Desire understanding and prosocial behavior:  
The relationship between early development of theory of mind and the social processes of preschool-age children

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Abstract

This study explores the relationship between desire understanding and prosocial behavior. A sample of 49 children, ranging from 3 to 5 years of age, was given a battery of desire understanding tasks. Prosocial behavior, as comprised of prosocial orientation, social initiative, and selflessness, was measured by teacher and parent reports. Overall desire understanding was related to teacher ratings of prosocial behavior. This significant correlation remained when controlling for selfishness. Effects of age and “risk status” were also found. Implications of teacher bias within the classroom, factors influencing the development of prosocial behavior, and a possible interaction between these two components are discussed.
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“Life does not consist mainly—or even largely—of facts and happenings. It consists mainly of the storm of thoughts that is forever blowing through one's head.” -Mark Twain

Interestingly enough, theory of mind, as the understanding of mental states, made its first appearance in psychological literature under the guise of nonhuman primates (Premack & Woodruff, 1978). Since this initial introduction, skepticism of the existence of theory of mind in primates has grown, and emphasis has shifted over to their human constituents. In recent years, theory of mind has grown to be a much researched area of psychology. As theory of mind is further explored, it has been more specifically defined as a capacity for perspective-taking: the ability to move away from an egocentric orientation to the recognition of others’ unique mental states; and, moreover, the ability to use these mental states to explain and predict behavior.

As curiosity surrounding the construct of theory of mind has grown, there has been a flurry of research delving into how this construct comes to be; that is, the development of theory of mind. Along this vein, Wimmer and Perner (1983) adapted Premack and Woodruff’s (1978) tasks to assess human children’s grasp of theory of mind. Wimmer and Perner thus gave rise to the (human) false belief task, and postulated that passing the test entailed an explicit representation of the wrongness of another’s belief in relation to one’s own knowledge. False belief understanding, as measured by Wimmer and Perner’s study, is understood as a concrete demonstration of theory of
mind: in order for children to answer correctly, they must disregard the salient information of their own knowledge to predict the actions of an individual who has had experiences different than those of the children. The traditional set-up of the false belief task is as follows: subjects observe an agent placing an object in a certain location, and then leaving the room. In the agent’s absence, the object is transferred to a different location. Subjects are then asked to predict where the agent will search for the object upon his return. In Wimmer and Perner’s study, only children over the age of 6 passed successfully completed their task.

Findings from Wimmer and Perner’s now-classic false belief study inspired a rebirth of interest in children’s understanding of mental life. Developmental psychologists have produced countless studies that build upon one another in a quest to clarify the course of man’s emerging psychological understanding.

*Early evidence of theory of mind*

The decades following the introduction of the false belief task have been witness to countless replications and alterations of Wimmer and Perner’s archetypal test. Researchers have repeatedly refined the classic false belief task to construct a more sensitive measure of children’s developing theory of mind through integrating varying forms and degrees of scaffolding. Unconventional assessments of theory of mind incorporate alternative representations of the same object (representational change: Gopnik & Astington, 1988), involvement of the child in strategic planning (Hala & Chandler, 1996), charting children’s eye gaze (e.g., Ruffman, Garnham, Import &

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Connolly, 2001), cued-recall (Freeman, Lacohee & Coulton, 1995), pretense (Cassidy, 1998a), and desire understanding (Cassidy, 1998b).

Alternative methods of testing of theory of mind have revealed evidence of a perspective-taking capacity as early as infancy (e.g., Bretherton, 1991; Charman et al., 2001; Leslie, 1994; Fodor, 1992; Harris, 1994). For example, Bretherton (1991) found that children at 9 and 12 months were able to use gestures to recruit and guide their partner’s attention. This capacity entails the consideration of others’ unique mental states. Charman et al. (2001) provide evidence for a similar joint attention capacity at 20 months, which they find to be associated with theory of mind at 44 months.

In a study by Meltzoff (1995), 18-month-olds were shown adults who intended, but failed, to complete a certain task. Subjects inferred the adults’ intentions from their failed attempts to successfully carry out the target task. These infants were able to disregard people’s surface actions, and conceptualize other people in terms of their deeper psychological workings. Moreover, soon after this same age, toddlers are also able to situate people in terms of their emotions. A study by Repacholi (1998) showed that 2 year-olds were able to identify the referent of another’s emotional expression. In addition, toddlers at this age use their understanding of others’ unique mental states to alter their communication to a partner, based upon that partner’s past experiences (O’Neill, 1996).

Thus, young children demonstrate evidence of a rudimentary theory of mind even before they have mastered the classic false belief task. What then is the underlying pathway that connects toddlers’ primitive mental state understanding to older children’s mature theory of mind? As the volume of research on theory of mind has grown, so has
the number of competing theories regarding its development (for a good review of main
theories on the development of theory of mind, see Bartsch & Wellman, 1995).

*Alternative theories of theory of mind*

A considerable faction of theory of mind theorists downplays the unique
significance of this cognitive development. These psychologists claim that theory of
mind development, in a sense, is no big deal; that this cognitive capacity is innate and
domain general. Observed behaviors associated with theory of mind development are
explained away by this camp as merely the side effects of a broader shift in reasoning
that occurs during the preschool years.

Leslie (e.g., 1994; Roth & Leslie, 1998) can perhaps be considered the
frontrunner of this “anti-development” camp. He postulates that the apparent
developmental progression of mental state understanding is in fact just this: apparent, and
a mere factor of superficial changes. Instead, Leslie offers a modular nativist account of
folk psychology, and claims that humans are born with an innate basis for the capacity to
acquire theory of mind—what he dubs the “theory of mind module” (ToMM). The
innate module equips humans to explain the behavior of others in term of their mental
states, essentially from birth. Leslie envisions ToMM as an information processing
mechanism that both represents and interprets mental states for the child, based upon
descriptions of the mental states.

Leslie proposes ToMM as the competence behind theory of mind; as such, it is
necessary *but not sufficient* to pass false belief tasks. In order to succeed on this task,
children must disregard the highly salient content of the true belief of the situation.
Leslie argues that such a capacity requires a level of executive functioning that is beyond
the developmental stage of most young preschoolers. Thus, Leslie argues, the performance demands of the false belief task prevent younger children from demonstrating their existing (innate) theory of mind understanding.

