

CULTURAL DIFFERENCES IN MEXICAN- AND ANGLO-AMERICAN  
ADOLESCENTS' SCHOOL SUCCESS: THE MEDIATING ROLE OF ADOLESCENTS'  
THEORY OF MIND

By

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## ABSTRACT

The present study investigated the development of mental state understanding among 314 Mexican- and Anglo- American adolescents approximately 11- to 14 years of age ( $M = 12.93$  years) from intact and step-families. Adolescents' constructivist understanding of the mind was hypothesized as a mediator between family background variables, including the quality of parent-child relationships and cultural values, and adolescents' social and academic success, beyond socioeconomic status (SES). Understanding of mind was assessed using questions about the role of mental processes in the interpretation of experience. Responses which reflected adolescents' constructivist understanding of the mind were differentiated from those that reflected an empirical view of the mind. Adolescents reported about their perceptions of parent-child relationships using items based on those in the acceptance, rejection, and consistent discipline scales of the Child's Report of Parent Behavior Index (CRPBI). Cultural values were assessed using a version of the Mexican- and Anglo-American Acculturation/Enculturation Scale (MAAS). Mothers, fathers, and teachers completed questionnaires about adolescents' problem social behavior using items adapted from the Behavior Problems Index (BPI). School data, including grades and standardized test performance, were obtained as measures of academic achievement. Aspects of parent-child relationships and cultural values predicted adolescents' understanding of the mind, but this understanding was unrelated to measures of social behavior and academic performance, after controlling for SES. Thus, there was no support for the mediational hypothesis, but results suggest that parent-child relationships and cultural values play a role in adolescents' theory of mind development.

## Introduction

Several studies have suggested that the ability to consider multiple perspectives positively affects social relationships (e.g., Hansen, Nangle, Meyer, 1998). Given that children experience many advances in social reasoning abilities during early adolescence (Carpendale & Chandler, 1996; Chandler & Lalonde, 1996), it is especially important to consider when and how these advances relate to social abilities during this period of development. Some research has suggested that family background factors, including the quality of parent-child relationships and cultural values, play a role in children's ability to consider other individual's perspectives (Gordon, 1988; Humfress, O'Connor, Slaughter, Target, & Fonagy, 2002). It is important to examine how these factors affect social reasoning abilities, as well. Theoretically, advances in social perspective-taking also might improve academic abilities (e.g., Gardner, 1991), yet little research has explored this possibility. If advances in cognitive abilities have a positive impact on social and academic outcomes, perhaps adolescents' social reasoning abilities mediate the relationship between family background factors and social and academic outcomes. The present study examines this hypothesis. The goals of the present study are threefold: 1) to examine how such family variables as parent-child relationships and cultural background relate to adolescents' understanding of mental states, 2) to explore how adolescents' understanding of mental activity relates to social and school outcomes, and 3) to examine whether mental state understanding could mediate the relationship between cultural background, quality of parent-child relationships, and adolescents' ability to succeed socially and academically, above and beyond socioeconomic status.

*Children's Understanding of the Mind*

Social cognition refers to the process of thinking about oneself and others. One aspect of social cognition is children's theory of mind (ToM) understanding, which refers to understanding that people have such mental states as thoughts, beliefs, and intentions, and that these cognitions can differ from one's own and other individuals' mental states. Theory of mind understanding typically begins to develop between the ages of 3 and 5 years (Wellman, Cross, & Watson, 2001). Most ToM researchers have examined the ability to reason about mental states among young children, but ToM development does not end in the preschool years. There are several important developmental changes in mental state understanding that occur in later childhood (Carpendale & Chandler, 1996). For example, around age 8, children begin to understand the constructive nature of the mind. At this age, children begin to understand that states of knowing are not dichotomous or static: the mind reorganizes representations to accommodate new knowledge (Moore, Bryant, & Furrow, 1989). Older children understand the interpretational nature of the mind when they understand that the same situation may lead different people to have different experiences (Schwanenflugel, Fabricius, & Noyes, 1996). These important later developmental changes in mental state understanding remain relatively understudied in comparison to the numerous studies that have examined young children's development. Thus, the present study examines advanced understanding of mental activity among 11- to 13-year-old children.

Researchers who have explored children's mental state understanding beyond the preschool age often have relied on false belief tasks based on those developed for younger children. Perner and Wimmer (1985) investigated 5- to 8-year-olds' second-order understanding, which refers to understanding one person's beliefs about another's beliefs, using a task based on

the Maxi task (Wimmer & Perner, 1983). The Maxi task is a paradigm for assessing young children's false belief understanding and involves an object (e.g. a piece of chocolate) being moved to another location while one character (Maxi) is away. Participants observe two characters together (Maxi and his mother). Maxi places the object in one location and then leaves. While he is away, Maxi's mother moves the object from the original location to a second location. Then the participant is asked where Maxi will look for the object upon his return. Because Maxi holds a false belief as a result of the unexpected change in the location of the object, children who respond that Maxi will think the object is still in its original location pass the false belief question.

Perner and Wimmer (1985) modified the Maxi task to assess children's second-order false belief understanding. They presented children with stories in which two characters, (John and Mary), see an ice-cream vendor at the park. Each character is then independently informed that the ice-cream vendor has moved to a new location. Neither John nor Mary knows that the other has been told the new location. Children were asked where John thinks Mary would go to buy an ice-cream. To respond correctly, children must indicate that John *believes* that Mary *believes* that the ice cream man is in the park. The findings across the six experiments varied, but in general they suggest that children begin to grasp second-order understanding around 6 years of age.

Carpendale and Chandler (1996) also have investigated mental understanding among 5- to 8-year-old children in several ways. They used classic tests of false-belief, asked children about such problems of interpretation as lexical ambiguity (e.g., two characters assumed two different meanings of a word), ambiguous referential communication (e.g., two characters hold two different interpretations of an ambiguous message), ambiguous figures (e.g., two characters

describe an ambiguous drawing differently), and matters of taste. All 5- to 8-year-old children passed the tests of false belief, but very few 5- to 6-year-old children passed the tests of interpretation. This was in contrast to the many older children who passed tests of interpretational understanding (77 percent of 7- to 8-year-olds). Thus, Carpendale and Chandler have suggested that older children have a more mature grasp of the individualized nature of thought compared to preschool children. Further studies comparing children's understanding of false belief and interpretation also suggest that older children undergo cognitive advancements that allow them to appreciate others' differing interpretations (Lalonde & Chandler, 2002). Together, these studies suggest that children begin to understand the mind as constructive around 7 years of age.

School-age children's understanding of the epistemic concepts of evidence, inference, and truth also provide some insight as to the developmental sequence of mental state understanding. Kalish, Weissman, and Bernstein (2000) investigated children's understanding that conventions (e.g., novel game rules, names of dolls) are constructed by people's beliefs. In a series of three experiments, they assessed 3- to 7-year old children's abilities to understand that conventions can change reality. In Experiment 1, 3- to 4- year old children were asked questions to assess their understanding of their own and a puppet's conventions (rules of a game), beliefs, and pretenses. Questions included asking children to track the representations people hold and form when engaging in conventions after the rules were changed. Children performed poorly at this task. Experiment 2 was designed to assess whether 3- to 6-year old children understand that conventions establish truth. It involved "pretending" and "deciding" conditions in which the researcher and child *pretended* that a doll belonged to the child, or *decided* that the doll belonged to the child. Children were asked questions about reality. For example, "Whose doll is it, mine or

yours?” A third character was brought in, who was ignorant of the decision (or shared pretense), and exclaimed, “Oh look, that’s [child’s] doll.” Children were asked if the character was right or wrong. Thus, this assessed their understanding that the convention (of deciding who the doll belonged to) had created reality. Only the oldest group of children, (6-7 years of age) consistently judged that conventions, but not pretenses, could change reality. Experiment 3 assessed 3- and 5-year-old children’s understanding of the relation between conventions and representations. Children were assessed on four tasks: belief, pretend, control tasks, (Gopnik & Slaughter, 1991) and a similar task that involved a change in convention, as opposed to a change in location. This convention task involved asking children what they thought a doll’s name was, and then telling them the actual name of the doll. Children were then asked what they had previously thought the name was. Younger children only performed better than chance on the pretend and convention tasks, while 5-year-olds performed better than chance on all tasks. Thus, there appears to be age related improvement in children’s representational understanding, such that 6- and 7-year-old children have a better understanding that reality is constructed by the mind, compared to younger children. Although Kalish et al. (2002) have investigated young children’s epistemic understanding, their findings apply to understanding children’s developing theories of mind in general. In particular, this study is consistent with current research that suggests that older children undergo advances in their theory of mind development.

Developmental changes in school-age children’s understanding of the constructivist nature of the mind also have been evidenced by increased knowledge about mental state verbs. For example, Moore et al. (1989) investigated 4- to 8-year-old children’s understanding that the terms know, think, and guess are used to express relative certainty. They asked children to find hidden candy with the help of puppets, who either *knew*, *thought*, or *guessed* the location of the

candy. Results indicated that by age 5, children can distinguish between *know* and *think*, but not *think* and *guess*. They could not distinguish these terms until around age 8. Thus, preschool-age children might only understand representational thought in the sense that a person can have knowledge (the puppet *knows* the chocolate is in cabinet A), or not have knowledge (the puppet *thinks* the chocolate is in cabinet A), without understanding that he or she might be guessing, without certainty, about its location. Around age 8, children begin to understand that having knowledge is not so dichotomous, which is when they begin to develop a constructivist theory of mind.

Schwanenflugel, Fabricius, and colleagues have described children as having a constructivist theory of mind when they understand that “knowledge can be more or less certain, that feelings of uncertainty are important in evaluating information, that things can have multiple meanings, and that these meanings can arise solely from differences in interpretive mental processes,” (Schwanenflugel, Fabricius, & Noyes, 1996, p. 288) which develops during late childhood (Schwanenflugel, Henderson, & Fabricius, 1998). In one study, they investigated 8- to 10-year-old children’s understanding of higher order mental state terms (e.g., memorizing, paying attention, discovering) and the degree to which this understanding relates to their ability to monitor their own reading comprehension. Children and adults were asked to group mental verbs according to similarities, which revealed their varying ability to distinguish between the information processing and certainty aspects of the mental verbs. At all ages, children who were better at monitoring their own comprehension were more likely to consider the certainty aspects of mental activity than children who were worse at monitoring. Older children performed the best. Schwanenflugel et al. (1998) also assessed the constructivist understanding of mind among third- and fifth-grade children and found developmental changes in children’s understanding of

the role of memory, the similarity between memory and comprehension, and the certainty in mental activities. Thus, children begin to understand that the mind constructs knowledge and, it is therefore subjective, during middle childhood and continue to develop their understanding of the mind as they consolidate insights about uncertainty, and interpretive nature of mental activity. Yet, it is unclear from this study if these cognitive advancements allow them to appreciate that other individuals might have differing interpretations.

Further support for young children's difficulty using mental state terms appropriately comes from educational research exploring children's and teachers' theories of mind (Astington, 1997). University students studying to become teachers studied young children's theory of mind development through classroom observations. Their methods included observing children's talk and activity in the classroom and administering experimental tasks designed to reveal children's understanding of epistemic concepts such as guessing. For example, one student noted that sixth graders had difficulty with the terms "estimate" and "guess" after the student was asked to approximate answers to math word problems. Children often use the term "estimate" in a different way than adults use it such that they seem to think that estimates are guesses, but they also want guesses to be right. Discussions about the value of mistakes facilitated children's ability to risk getting an answer wrong. Thus, it appears that sixth-grade children develop some understanding about certainty. By itself, this evidence of children's confusion with mental state terms might be viewed cautiously because of the subjective methods used to obtain it, but in view of other corroborating evidence, it does provide support that children develop understanding about guessing, certainty, and estimation during middle childhood.

Given that social cognition involves the process of thinking about oneself and others, studies investigating children's understanding of other individual's emotions also provide insight

about how children develop a theory of mind. Several studies have examined children's understanding of ambiguous social situations and how children respond socially (e.g., Crick & Dodge, 1994). The studies that focus on children's socio-emotional development are particularly relevant. For example, Gnepp and Klayman (1992) investigated children's ability to reason about situations that commonly elicit different feelings in different people. In three experiments, Gnepp and Klayman asked first, third, and sixth grade children, as well as adults to reason about how characters felt in various emotionally equivocal and unequivocal situations. One emotionally equivocal situation involved a character who received an egg salad sandwich for lunch. Participants were shown emotional facial expressions (happy, sad, and afraid) and asked to consider the character's feelings after receiving the sandwich. Participants also were asked if they were thinking of one feeling, or two feelings, and asked how they themselves would feel in the situations (i.e., how they themselves would feel about receiving an egg salad sandwich). Participants rated the probability that the character in the story would feel the same way about the situation as they themselves would feel. In addition, the adults were asked if the character could have felt another way. Results indicated that subjects at all ages tended to respond initially by stating the feeling that reflected their own imagined reaction to the situation (e.g., if they themselves would feel happy about receiving an egg salad sandwich, then the first feeling they inferred about the character was that he also would feel happy) and not surprisingly, younger children were more confident than older ones about the first plausible emotion they inferred. Yet, while adults recognized that alternative emotions also were plausible, even they judged the potential alternative emotions as less plausible than their initial appraisals. Experiment 2 involved similar procedures; except all participants were asked if the character could have felt a different way. Results indicated that children had difficulty seeing how a different feeling from

their initial choice could be plausible, although they could provide another emotion when this was requested. In Experiment 3, participants were reminded that some people feel differently across situations, but the prompts had no significant effect on the children's responses. Thus, these findings show that children as young as 6 years of age are able to represent multiple emotional possibilities for an individual, but they and much older children have difficulty understanding individual differences in emotional reactions. They err toward giving their own appraisal of a situation and tend to assume that their initial appraisal is more probable than any other. Although they do not provide any evidence, Gnepp and Klayman (1992) suggest that when children fail to recognize that some situations can elicit different emotions in different people, their social interactions are negatively affected. Indeed, it seems likely that reacting appropriately in social situations requires understanding of other's feelings. Theory of mind research provides support for this possibility.

#### *Peer Interactions and Theory of Mind*

Theory of mind understanding has many social consequences, including associations with social interaction (e.g., Astington & Jenkins, 1995), social-emotional maturity (Dunn, 1995; Lalonde & Chandler, 1995), and prosocial behavior (Watson, Nixon, Wilson, & Capage, 1999).

Lalonde and Chandler (1995) found positive associations between children's ToM understanding and their social skills, as measured by teacher questionnaire. The questionnaire contained a checklist of two sets of behaviors: 1) *intentional* behaviors that described abilities thought to require understanding of others' thoughts; and, 2) *conventional* behaviors that described social abilities demonstrating only a simple grasp of social skills. For example, a child demonstrating an *intentional* behavior would be "able to comment on differences between his or her own wishes and those of another," while a child demonstrating *conventional* behavior would

be “able to say, ‘thank you’ when given something” (Lalonde & Chandler, p. 180-181).

Children’s understanding of false belief was correlated positively with the use of intentional abilities, but was unrelated to the use of conventional abilities. These results suggest that false belief understanding correlates with well-developed understanding of others’ thoughts and desires.

