaronson, N., Bech, P., Fukuhara, S. Kaasa, S. Ware, J. E. (1998). Translating health status questionnaires and evaluating their quality: The IQOLA project approach. *Journal of Clinical Epidemiol*, 51, 913–923.

Cassidy, K. W., Werner, R. S., Rourke, M., & Zubernis, L. S. (2003). The relationship between psychological understanding and positive social behaviors. *Social Development, 12*, 199-221.

Cole, K., & Mitchell, P. (1998). Family background in relation to deceptive ability and understanding of the mind. *Social Development, 7*, 181-197.

Fabricius, W.V., Boyer, T.W., Weimer, A.A., & Carroll, K. (2010). True or false: Do 5-year olds understand belief? *Developmental Psychology, 46*, 1402-1416.

Flavell, J.H. (1999). Cognitive development: Children's knowledge about the mind. *Annual Review of Psychology, 50*, 21-45.

Lee, K., Cameron, C.A., Doucette, J., & Talwar, V. (2002). Phantoms and Fabrications: Young children's detection of implausible lies. *Child Development, 73,* 1688-1702.

Lewis, M., Stanger, C., & Sullivan, M. (1989). Deception in 3-year-olds. *Developmental Psychology, 25,* 439 – 443.

Miller, C. A. (2006). Developmental relationships between language and ToM. *American Journal of Speech-language Pathology, 15,* 142-154.

Miller, S.A. (2009). Children's understanding of second-order mental states. *Psychological Bulletin, 135,* 749-773.

Milligan, K., Astington, J. W., & Dack, L. A. (2007). Language and theory of mind: Meta-analysis of the relation between language ability and false-belief understanding. *Child Development, 78,* 622-646.

Nelson, P.B., Adamson, L.B., & Bakeman, R. (2008). Toddlers' joint engagement experience facilitates preschoolers' acquisition of theory of mind. *Developmental Science, 11,* 847-852.

Premack, D., & Woodruff, F. (1978). Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences, 4,* 515-526.

Ruffman, T., Slade, L., & Crowe, E. (2002). The relation between children's and mothers' mental state language and theory-of mind understanding. *Child Development, 73,* 734–751.

Talwar, V., & Lee, K. (2002a). Development of lying to conceal a transgression: Children's control of expressive behavior during verbal deception. *International Journal of Behavioral Development, 26,* 436-444.

Talwar, V., & Lee, K. (2002b). Emergence of white-lie telling in children between 3 and 7 years of age. *Merrill-Palmer Quarterly, 48,* 160-181.

Talwar, V. & Lee, K. (2008). Social and cognitive correlates of children's lying behavior. *Child Development, 79,* 866-881.

Walker, S. (2005). Gender differences in the relationship between young children's peer-related social competence and individual differences in theory of mind. *The Journal of Genetic Psychology, 166,* 297-312.

Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition, 13,* 103 – 128.

Woodcock, R.W., Munoz-Sandoval, A. F., Ruef, M. L., & Alvarado, C. G. (2005).*Woodcock Munoz Language Survey-Revised*. Itasca, IL: Riverside Publishing.

APPENDIX A

Appendix A

ID: _____ (Please do not write your name on this form)

Demographic Information Survey

1. How many adults currently live in the child's household?_____

Please circle all that apply:

(Step)Mother (Step)Father Grandfather Grandmother Other_____

2. How many <u>older</u> siblings live with your child? _____

3. How many <u>younger</u> siblings live with your child? _____

4. What language does your child currently understand better? English or Spanish

5. What language can your child currently speak better? English or Spanish

(Step)Mother:
Age_____
Ethnicity _____
Religious Affiliation _____
Highest Educational Level Completed
_____ Grade School
_____ High School/GED
_____Vocational/Technical School
_____ A.A. Degree
_____B.A./B.S. Degree
_____Masters or Professional degree
_____ Ph.D. /M.D./J.D.
Currently Employed? Yes ____No____
Occupation_____

(Step)Father:
Age_____
Ethnicity _____
Religious Affiliation _____
Highest Educational Level Completed
_____ Grade School
_____ High School/GED
_____Vocational/Technical School
_____ A.A. Degree
_____B.A./B.S. Degree
_____Masters or Professional degree
_____ Ph.D. /M.D./J.D.
Currently Employed? Yes_____ No ____
Occupation_____

Total Household Income Yearly:

_____ Less than $10,000
_____ 10,000-20,000
_____ 20,001-30,000
_____ 30,001-40,000
_____ 40,001-50,000
_____ 50,001-60,000
_____ 60,001-70,000
_____ 70,001-80,000
_____ 80,001-90,000
_____ 90,001-100,000
_____ Over 100,000

APPENDIX B

Appendix B

(Place Crayon box on table)

Researcher: *Take a look at this box.*

Inference Question: What do you think is in here? _____

Researcher: *I am going to show you what is in here. It is a penny.* **[Remove penny and let child touch it. Put penny on table near box.]** *Now I am going to put the penny back inside the box.*

Control Question 1: What kind of box is it?_____

Control Question 2: What is really inside the box? _____

[Open box to show penny, close again. **NOTE: If child fails control, retell story**.]

Belief Question: What if another child came in who hasn't seen inside this box. When he first looks at the box, before he opens it, will he think there is

Crayons or a Penny inside? Penny or Crayons inside?

Child's Response:_____

Justification question: Why will the other child think that?

Child's Response:_____

APPENDIX C

Appendix C

(Place Oreo cookie box on table)

Researcher: *Take a look at this box.*

Inference Question: What do you think is in here? _____

NOTE: If necessary, ask in this order (circle if used): Avoid telling the child its Oreo cookies.

I. "What does the box look like it will have inside?
II. "Can you guess what will be inside?"
III. "What kinds of things come in a box like this?

Researcher: *Now I am going to show you what is in here. It's a marker. Now I am going to put these cookies inside the box instead.*

Control Question 1: What was inside the box first? _____

Control Question 2: What is inside the box now? _____

Researcher: *I have a friend standing right outside the door. (S)He's never seen inside this box.*

Belief Question:

When (s)he first looks at the box, before (s)he opens it, will (s)he *think* there are

Cookies or a marker inside? A marker or Cookies inside?

Child's Response: _____

Justification Question: "Why will my friend think that?"

Child's Response: _____

BIOGRAPHICAL SKETCH

Lucia A. Salinas was born in McAllen, Texas on May 4, 1985. Her family consists of Rio Grande Valley natives primarily from Pharr, Texas and Elsa, Texas.

She attended the Oratory Academy private school before attending the McAllen School District where she graduated from McAllen High School in 2003. In August of 2009, a Bachelor of Science in Psychology was conferred to Ms. Salinas by the University of Texas-Pan American. In the fall of 2009, she pursued her master's degree in Experimental Psychology, with a concentration in Applied Behavior Analysis at UTPA, and she graduated in December of 2011. She aspires to continue working with children and adults with autism and pursuing a PhD in Applied Behavior Analysis.

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