Leslie suggests a separate, general (non-theory-of-mind-specific) processing mechanism which children rely on to navigate the performance demands of theory of mind tasks. He labels this mechanism as the “selection processor” (SP). The SP’s role, in a sense, is to hold the child’s hand through a test of false belief and steer him towards the correct mental state to attribute to an agent. Thus, the ToMM computes descriptions of an agent’s underlying intentional states to explain of observed behavior, whereas the SP’s task follows an executive function and inhibits any immediate impulses that distract from children’s selection of an appropriate belief. Building upon this assumption, Leslie explains children’s improving performance on false belief tasks as a factor of the concurrent development of a general executive function, which encompasses the emergence of the SP. In support of this proposal, Leslie cites young children’s success on simplified tests of false belief understanding that are free from the unrealistic performance demands he spurns.

Alternatively, Wellman and his colleagues (e.g., Bartsch & Wellman, 1988; Bartsch & Wellman, 1995; Wellman, Phillips & Rodriguez, 2000; Wellman & Woolley, 1990) propose a theory-theory model, which will be briefly reviewed here in anticipation of a more in-depth consideration later on in this paper. The theory-theory camp understands the emergence of theory of mind as a function of a child’s cognitive development, which is undergoing a critical period of maturation during the preschool years. Beginning around age 2, toddlers are able to understand others’ simple mental
states (mainly desires) in purely nonrepresentational terms. By age 4 or 5, the child’s mind has matured enough to entertain most forms of mental state understanding (desire and belief); moreover, these children access this understanding to explain others’ actions.

Contrary to Leslie’s nativist module, the theory-theory camp considers the effect of interplay between experience and conceptual structure in theory of mind development. The rigid structure of Leslie’s model assumes a single causal pathway, and in doing so, fails to account for individual differences found throughout the development of theory of mind (e.g., Capage & Watson, 2001; Dunn, 1995; Dunn et al., 1991; Jenkins & Astington, 1996). A more flexible model is needed to tell the story behind mental state understanding.

Seemingly inspired by Leslie’s ToMM module, Fodor (1992) proposes a highly cognitive, non-empirical theory of changing heuristics. Similar to Leslie, Fodor subscribes to the nativist theory of an innate capacity for theory of mind, accompanied by a developing information processing system. He thus maintains that even very young children understand desire’s role as a motivating force behind human behavior.

Furthermore, Fodor holds that children recognize that people’s mental states are contingent on their interpretations of reality. That is, children recognize that people have beliefs, and will act in a way to satisfy their desires, provided that their beliefs are true. It is on this last phrase that Fodor bases his theory of preschoolers’ mental state reasoning, which he illustrates with two fundamental heuristics. The first heuristic (H1) predicts that an agent will act in a way that will satisfy his desires. The second heuristic makes the same prediction, provided that the agent’s beliefs are true. According to Fodor, 2- and 3-year-old children automatically revert to H1, and only use H2 when H1
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fails to afford a unique behavioral prediction. Four-year-olds, however, consider beliefs when selecting heuristics. They use H1 when they observe true beliefs as basis for agent’s actions, and H2 when they consider the beliefs upon which the agent is acting to be false. Thus, Fodor concludes that all theory of mind competence is there and equal in terms of all mental states; the perceived change in conceptual reasoning is in fact a heuristic shift in disguise.

Fodor’s theory of changing heuristics thus credits very young children with the ability to conceptualize complex mental states. Wellman (Bartsch & Wellman, 1995) is quick to point out natural language data that chronicles an early phase in which thought and belief terms are absent from children’s vocabulary. An innate (false) belief understanding such as Fodor proposes gives no reason to expect any delay in children’s talk about the mind, as the mind is there all along. It is thus possible to observe crucial holes in Fodor’s logic.

In similar nativist account, Frye and Zelazo propose a cognitive complexity and control theory (CCC: e.g., Frye, Zelazo, Brooks, & Samuels, 1996; Frye, Zelazo, & Burack, 1998; Zelazo & Frye, 1998). This account also conceptualizes a mechanism underlying mental understanding that is domain general. Therefore, development of theory of mind is considered to reflect a fundamental change in children’s general reasoning: mainly, the emergence of executive control, which allows children to make context-dependent predictions. The maturation of executive control accounts for the changes observed in preschoolers’ forms of systematic or logical reasoning that can be applied to many sets of information (e.g., numbers, objects, relations, spatial arrays) as well as intentional actions and mental states. CCC theorists argue that theory of mind
tasks are inferentially complex, and that their solution thus requires these general reasoning skills that children must develop. Specifically, Frye and Zelazo complain that assessments of theory of mind require children to make “embedded judgments”; that is, nest one “if-then” statement in another. This executive function capacity aids children in the “cognitive complexity” entailed in false belief tasks, as Leslie’s proposed SP might.

To support their claims, Frye and Zelazo designed several tasks that required a parallel kind of conditional reasoning, but had nothing to do with mental states (e.g., Zelazo & Frye, 1998). For example, in a card sorting task, children would have to group the cards according to different characteristics: color, shape, or number (e.g., Zelazo & Frye, 1998). This task required subjects to make several embedded judgments: e.g., if the cards are being sorted by shape, and this card is a red square, put it here; but if the sort is about color, put the same card there. Children’s performance on these tasks changed from 3 to 5; moreover, these changes ran parallel with performance on comparable tests of theory of mind. In addition, scores on the alternative comparison tasks were significantly correlated with those of the theory of mind tasks.

Results of Frye and Zelazo’s research seem to suggest that changes in children’s performance on false belief tasks are, in fact, due to shifts in a logic ability that gradually comes online during the 3- to 5-year-old age range. However, while Frye and Zelazo’s alternative tasks were related with tests of theory of mind, substantial developmental differences still remain between tasks that seem extremely equivalent in terms of their logical structures or cognitive complexity. Bartsch and Wellman (1995) constructed linguistic tests that followed an underlying form similar to Frye and Zelazo’s proposed alternative tasks. Children were able to reason about desires far in advance of beliefs,
even on trials that were comparable in their cognitive complexity. This finding directly contradicts Frye and Zelazo’s hypothesis, and suggests that which mental states are entailed in a task may be a better predictor of children’s success than the logical structure of the task.

Perner (e.g., Clements & Perner, 1994; Perner, 1988; Perner, 1991; Wimmer & Perner, 1983) rejects these various nativist accounts of theory of mind development in favor of his own representational model. According to Perner, through this development, a child progresses from a literal interpretation of the world to a more symbolic one around 18 months, as he becomes able to entertain multiple mental state representations at once. Then, around 4 and a half years of age, children acquire the capacity for representing the representations themselves. That is, children in this stage of development of theory of mind are able to realize not just that an agent holds a (unique) false belief, but that this person believes his false representation to be true.