Watson et al. (1999) investigated the relation between false belief understanding and positive interactions with peers on a global level. Social interaction skills were assessed in two ways. First, 3- to 6-year-old children’s social behavior was recorded during a free-play period in order to capture vocalizations directed toward a peer. Second, teacher ratings of positive social skills were obtained. Teachers completed a 10 item scale which required respondents to indicate on a Likert scale of 1 to 4 how socially skilled they perceived a child to be. A standard battery of ToM tasks was used to assess children’s false belief understanding. False-belief understanding was a significant predictor of children’s positive social skills. Children who performed better on tasks assessing false belief understanding received higher ratings of positive social skills by teachers and were observed to produce more vocalizations with peers during the free-play observation period than their peers.

In conjunction with the Watson et al. study (1999), Capage and Watson (2001) investigated individual differences among children in ToM performance, aggressive behavior, and social skills. Children’s performance on false belief tasks was a better predictor of their social competence than was their ability to generate solutions to interpersonal problems. These results held after controlling for the effects of age, language comprehension, and teacher ratings of aggression. Further, children’s false belief performance was related negatively to teachers’ ratings of children’s aggression. Capage and Watson suggested that in order to engage in

competent social behavior, children must be able to understand false beliefs. Children's understanding of others' beliefs might help them to recognize potentially problematic social situations and solve them easily. For example, if a child understands that another person holds a false belief, then the child might better be able to accommodate the other person's perspective, and thus could relate well socially. Maladaptive social interactions, such as those that involve aggression, might be related to the inability to understand the representational nature of beliefs.

Slaughter, Dennis, and Pritchard (2002) also found that preschoolers' theory of mind understanding positively related to acceptance from peers in two studies. In Study 1, they used peer nomination and peer preference measures to classify 78 children according to peer groups, based on Coie and Dodge's (1983) methodology. They found that among 5- to 6-year old children, theory of mind scores were significantly related to social preference. Children classified as 'popular' were found to score higher on theory of mind tasks than children classified as 'rejected'. In Study 2, which examined ToM and peer interaction among 87 4- to 6-year-olds, the results were replicated and measures of peer acceptance, verbal intelligence were added. In addition, teacher ratings of prosocial and aggressive behaviors were obtained. Across the total sample of children, prosocial behavior was the best predictor of social preference scores. However, while aggressive and prosocial behaviors were the best predictors of peer acceptance in the younger children, ToM was found to be the best predictor of social preference scores for the older children. Thus, the researchers have suggested that the impact of theory of mind ability on peer acceptance increases with children's age.

Leekam (1991) also suggests that social cognitive changes in older children's thinking affect their social interactions. Specifically, she suggests that older children are better able to deceive others, as they develop advanced ToM understanding. ToM development also likely

affects children's social interactions more generally, given that social interactions often depend upon what people believe about other people's beliefs (Astington & Jenkins, 1995). Research has explored this idea.

Bosacki and Astington (1999) examined the relationship between social understanding and social competence among 128 10- to 13-year-old children. Children's social understanding was assessed by telling each child two socially ambiguous stories, followed by test questions to measure the child's conceptual-role taking skills, empathetic sensitivity, person perception, and alternative thinking. For example, one story involves two girls on the playground, who are watching other children play. One girl turns toward the other girl, smiles, and nudges her, while looking at a new girl. Control questions were asked to ensure story comprehension, followed by a conceptual role-taking question, "Why did the girl smile at her friend," an empathetic question, "How do you think the new girl feels?" a person perception question, "What kind of person do you think she is?" and an alternative explanation question, "Is there another way you can think about this story?" Children's social competence was assessed using teacher's ratings of child's behavior, peer-rated social interaction skills, and peer-rated likability. Children also were given a vocabulary measure. Results revealed positive correlations between children's social understanding and peer ratings of social-interaction skills, and children's vocabulary ability. Results also indicated that girls' scored higher on the social understanding and social competence measures than boys, independent of vocabulary. Thus, the results suggest that children's specific social knowledge is related to their social interactions with peers, however, it is not clear from this study how children's general knowledge about the interpretative aspects of the mind might relate to social competence. Research that examines children's developing understanding of mental processes offers insight regarding this possibility.

One study suggests that school-age children's understanding of the interpretational mind is related to less aggression at school. Fabricius, Perault, and Schwanenflugel (2001) examined the relationship between children's understanding of constructivist ToM processes, social problem solving skills, and the number of referrals they received for aggressive acts among 358 ninth graders. Participants responded to six questions about the interpretive aspects of attention, comprehension, and memory by completing a paper-and-pencil questionnaire. One question asked, "Could somebody remember something that never happened?" Presenting children with socially ambiguous situations and asking them to define and solve social problems was used to assess participants' social problem solving skills. Results indicated that both ToM and social problem solving abilities predicted the number of times children had been referred for aggressive behavior from children's school records. Thus, children who are better able to identify the interpretative aspects of the mind appear to be less aggressive. This could suggest that children who can better understand the interpretational mind hold less antagonistic interpretations of ambiguous social situations. Further research is necessary to determine how children's understanding of the mind relates with children's specific social experiences at school and how it might relate to their relationship with their parents.

#### *Parent-child Interactions and Theory of Mind*

Research has long suggested that parent-child interactions impact children's emotional and social cognitive development across the lifespan. Theorists contend that attachments formed in early childhood serve as the basis for the construction of subsequent relationships (Bowlby, 1973) and secure parent-child relationships have been associated with effective cognitive functioning (Hartup, 1989).

Parents might facilitate ToM understanding through discourse about mental state terms. For example, Welch-Ross (1997) investigated mother-child conversation with regard to ToM development, finding that the frequency with which mothers discussed emotions with their child was related to the child's performance on ToM tasks. Dunn and colleagues also have examined ToM development in the context of several family variables. Longitudinal data on the relationship between early family discourse about emotions and children's later understanding of feelings states suggest that family discussion about emotions is influential to children's emotion understanding (Dunn, Brown, & Beardsall, 1991). Further research demonstrated that there is a positive association between mother-child interaction and discourse and children's ToM development (e.g., Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991). Further research (Ruffman, Perner, & Parkin, 1999) also suggests that parent-child relations are important for ToM understanding such that children's understanding of belief was predicted by mother's parenting style. Specifically, children's understanding of belief was positively related to the number of times mothers responded to disciplinary situations by asking their child to reflect on the victim's feelings. Thus, perhaps parents who emphasize other individual's differing emotions, as well as mental states, help facilitate children's development of ToM.

The quality of young children's early relationships with their caregivers also has been related to children's later ToM understanding, such that infants who were described as securely attached to their caregivers later demonstrated superior mental state understanding compared to insecurely attached infants (Meins, Fernyhough, & Russell, 1998). However, these studies often exclude the father-child relationship entirely. Further research is necessary in order to understand the relationship between ToM understanding and parent-child relations, and in particular, research that examines the role of fathers in child development of ToM is necessary.

This could help answer questions regarding which aspects of the attachment relationship drive ToM development. Perhaps mothers of securely attached children treat their children as mental agents more so, or at a younger age, than mothers of insecurely attached children. Yet, perhaps it is the children with advanced social understanding who elicit higher maternal responsiveness. Examining the child's ToM development and attachment to different attachment figures could help disentangle the child's and parental role in ToM development. Nevertheless, theory and evidence from studies of attachment and later ToM development suggest links between security of attachment and young children's ToM development. However, it is unclear how parent-child relationships relate to children's ToM understanding in later childhood from the attachment research that focuses on infants.

There is evidence that parent-child relationships continue to relate with ToM understanding in older children. For example, Humfress et al. (2002) examined the relationship among children's advanced theory of mind understanding (mentalizing ability), parent-child relationships, and parental practices among 12- to 13-year-old children. Mentalizing ability was assessed using a task developed by Happé (1994), which involved telling 71 children a series of stories and asking them to infer character's mental states (e.g, pretence, lying, joking, misunderstanding). Child-parent attachment was assessed with a 19-question interview asking children to discuss their mental representations of attachment figures. Children's verbal intelligence and parenting quality also were assessed. Results indicated that there was significant overlap between children's performance on the mentalizing and attachment measure, irrespective of the child's verbal ability or parent's practices. Thus, it is possible that secure parent-child relationships positively impact children's social cognitive development, which then positively affects children's social interactions.

In particular, ToM might mediate the relationship between parenting and externalizing behavior. Vygotsky's (1978) socio-cultural theory of children's development contends that cognitive skills are socially constructed through interactions with supportive and responsive adults. Consistent with this theory, research from the attachment theory literature provides evidence that children's relationships with parents are important to children's social cognitive development throughout childhood. For example, young children (3-year-olds) with secure attachments to caregivers have higher levels of socioemotional understanding and develop a conscience earlier, as compared to children with insecure attachments (Laible & Thompson, 1998, 2002). Older children (fifth-graders) with secure relationships with their mothers were more accepted by peers, had more reciprocated friendships, and were less lonely than children with less-secure relationships with their mother (Kerns, Klepac, & Cole, 1996). Having a secure attachment in late adolescence also has been related to a higher ability to constructively modulate negative feelings in social contexts, lower ratings of anxiety and hostility by peers, and self-reports of fewer symptoms of distress and higher social competence, as compared to adolescents' with a dismissing attachment style (Kobak & Sceery, 1988). Researchers also have shown that parental meta-emotion philosophy (i.e., an organized set of feelings and thoughts about one's own emotions and one's children's emotions) is related to children's outcomes during middle childhood, including academic achievement and peer relations (Gottman, Katz, & Hooven, 1996). Thus, there is support for the hypothesis that children's relationships with parents will positively relate to their social cognitive abilities and social interactions.

Yet, it also is possible that children with better social cognitive understanding are more willing to engage in positive parental interactions. Gordon (1988) indicated that adolescents who demonstrated difficulty understanding another person's point of view had problematic

interactions with peers, parents, and teachers. Further studies investigating the relationship between parent-child interactions and children's mental state understanding are needed.

### *Culture and Theory of Mind*

Some cross-cultural research of young children's ToM understanding has indicated that developmental trajectories are similar across cultures, despite children from various cultural backgrounds coming early or late to ToM understanding (Wellman et al., 2001). In particular, there is evidence that ToM development might be similar for Chinese and American children. Flavell, Zhang, Zou, Dong and Qi (1983) examined ToM development among Chinese and American children and found that they show similar performance levels at several ages on one ToM task (the appearance-reality task). Nevertheless, many questions remain about ToM performance among children across many cultures and there is debate about the universality of ToM development. In particular, there are several reasons to suspect differences in ToM understanding across cultures, given that research has linked development with parental practices (Meins, Fernyhough, Wainwright, Gupta, Fradley, & Tuckey, 2002), family variables (Cutting & Dunn, 1999), and sibling interactions (Perner, Ruffman, & Leekam, 1994), all which vary across cultures. However, family variables not only vary cross-culturally, but also across regions or social classes within the United States. For example, Garcia-Coll, Meyer, and Brillon, (1995) found that Mexican-American families are higher on familism (i.e., valuing the family) and traditional values than Anglo-American families. Thus, it is likely that the subcultural environment also might influence ToM understanding.

Mexican- and Anglo-American children might differ in ToM understanding for several reasons. Research suggests that Mexican-American children have more cooperative and less competitive behavioral preferences than Anglo-American children (Bernal & Knight, 1997).

Thus, Mexican-American children might hold more collectivist views than Anglo-American children, decreasing the probability that they discuss individual differences in mental states.

Lillard (1998) suggests that a lack of cultural dialog about mental state understanding might lead individuals to hold a “more individualized understanding of those states (p. 13).” Thus, children from collectivistic cultures might not emphasize others’ differing points of view, as compared to those from individualistic cultures. There is evidence that collectivist cultures tend to perceive in-group norms as universally valid (Shweder & Levine, 1984). Thus, children from collectivist cultures might be less likely to focus on the interpretational nature of mental processes.

Further research suggests possible differences between Mexican- and Anglo-American theories of mind because of varying parental practices. Chicano mothers are more likely to teach children through modeling as compared to Anglo-American mothers who are more likely to teach children to use critical thought processes to come to solutions (Laosa, 1978). (Note: Chicano is a term to describe Mexican-descended Latinos who are proud of their ethnic heritage). Laosa suggests that differing parenting styles might result in different learning styles, but it also is likely that parental styles could result in differing theories of mind, given that more “mental state” talk by parents affects ToM development.

It is important to explore whether cultural values influence ToM development and whether understanding other individual’s perspectives impacts the number of negative social outcomes that might arise from initial multiethnic social encounters. Laosa (1999) describes how there is a possibility for conflict when different cultures initially come into contact and that there are many challenges regarding how two culturally diverse groups will relate to one another. It is possible that having an understanding that individuals have differing perspectives, as compared to one’s own, might help individuals interact in a prosocial manner. For example, consider a

Mexican-American adolescent who has an empiricist understanding of the mind. He would likely get along better with another Mexican-American because of their similar ways of viewing the world, than he would with an Anglo-American who is more likely to have differing views. Perhaps the Mexican-American does not need to consider individuals' very different perspectives when he is among others who think like he does. However, there is there is an increased possibility for conflict when among other individuals who do not view the world in the same way as him. Yet, if the Mexican-American adolescent has a well-developed understanding of the mind, and understands that individual's differ in their perspectives, then he is more likely to have positive social interactions with others in general. In other words, understanding that other individuals might think differently, likely helps children fair better socially. The present study examines this possibility.

#### *Theory of Mind and Academic Performance*

Little work has directly investigated the benefits of children's understanding of the mind and schooling, yet there are several ways that children's understanding of mind might relate with school activities. Astington and Pelletier (1996) have suggested that children's ToM understanding might help children make sense of school. They suggest that children learn information at school by actively constructing knowledge and by revising and forming their own beliefs, as opposed to conceiving of learning as a function of a simple transmission from teacher to student. Thus, children who have a well-developed understanding of multiple viewpoints and who can understand that knowledge is influenced by multiple interpretations, might be more successful at learning than children who have an empiricist view of the mind. It also is possible that children's development of ToM aids in their story productions (McKeough, 1992) and interpretations of literature (Gardner, 1991). Children's ToM understanding might relate directly

to improved performance in some subjects of school. For example, Schwanenflugel, Henderson, and Fabricius (1998) found that children's increased understanding of higher order mental state terms (e.g., memorizing, paying attention, discovering) positively related to self-monitoring of reading comprehension. Thus, children's understanding of mind likely relates with academic ability. The present study tests this hypothesis.

Furthermore, ToM might mediate the relationship between culture and academic performance. Mexican-American children are at risk for school failure (Arellano & Padilla, 1996; Stevenson, Chen & Uttal, 1990). One possible reason for mean differences in educational achievement among ethnic groups is that values emphasized in the home are different than those learned at school (Laosa, 1999). In a series of studies investigating the parental values of Chicano families, he found that Chicano parents tend to teach their children to be courteous, respectful, and cooperative. These values may be less compatible with mainstream classroom teaching strategies that encourage students to ask questions as active participants in the learning process, and to think independently.

Further research finds that compared to European Americans, Latino parents are more likely to rely on authoritarian strategies that emphasize obedience and conformity and that in general, adolescents whose parents are warm, firm, and democratic achieved more in school than their peers (Steinberg, Dornbusch, & Brown, 1992). Thus, Mexican-American children might find American education difficult because of their teachers' emphasis on (the American values of) learning independent interpretation and critical thinking, which conflict with their values of cooperative learning through observation. Relatedly, they also may find it difficult because they are less attuned to the interpretational nature on mental activity itself. Thus, perhaps the difficulty that less-aculturated children have with school is partly due to their views of the mind.

The present study will to examine the relationship between culture, adolescents' mental state understanding, and academic performance.

### *Theory of mind and Socioeconomic Status*

Studies have explored social cognitive development among children from various socioeconomic contexts. Some have indicated significant differences between middle- and working-class children in social cognitive abilities. British children from professional-class parents (e.g., doctor) performed highest on tests that examined such social cognitive abilities as false-belief and emotion understanding, and language comprehension, when compared with children from a range of lower occupational classes including technical (e.g., computer technician) and unskilled workers. Such results suggest that family background has significant implications for children's social cognitive development (Cutting & Dunn, 1999). Studies of American children also have found evidence that relationships among ToM, emotion understanding, and social competence are affected by socioeconomic factors. Children from low-income families, attending the Head Start program, performed significantly worse on tests of false belief compared to non-Head Start children (Weimer & Guajardo, 2005). The present study examines the relationship between Mexican- and Anglo-American adolescents' mental state understanding and social behavior, above and beyond socioeconomic factors.

### *Purpose*

Despite the growing amount of literature investigating ToM understanding in young children, there are relatively few studies examining ToM development among older children. It is important to investigate these cognitive developmental advancements among older children and how their newfound mental state understanding relates to social development. Further, it is important to consider the impact of the child's cultural environment in the development of social

cognitive ability. Yet, few studies have examined these questions. This lack of research leaves many questions concerning interactions among these factors unanswered. Links between children's understanding of the constructivist nature of the mind and social interactions are particularly of interest.

Collectively, these studies suggest the need to expand research investigations of ToM understanding to include older children, and to include participants from multicultural backgrounds. Continued development of ToM understanding, the ability to understand one's own mental states and to recognize others' differing beliefs, desires, and perspectives of the world, is unquestionably important developmentally. Having this understanding might help adolescents relate socially, a particularly important adaptive skill (Hansen et al., 1998). As children come to understand that different people can interpret, evaluate, and remember the same event differently, they likely interact more positively with peers and parents than children with less developed social reasoning abilities. It also is likely that the development of a constructivist ToM might help adolescents academically, as they come to understand that answers are not always right and wrong, and learn to consider multiple perspectives or explanations.

There is strong support that ToM performance correlates with social factors (e.g., Astington & Jenkins, 1995) and studies investigating family measures and ToM development (Dunn et al., 1991) strongly indicate a relationship between increased parent-child interaction and ToM development. Yet further research is necessary not only to gain a more specific comprehension of the relationship between this understanding and social interactions, but also to investigate this relationship among multicultural children. The present study provides insight about the relationship between ToM, social development, and cultural factors through the inclusion of Mexican and Anglo-American adolescents.

Mexican- and Anglo-American children might differ in their understanding of the mind. Thus, this investigates adolescents' understanding of mind among Anglo- and Mexican-American adolescents and how this understanding relates with social and academic outcomes. While Anglo- and Mexican-American adolescents might demonstrate differences in their understanding of mind, it is expected that overall children's constructivist understanding will be negatively related to social scale items that assess problem behavior and positively related to higher academic scores. Quality parent-child relations across both groups also are expected to relate positively with constructivist responses on the theory of mind measure. Thus, this study will examine two models. First, children's theory of mind might mediate the relationship between cultural background, quality of parent-child relationships, and social behavior. Second, children's theory of mind might mediate the relationship between cultural background, quality of parent-child relationships, and academic success. In order to have a mediational model, however, the predictors must first be related to ToM and ToM must relate to outcome variables (e.g., 'A' must predict 'B', and 'B' must predict 'C' before it can be said that 'B' mediates 'C'). Thus, these models will be examined if initial correlational analyses provide support for a possible mediational model.

## Method

### *Participants*

Participants included 314 (168 girls, 146 boys) self-identified Mexican- ( $n = 157$ ) and Anglo-American ( $n = 157$ ) adolescents, ages 11 to 13 years ( $M = 12.93$  years), who were a subset of a larger, ongoing project: the Parents and Youth Study (PAYS). The sample for the present study includes adolescents from ethnically diverse, step- and intact families (86 Anglo-American intact, 71 Anglo-American step, 87 Mexican-American intact, and 70 Mexican-American step). All participants were interviewed individually in their home in their language of preference (302 English and 12 Spanish-speaking adolescents). Adolescents were interviewed in the Spring and Fall semesters of their 8<sup>th</sup> ( $n = 160$ ) and 9<sup>th</sup> grade ( $n = 154$ ) school year. Sample recruitment was based upon protocol for the overall PAYS project.

*Recruitment of adolescents and parents.* PAYS is a five-year longitudinal investigation of the role of fathers in adolescent development conducted by Arizona State University (ASU) and University of California (UCR) researchers (Cookston, 2006). Data from the present study were collected during the first wave of the project. PAYS recruited participants from two locations: Phoenix, AZ ( $n = 149$ ) and Riverside, CA ( $n = 165$ ). The original goal of PAYS was to recruit 400 families with approximately 200 families comprised of Anglo-Americans and 200 families Mexican-Americans. Families were only eligible if all three members (mother, father, and child) were of the same Ethnicity (Mexican or Anglo-American). It also was the goal to include two types of families: 200 intact families (children and both of their biological parents) and 200 step-families (children living with their biological mother and a stepfather, who had lived in the home for at least one year, but was not necessarily married to the child's mother).

Recruitment strategies varied across sites due to differing laws and school district policies. In Arizona, adolescents were recruited from eight schools in the Phoenix metropolitan area via a post card procedure, which surveyed students' ethnic background and family composition. A staff member at each school sorted the cards into eligible and ineligible students. PAYS researchers then randomly selected which families (from among the 2,459 possible eligible) to contact via a letter and brochure asking for consent to call, which were sent home with students. ASU researchers called families to explain the details of the project and offer a monetary reward for participation, only after consent was obtained through the school staff member. In Arizona, a total of 640 families were contacted, and of these 204 were both eligible and agreed to participate.

In California, families were recruited from two school districts. School staff used emergency contact cards and enrollment data to determine families that they thought were eligible. They then contacted these families to explain the PAYS project and screen for eligibility. If the families agreed to participate and met eligibility requirements, UCR researchers called families to explain the details of the project and offer a non-monetary reward (e.g., movie gift passes) for participation. In California, a total of 540 families were contacted, and of these 192 were both eligible and agreed to participate.

*Recruitment of teachers.* Adolescents were asked to provide the names of two teachers that PAYS researchers could contact. In both Arizona and California, a letter describing the PAYS project, and copy of written consent from the parents, were mailed to each teacher requesting that he or she complete the enclosed questionnaire about the adolescent's behavior. In Arizona, an incentive of \$5 cash, and a pre-paid envelope was enclosed along with the letter. There were approximately 400 questionnaires sent and teachers were prompted to return the

questionnaires by follow-up phone calls from PAYS researchers. In Arizona, 387 (97%) were completed by teachers; 197 (98%) adolescents had a report from at least one teacher, and 190 (95%) had reports from both teachers. The procedure in California was similar, except that a non-monetary incentive was used in place of cash (e.g., movie gift certificates), and no follow-up phone calls were placed, due to state policies. Thus there were approximately 382 questionnaires sent, but only 261 (68%) were completed by teachers; 169 (88%) adolescents had a report from at least one teacher, and 92 (48%) had reports from both teachers.

Not all of the participants in the overall PAYS project were administered the theory of mind measure. Initially, the questions were only asked if time permitted. After approximately three weeks into interviews, however, it was PAYS protocol to assess all children on this measure. Thus, only 323 adolescents were assessed on theory of mind, and of these, 314 provided audible responses.

### *Measures*

*Theory of mind questions.* All participants in the present study were asked three questions that assessed their ability to consider the mind as interpretative, which were based on questions developed by, Fabricius, Schwanenflugel and Perault (2003). The present study used questions that assessed participant's ability to consider the role of interpretation in comprehension, attention, and memory. These questions were asked in a fixed order. The first item reads, "Do you think a person could remember everything that someone said to them, but not understand it? (yes or no) If so, tell me why or why not." Adolescents' entire responses were audio-taped, and coded by two independent coders (blind to participants' ethnicity or family type) using standard coding procedures. Participants were included in the study if they were asked and provided an audible response to at least two of the three ToM questions. The number of children who

provided codable responses varied slightly across the three questions: 311 (comprehension), 310 (attention), and 312 (memory).

Coding procedures were developed by Fabricius et al. (2003) and are provided in Appendix A. First, the participant received a score of ‘1’ if he or she answered yes and a score of ‘0’ if he or she answered no to the initial question of whether or not each situation could happen. Second, the participant’s explanation was coded. This was the more important aspect of the response. These were coded as ‘1’ for a constructivist response or ‘0’ for an empiricist response, regardless of the participant’s initial yes/no reply. It was rare that a participant initially stated, “No” and then went on to provide a constructivist response. (This occurred seven times for the comprehension question, six times for the attention question, and three times for the memory question).

The comprehension item (Question 1), was stated above. Responses were scored as ‘1’ for constructivist if the respondent made an explicit distinction between remembering words, but not understanding meaning, or clearly indicated that the intended meaning in a statement was different from the received meaning or interpretation. Responses were coded as ‘0’ for empiricist if the respondent simply stated that someone could remember everything that someone said to them, but not understand it because of language, auditory, or knowledge difficulties.

The attention item (Question 2) reads, “Do you think that if a person was listening to music for a few minutes, could they just stop hearing it? Why or why not?” Responses were scored as ‘1’ for constructivist if the respondent made reference to the filtering role of attention in his or her response. For example, one respondent said, “Yes, that could happen . . . you’ll be playing basketball and be more interested in basketball than the music, so you’ll like, tune it

out.” Empiricist responses were scored as ‘0’ and included those in which the participant referred simply to sensory problems, or indicated that the music had been physically turned off.

The memory item (Question3) asked, “Could two people watch the same thing happen and both see and hear everything but each could remember it differently? Why or why not?” Responses were scored as ‘1’ for constructivist if the respondent made reference to (a) automatic mental processes, (b) the brain inferring information. They also were scored as constructivist if the participant made reference to (c) factors that differ across people, (different interpretations from preconceived notions, different conceptual perspectives, backgrounds, or expectations, different selective attention to the same event) that could have led the individuals to have different memories. Empiricist responses received a ‘0’ and included those that simply referenced forgetting, not seeing, or remembering something unreal.

Two raters both coded 25% of the data in order to estimate reliability. Kappa values indicated very good agreement. Kappa was .80 for the comprehension question, .92 for the attention question, and .84 for the memory question.

*Adolescents’ perception of parent-child relationships.* Adolescents were asked about their perceptions of their parents’ behavior. These items were based on the Child’s Report of Parent Behavior Index (CRPBI), which was originally developed by Schaefer (1965) and subsequently revised by Teleki et al. (1982). The present study used child reports about mom and (step)father for the three subscales of a revised version of the CRPBI: 1) Acceptance, 2) Rejection, and 3) Consistent discipline. Items were averaged and subscale scores were created by multiplying the average of the items by the number of items in each subscale. Thus, scaled scores for the acceptance and rejection subscales ranged from 10 to 30 (10 items each), and for the consistent discipline subscale from 8 to 24 (8 items). For the full sample in the Parent and Youth Study,

children's reports of (step)father's acceptance had a reliability alpha of .88, .77 for rejection, and .71 for consistent discipline. Children's reports about mother had a reliability alpha of .87 for acceptance, .81 for rejection, and .71 for consistent discipline. See Appendix B for a complete list of items. Means and standard deviations are presented in Table 1. There were no missing data on this variable; thus,  $n = 314$ . Higher scores reflect adolescents' increased perception of feeling accepted, rejected, and experiencing consistent discipline from parents. Mothers and fathers also reported about each other, as parents. Thus, mothers' reports of the father-child relationship, and fathers' reports of the mother-child relationship also were obtained for the three subscales (acceptance, rejection, and consistent discipline). However, preliminary analyses revealed that neither mothers' nor fathers' reports about acceptance, rejection, or consistent discipline about each other were related to any theory of mind question. Thus, these scales were not used in the present study.

*Mexican-American acculturation/enculturation scale.* Adolescents' culturally-dependent values (e.g., how they feel about traditional gender roles, family cohesion, and spirituality) were assessed, using a selection of items from the Mexican American Acculturation/Enculturation Values Scale (MAAS; Knight et al., 2006). This measure was developed based upon focus groups of Mexican American mothers, fathers, and adolescents from different geographic locations. Families were asked to describe their cultural values and surveyed on some items used in similar measures (Sabogal, Marín, Otero-Sobogal, Vanoss Marín, & Perez-Stable, 1987). The cultural values described were categorized into two broad subscales of enculturation and acculturation, each with several smaller subscales. For enculturation, subscales of cultural values included items about the following: familism-support, familism-obligation, familism-referents, religion, respect, and traditional gender roles; for acculturation these included items about

material success, independence and self-reliance, and competition and personal achievement.

Participants were asked to rate how much they agreed on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree) with statements about cultural values. For example, participants were asked, “How much do you agree that money is the key to happiness?” and “A person should share (his/her) home with relatives if they need a place to stay?” Items were averaged and scale scores were created by multiplying the average of the items by the number of items in each subscale (28 for enculturation and 9 in acculturation) for participants who answered at least 75% of the items. See Appendix C for complete list of items. This measure was administered to all participants (both Mexican- and Anglo-Americans), which allowed an examination of mental state understanding among individuals with a broad range of cultural values. The possible range for the enculturation subscale was 28 to 140, and for acculturation 9 to 45. There were no missing data on this variable; thus,  $n = 314$ . Means and standard deviations for the MAAS are presented in Table 1. Alpha reliability for the acculturation score based on 9 items was .68, and for enculturation .84, based on 28 items. Higher scores on the Enculturation subscales reflect agreement with enculturation, or more traditional Mexican values, while higher scores on the Acculturation subscales reflect agreement with acculturation, or more American values. Mexican- and Anglo-American participants did not significantly on either the enculturation or the acculturation subscales,  $F(2,311) = 2.17, p = .12$ .

*Reports of externalizing outcomes.* Mothers, fathers, and two teachers completed questionnaires about adolescents’ problem social behavior. These items were adapted from the Behavior Problems Index (BPI; an adapted and shortened form of Achenbach’s Child Behavior Checklist, 1991; Peterson & Zil, 1986) and queried internalizing<sup>1</sup> and externalizing problem behaviors. These scales have been validated across linguistically and culturally diverse samples

(Knight & Hill, 1998). Response categories for parent reports ranged from 1 to 3 (Often true=1; Sometimes true=2; Never true=3) and for teacher reports from 1 to 5 (very often = 1, Often = 2, Sometimes = 3, Rarely = 4, Never =5). Items were averaged and scale scores were created by multiplying the average of the items by 18, since there were 18 items in the externalizing subscale. Only participants who answered at least 75% of the items in the scale received a score. See Appendix D for a complete list of items. There were no missing cases for mothers' reports ( $n = 314$ ), but there was one missing case for fathers' reports ( $n = 313$ ). The ratings from the two teachers were averaged to form a composite (mean) score of the teachers' reports. There were several cases in which only one teacher report was provided. For adolescents who were rated by only one teacher, that rating was used as the composite teacher report score; in total,  $n = 293$ . The range for the externalizing subscale was from 18 to 60 for parent reports and from 20 to 90 for teacher reports. Alpha reliability was based on the full sample in the Parents and Youth Study. For (step)father report, the alpha for externalizing was .88, and for mother report, the alpha was .86, and for teacher report, .96. Means and standard deviations are presented in Table 1. Higher scores indicate higher frequency of externalizing problems.