Bartsch and Wellman’s (1995) natural language data provides strong evidence that undermines Perner’s theory. In noting only two developmental steps, Perner glosses over several additional separate achievements. Natural language data instead describes an intermediate stage for 3-year-old children in which they comprehend the nature of desires, but are not fully able to incorporate that of beliefs. The clash between this representational change account and language data leaves Perner with an unsupported model.

Yet perhaps all of this theoretical debate is for naught: perhaps, there is no theory in theory of mind. Harris (e.g., 1994) proposes a simulation account which argues that, in fact, the development of our ordinary folk psychology does not proceed through any
mental state concepts. Rather, in reasoning about minds, we simply draw from our own
first hand experiences: we inherently possess mental states, experience them, and learn to
refer to them. We project ourselves onto the circumstances of another individual so that
we might feel for ourselves what he is feeling and thus understand his mental states.
Under Harris’ theory, our approach to perspective-taking is ignorant of the mental life of
others. This account thus rejects the concept of representational and theoretical
development.

The simulation account gives no reason to predict any varying difficulty of
simulation among different mental states, as each is equally accessible to a child as states
of his own mind. However, natural language data for genuine psychological reference
shows a six month delay between mention of desire and belief terms (Bartsch &
Wellman, 1995). This is quite a substantial delay, which must reflect an equally
substantial conceptual transition that is experienced by children at this stage. In
comparison, the time gap is considerably smaller (about 2 to 3 months) between
reference to self versus other in relation to both mental states. Thus development seems
to be ordered more in regard to varying conceptual complexity of mental states, and not
in relation to separation between self and other. Simulation theory fails to account for
this pattern found in natural language data, and so calls for reconsideration.

Wellman’s theory of mental state understanding

Let us then delve into the theory-theory argument proposed by Wellman and his
colleagues (e.g., Bartsch & Wellman, 1988; Bartsch & Wellman, 1995; Wellman et al.,
2000; Wellman & Woolley, 1990) that seems to win out over the major alternative
theories. Wellman charts the early emergence of everyday psychology; that is, the early
development of commonsense understandings of human action. As reflected in his arguments against competing theories, Wellman views the development of theory of mind as a conceptual maturation of the child’s cognitive capacity. As the child is able to entertain more complex mental concepts, he references more sophisticated mental states in explaining human action.

Wellman illustrates his model of theory of mind development with what he proposes to be the three main stages of mental understanding. During this process, children grow from understanding human action only in terms of simple desires, to construing action in terms of beliefs and desires (Bartsch & Wellman, 1995; Wellman & Woolley, 1990). According to Wellman, children begin as desire psychologists at 2 years of age: they predict and explain actions by attributing desires. These budding theorists of mind are able to identify feelings of longing directed toward something that is either in the world, or that they have experienced.

Toddlers in the simple desire phase talk about desires in terms of wants and likes, in a wide variety of situations: desires for objects and actions; for current or future states of affairs; and for their own or others’ desires. However, in this phase, the child’s use of mental state language only reflects his understanding of the agent’s longing for an object. The 2-year-old’s concept of desire occurs completely outside the representational realm: the child can reflect reality, but does not have the perspective-taking capacity to process or analyze a representation in a way that allows it more abstract properties.

At age 3, children enter the period of desire-belief theory in an intermediate stage of reasoning between the nonrepresentational desire theory and a full-blown belief-desire theory. These children begin to toy with the concept of a mental state as impetus for
action. They talk more about thoughts and beliefs, demonstrating their understanding that other people have these mental states. Still, 3-year-olds struggle with, and generally circumvent explaining their own and others’ actions on the basis of beliefs, and instead prefer to revert to simpler mental states in explaining and predicting actions. As reflected in their language, the desire-belief psychologist’s conception of thoughts and beliefs is not central to their larger understanding of the events of the world, and this understanding remains largely nonrepresentational.

Children in the desire-belief stage continue to perform marginally on the false belief task, but pass tests involving partial belief (e.g., Roth & Leslie, 1998). A partial (true) belief task is an abridged version false belief task. Instead of moving an object in the absence of an agent, the experimenter places an additional, identical object in a new location before soliciting the child’s prediction of the agent’s course of action. The partial belief task involves a simpler form of mental understanding: instead of representing a misrepresentation, as in the false belief task, the subject need only conceive of a true belief plus “does not know about location B” in considering the agent’s perspective.

By the time children reach their fourth birthday and the final phase of belief-desire psychology, they pass the false belief task with ease. They have finally developed the mental tools necessary to grant thoughts and beliefs the central role in their understanding of general human action. Belief-desire psychologists not only realize that humans have thoughts and beliefs, but also that these mental states are crucial to explaining why people do things; that is, that actors’ pursuits of their desires are inevitably shaped by their beliefs about the world. It is the actors’ potentially mistaken
conceptions of what the world is like, rather than the world directly, that determine their plans and actions.

Desire

Wellman’s (Wellman & Woolley, 1990) theory of the early development of everyday psychology is supported both by his own natural language data (Bartsch & Wellman, 1995) and by surrounding research, which demonstrate that children can indeed attribute desires before they can attribute beliefs (e.g., Cassidy, 1998a, 1998b; Cassidy et al., under review; Moses, Coon, & Wusinich, 2000). More specifically, a study by Cassidy (1998b) investigated the predominance of belief or desire in 3- and 4-year-olds mental state reasoning. An experiment similar to the false belief task was run, except this research utilized stimuli (food) that was either desired or hated by the puppet protagonist. Cassidy found that the younger children who failed the false belief task were distracted by the puppet’s food preference, and predicted where the puppet would look for his food based upon the desirability of what had been hidden. That is, the subject chose the hiding place that contained the object when the desirable object was hidden, and chose the location that did not contain the object when the undesirable object was hidden. These findings support the idea that young children predict an agent’s actions based upon this agent’s desires, and not upon his beliefs.

Thus, young children who are not yet able to grasp the concept of belief seem to understand that an agent will act to satisfy his own desires. As the child’s theory of mind matures, he develops a more secure desire understanding that acknowledges several important qualities of desires. Desire understanding as a stage of theory of mind development entails conceiving of the subjective quality of desires (Repacholi & Gopnik,
understanding that different people have different desires (Moore et al., 1995). Subjective desire understanding begins with 2-year-old simple desire psychologists (Wellman & Woolley, 1990). These young children understand that people will act in a way to satisfy their unique desires (Fodor, 1992), and will continue action until desire fulfillment has been achieved (Wellman & Woolley, 1990). Even young children are able to expect that people will be pleased when they achieve what they want and displeased when they do not, based upon preferences that vary from individual to individual (Yuill, Perner, Pearson, Peerbhoy & van den Ende, 1984).

In addition, children are aware of the causal relationship between emotion and desires (e.g., Wellman & Woolley, 1990). Wellman and Banerjee (1991) told subjects stories that contained information both about a character’s mental state in relation to an outcome, and about the actual outcome itself. Following the stories, children rated the characters on a range of emotional reactions. Resulting data suggested that as early as 3 years of age, children specifically understand relevant desires underlying a whole host of emotional conditions. Looking even earlier, Repacholi and Gopnik (1997) showed that 14-month-olds were able to infer an experimenter’s food preferences from her prior expression of positive affect; at 18 months, subjects correctly made this inference even when the experimenter’s desires were in conflict with their own. This data demonstrates that even infants are able to predict desire from emotion. In addition, results from a study by Wellman et al. (2000) show that children understand this causal relationship acting in both directions: the researchers found that children were also able to predict positive emotion (satisfaction) in reaction to desire fulfillment. Moses et al. (2000) expanded
upon this data to show that children will predict an agent’s future involvement in an activity during which he has expressed satisfaction.

As 3-year-olds begin to integrate beliefs into their everyday psychology, they are accordingly able to compute even more complex forms of desire. Preschoolers’ cognitive development allows them to more and more consider those desires that demand an increasingly sophisticated representational understanding. For example, adding an element of conflict into desire understanding tests (between the child’s own preferences and those of the experimental protagonist) complicates the child’s computation of these mental states (e.g., Cassidy et al., under review; Moore et al., 1995). In order to compute conflicting desires, children must be able to understand that other people can have desires that are not only different than their own, but may also directly disagree with those they hold. Children’s facility with this concept depends on the intensity or saliency of the conflict at issue (Reiffe, Terwogt, Koops, Stegge, & Oomen, 2001). Overall, research by Cassidy et al. (under review) suggests that children are comfortable with handling conflicting desires by age 3.

Desires that are not stated explicitly also seem to confuse young children’s mental state understanding. Previous research suggests that implicit desire understanding comes online at about the same time as conflicting desire understanding (e.g., Cassidy et al., under review). Around age 3, children are able to infer the desires of others based on an individual’s past experiences or general preferences. Three-year-olds participating in Moses et al.’s (2000) research understood that an individual’s previous positive or negative experience with a certain activity impacted how likely it was that this individual would choose to partake in the activity in the future. Five-year-olds in a study by Yuill
and Pearson (1998) were also able to make predictions about the emotional consequences of an actor’s desires, when inferring these desires from the actor’s overall preferences. These children successfully predicted different emotional reactions for actors with different personality traits, who were in the same situation. Repacholi and Gopnik (1997) propose that even children as young as infants easily infer the desires of others through nonverbal (emotional or physical) behavior.

Cassidy et al. (under review) designed a task in which children were faced with desires that were both conflicting and implicit at once. In this Implicit Conflict trial, children had to infer a desire that was in conflict with their own, based upon a story about an agent’s past positive or negative experiences. Children found the combination of desire inference and conflicting desire so challenging that their scores on this task dropped to the level of their performance on the false belief test; on average, it was not until a child was several months beyond his fourth birthday that he was able to pass the implicit conflicting desire understanding task.

Tests of wicked desires (e.g., Yuill et al., 1996) demand very complex representation in which children must integrate a moral code with their mental state understanding. Wicked desire tasks feature a protagonist who commits a desired but immoral act. While young children have a grasp on the subjective quality of desires, their performance on tests involving wicked desire suggests that this understanding may only apply to things that are matters of taste, and not to goals that have an intrinsic value (Cassidy et al., under review). Children are unable to judge an actor’s emotions in relation to intention in a negative context until they reach 4 to 5 years of age, and continue to struggle with wicked desire understanding through 6 years of age (Yuill et al.,
1996). Only older children are able to judge ill-doers as pleased with their success or remorseful at their wrongdoing, as required for success on a trial of wicked desire understanding. Evidence from wicked desire understanding tasks reveal that that young children’s understanding of desire, while sophisticated, is not adult-like.

The context of social processes

The practical application of research on the development of mental understanding stems from the folk psychology model of its role in regulating children’s interactions with one another (Astington, & Gopnik, 1991; particularly through the use of discourse: Slomkowski & Dunn, 1996). A mentalistic theory of behavior appears to play a critical role in human interactions. Theory of mind informs children’s decisions of how to act in a given social situation. In entertaining an outside perspective, children pick up on cues that dictate social code, within which they must act to behave appropriately.

Evidence from previous research sets forth a general relationship between theory of mind and social behavior (Astington & Jenkins, 1995; Capage & Watson, 2001; Cassidy et al., in press; Watson, Nixon, Wilson & Capage, 1999). Astington and Jenkins (1995) identified activities in pretend play that seemed to rely on consideration of a play partner’s mental processes. Children’s frequency of joint proposals (suggestion of an activity that involved both the child and a play partner) and explicit role assignments (verbally and directly assigning a role to oneself or a play partner) was associated with their performance on a battery of false belief tests. These findings validated the implications of laboratory measures of theory of mind for social behavior in naturalistic settings. Cassidy et al. (in press) further contextualized these results by integrating teacher and peer ratings with experimenter observations of social behavior. This research
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was consistent with that of Astington and Jenkins, and also found mental and emotional understanding to be significantly related to ratings of social skills. Findings from these studies are well-situated in their surrounding literature: overall, teacher reports and theory of mind assessments from several other studies also strongly indicate a significant relationship between mental and social understanding (e.g., Capage & Watson, 2001; Dunn, 1995; Dunn et al., 1991; Lalonde & Chandler, 1995; Watson et al., 1999).

Recently, researchers have looked back to understand the roots of this relationship, and looked forward to discover its later correlates (e.g., Capage & Watson, 2001; Cassidy et al., in press). More specifically, Lalonde and Chandler (1995) conducted a classroom study in an attempt to pin down the practical implications of the observed association between theory of mind and social behavior. Their curiosity as to which particular elements of social-emotional competence did and did not presume some sort of consideration of mental states was piqued by studies on children with autism. Children within this population have a very rudimentary, if any, theory of mind and are oblivious to social cues, yet easily follow codes of social convention on par with their nonautistic peers (e.g., Baron-Cohen, Leslie & Frith, 1996). This then suggests that only certain social processes entail mental understanding while others act independently of theory of mind.