*Standardized test scores and academic performance.* Standardized test scores assessing adolescents' Language, Math, and Reading abilities were obtained from adolescents' schools or school districts. These three scores were available for adolescents who attended school in either state (California or Arizona). Children's total grade point average (GPA) also was computed based on data obtained from their schools. Total GPA was computed using the following scale: A= 4.0, B= 3.0, C=2.0, D = 1.0, and F= 0. All grades for any school subject provided were averaged together to create a total GPA score. Standardized test scores for adolescents' reading, language, and math ability ranged from 0 to 99. Total GPA ranged from 0 to 4.0. Means and

standard deviations are presented in Table 1. There were several missing cases on this variable.

The sample size for the standardized test scores for reading was 199, and for language and math,  $n = 202$ . For GPA,  $n = 218$ .

*Demographic information.* Mothers of each participant in the present study completed questionnaire items regarding information about the family's total household income, parental education and occupation, and number of siblings currently living in the home. Information regarding total household income, and household composition was used to develop a socioeconomic (SES) variable. There were eight missing cases for this variable (thus,  $n = 306$ ). Gross yearly total household income ranged from \$4,200.00 to \$430,000.00 ( $M = \$62,070.00$ ).

## Results

### *Preliminary Analyses*

Table 1 shows the means and standard deviations for the three ToM questions, the mean for a composite score for ToM questions (created by taking the mean of the three questions), and the means and standard deviations for all predictor and outcome variables of ToM. The means for the three ToM questions were consistent with past research, although lower. Schwanenflugel et al., (2003) found that the mean from seventh graders (attending schools in a predominately middle- to upper-middle class SES area) was .80 for the comprehension question, .65 for the attention question, and .60 for the memory question. Means in the present study demonstrate that adolescent's performance was not at floor or ceiling.

Table 2 shows the frequencies of patterns of adolescent's responses. There were eight possible patterns that these responses could have followed. However, as is clear in Table 2, the majority of adolescent's constructivist (1s) versus empiricist (0s) responses fell within four patterns such that adolescents were more likely to provide a constructivist response to the memory and comprehension questions compared to the attention question, (71 adolescents scored a '0' on all three questions, 80 scored a '0' on 2 of the 3 questions, 69 scored a '0' on only one question, and 23 scored a '1' on all questions) and most adolescents who provided an empiricist response to the attention question (the question with the lowest mean) also provided empiricist responses to the other two questions. This pattern of responses across each question suggests a developmental sequence and regularity indicative of an emerging understanding of the mind. A repeated measures of ANOVA on the three theory of mind questions and follow-up comparisons using the Bonferroni adjustment revealed that responses to all three ToM questions significantly differed from each other,  $F(1,304) = 574.04, p < .05$ . Thus, the questions seem to

assess different levels of difficulty in adolescents' emerging understanding of mind, and this pattern could suggest that development moves from an understanding of the role of comprehension, then memory, to attention, in the mind's construction of knowledge.

Furthermore, these patterns demonstrate that there was no effect of question order. If an adolescent scored a '0' on any question, it was most often on Question 2 (69), as compared to Question 1 (5) and Question 3 (18).

Table 3 shows that the responses to the three theory of mind questions were not highly inter-correlated. Pearson *r*s ranged from .08 to .18, with only the comprehension and memory question relating significantly,  $r = .18, p < .05$ . This is not surprising, given the pattern of adolescent's responses across the three questions. The low inter-correlations could suggest that these items do not comprise a single factor scale. Thus, the relationships between ToM and the dependent variables were examined using both the individual ToM questions, as well as a composite ToM score.

Initial analyses were conducted to examine the effects of sex and semester of interview (Spring or Fall) on theory of mind scores. The MANOVA was not significant, for sex,  $F(3, 299) = .48, p > .05$ , nor semester of interview,  $F(3, 299) = .64, p > .05$ . (Note: *F* values represent Pillai's trace statistics for all reported multivariate analyses.) These analyses ensured that there were no significant differences between girls' and boys' theory of mind scores and no significant differences between the scores of participants who were interviewed in the spring and fall semester of the school year. A MANOVA to examine the effects of the language of interview (English or Spanish) and site of interview (Arizona or California) on theory of mind scores was not significant for language,  $F(3, 299) = .76, p > .05$ , nor for site,  $F(3, 299) = .22, p > .05$ . Thus,

there did not appear to be differences between the scores of participants who were interviewed in English or Spanish, or an effect of site of interview (Arizona versus California).

In order to test whether there was support for the hypothesized mediational models, initial correlational analyses were conducted to examine the relationships between predictors of ToM, and ToM and outcome variables. Thus, preliminary correlational analyses were conducted to assess whether adolescents' scores on the ToM questions were related to their perceptions of parent-child relationships (acceptance, rejection, and consistent discipline), cultural variables (acculturation and enculturation), mother's, father's, and teachers' ratings of externalizing, academic performance (standardized test scores and GPA), and SES. Results indicated that not all of these variables were significantly correlated with ToM variables. In particular, adolescents' perceptions of acceptance from mothers and fathers were not significantly related to the ToM questions, nor was the acculturation measure related to ToM. Furthermore, ToM was not significantly related to mothers', fathers', or teachers' ratings of externalizing. Thus, only the correlations among the remaining, related dependent variables are reported in Table 3. These correlations were examined using pairwise deletion.

Since SES was significantly related to theory of mind and dependent variables, subsequent correlational analyses were conducted to examine the relationship between theory of mind and related dependent variables of interest, over and above socioeconomic status. Given the large amount of missing data on the reading comprehension variable, correlational analyses are reported using both pairwise and listwise deletion; the latter omitted cases that have missing values on any variable, which in this study was most often the reading comprehension variable. Results using pairwise deletion are discussed in further detail in subsequent paragraphs. The

correlations among theory of mind scores and dependent variables, using both pairwise and listwise deletion, after controlling for SES, are reported in Table 4.

#### *Theory of Mind and Socioeconomic Status*

Table 3 shows that socioeconomic status was significantly correlated with mean theory of mind scores  $r(n=306) = .14, p < .05$ . SES also positively correlated with the comprehension question,  $r(n=303) = .11$ , and the memory question,  $r(n=304) = .14, p's < .05$ .

#### *Theory of Mind and Parent-Child Relationships*

Table 3 shows that theory of mind scores were correlated with several parent-child relationship variables prior to controlling for SES. Mean ToM scores negatively correlated with adolescent's perception of rejection from father,  $r(n=314) = -.15, p < .01$ , and rejection from mother,  $r(n=314) = -.11, p < .05$ . Mean ToM positively correlated with adolescent's perception of consistent discipline from dad  $r(n=314) = .17, p < .01$ , and mom,  $r(n=314) = .14, p < .05$ . The comprehension item positively correlated with adolescent perception of consistent discipline from dad  $r(n=311) = .14, p < .05$ . The attention item negatively correlated with enculturation,  $r(n=310) = -.12, p < .01$ . The Memory item negatively correlated with adolescent's perception of rejection from dad,  $r(n=312) = -.16$ , and rejection from mom,  $r(n=312) = -.14, p's < .05$ , and positively correlated with adolescent's perception of consistent discipline from dad  $r(n=312) = .17$ , and mom,  $r(n=312) = .17, p's < .01$ .

Table 4 shows that after controlling for SES, several of these correlations remained significant,  $p's < .05$ . Mean ToM ( $n=303$ ) correlated with adolescent's perception of rejection from dad  $r = -.13$ , consistent discipline from dad,  $r = .14$ , and consistent discipline from mom,  $r = .12$ . The Comprehension item (Question 1,  $n=301$ ) positively correlated with adolescent perception of consistent discipline from dad  $r(n=311) = .11$ . The Memory item (Question 3,  $n=$

301) negatively correlated with adolescent's perception of rejection from dad,  $r = -.13$ , and rejection from mom,  $r = -.12$  and positively correlated with adolescent's perception of consistent discipline from dad,  $r = .14$ , and with consistent discipline from mom,  $r = .15$ .

#### *Theory of Mind and Culture*

Table 3 shows that prior to controlling for SES, mean ToM and the attention question negatively correlated with adolescent's enculturation scores,  $r$  (mean ToM,  $n = 314$ ) =  $-.11$ , and  $r$  (attention,  $n = 310$ ) =  $-.12$ ,  $p$ 's  $< .05$ . However, Table 4 shows that after controlling for SES, only the correlation between the attention question and enculturation remained significant,  $r$  ( $n = 299$ ) =  $-.12$ ,  $p < .05$ .

#### *Theory of Mind and Externalizing Behavior*

Table 3 shows that there were no significant correlations between mothers', fathers' nor teachers' reports of children's externalizing behavior and their theory of mind scores,  $r$ 's ranged from  $.01$  to  $-.11$ ,  $p$ 's  $> .05$ .

#### *Theory of Mind and Academic Performance*

The only significant correlation among any academic variable (standardized test scores for reading, language, and math, and GPA) was that mean ToM scores positively correlated with adolescent's standardized tests of reading comprehension,  $r$  ( $n = 314$ ) =  $.14$ ,  $p < .05$ , prior to controlling for SES, as is shown in Table 3. Table 4 shows that this correlation no longer remained significant after controlling for SES,  $r$  ( $n = 189$ ) =  $.11$ ,  $p = .12$ .

#### *Group Comparisons Using Mean Scores*

*Family type and ethnic group differences.* A MANCOVA was conducted to examine family type (Intact versus Step families) by ethnic group differences (Mexican-American versus Anglo-American adolescents) across each theory of mind question, adolescents' reports of

rejection and consistent discipline from mothers and fathers, and enculturation values, after covarying out socioeconomic status. Table 5 shows the adjusted means and standard errors among these variables, after controlling for SES.

There were no main effects of family type [ $F(8,285) = 1.42, p = .19$ ] nor ethnic group differences [ $F(8,285) = 1.50, p = .16$ ], however there were significant interaction effects,  $F(8,285) = 2.00, p < .05$ . Specifically, there was a significant interaction effect on the comprehension question,  $F(1,292) = 4.91, p < .05$  and on the attention question,  $F(1,292) = 5.54, p < .05$ .

An overall post hoc test of the simple effects of ethnic group differences within family type (step and intact) was significant,  $F(8,286) = 2.05, p < .05$ . Specifically, among children from intact families only, Anglo-American children scored significantly higher on the comprehension [ $F(1,293) = 5.36, p < .05$ ] and attention questions [ $F(1,293) = 6.67, p = .01$ ] compared to Mexican-American children. There were no significant ethnic group differences among children from stepfamilies,  $F(8,286) = 1.20, p = .30$ .

Given the amount of missing data on the reading comprehension variable, a separate ANCOVA was conducted to examine family type (Intact versus Step families) by ethnic group differences (Mexican-American versus Anglo-American adolescents) on reading comprehension ( $n = 183$ ). These results also are reported in Table 5. There was a significant main effect of ethnicity,  $F(1,187) = 17.77, p < .01$ , but no significant effect of family type, nor interaction effects. Anglo-American ( $M = 58.36, SD = 2.25$ ) children had significantly higher scores on reading comprehension compared to Mexican-American children ( $M = 44.82, SD = 2.14$ ), even after controlling for SES differences. Also in light of the large amount of missing data on the reading comprehension variable, a MANOVA was conducted to compare adolescents with reading comprehension scores to those without reading comprehension scores on each theory of

mind question, adolescents' reports of rejection and consistent discipline from both mothers and fathers, enculturation values, externalizing behavior (as reported by mothers, fathers, and teachers), and socioeconomic status. Adolescents who were missing reading comprehension scores ( $n = 115$ ,  $M = 20.97$ ,  $SD = 3.90$ ) reported more consistent discipline from their mothers compared to adolescents with reading comprehension scores ( $n = 199$ ,  $M = 19.97$ ,  $SD = 2.92$ ),  $F(1, 275) = 6.87$ ,  $p < .05$ . There were no significant differences on the theory of mind questions, nor any other variable. Further, the groups did not differ significantly by family type, gender, or ethnic group composition.

*Sex differences.* A MANCOVA that examined whether there were sex differences on the theory of mind questions, adolescents' reports of rejection and consistent discipline from mothers and fathers, and enculturation values, after covarying out socioeconomic status was not significant,  $F(8, 287) = 1.58$ ,  $p = .13$ . Similarly, reading comprehension scores did not differ across boys and girls,  $F(1, 189) = .06$ ,  $p = .80$ .

### *Structural Equation Models*

Originally, two theoretical models were proposed. Model 1 was proposed to examine whether adolescent's theory of mind understanding was a mediator between parent-child relationships, cultural values, and problem social behavior, above and beyond socioeconomic factors. There was no support for Model 1, because theory of mind scores were not significantly related with mothers', fathers' or teachers' reports of externalizing behavior. Model 2 was proposed to examine whether theory of mind understanding was a mediator between parent-child relationships, cultural values and academic abilities, above and beyond socioeconomic factors. For Model 2, some of the intercorrelations among the variables were significant: theory of mind scores were related to aspects of parent-child relations, adolescent enculturation values, and

standardized test scores for reading comprehension. Thus, there was some support to test Model 2 and therefore structural equation modeling was developed to examine the relationship among the relevant variables of Model 2. It was expected that “quality parent-child relationships” would predict positive scores on theory of mind scores. Quality parent-child relationships were those in which the child reported higher rates of acceptance and consistent discipline, and lower rates of rejection from parents.

Given that adolescents’ reports of acceptance from mother and fathers were not significantly related to the composite ToM score, or any ToM question, only reports about rejection and consistent discipline were used as parenting measures in all structure question models. Figure 1 shows the original model (Model A) used to analyze whether adolescents’ theory of mind mediated the relationship between adolescents’ perceived rejection and consistent discipline from mothers and fathers, enculturation values, and reading comprehension scores, over and above socioeconomic status. All predictors (rejection and consistent discipline from mothers and fathers, and enculturation values) were allowed to correlate in Model A, and in all other models.

Structural equation modeling, using EQS software developed by Bentler (1995), was used to test all models. Tetrachoric correlations are reported in Table 6. These correlations were used because the latent factor of theory of mind is theoretically continuous, although its indicators (the comprehension, attention, and memory questions) were coded dichotomously. When items are based on categorical variables, factor analyses should be conducted on the matrix of polychoric inter-item correlations rather than on the matrix of Pearson correlations (Panter, Swygert, Dahlstrom, & Tanaka, 1997). The tetrachoric correlations among the ToM

questions are slightly higher,  $r$ 's = .13 to .21 (Table 6), compared to the Pearson correlations,  $r$ 's = .08 to .18 (Table 5).

Given the categorical nature of the data, listwise deletion was used to handle missing data<sup>2</sup> and robust statistics are reported for fit indices for all structure equation models. Fit indices for Model A indicated that the model had good fit: Satorra-Bentler Scaled  $\chi^2$  ( $n = 186, 14$ ) = 7.43,  $p = .92$ , CFI = 1.00, RMSEA = .00 (90 percent confidence interval of RMSEA = .00 to .03). Standardized parameter estimates for all direct effects are shown in Figure 1. Collectively, the predictors accounted for 32% of the variance on the ToM factor, and the predictors with ToM factor accounted for 20% of the variance on reading comprehension scores. However, the only significant predictor for the theory of mind factor, above and beyond all other predictors, was the enculturation variable (with a path coefficient of -.29).