Lalonde and Chandler chose to focus their research on 3-year-old (nonautistic) subjects, presenting them with a reliable measure of theory of mind from six different false belief tasks. Lalonde and Chandler nominated a list of social-emotional behaviors that they expected to both covary and not covary with false belief understanding, and presented this list to subjects’ preschool teachers for appropriate rating. The researchers
dubbed those behaviors they expected to correlate with false belief understanding as “Intentional” markers of social competence, and were seen to entail explicit consideration of another’s mental state. Conversely, the researchers also posed a list of “Conventional” behaviors, which they saw as reflecting compliance with social norms and not an authentic intentional stance. True to their hypothesis, Lalonde and Chandler’s data presented a clear divide between behaviors labeled as “Intentional” or “Conventional” in terms of their association with subjects’ performance on tests of theory of mind: simply, those items considered to be “Intentional” behaviors were quite significantly related subjects’ false belief understanding, and items of “Conventional” behaviors were not. Lalonde and Chandler’s findings provide a persuasive argument in support the significant divide between behaviors that entail mental state understanding, and those that reflect the child’s socialization.

Lalonde and Chandler’s study first made the fundamental discovery that prosocial behavior, and not general social skill, correlates with theory of mind. Lalonde and Chandler’s contemporaries have validated the initial study with findings from their own research on children’s mental state understanding as related to their positive social interactions with peers. False-belief understanding has found to be a reliable predictor of both experimentally assessed (Slomkowski & Dunn, 1996) and teacher-rated (Watson et al., 1999) prosocial skills.

Further research more specifically suggests a link between perspective taking skills and prosocial behavior (Eisenberg and Fabes, 1998b). Children with more mature perspective-taking skills (and, hence, a more advanced theory of mind) are afforded more opportunities to be prosocial; for example, parents are more likely to choose older
siblings with better perspective-taking skills to care for younger siblings (Eisenberg and Fabes, 1998b). The role of perspective-taking skills in facilitating prosocial development is logical, as they provide individuals with the tools necessary to individuals identify with and understand others’ distress or needs. These skills are believed to foster empathy and sympathy, which are main components of prosocial behavior (Eisenberg & Fabes, 1998b). Furthermore, as demonstrated in Jenkins and Astington’s (1996) research, children who more often end up in interactions involving prosocial behavior experience an accelerated development in their own prosocial skills. Jenkins and Astington interpolated this conclusion from their finding of an association between family size and children’s theory of mind, with larger families predicting better performance on false belief tasks. Jenkins and Astington explain this relationship by postulating that a large family’s socially rich home environment affords children more opportunities for learning thought-behavior relationships.

Slomkowski and Dunn (1996) view friendship as an ideal format to assess the prognostic value of social understanding, thanks to the opportunities for perspective taking entailed in peer interaction. Speech between friends—what Slomkowski and Dunn dub “connectedness of communication”—is one of the most sensitive measures of social processes in early childhood. Connectedness of communication reflects the extent to which each interlocutor is “tuned in” to his partners’ desires; thus, it may be considered a good index of a friend’s desire understanding. Slomkowski and Dunn showed that individual differences in mental state understanding predicted their subjects’ connectedness of communication with friends; they thus postulated a common underlying construct of the understanding of, and coordination with, a partner’s perspective.
It is thus reasonable to expect that a child’s capacity for desire understanding might be a strong marker of his success in peer relationships, as measured by his tendency towards prosocial behavior. Previous research has demonstrated that children who exhibit early traces of false belief understanding are able to access this ability for social interactional purposes (Lalonde & Chandler, 1995). Viewing desire understanding as a precursor to theory of mind cognition, it once again follows that this comprehension would support the development of prosocial behavior, as seen in Lalonde and Chandler’s subjects’ peer interactions.

Present research

The present study sought to further refine the relationship between theory of mind and social processes, through an investigation based upon previously mentioned implications of the association between desire understanding and prosocial behavior. To date, there have been few examinations of the link between the precursors of theory of mind, and children’s display of prosocial behavior through interactions with peers. Specifically, no studies have looked at the connection between individual differences in desire understanding and prosocial behavior.

Current research focuses on the early emergence of theory of mind observed in preschoolers’ desire understanding capacity, and poses the question: how does an early desire understanding affect the display of prosocial behaviors in preschool-age children? Desire understanding was assessed through three tasks of varying complexity: simple desire tasks (Wellman & Woolley, 1990), conflicting desire tasks (Cassidy et al., under review), and wicked desire tasks (Yuill, et al., 1996). Thus, a strength of this study is the variety reflected in the battery of desire understanding tests administered. Prosocial
behavior was measured by items of prosocial orientation, social initiative and selflessness, as defined below. Gleaning from Lalonde and Chandler’s (1995) findings, items of prosocial orientation were seen as most closely resembling “Intentional” behaviors, and so were expected to display the strongest association with measures of desire understanding.

As current research was unable to engage in a thorough observational study due to time constraints, parent and teacher ratings that relied on these observers’ perceptions of the children’s social processes were taken as measures of prosocial behavior. Related research suggests that certain behavioral tendencies may inhibit children’s mental understanding from facilitating their prosocial development. For example, studies on social bullies have found that these children exploit their sophisticated social information processing skills to take advantage of other children and maintain their dominance (Sutton, Smith & Swettenham, 1999). In more extreme cases, research has found no evidence of impaired theory of mind in “hard to manage” children, who have poor social skills and even a hostile interpretation bias (Hughes, Cutting & Dunn, 2001). It was imagined that this pattern might confound present research in a more moderate form of subjects’ selfishness tendencies. Thus, a measure of selflessness (understood as the complement of selfishness) was pilot tested by the authors and included in the rating scale of prosocial behavior, in addition to measures of prosocial orientation and social initiative (Rydell, Hagekull & Bohlin, 1997).

The current study is also unique in its subject pool. Previous research in desire understanding (e.g., Cassidy, 1998a, 1998b; Moses et al., 2000; Wellman & Bartsch, 1988; Wellman & Woolley, 1990), positive social behavior (e.g., Cauley & Tyler, 1989;
Clark & Ladd, 2000; Jackson & Tisack, 2001), and their interacting relationship (e.g., Astington & Jenkins, 1995; Cassidy et al., in press; Lalonde & Chandler, 1995) have focused mostly on middle class children of educated parents. Though previous research offers inconclusive findings on the effect of socioeconomic status on prosocial development (for a review, see Eisenberg & Fabes, 1998b), present research specifically considered the risk factors associated with children raised in marginalized social classes. Researchers did not expect to find a significant effect of subjects’ “risk status,” as Wellman (Wellman & Woolley, 1990) declares his model of theory of mind development to be universal.

We hypothesized that a greater capacity for perspective-taking and understanding the mental states of others would better prepare children for social interactions. Therefore, we predicted that children who performed better on tasks of desire understanding would be rated higher in terms of prosocial behaviors by their parents and teachers.

Method

Subjects

Fifty children participated in the experiment. Children were recruited from preschools in a low to middle class suburb of a major Midwestern city in the United States. Data from one female subject was removed from the study as it was significantly incomplete. This left a remaining subject population of 49 children (mean age: 58 months; range: 33-71 months). Three of the children were African-American; 4 were Asian-American; 2 were Hispanic, and the remaining children were Caucasian-American. Thirty-seven children were girls. These children were split up among three classes,
according to “risk status.” Two classes were designated as a prevention program for children labeled as “at risk”; the third classroom was made up of mainstream students.

**Desire understanding**

Subjects were administered 9 total tasks of types of desire understanding tests: the three simple desire tasks, two conflicting desire tasks, two conflicting desire tasks, and two wicked desire tasks. The testing was conducted in one session; order of type of task was randomized according to a random numbers chart, and test questions within each type of task were counterbalanced across all subjects. Gender matching between subjects and story protagonists was used in all testing.

**Simple desires** (Wellman & Woolley, 1990)

**Stimulus Materials**

Materials used in all tasks were a poster-board figure (approximately 4 inches high; gender coordinating with that of the subject) and a storyboard layout (approximately 9 inches by 22 inches) with two separate locations.

**Procedure**

Three stories were presented to each subject in three different contexts: Finds-Wanted, Finds-Nothing, and Finds-Substitute, as explained below. Stories were told along with a cardboard character. The character was set on a storyboard depicting two separate locations. Children made judgments about the actions and emotional reactions of small cardboard characters in each of three types of situations (see Appendix A for set of stories). In the Finds-Wanted situation, the agent desires something that may be in one of two locations. The character is successful in finding the desired object in the first location he searches. The Finds-Nothing situation was identical to the Finds-Wanted,
with the change in the result: the agent searches in the first location and finds nothing there. In the Finds-Substitute set-up, the character finds something other than the desired object in the first location.

Following the each story, children were asked two test questions; one solicited the child’s action prediction for the agent, and the other solicited the child’s emotion prediction. In making action judgments, children had to guess the agent’s next action in the sequence: e.g., “Will he go to the pond or will he look in the red barn?” Children were prompted to make their predictions after observing the results of character’s search (representation of the location in which the protagonist was searching was removed from storyboard). Children with an understanding of another’s desires should predict a cessation of action in the Finds-Wanted situation, and a continued search in the Finds-Nothing and Finds-Substitute situations.

In addition, children were asked to describe how a character felt after he discovered the results of his initial search efforts, and thus had to predict the agent’s emotion which would result from his findings: e.g., “Does he feel happy or does he feel sad?” An understanding of the causal relationship between desires and emotions should result in a prediction of satisfaction/happiness in the Finds-Wanted situation, and dissatisfaction/sadness in the other situations.

Conflicting desires (Cassidy et al., under review)

*Stimulus Materials*

Materials used in the Implicit No Conflict Trial were four pictures drawn to represent 4 different activities (going on a picnic, going to the beach, going to the pool and going to the playground). The 4 pictures for the Implicit Conflict Trial represented
Desire Understanding and Prosocial Behavior

going to the bank, going to the post office, going to the supermarket and going to the zoo.

Procedure

All subjects participated in two desire-action prediction trials (see Appendix B for set of stories). For all stories, protagonist’s gender was matched to that of the subject.

In the Implicit Conflict trial, the experimenter displayed 4 pictures to the subject (3 appealing and 1 unappealing) to the subject. Children were asked to choose one favorite activity and one least favorite activity. It was thought that most children would like choose the appealing activity (going to the zoo) as their favorite and one of the unappealing activities as their least favorite. After subjects made their choices, they were told a story about a child who had a negative experience with the activity that the subject liked, and a positive experience with the activity the subject hated. At the end of the story, the subject was asked the test question, “Which activity will (name of protagonist) choose?” The child was then asked a participant preference question (e.g., “Which activity do you like to do the best, and which activity do you really not like to do?”) to confirm that subjects did not change their preferences from those that they stated at the beginning of the trial, since we needed to be sure that their preferences were, in fact, in conflict.

The Implicit No Conflict condition was parallel in structure to the Implicit Conflict trial, except that subjects were not expected to have a strong preference for any of the activities over another; hence, there should not have been any conflict between the preferences of the story protagonist and the child himself. Subjects were shown 4 pictures that represented activities of similar type and level of interest: going on a picnic, going to the beach, going to the pool and going to the playground. Children were then
asked to choose the two activities that they really liked to do, to further minimize
potential for discrepancy in preference between subject and story protagonist. Subjects
were told a story about a protagonist who had negative experiences with one of the
activities the child had chosen, and positive experiences with other. At the end of the
story, subjects were asked the test question (“Which activity will (name of protagonist)
choose?”), and participant preference question (“Which two activities do you like
best?”).

Wicked desires (Yuill, Perner, Pearson, Peerbhoy, & van den Ende, 1996)

Design

Each participant was presented with two stories with negative motives; one story
was a match (the outcome happened to intended recipient), and the other was a mismatch
(the outcome happened to another recipient). A brief example of a match story is: “This
big boy in the green shirt does not like the little boy in the yellow shirt. He wants to
make him mad. The big boy in the green shirt gives the little boy in the yellow shirt a big
bump.” The protagonist achieved his goal. In a mismatch condition, the protagonist does
not hit the child he intends to, but rather hits another child instead.

Stimulus Materials

See Appendix C for set of stories.

Procedure

Each story was illustrated by a sequence of three scenes, portraying motive,
action and outcome. Participants were asked probe questions (e.g., “What does the boy
with the ball want to do?”) throughout the story to encourage participation. After each
story, participants were asked to make emotion judgments (e.g., “Is the boy who threw
the hall happy or sad, or in between?”) and moral judgments (e.g., “Is the boy who threw the ball good or bad?”).

**Prosocial measures**

Prosocial behavior was measured by Rydell and colleagues’ (1997) Social Competence Inventory in conjunction with the authors’ own selflessness rating scale (See Appendix D for an example of a complete rating scale). The Social Competence Inventory was designed as rating measure of social competence for parents and teachers. More specifically, this measure was conceptualized by Rydell et al. as social skills and behaviors that contribute to “children’s adaptive functioning in their social environment” (p. 824). Selflessness items were created by the authors to measure subjects’ scope of altruism: his “other” orientation. The positive loading items were shares toys with others when asked by peer; initiates sharing without prompting; is patient when his/her needs cannot be met first. The negative loading items were behaves selfishly; takes things from others without asking; and thinks world revolves around them. The selflessness measure was pilot tested on three children, and determined to be reliable and valid.