The relatively strong intercorrelations among the other predictors (e.g., consistent discipline from dad and consistent discipline from mom,  $r = .66$ ; see Table 6) likely contributed to the finding that only the enculturation (and no other) variable predicted the ToM factor. Enculturation was less related to the other predictors,  $r$ 's = -.19 to .18. Enculturation values negatively correlated with the ToM factor,  $r = -.27$ , and several predictors also individually were correlated with the theory of mind factor. Specifically, rejection from mother was the strongest correlation,  $r = -.38$ , followed by consistent discipline from mothers,  $r = .36$ . Rejection from dad and consistent discipline from dad also correlated with the ToM factor,  $r = -.35$ , and .27, respectively. Socioeconomic status was positively correlated with the ToM factor,  $r = .29$ . Thus, Model A supports the hypothesis that parent-child relationships and enculturation collectively are important predictors of theory of mind; yet only the enculturation variable significantly predicted the ToM factor, beyond all other variables. Table 6 shows that reading comprehension

was correlated positively with the ToM factor,  $r = .33$ . However, contrary to hypotheses, the theory of mind factor did not significantly predict reading scores (path coefficient = .16, ns in Figure 1). Likewise, there were no significant indirect effects on reading comprehension.

Three alternative structural equation models (Models B, C, and D) were examined to specifically explore the parent-child relationship variables as predictors of adolescents' theory of mind, within the prescribed theoretical model. Figure 2 shows Model B, a structural equation model collapsing across parenting behavior for mothers and fathers. Model B differs from Model A in that parenting aspects were not entered individually for each parent, but rather each mothers' rejection and consistent discipline scores were averaged to create a parent-child relationship 'mother' variable and fathers' rejection and consistent discipline scores were averaged to create a parent-child relationship 'father' variable. These were entered as predictors in the model. Fit indices for Model B indicated that the model had good fit: Satorra-Bentler Scaled  $\chi^2 (n = 186, 10) = 7.75, p = .65, CFI = 1.00, RMSEA = .00$  (90 percent confidence interval for RMSEA = .00 to .07). Model B produced very similar results to those reported about Model A in that no parent-child relationship variable significantly related to the theory of mind factor. Collectively, the predictors in Model B accounted for 31% of the variance on the ToM factor, and the predictors with ToM factor accounted for 20% of the variance on reading comprehension scores. Just as in Model A, however, the only significant predictor for the theory of mind factor, above and beyond all other predictors, was the enculturation variable with a path coefficient of -.29.

Figure 3 shows Model C. Model C differs from Model A in that parenting aspects were not entered individually for each parent, but rather the average of mothers' and fathers' rejection and average of mothers' and fathers' consistent discipline were entered as predictors. Fit indices

for Model C indicated that the model had good fit: Satorra-Bentler Scaled  $\chi^2$  ( $n = 186, 10$ ) = 5.74,  $p = .84$ , CFI=1.00, RMSEA = .00 (90 percent confidence interval for RMSEA = .00 to .05). Model C produced very similar results to those reported above in Model A, except that when parenting behaviors (rejection and consistent discipline) were collapsed across parents, parental rejection emerged as a significant predictor of the theory of mind factor, standardized path coefficient =  $-.37$ ,  $p < .05$ . The predictors in Model C accounted for 30% of the variance on the ToM factor, and the predictors with ToM factor accounted for 20% of the variance on reading comprehension scores. Significant predictors for the theory of mind factor, above and beyond all other predictors, include rejection (collapsed across adolescent's reports for mother and father) with a path coefficient of  $-.37$ , and the enculturation variable (with a path coefficient of  $-.29$ ). Thus, both parental rejection and enculturation values negatively predicted adolescents' constructivist ToM scores.

Figure 4 shows Model D, a structural equation model with a parent-child relationship factor, comprised of mothers' and fathers' rejection and consistent discipline scores. In Model D rejection scores were reverse-coded; thus both types of parenting from mothers and fathers loaded positively onto the parent-child relationship factor,  $p < .05$ . The standardized path coefficient for rejection from dad was  $.78$ ; and for rejection from mom, it was  $.82$ . For consistent discipline from dad, it was  $.67$ ; and for consistent discipline from mom, it was  $.76$ . Fit indices for Model D indicated that the model had good fit: Satorra-Bentler Scaled  $\chi^2$  ( $n = 186, 29$ ) = 20.86,  $p = .86$ , CFI=1.00, RMSEA = .00 (90 percent confidence interval for RMSEA = .00 to .03). Model D shows that the parent-child relationship factor positively relates to the theory of mind factor (standardized path coefficient =  $.43$ ,  $p < .05$ ). Collectively, the predictors in Model D accounted for 31% of the variance on the ToM factor, and the predictors with ToM factor accounted for

19% of the variance on reading comprehension scores. Significant predictors for the theory of mind factor, above and beyond all other predictors, included the enculturation variable with a path coefficient of  $-.30$ , and the parent-child relationship factor with a path coefficient of  $.43$ . Thus, Model D showed that enculturation values negatively predicted the ToM factor, but quality parent-child relationships positively predicted the ToM factor.

#### *Group Comparisons Using Factor Scores*

Box's M tests of the homogeneity of the covariance matrices were conducted by analyzing three one-way MANCOVAs (by family type, by ethnic group, and by sex; controlling for SES) on the three theory of mind indicators of the theory of mind factor. For both family type and gender, the Box's M tests were not significant, indicating that the covariance matrices do not differ. However, the Box's M test for the MANCOVA by ethnic group was significant,  $F(45, 107478) = 1.67, p < .05$ . This suggests that group models run separately by ethnic group might yield differing path coefficients in the models for Mexican- and Anglo-Americans. Given the small sample size ( $n = 87$ ) of each group when all variables were included in the model, it was not statistically appropriate to use structural equation modeling<sup>3</sup> (Kline, 2005). A Box's M test testing the covariance among the theory of mind items was not significant, which suggests that any differences in model fit would not likely be due to differences on the theory of mind factor.

## Discussion

The present study tested the following hypotheses. First, it was expected that quality parent-child relationships would positively relate to adolescents' constructivist understanding of the mind. Specifically, it was hypothesized that the acceptance and consistent discipline subscales of the parent-child relationship measure would positively correlate with adolescents' constructivist understanding of the mind, while the rejection subscale would negatively correlate with adolescents' constructivist understanding of the mind. Second, it was expected that adolescents' cultural values would relate to adolescents' constructivist understanding of the mind. Specifically, it was hypothesized that higher acculturation values would positively correlate with constructivist ToM, and higher enculturation values would negatively correlate with constructivist ToM. Third, it was expected that adolescents' constructivist understanding of the mind would correlate negatively to their problem social behavior, or higher scores of externalizing behavior, as rated by teachers and parents. Fourth, it was expected that constructivist understanding of the mind would relate positively to higher GPA and standardized test scores. Based on the veracity of these hypotheses, the present study also sought to test two theoretical models of the relationship between theory of mind, predictors, and outcome variables. First, it was hypothesized that theory of mind could mediate the relationship between (a) cultural background, and quality of parent-child relationships, and (b) social behavior. Second, it was hypothesized that theory of mind could mediate the relationship between (a) cultural background, quality of parent-child relationships, and (b) academic success. These hypotheses and proposed theoretical models will be addressed in order, after a brief discussion of characteristics of the theory of mind variable and its relationship with socioeconomic status.

The pattern of adolescent's constructivist versus empiricist responses on the theory of mind questions could suggest a developmental sequence and regularity indicative of adolescents' emerging understanding of the mind. The majority of responses fell into a pattern such that adolescents were more likely to provide a constructivist response to the memory and comprehension questions compared to the attention question. This pattern might reflect that understanding the filtering role of attention is more difficult than understanding two people's differing perspectives and understanding the role of comprehension in remembering. Given that there was not a great deal of variability in age in the present sample, there was not evidence of any age-related advances in ToM development. Thus, these results should be replicated with a broader age range of children before solid conclusions can be drawn. It also would be interesting to examine adolescents' understanding of other mental state processes and whether understanding of such processes also falls into a sequential pattern.

The mean number of constructivist responses was comparable, although lower, than has been found in previous research investigating seventh-graders' constructivist views of the mind (Schwanenflugel et al., 2003). Furthermore, there did not appear to be an effect of order. If an adolescent provided empirical responses to any question, it was most often on the attention question, which was the second questioned asked. Thus, the order of difficulty of the three questions was not simply a reflection of the order in which they were presented.

The finding that most adolescents provided empirical responses to the attention question suggests that an emergence of a constructivist understanding is possible in the coming years. There is reason to suspect that a follow-up study on the same adolescents might provide evidence that mental state reasoning about attention has increased and therefore is still developing during the young adolescent developmental time period. Future research could explore this possibility.

### *Theory of Mind and Socioeconomic Status*

Given that SES has been shown to relate to social reasoning abilities in some previous research (Weimer & Guajardo, 2005), it was important to examine whether this variable related to ToM in the present study. Socioeconomic status was positively correlated with mean theory of mind scores; specifically higher SES positively related to constructivist responses on the comprehension and memory questions. This is likely one reason that the means on the theory of mind questions in the present study were lower than those found in past research (Schwanenflugel et al., 2003) which has examined children's ToM understanding among seventh graders from a higher SES population. These results strengthen conclusions from past research (Holmes-Lonergan, 2003; Holmes, Black, & Miller, 1996; Weimer & Guajardo, 2005) that children from varying income levels perform differently on theory of mind tasks. Although not all research has consistently demonstrated that SES is important in young children's false belief understanding (Garner, Curenton, & Taylor, 2005), SES differences among participants is a necessary factor to consider, and control for, when examining the relationships between cultural and parent-child relationship variables and children's cognitive development, given that these variables have been shown to vary across socio-demographic levels (Portes, Cuentas, & Zady, 2000). Thus, the present study examined relationships among the variables, after controlling for SES.

### *Theory of Mind and Parent-Child Relationships*

Theory of mind performance was related with several parent-child relationship variables in the predicted directions, even after controlling for SES. As predicted, mean ToM scores positively related to adolescent's perception of consistent discipline from their father, and consistent discipline from their mother, and negatively related to their perception of rejection

from their father and rejection from their mother. In particular, the comprehension question positively correlated with adolescents' perceptions of consistent discipline from fathers. Also, the memory question negatively correlated with adolescents' perceptions of rejection from fathers and rejection from mothers and positively correlated with adolescents' perceptions of consistent discipline from fathers and with consistent discipline from mothers. These results are consistent with predictions; however, contrary to expectations, mean ToM scores did not relate to adolescents' perception of acceptance from their mothers or acceptance from fathers, nor did any ToM question individually. Thus, results are only partially consistent with past research that has indicated that 12-year-old children's ability to infer character's mental states positively relates to parent-child attachment (Humphress et al., 2002). There are several possible reasons for these discrepancies.

It is possible that not all aspects of parent-child relationships relate with adolescents' developing understanding of the mind. Perhaps consistent discipline and lack of rejection are more predictive or have stronger effects on adolescent's developing ToM, compared to acceptance. Inconsistent disciplinary styles and rejection of children during adolescence might be particularly problematic for children's constructivist understanding about the mind because they do not facilitate children's ability to causally link mental states with behavioral outcomes. For example, if a mother "changed her mind to make things easier for herself," or "frequently changed the rules that the child was supposed to follow," it would be difficult for a child to gain insight about how her mother's mental processes were influencing her parenting decisions. Consistent rules, especially those developed with a clear rationale for the child's well-being, could more likely lead to the child's understanding that the mother's actions and rules are based on her beliefs. Parental rejection might be particularly unfavorable to developing a constructivist

understanding of the mind because children develop ToM through discourse and talking about other individual's differing perspectives. If a father "acted as though the child was in his way" and "didn't get the child things unless the child asked for them over and over again," he also might fail to engage in discussions with his child that could facilitate ToM development. Given that parents likely facilitate ToM understanding through discourse about mental state terms and interaction with their children (Dunn, Brown, & Beardsall, 1991; Welch-Ross, 1997), parental rejection might be particularly detrimental to ToM development. Yet, this study did not measure parent-child mental state talk. Thus, it is difficult to know the precise mechanism underlying the effect of rejection on ToM development. Thus, continued work in this area should strive to include measures of parent-child dialogue about mental states to explore this hypothesis.

It also is possible that negative parenting has a stronger influence on older children's ToM development because of frequency. There is an overall decline of interactions between parent and child with age and particular increase in negative conflict between parents and children during adolescence (Collins & Madsen, 2002). Perhaps rejection, in particular, is problematic to adolescent's developing a constructivist ToM simply because it occurs a greater portion of the time, compared to positive interactions. Given that this measure only asked children to rate how true statements were, it is difficult to know how often each behavior occurred. For example, a child who responded with "true" to this statement, "Your mother acted as though you were in her way," might have meant this happened once, or the situation could have occurred with great frequency. Further studies investigating the relationship between parent-child interactions and children's mental state understanding are needed.

*Theory of Mind and Culture*

Acculturation and enculturation are processes of cultural adaptation that produce changes in a wide array of psychosocial dimensions including knowledge, behaviors, beliefs, attitudes, values, and self-concept (Gonzales et al., 2002). Acculturation is the process of adaptation to the mainstream culture while enculturation is the process of adaptation to the ethnic culture. In the present study, it was expected that higher acculturation values would positively correlate with constructivist ToM, and higher enculturation values would negatively correlate with constructivist ToM. Results support only the latter hypothesis in that the correlation between the attention question and enculturation remained significant, after controlling for SES. There are several possible reasons for these results.

One possible reason for the finding that acculturation was unrelated to ToM is that the acculturation scale had low alpha reliability. Perhaps because these items did not have high internal consistency, they did not adequately measure acculturation values. Given that Mexican-American adolescents did not differ from Anglo-Americans on either subscale (acculturation nor enculturation), the construct validity for both subscales is also called into question. Knight et al. (2006) describe these processes of acculturation and enculturation as occurring among *ethnic minority families* including those who have been in the United States for several generations and those who have only recently immigrated. The present study not only included Mexican-American families, but also measured acculturation and enculturation among Anglo-American participants, as well. Given that the measure of acculturation and enculturation (i.e., the MAAS) was originally developed for use with ethnic minorities, it is unclear how to interpret results from Anglo-American participants.

From one perspective, it seems reasonable that people within all ethnic groups *all* people will vary as to how much they value family (i.e., familism-support, familism-obligation,

familism-referents), religion, respect, traditional gender roles, material success, independence and self-reliance, and competition and personal achievement. Therefore asking *all* participants rather than just the Mexican-Americans is useful because it allows cultural values to be measured continuously, as opposed to dichotomizing the sample into ethnic groups (with possibly more variability within ethnic groups than between them). Yet, without having established reliability of this measure, it is difficult to know whether the Mexican- and Anglo-American participants rated the items in comparable ways. In particular, there is evidence that Mexican-American subjects exhibit a stronger tendency to choose the extreme categories in a response scale compared to non-Hispanic participants (Marín, Gamba, & Marín, 1992), especially when a 5-point scale is used, compared to a 10-point scale (Hui & Triandis, 1989). In the present study, which used a 5-point response scale, data from Mexican-American participants was indeed negatively skewed, suggesting that they might have had a stronger tendency to choose the extreme positive response options.

Further complicating the interpretability of these results, data for the present study were collected during the timeframe in which the acculturation and enculturation scales were under development. Items from the revised Mexican-American and Anglo-American Acculturation/enculturation Scale (MAAS) were inadvertently omitted from the scales used in the present study. Thus, future research using a finalized and complete measure of cultural values should be done to replicate these findings.