Rydell et al.’s questionnaire items were designed to reflect a wide range of social competence characteristics (see Appendix E for full listing of items by subscale). Analyses of the measure revealed a two factor structure. These factors were categories of prosocial orientation (a style promoting positive social interactions) and social initiation (behaviors of initiative as opposed to withdrawal in social situations). Items included social skills and behaviors indicative of empathy, altruism, generosity, helpfulness, social participation, initiative taking, cooperation, and conflict handling. In terms of test-retest reliability, the increment in $R^2$ varied between .27 and .53, and betas ranged from $[\beta] =$
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.58 to [beta] = .82, (all \( p \) values < .001), thus evidencing significant reliability. The test was determined to be valid across measures of interrater correlations, cross-time relations, observational data, and discrimination between peer statuses.

Procedure

50 parents completed a questionnaire containing the Social Competence Inventory and selflessness items, which was distributed to the children in class and later returned directly to the school. Five teachers (3 for the “at risk” class and 2 for the mainstream class) also completed the same questionnaire during this period.

Results

Desire

Subjects were awarded 1 point for each question answered correctly during simple desire understanding and wicked desire understanding assessments, and no points for questions answered incorrectly. Thus the total score possible ranged from 0 to 6 points for subject’s desire understanding, and 0 to 2 points for wicked desire understanding.

Scoring within the conflicting desire assessment was more complicated. Each task ended with a test question, and a participant preference question. Subjects’ responses to the participant preference question during the No Conflict trial were not taken into account in scoring the tasks. For children who reported a different preference than they had at the beginning of a task during the Conflict trial, performance on this trial was disregarded and the subject was scored based on his responses in the No Conflict trial: 1 point was awarded for a correct answer, and no points were awarded for an incorrect answer. Subjects who maintained consistent preferences throughout the trial were scored based upon both tasks; one half of a point was awarded for each correct
answer on the two test questions. Subjects could attain a possible score of 0 to 1.

After scoring each task, a total desire understanding score was calculated. In order to ensure that each task contributed equally to the total desire score, tasks were rescored out 6, such that total possible desire understanding score had a range of 0 to 18. For a summary of subjects’ performance on desire understanding tasks, see Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple desires</td>
<td>4.796</td>
<td>1.224</td>
<td>1 – 6</td>
</tr>
<tr>
<td>Conflicting desires</td>
<td>.653</td>
<td>.342</td>
<td>0 - 1</td>
</tr>
<tr>
<td>Wicked desires</td>
<td>1.102</td>
<td>.549</td>
<td>0 - 2</td>
</tr>
<tr>
<td>Total (composite score)</td>
<td>12.020</td>
<td>3.218</td>
<td>6 - 18</td>
</tr>
</tbody>
</table>

**Prosocial behavior**

The prosocial behavior rating scale consisted of items from three subtypes of prosocial behavior: prosocial orientation, social initiative, and selflessness. Each child was rated by parents and teachers on each subscale. All items on the prosocial behavior measure were scored on five-point scales, ranging from “doesn’t apply at all” (1) to “applies very well to the child” (5), with higher scores indicating advanced competency. If a rating scale was returned with a skipped item, the child’s average for the subtype was substituted for the missing value. Negative items were reverse scored so that all items reflected the same valence, with a higher score indicating more prosocial behavior. Total score of prosocial behavior was determined by the sum of the scores from the subtypes.
The range of scores possible was 0 to 105 on prosocial orientation items, 0 to 30 on selflessness items, and 0 to 40 on social initiative items.

Correlations were run between parent and teacher ratings of subjects’ prosocial behavior. Ratings were only found to be significantly correlated between raters for the social initiative scale ($r = .413, p < .01$), and so the parent and teacher ratings were averaged to create a composite social initiative variable that was used for all further analyses. Both of the other subscales (prosocial orientation and selflessness) were separated by rater in data analysis. Tables 2 and 3 show the descriptive statistics for teacher ratings and parent ratings, respectively, of prosocial behavior used in analyses.

<p>| Table 2. Means and standard deviations and ranges for teacher ratings of prosocial behavior |
|---------------------------------|----------------|----------------|</p>
<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosocial Orientation</td>
<td>72.878</td>
<td>12.630</td>
</tr>
<tr>
<td>Social Initiative (average)</td>
<td>27.184</td>
<td>4.654</td>
</tr>
<tr>
<td>Selflessness</td>
<td>21.714</td>
<td>4.783</td>
</tr>
<tr>
<td>Total (composite score)</td>
<td>121.490</td>
<td>19.172</td>
</tr>
</tbody>
</table>
Table 3. Means and standard deviations and ranges for parent ratings of prosocial behavior

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosocial Orientation</td>
<td>75.777</td>
<td>9.139</td>
<td>52.00 – 96.55</td>
</tr>
<tr>
<td>Selflessness</td>
<td>20.122</td>
<td>3.339</td>
<td>8.00 – 26.00</td>
</tr>
<tr>
<td>Total (composite score)</td>
<td>123.369</td>
<td>12.625</td>
<td>82.00 – 148.55</td>
</tr>
</tbody>
</table>

Within-rater correlations between prosocial behavior subtypes were also run. For teachers, significant correlations were found between their ratings of prosocial orientation and social initiative ($r = .509; p < .01$), and prosocial orientation and selflessness ($r = .629; p < .01$). For parents, significant correlations were only found between ratings of prosocial orientation and selflessness ($r = .320; p < .05$).

Age, “risk status,” and gender

Age effects may be observed in Table 4. Age was found to significantly correlate with parent and teacher ratings of prosocial orientation, teacher ratings of selflessness, and total teacher ratings of prosocial behavior. Age was correlated significantly with all types of desire understanding tasks. This suggests that the tests were executed reliably, as previous research that used the separate tests of desire understanding demonstrated a comparable age effect (e.g., Cassidy et al., under review; Wellman & Woolley, 1990; Yuill, Perner, Pearson, Peerbhoy, & van den Ende, 1996).

Table 4. Pearson correlations between age, desire understanding and prosocial behavior
An effect of “risk status” was also observed, but only for the teacher ratings of prosocial orientation. “At risk” children ($M$ score = 67.1667; $SD = 8.43672; N = 30) were rated significantly lower by their teachers in prosocial orientation than mainstream children ($M$ score = 81.8947; $SD = 13.05924; N = 19$), $t(47) = -4.806, p < .0001$.