Nevertheless, the finding that higher enculturation values (and not acculturation values) related to constructivist ToM understanding is interesting. This could suggest that having traditional views regarding the family, religion, respectfulness, and gender roles is associated with having an empiricist understanding of the mind, as opposed to a constructivist view. For

example, a person who has a concrete view of right and wrong, and accepts prescribed standards regarding gender roles and the family, might be more likely to view mental processes as merely assimilating “reality”. However, a person who conceptualizes right and wrong as being ambiguous and uncertain (at least some of the time) and who challenges conventional rules regarding gender roles and the family, might be more likely to view mental processes as influencing the “reality” that is created by the mind, and thus to provide constructivist responses on theory of mind questions.

The finding that children with higher acculturation values were not more likely to show a constructivist ToM could suggest that valuing self-reliance, competition and personal achievement are not related to mental state understanding. Constructivist ToM was hypothesized to relate with individualist, versus collectivistic, perspectives and in particular, it was expected that valuing competition and personal achievement might better predict constructivist ToM because people focused on competing might discuss and emphasize individual differences more often than people focused on cooperating, who discuss mutual goals and commonalities. The lack of dialog about differing mental states might lead individuals toward an empiricist view. However, results from the present study could suggest that ToM development does not occur in this way. Perhaps collectivistic talk encompasses mental state perspectives as much as individualistic talk. Another possible reason why acculturation values did not relate with ToM is that the low variability on the acculturation measure obscured the relationship. Mexican-American and Anglo-American children did not differ on acculturation values (self-reliance, competition and personal achievement) in this sample. In fact, the majority of participants reported that they had individualist ideals. It is difficult to determine from the present findings whether individualist versus collectivist ideals predict having a constructivist view of the mind.

Future research should include measures that identify differences in individualist and collectivistic values, and measures of how often participants emphasize and have discussions that focus on individual differences.

### *Theory of Mind and Externalizing Behavior*

Further hypotheses of the present study predicted that children with a constructivist understanding of the mind would be rated lower in externalizing behavior by their teachers and/or parents. Neither teachers' nor parents' ratings of children's social skills, however, were related to ToM performance. This finding was surprising, given that past studies have indicated children's social interaction skills and ToM understanding are related (Lalonde & Chandler, 1995; Slaughter, Dennis, & Pritchard (2002); Watson et al., 1999).

Several possible reasons could account for the discrepancy between the results of the present study and previous research. The sample in the present study was comprised of much older children ( $M = 12.93$  years,  $SD = .49$ ) than the children ( $M = 5.08$  years,  $SD = .75$ ) investigated by Watson et al. (1999). Perhaps young children's developing social skills predict ToM, but not among older children. This is unlikely, however, given that some research has indicated that adolescents who demonstrated difficulty understanding another person's point of view had problematic interactions with peers (Gordon, 1988). Perhaps the Behavior Problems Index (BPI) was not sensitive to the particular type of adolescent's social skills that relate to ToM. In particular, the BPI does not examine behaviors based upon intentionality of the child's actions. For example, the BPI contains an item that asks parents and teachers to rate the degree to which the child "was impulsive, or acted without thinking." Another item asks the degree to which the child "was not liked by other children." However, it is difficult to glean the reason for the child's actions from these items. Items that reflect intentional behavior would

more likely represent the child's ability to understand others' thoughts and desires. Perhaps, however, parents' and teachers' ratings of the specific social skills that exemplify adolescents' ability to engage in purposeful social interactions would relate to ToM. For example, it would be interesting to examine how measures of prosocial moral reasoning, sympathy, perspective-taking, ascription of responsibility, and social desirability relate with ToM in adolescence, since these have been found to be predictive of prosocial tendencies in adolescents (Carlo, Hausmann, Christiansen, Randall, 2003).

Aside from intentionality, other important variables might be at play. For example, Eisenberg, Zhou, Spinrad, Valiente, Fabes, and Liew (2005) found evidence that young children's emotional control mediates the relationship between parenting and children's externalizing problems. Thus, even if children recognize that others might think differently and have unique perspectives of situations, they might not have the ability to control their behavior, in order to engage in positive social interactions. Future research examining the relationship between ToM and social development would benefit from the inclusion of measures of emotion regulation and inhibitory control.

#### *Theory of Mind and Academic Performance*

The only significant correlation among any academic variable (standardized test scores for reading, language, and math, and GPA) was that mean ToM scores positively correlated with adolescent's standardized tests of reading comprehension, and this relationship no longer remained significant after controlling for SES. Thus, it appears that adolescents' ToM is not related to academic abilities, above and beyond socioeconomic factors. This finding is unexpected given that researchers have theorized that children's understanding of the mind might help them make sense of school (Astington & Pelletier, 1996), improve their story productions

(McKeough, 1992), and aid in literature interpretation (Gardner, 1991). Given that these suppositions have not been tested empirically, it is difficult to ascertain exactly why adolescent's ToM was unrelated to their academic abilities.

One possibility comes from results from a cross-cultural study of how schooling might be implicated in children's developing understanding of the mind, which included schooled and unschooled children from Cameroon. Vinden (2002) investigated 4- to 11-year old children's understanding of belief using standard true and false belief tasks and a follow-up "evidence" task that asked children to consider evidence for beliefs. Children who had attended school performed better than children who did not attend school. Interestingly, for both schooled and nonschooled participants, the ability to consider evidence for belief emerged about a year after the ability to understand false beliefs. Vinden contends that this similar developmental trajectory across schooled and unschooled children might "indicate that the development of an understanding of *evidence* for belief relies primarily on real-world experiences rather than being promoted through classroom interactions." (p. 451). Thus, perhaps adolescents' ToM in the present study did not relate with academic abilities after controlling for SES because advanced understanding of mind develops independently from schooling and therefore has more practical real-world as opposed to academic implications.

However, Schwanenflugel et al., (1998) found that children's increased understanding of higher order mental state terms positively related to self-monitoring of reading comprehension. Thus, questions emerge about the specific role of theory of mind development in academic performance. Perhaps it is adolescent's particular understanding of their own knowledge, rather than their general knowledge about the mind and mental processing that best predicts academic abilities. For example, Kuhn (2000) suggests that metacognition, or cognition that reflects on,

monitors, or regulates first-order cognition, is particularly important in the development of scientific thinking, and that this ability has many broader academic implications. In particular, she asserts that “there would seem few more important accomplishments than people becoming aware of and reflective about their own thinking and able to monitor and manage the ways in which it is influenced by external sources, in both academic, work, and personal life settings.” Thus, perhaps if the present study had included more items relating to adolescent’s understanding about their own mind and abilities, these cognitive abilities would have been related to academic abilities. Future research investigating the role of theory of mind an academic performance should include further measures of metacognitive abilities.

#### *Group Comparisons*

Most ToM research to date has included primarily young, Anglo-American children from middle- to upper-class families. The present study extended the investigation of ToM development to include older children from diverse backgrounds. In particular, the present study explored for possible group differences between Mexican- and Anglo-American adolescents and children from step and intact families across theory of mind, parental rejection and consistent discipline, enculturation values, and reading comprehension, above and beyond socioeconomic status. There were no main effects of family type or ethnic group on reports about parental rejection and consistent discipline or enculturation values, after controlling for SES differences. However, Anglo-American adolescents performed better on reading comprehension compared to Mexican-American adolescents. Thus, reading comprehension and theory of mind were the only variables in which the ethnic groups differed, after controlling SES. Given the focus of the present study, differences on the ToM variable were particularly of interest. ToM varied across ethnic groups, but only within intact families. Interestingly, among children from intact families,

Anglo-American children scored higher on the comprehension and attention questions compared to Mexican-American children. There were no ethnic group differences among children from stepfamilies. This finding is somewhat consistent with the study's hypotheses that there may be differences in Mexican- and Anglo-American's ToM views.

The mean differences in ToM between ethnic groups in intact families could be due to differing parenting styles of Mexican- and Anglo-Americans. Latino parents are more likely to rely on authoritarian strategies that emphasize obedience and conformity as compared to Anglo-Americans, who are more likely to rely on firm, but democratic parenting styles (Steinberg, Dornbusch, & Brown, 1992). Since extensive verbal give-and-take is a part of democratic, or authoritarian parenting styles, Anglo-American children might have a more of an opportunity to engage in conversations about emotions and other mental states, which are known to facilitate ToM understanding, at least among young children (Dunn, Brown, & Beardsall, 1991; Ruffman, Perner, & Parkin, 1999; Welch-Ross, 1997). Perhaps the different parenting styles were most influential among intact families because in intact families children experienced more consistency in parenting style, given that they had the same parents throughout their childhood. It also is possible that there is less democratic parenting among Anglo-American step families. Further research should examine these hypotheses.

### *Theoretical Significance*

The present study sought to examine two theoretical models. First, it was proposed that children's theory of mind might mediate the relationship between (a) cultural background and quality of parent-child relationships, and (b) social behavior. There was no support for this model however, because theory of mind scores were not significantly related with mothers', fathers' or teachers' reports of externalizing behavior, as discussed previously. Second, children's theory of

mind might mediate the relationship between (a) cultural background, quality of parent-child relationships, and (b) academic success. This theoretical model was examined in several ways. First, Model A tested whether adolescents' theory of mind mediated the relationship between adolescents' perceived rejection and consistent discipline from mothers and fathers, enculturation values, and reading comprehension scores, over and above socioeconomic status. Model A, in which the parent-child relationship reports were entered as separate predictors of ToM and reading comprehension, showed that the only significant predictor for the theory of mind factor, above and beyond all other predictors, was the enculturation variable. Similarly, Model B, which collapsed scores on rejection and consistent discipline for each parent such that a 'mother' and 'father' variable were entered as predictors of ToM and reading comprehensions produced analogous results; no parent-child relationship variable significantly related to the theory of mind factor. Only enculturation negatively predicted the ToM factor. However, Model C showed that when parenting behaviors (rejection and consistent discipline) were collapsed across parents, parental rejection also emerged as a significant predictor of the theory of mind factor. Lastly, Model D revealed that a parent-child relationship factor positively predicted a theory of mind factor, as well as the enculturation variable negatively predicting it. Collectively, all of the models show that the predictors accounted for approximately 30% of the variance on the ToM factor, and the predictors with ToM factor accounted for approximately 20% of the variance on reading comprehension scores. Contrary to hypotheses, the theory of mind factor did not predict reading scores in any model. Thus, there was no support for a mediational model.

Although there was no support for the mediational hypothesis, these models reveal consistent support that enculturation inversely predicts adolescent's constructivist ToM, beyond all other variables. Furthermore, Models C and D suggest that parent-child relationships are

important to ToM development, even after controlling for adolescent's cultural values.

Specifically, parental rejection predicts having an empiricist view, as opposed to a constructivist understanding of mental states. As discussed above, parental rejection might be negatively related to the development of a constructivist view because it corresponds with parent's overall lack of conversation with their children, and in particular, lack of discussion about others' perspectives. Further research should examine this possibility.

Despite the lack of support for the proposed mediational models, the present study does make several meaningful theoretical contributions to the field of child development with regard to increasing knowledge about the nature of adolescent's ToM development. First, the present study extended the investigation of the relationship between ToM understanding and social skills to include older children from diverse family backgrounds and strengthened conclusions from past research regarding differential performance on ToM tasks among children from varying income levels. Given that the present study included children from various family types, it is of interest that only parental rejection was predictive of having a constructivist ToM.

Past research investigating parent-child relations and ToM has often excluded the father-child relationship entirely. The inclusion of fathers in this study reveals that the father-child attachment relationship is important to ToM development, in that adolescents' reports of rejection and consistent discipline both were correlated with their ToM scores, even after controlling for SES differences among adolescents. Thus, it might not just be mothers of securely attached children that treat their children as mental agents; these results suggest that fathers also might help facilitate ToM development among children. Results are consistent with the idea that children with advanced social understanding elicit more responsiveness and consistency of discipline than children with less-advanced social understanding. Thus, further research should

examine child's ToM development longitudinally and include both mothers and fathers as attachment figures to help disentangle the child's and parental roles in ToM development. Findings from the present study also offer many other suggestions for future research.

#### *Limitations and Future Directions*

There were several limitations of the present study. In particular, the theory of mind measure contained only a limited number of items. Future research investigating the adolescent's theory of mind development should include more ToM items, and a measure of children's metacognitive abilities. Responses to these limited questions did not provide strong support for the notion of a theory of mind factor, despite the good fit of a confirmatory factor analytic model. While this pattern might reflect that adolescent's develop an understanding of attention, comprehension, and memory at different points in development, these results should be interpreted cautiously until they have been replicated with a broader age range of children.

While the present study found that aspects of parent-child relationships related to adolescent's ToM development, further studies investigating the relationship between parent-child interactions and adolescent's mental state understanding are needed to gain a better understanding as to the reasons why parent child relationships relate to children's ToM understanding. In particular, measures of parent-child dialogue about mental states would be useful, and further studies of ToM and parenting should include measures of parenting style.

The present study did not use a reliable and complete measure of enculturation and acculturation values. Thus, future research using a reliable measure of cultural values should be done to replicate these findings. A measure that can identify differences in individualist and collectivistic values is particularly warranted. Measures of how often families emphasize and discuss individual differences in views would be particularly useful.

Another limitation of the present study was that it relied on a measure of adolescent's problem behavior, as opposed to measuring both antisocial and *prosocial* behavior. Furthermore, there was no way to measure children's motivation for this aggressive behavior. Further insight as to the relationship between ToM and social skills could be gained by using a social skills measure with a checklist of adolescent's intentional actions relating to social interaction, measures of emotion regulation and inhibitory control, or involve observational methods that would allow a distinction to be made between children's intentional versus unplanned social behavior. Measures of prosocial moral reasoning, sympathy, perspective-taking, ascription of responsibility, and social desirability would especially be useful.

Finally, the present study was cross-sectional by design, which did not allow causal determinations regarding relationships among ToM development, cultural, parent-child relationships, social, and academic outcomes to be explicitly investigated. Although the structural equation model tested directional relations among the variables, equivalent models might also fit the data equally well, or better. It also is possible that a model including more variables that are relevant to adolescents' ToM development would better explain the relationship among these variables. Thus, although the present study demonstrated that ToM, cultural values, parent-child relationships, and socioeconomic variables are related, longitudinal research is necessary to determine how these variables precisely impact each other.

### *Conclusions*

In summary, the present study found some support for several of the proposed hypotheses. First, it was expected that quality parent-child relationships would positively relate to adolescents' constructivist understanding of the mind. As predicted, parental rejection and consistent discipline were related to ToM understanding; however, there was no support for the

hypothesis that parental acceptance relates to ToM. Second, it was expected that adolescents' cultural values would relate to adolescents' constructivist understanding of the mind.

Adolescent's enculturation values were negatively related to ToM understanding; however there was no support for the idea that acculturation values relate to ToM. Third, it was expected that adolescents' constructivist understanding of the mind would correlate negatively to their problem social behavior, or higher scores of externalizing behavior, as rated by teachers and parents.

However, this hypothesis was not supported. Fourth, it was expected that adolescents' constructivist understanding of the mind would relate positively to higher GPA and standardized test scores. There was only limited support for this hypothesis in that ToM scores related to reading comprehension. Thus, one theoretical model was tested. The present study examined whether theory of mind could mediate the relationship between cultural background, quality of parent-child relationships, and reading comprehension. There was no support for this mediational model.

Several goals were accomplished in the present study. First, it extended the investigation of relationships among ToM development and social skills to include older children and children from diverse family types: Mexican-and Anglo-Americans adolescents from step-and intact families. The present study did not find similar relationships among these variables that have been found in previous studies involving younger children from a less-ethnically diverse sample. Thus, the present study suggests the possibility that relationships among ToM, and social competence could be affected by cultural and family background factors. In particular, parenting style and cultural values might play a role in ToM development. Research is necessary to investigate this possibility further. Second, the present study examined how adolescents' understanding of mental activity might relate to their school outcomes. There was little support

for this idea, given that ToM only related to reading comprehension scores and this relationship did not remain significant when SES was considered.

Finally, the present study provided a foundation for many future studies including those that include an expanded ToM measure. Further, research should examine specific aspects of adolescent's social skills that reflect intentional social interactions, and perhaps include measures of emotion regulation, prosocial moral reasoning, sympathy, perspective-taking, ascription of responsibility, and social desirability. Future investigations of ToM and parenting should include measures of parent-child dialogue about mental states, parenting style, and cultural ToM research should include reliable and complete measure of enculturation and acculturation values. Research with measures that can explicitly identify differences in individualist and collectivistic values would be particularly useful. Continued investigations of adolescent's ToM development are necessary to allow further understanding of the underlying interacting factors that affect adolescent's social cognitive development.

## Footnotes

<sup>1</sup> There was not a strong theoretical basis to suspect that theory of mind would relate to internalizing, or less-overt problem behavior (e.g., feeling anxious and depressed). Nevertheless, given that externalizing and internalizing behavior were highly correlated, I examined the relationships among reports of adolescent's internalizing behavior and theory of mind scores on an exploratory basis. Neither mothers' nor father's reports were significantly related to theory of mind, however, mean teacher reports of internalizing negatively correlated with the memory question, ( $n = 291$ ),  $r = -.19$ ,  $p < .01$ .

<sup>2</sup> Given the amount of missing data on the reading comprehension variable, a structural equation model including the theory of mind factor and only predictors of theory of mind (i.e., without the reading outcome variable) was used to examine the effect of including *only* participants who were missing data on the reading variable ( $n = 111$ ). Unfortunately, results could not be interpreted because of condition codes in the data output, which could have occurred because of the relatively small sample size. It is important to note, however, that including further cases might produce differing results in future research.

<sup>3</sup> Two separate models (one including only Mexican-American adolescents and another with only Anglo-American adolescents) with a parenting factor, enculturation and SES variables predicting the ToM factor (excluding the reading variable) were compared. Results suggested that the greatest differences between the two models were on the SES and enculturation variables. Specifically, among Anglo-Americans, enculturation was slightly negatively (and not significantly) predictive of ToM, while SES significantly predicted the ToM factor. Among Mexican-Americans, these variables were not related to ToM. These results should be interpreted with great caution, however, because it is important to examine the fit of the factor structure in

both groups to ensure that there are no differences before examining any structural relationships among the variables. This was not possible because of the limited number of items measuring theory of mind. Furthermore, because of current structural equation programming limitations, structured means modeling cannot be conducted with categorical data.

Table 1

*Sample Size, Possible Range, Means, and (Standard Deviations) for All Variables*

Variable	<i>n</i>	Possible Range	Mean (Standard Deviation)
Comprehension (Question 1)	311	0-1	.41 (.49)
Attention (Question 2)	310	0-1	.18 (.39)
Memory (Question 3)	312	0-1	.63 (.48)
Mean ToM	314	0-1	.41 (.29)
Acceptance dad	314	10-30	25.05 (4.53)
Acceptance mom	314	10-30	27.55 (3.50)
Rejection dad	314	10-30	14.71(3.70)
Rejection mom	314	10-30	14.19 (3.90)
Discipline dad	314	8-24	19.67(3.31)
Discipline mom	314	8-24	20.27(3.61)
Enculturation	314	28-140	113.43 (13.21)
Acculturation	314	9-45	32.89 (5.21)
Mom's report of externalizing	314	18-60	30.89 (6.23)
Dad's report of externalizing	313	18-60	30.20 (6.18)
Mean of teacher reports of externalizing	293	20-90	28.14 (10.54)
Reading	199	0-99	51.72 (22.20)
Language	202	0-99	52.39 (23.77)
Math	202	0-99	51.58 (20.35)
Total GPA	218	0-4	2.73 (0.92)
SES	306	0-30	2.96(2.53)

Table 2

*Frequencies of Patterns of Constructivist (1) and Empiricist (0) Responses Across the Three Theory of Mind Questions (n=309)*

	More Frequent Patterns:				Less Frequent Patterns:			
Memory								
(Question 3)	0	1	1	1	0	0	1	0
Comprehension								
(Question 1)	0	0	1	1	1	1	0	0
Attention								
(Question 2)	0	0	0	1	1	0	1	1
Number of adolescents								
with response pattern:	71	80	69	23	5	29	18	10

Table 3

*Correlations Among Theory of Mind Scores, Dependent Variables, and SES Using Pairwise Deletion, n's = 196 to 311*

	1	2	3	4	5	6	7	8	9	10	11
1. Mean ToM	-	.69**	.54**	.70**	-.11*	-.15*	-.11*	.17**	.14*	.14*	.14*
2. Comprehension		-	.08	.18**	-.07	-.08	-.03	.14*	.09	.13	.11*
3. Attention			-	.11	-.12*	-.04	-.05	.01	.00	.11	.00
4. Memory				-	-.03	-.16*	-.14*	.17**	.17**	.06	.14*
5. Enculturation					-	-.06	-.10	.04	.02	-.28**	-.12*
6. Rejection dad						-	.55**	-.62**	-.48**	-.10	-.17**
7. Rejection mom							-	-.52**	-.65**	-.18*	-.15*
8. Discipline dad								-	.66**	.15*	.25**
9. Discipline mom									-	.19*	.19**
10. Reading										-	.28**
11. SES											-

\*\*  $p < 0.01$

\*  $p < 0.05$

Table 4

*Intercorrelations Among Theory of Mind Scores and Dependent Variables, After Controlling for SES, Using Pairwise Deletion, n's from 183 to 303 (and Listwise Deletion, n = 183)*

	1	2	3	4	5	6	7	8	9	10
1. Mean ToM	-	.68** (.68**)	.55** (.55**)	.69** (.66**)	-.09 (-.14)	-.13* (-.15*)	-.09 (-.16*)	.14* (.10)	.12* (.15*)	.11 (.15*)
2. Comprehension		-	.08 (.10)	.16** (.11)	-.05 (-.13)	-.07 (-.05)	-.02 (-.01)	.11* (.04)	.07 (.07)	.10 (.09)
3. Attention			-	.11 (.08)	-.12* (-.10)	-.04 (-.08)	-.05 (-.07)	.01 (.00)	.00 (.00)	.11 (.14*)
4. Memory				-	-.02 (-.04)	-.13* (-.16*)	-.12* (-.22**)	.14* (.14)	.15* (.19*)	.02 (.05)
5. Enculturation					-	-.08 (-.13)	-.12* (-.09)	.07 (.09)	.04 (.07)	-.26** (-.28**)
6. Rejection dad						-	.54** (.52**)	-.61** (-.57**)	-.46** (-.48**)	-.05 (-.07)
7. Rejection mom							-	-.50** (-.54**)	-.64** (-.64**)	-.14* (-.16*)
8. Discipline dad								-	.65** (.65**)	.09 (.10)
9. Discipline mom									-	.14* (.15*)
10. Reading										-

\*\*  $p < 0.01$

\*  $p < 0.05$

Table 5

*Adjusted Means and (Standard Errors) For Theory of Mind Scores and Related Dependent Variables by Family Type and Ethnic Group, After Covarying Out SES (n=297 for all variables except reading comprehension; n =183)*

	Intact		Step		Significant effects
	Anglo-American	Mexican-American	Anglo-American	Mexican-American	
Comprehension	.53(.06) <sup>a</sup>	.35(.05) <sup>b</sup>	.35(.06) <sup>c</sup>	.42(.06)	Interaction
Attention	.27(.04) <sup>a</sup>	.11(.04) <sup>b</sup>	.14(.05) <sup>c</sup>	.19(.05)	Interaction
Memory	.66(.06)	.58(.05)	.59(.06)	.68(.06)	
Enculturation	114.27(1.49)	115.44(1.46)	109.79(1.67)	113.97(1.67)	
Rejection dad	13.72(.41)	14.96(.40)	14.85(.46)	15.33(.46)	
Rejection mom	13.49(.43)	14.14(.43)	13.99(.49)	15.12(.49)	
Discipline dad	20.60(.36)	19.37(.35)	19.64(.40)	18.98(.40)	
Discipline mom	21.34(.39)	20.02(.39)	20.17(.44)	19.32(.44)	
Reading	58.37 (3.04)	46.45 (2.82)	58.33 (3.39)	43.41 (3.20)	Ethnicity

Note: Values marked with an 'a' differ from values marked with 'b's and 'c's, but 'b's and 'c's do not significantly differ,  $p < .05$



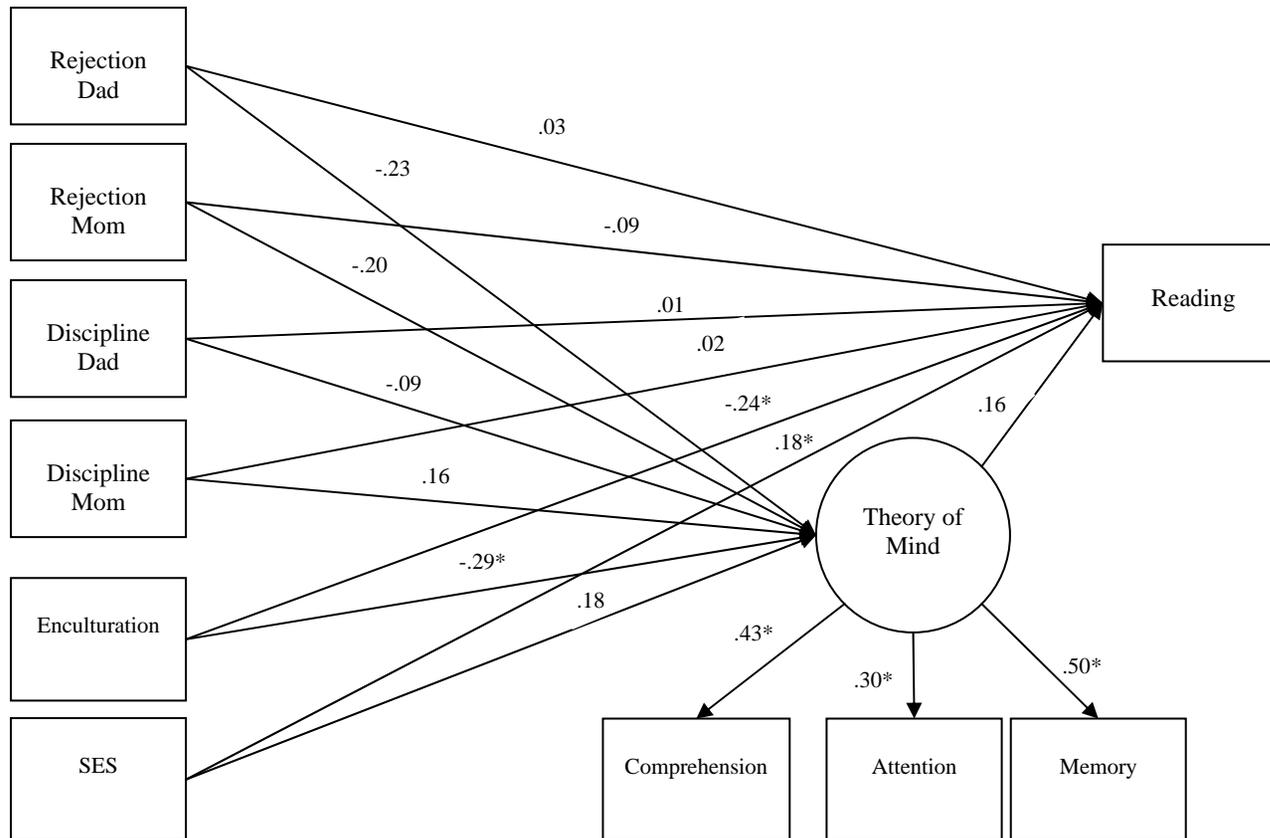


Figure 1

Model A: Structural Equation Model with Rejection and Consistent Discipline Separately for Mothers and Fathers, Showing Standardized Path Coefficients ( $n = 186$ )

\*  $p < .05$

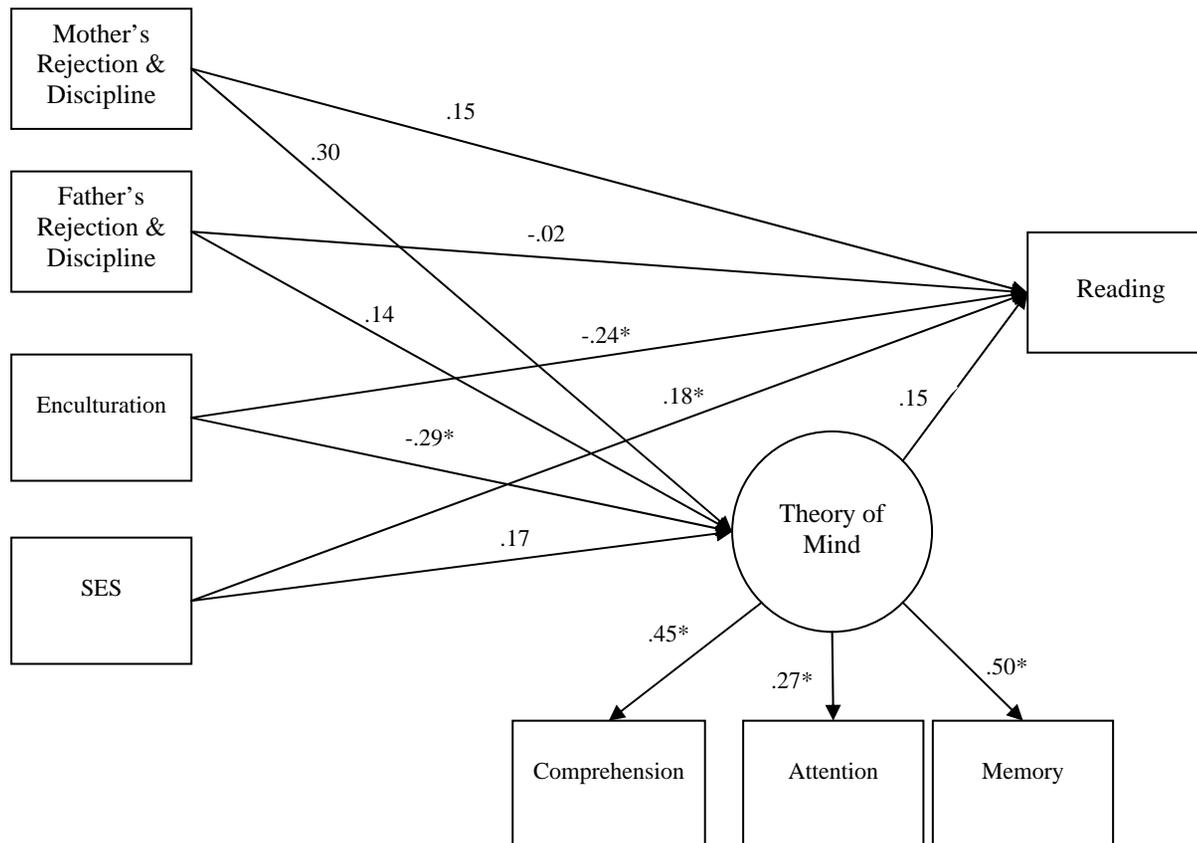


Figure 2

Model B: Structural Equation Model Collapsing Across Parenting Behavior for Mothers and Fathers, Showing Standardized Path coefficients, ( $n=186$ )

\*  $p < .05$

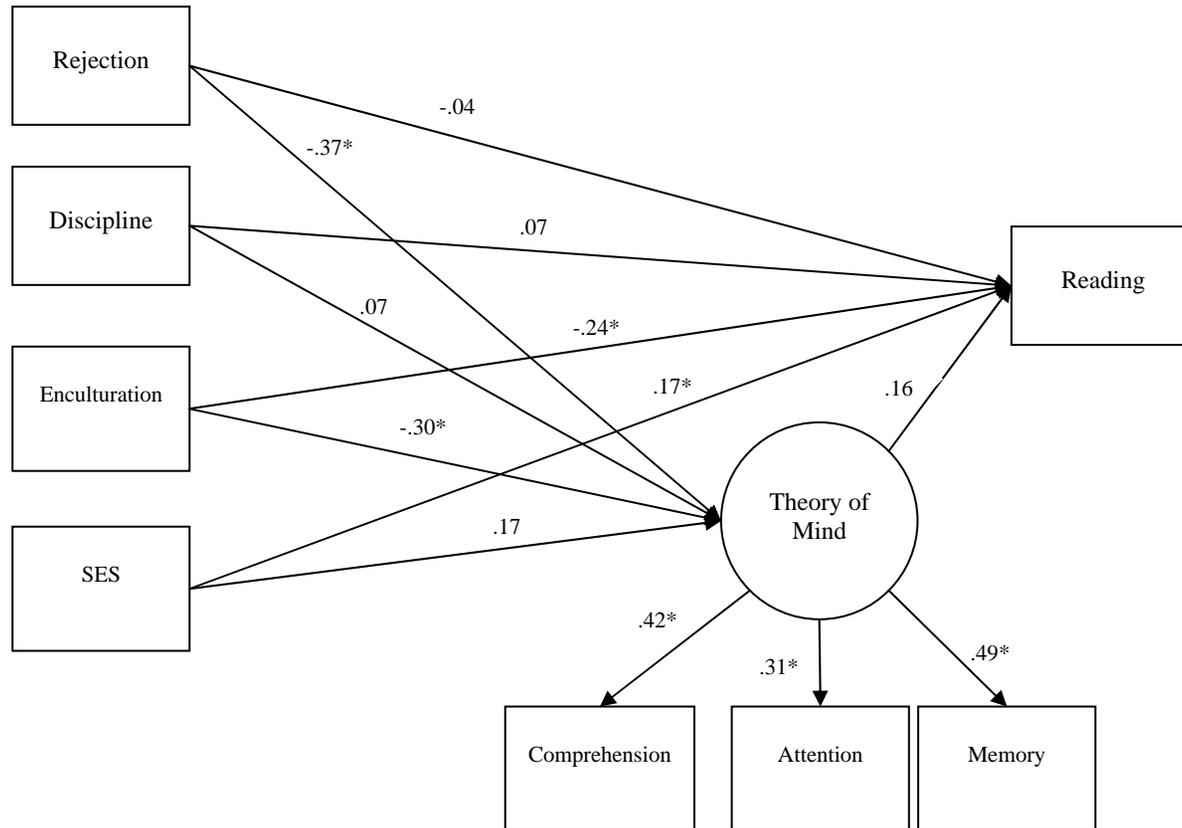


Figure 3

Model C: Structural Equation Model with Rejection and Consistent Discipline Collapsed Across Parents, Showing Standardized Path Coefficients ( $n= 186$ )

\*  $p < .05$

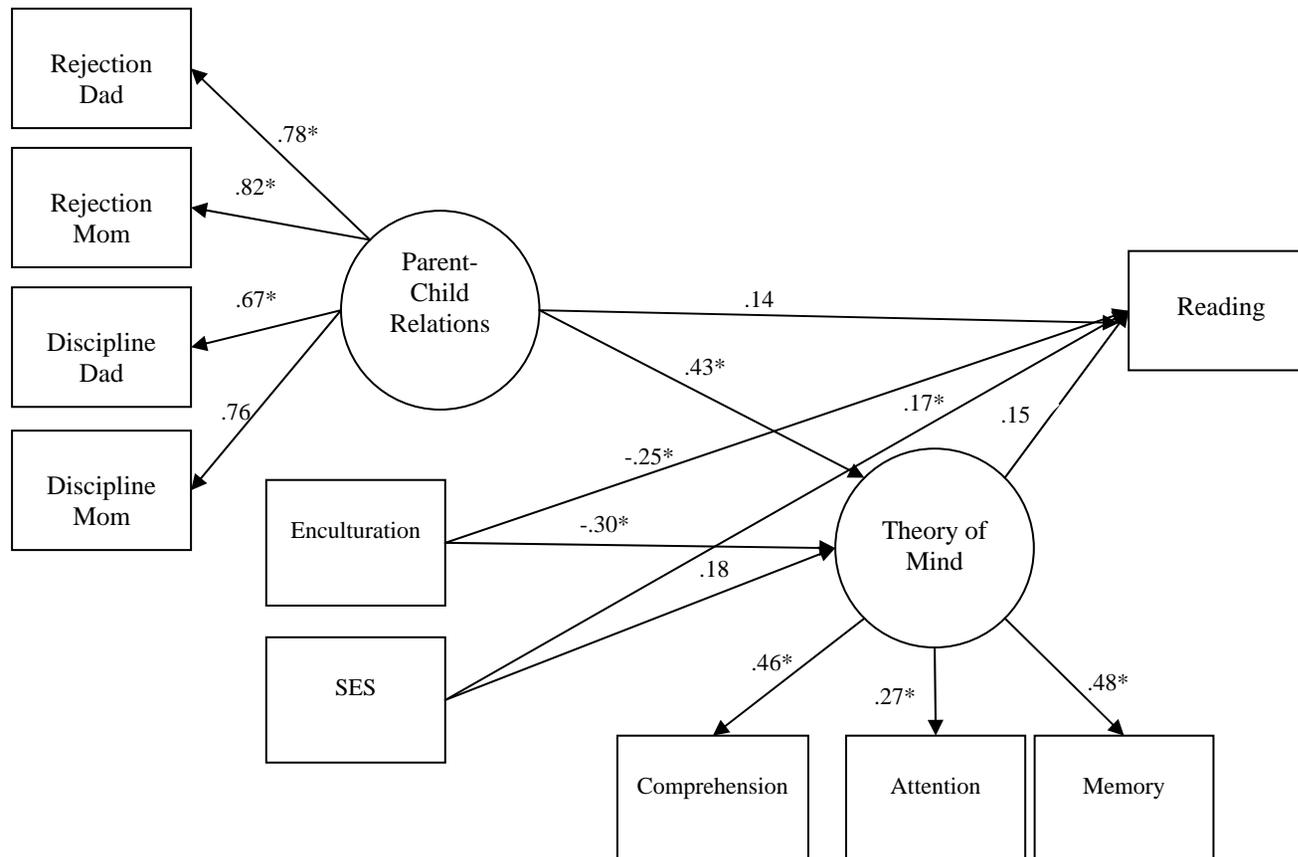


Figure 4

Model D: Structural Equation Model with Parent-Child Relationship factor (with Reverse-coded Rejection Subscales), Showing Standardized Path Coefficients ( $n=186$ )

\*  $p < .05$

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APPENDIX A

## THEORY OF MIND QUESTIONS: INTERVIEWING AND CODING

## INSTRUCTIONS

Interviewers were instructed to first ask the children for a “yes” or “no” answer, and then to ask him/her to explain the response by saying, “Tell me why or why not.” Instructions to coders included: Code each of the participant’s answers as either “Yes, with Mental Process explanation,” “Yes, with Non-Mental Process explanation,” or “No.” If a child gives a Mental Process explanation and a Non- Mental Process explanation, code it as the former. For example, if in response to Attention B, the child said, “Yes, they could be deaf, or they could just start paying attention to something else,” code it as a Mental Process explanation.

1. Comprehension: Could somebody remember everything that someone said to them but not understand it?
  - a) Yes, with Mental Process explanation.
    - 1) Explicitly distinguishes between remembering and understanding (e.g., memorizing vs. analyzing, remembering words vs. understanding meaning, etc.), and describes it as generally possible, not just in special cases involving foreign vocabulary, knowledge deficits, difficult topics, speaking gibberish.
  - b) Yes, with Non-Mental Process explanation.
    - 1) Does not distinguish between remembering and understanding, only mentions understanding (e.g., he does not understand because it’s foreign

vocabulary), or only mentions remembering.

2) Yes, with a contradictory explanation (he forgot part, wasn't paying attention, etc.)

3) Yes, but they don't know how.

c) No

2. Attention: If somebody was listening to music for a few minutes, could they just stop hearing it?

a) Yes, with Mental Process explanation.

1) Attention stops going to the music and goes to something else.

b) Yes, with Non-Mental Process explanation.

1) No longer has the opportunity to hear the music (goes to sleep, turns off radio, etc.)

2) Yes, with a contradictory explanation.

3) Yes, but they don't know how.

c) No

3. Memory: Could two people watch the same thing happen and both see and hear everything, but remember it very differently?

a) Yes, with Mental Process explanation.

1) Different conceptual perspectives or interpretations.

2) Selective Attention, focusing on different aspects.

- b) Yes, with Non-Mental Process explanation.
  - 1) Perceptual problems (exposed to slightly different perceptual experience, watched from different angles, different visual abilities, one person is better, etc.)
  - 2) Yes, with a contradictory explanation:
    - a. one person misses something
    - b. one lies
    - c. one forgets something
  - 3) Yes, but they don't know how.
- c) No.

APPENDIX B

## ITEMS ADAPTED FROM THE CHILD REPORT OF PARENT BEHAVIOR

## INVENTORY (CRPBI)

Items below are worded for the report about father. Wording was similar in every regard for child reports about mother, except “dad/step-dad” was replaced with “mom”, and all pronouns were changed from masculine to feminine. Children had the following response options: true, somewhat true, false. The interview asked the child, “How true is each of these statements? During the past 3 months, your (dad/step-dad)...”

*Acceptance items:*

1. was able to make you feel better when you were upset.
2. enjoyed doing things with you.
3. made you feel better after talking over your worries with him.
4. understood your problems and worries.
5. smiled at you very often.
6. enjoyed working with you in the house or yard.
7. comforted you when you were afraid.
8. cheered you up when you were sad.
9. had a good time at home with you.
10. seemed proud of the things you did.

*Rejection items:*

1. thought your ideas were silly.
2. was not very patient with you.

3. forgot to help you when you needed help.
4. was always getting after you, or nagging you about something.
5. almost always complained about what you did.
6. often blew his top when you bothered him.
7. didn't get you things unless you asked for them over and over again.
8. didn't seem to know what you needed or wanted.
9. didn't work with you.
10. acted as though you were in the way.

*Consistent Discipline items:*

1. sometimes allowed you to do things that your mother said were wrong.
2. soon forgot a rule he had made.
3. punished you for doing something one day, but ignored it the next.
4. it depended on his mood whether a rule was enforced or not.
5. only kept rules when it suited him.
6. changed his mind to make things easier for himself.
7. frequently changed the rules you were supposed to follow.
8. insisted that you follow a rule one day and then forgot about it the next.

APPENDIX C

## MEXICAN-AMERICAN ACCULTURATION SCALE (MAAS)

Interviewer instructions to each children were, “Give the answer that best represents your opinion.” Response option included: strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, strongly agree.

*Enculturation items:*

1. God is first; family is second.
2. Parents should teach their children that the family always comes first.
3. Children should be taught that it is their duty to care for their parents when their parents get old.
4. Children should always do things to make their parents happy
5. No matter what, children should always treat their parents with respect.
6. Family provides a sense of security because they will always be there for you.
7. If a relative is having a hard time financially, you should help them out if you can.
8. When it comes to important decisions, the family should seek advice from close relatives.
9. Men should earn most of the money for the family so women can stay home and take care of the children and the home.
10. Children should never question their parents' decisions.
11. My belief in God gives me inner strength and gives meaning to life.
12. Families need to watch over and protect teenage girls more than teenage boys.
13. It is always important to be united as a family.

14. Children should always honor their parents and never say bad things about them.
15. If everything is taken away, I still have my faith in God.
16. It is important to have close relationships with aunts/uncles, grandparents and cousins.
17. Children should follow the rules of their parents, even if they think the rules are unfair.
18. Older kids should take care of and be role models for their younger brothers and sisters
19. It is important for the man to have more power in the family than the woman.
20. Children should be taught to always be good because they represent the family.
21. A wife should always support her husband's decisions, even if she doesn't agree with him.
22. It is important to work hard and do your best because your work reflects on the family.
23. It is important for family members to show their love and affection to one another.
24. The mother is the main person responsible for raising children.
25. A person should always think about their family when making important decisions.
26. Parents should be willing to make great sacrifices to make sure their children have a better life.

27. Holidays and celebrations are important because the whole family comes together.
28. It is important to thank God everyday for all we have.

*Acculturation items:*

1. People should learn how to take care of themselves and not depend on others.
2. You must be ready to compete with others if you want to get ahead.
3. As children get older their parents should allow them to make their own decisions.
4. The most important thing parents can teach their children is to be independent from others.
5. Parents should encourage children to do everything better than others.
6. Parents should teach their children to compete to win.
7. When there are problems in life, a person can only count on (him/her)self.
8. Personal achievements are the most important things in life.
9. Parents should encourage children to solve their own problems.

## APPENDIX D

## TEACHER REPORTS OF CHILD'S EXTERNALIZING BEHAVIOR

Instructions to each teacher were, "The following statements are about student behaviors that many children have. As you read each sentence, decide which phrase best describes the student's behavior at school over the last three months. Choose only one response." Response options included: never, rarely, sometimes, often, very often.

*Externalizing Items*

1. had sudden changes in moods or feelings.
2. was nervous, high-strung, or tense.
3. cheated or told lies.
4. argued too much.
5. could not concentrate, could not pay attention for long.
6. was easily confused, seemed to be in a fog.
7. bullied or was cruel or mean to others.
8. was disobedient at home.
9. had trouble getting along with other children.
10. was impulsive, or acted without thinking.
11. was not liked by other children.
12. had a lot of difficulty getting (his/her) mind off certain thoughts (had obsessions).
13. was restless or overly active, could not sit still.
14. was stubborn, sullen or irritable.
15. had a very strong temper and lost it easily.

16. was disobedient at school.
17. had trouble getting along with teachers.

*Externalizing and Internalizing Items*

18. was unhappy, sad, or depressed.
19. was too fearful

*Internalizing Items*

20. felt or complained that no one loves him/her.
21. felt worthless or inferior.
22. was withdrawn, did not get involved with others.
23. broke things on purpose or deliberately destroyed (his/her) own or another's things.
24. clung to adults.
25. cried too much.
26. demanded a lot of attention.
27. was too dependent on others.