No gender difference was found for ratings of prosocial behavior or performance on desire understanding tasks. This is consistent with previous research on desire understanding, particularly those upon which measures of this study were based (Cassidy et al., under review; Wellman & Woolley, 1990; Yuill, Perner, Pearson, Peerbhouy, & van
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den Ende, 1996). However, this is inconsistent with findings from previous research that has demonstrated an age effect within prosocial behavior (for a good review, see Eisenberg & Fabes, 1998b).

Desire understanding and prosocial behavior

Correlations between desire understanding and ratings of prosocial behavior are shown in Table 5. As expected, several measures of desire understanding correlated with different prosocial behaviors. Teacher ratings of prosocial orientation were significantly correlated with total desire understanding. In addition, total desire understanding was found to correlate significantly with teacher ratings of selflessness and teacher ratings of total prosocial behavior. Present research was concerned with a possible confound in these results: there may be children who clearly understand others’ desires, but choose not to engage in prosocial behaviors due to selfish tendencies. Partial correlations were thus run to control for effect of selfishness, as measured by the selflessness subscale on the prosocial behavior measure; in this analysis, no effect of selfishness was found.
Table 5. Pearson correlations between desire understanding and prosocial behaviors

<table>
<thead>
<tr>
<th>Prosocial Behavior</th>
<th>Desire Understanding Tasks</th>
<th>Simple</th>
<th>Conflicting</th>
<th>Wicked</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosocial Orientation</td>
<td>teacher</td>
<td>.283*</td>
<td>.268</td>
<td>.134</td>
<td>.347*</td>
</tr>
<tr>
<td></td>
<td>parent</td>
<td>.136</td>
<td>.013</td>
<td>.078</td>
<td>.100</td>
</tr>
<tr>
<td>Social Initiative</td>
<td>teacher</td>
<td>.082</td>
<td>.182</td>
<td>-.126</td>
<td>.083</td>
</tr>
<tr>
<td></td>
<td>parent</td>
<td>-.106</td>
<td>-.126</td>
<td>-.166</td>
<td>-.206</td>
</tr>
<tr>
<td>Selflessness</td>
<td>teacher</td>
<td>.146</td>
<td>.161</td>
<td>.162</td>
<td>.241</td>
</tr>
<tr>
<td></td>
<td>parent</td>
<td>-.106</td>
<td>-.126</td>
<td>-.166</td>
<td>-.206</td>
</tr>
<tr>
<td>Total</td>
<td>teacher</td>
<td>.264*</td>
<td>248*</td>
<td>.060</td>
<td>.284*</td>
</tr>
<tr>
<td></td>
<td>parent</td>
<td>.067</td>
<td>.063</td>
<td>.023</td>
<td>.090</td>
</tr>
</tbody>
</table>

* Significant at the .05 level (1-tailed)
** Significant at the .01 level (1-tailed)

Due to the previously reported effect of “risk status,” analyses of the relationship between desire understanding tasks and prosocial measures were rerun, separating subjects by class. This analysis was run to confirm that one class was not “overinfluencing” results. Significant relationships were not maintained in either “risk status” group between total desire understanding and teacher/parent prosocial ratings; however, similar trends were observed within the data, and the relationship appears to be stronger for the mainstream children. Refer to Table 6 for a complete description of the relationships between individual desire understanding tasks and teacher/parent ratings of prosocial behavior. For a complete summary of correlations between total desire understanding and prosocial behavior subscales, see Table 7.

Table 6. Split correlations between teacher/parent ratings of prosocial behavior and individual desire understanding tasks
Desire Understanding and Prosocial Behavior

### Table 7. Split correlations between total desire understanding and subscales of prosocial behavior

<table>
<thead>
<tr>
<th></th>
<th>Total desire understanding</th>
<th>Prosocial orientation (teacher)</th>
<th>Social initiative (teacher)</th>
<th>Selflessness (teacher)</th>
<th>Total prosocial ratings (teacher)</th>
<th>Prosocial orientation (parent)</th>
<th>Social initiative (parent)</th>
<th>Selflessness (parent)</th>
<th>Total prosocial ratings (parent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MS ( r = .447 )</td>
<td>AR ( r = .264 )</td>
<td>MS ( r = .075 )</td>
<td>AR ( r = .079 )</td>
<td>MS ( r = .363 )</td>
<td>MS ( r = .241 )</td>
<td>MS ( r = .136 )</td>
<td>AR ( r = .185 )</td>
<td>MS ( r = .192 )</td>
</tr>
<tr>
<td><strong>MS</strong></td>
<td><strong>AR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Total desire understanding**

- MS = Mainstream \( r \)-values
- AR = “At risk” \( r \)-values

*Significant at the .05 level (1-tailed)

**Significant at the .01 level (1-tailed)

### Discussion

#### Desire understanding

As predicted by previous research (Cassidy et al., under review; Wellman & Woolley, 1990; Yuill, Perner, Pearson, Peerbhoy, & van den Ende, 1996), mean scores decreased from simple desire understanding, to conflicting desire understanding, to wicked desire understanding. This finding tells us that children were more challenged by some desire tasks than by others. These results, particularly in the context of the age effect found for desire understanding, support Wellman and Woolley’s (1990) concept of a gradual cognitive development, as reflected in the capacity to conceptualize others’ mental states.
As children become more secure in entertaining others’ mental life, they are able to both consider more complex forms of desire, as well as use their understanding of desire in more involved ways. In our simple desire understanding task, children had to make both action-based and emotion-based predictions for the protagonist in the story, whose desires were likely related to the child’s own. The conflicting desire task demanded more of the children’s perspective-taking skills, as their prediction was based upon another’s preferences that were not in accordance with their own. Judgments in the wicked desire understanding task involved a further ethical assessment, as children had to judge an agent’s emotions in reaction to committing an immoral act. Each progressive task demanded greater sophisticated cognition, and so could only be completed by children who were at a later developmental stage.

Our findings should not be interpreted as suggesting a linear development of desire understanding. The three tests of desire understanding failed to correlate with one another, which suggests that desire understanding does not emerge from one specific underlying mechanism. Rather, we propose a multifaceted development of desire understanding. Simple desire understanding, conflicting desire understanding and wicked desire understanding appear to hint at three separate cognitive tools: a basic notion of another’s mental state, the means to analyze this state apart from your own, and the ability to involve moral code in judging the other’s mental actions. Each one of these is a discrete component of complete desire understanding—not a dependent stage of a single factor. It still follows, then, that a child who has mastered more of these forms would demonstrate more successful performance in overall desire understanding than his peer who can only understand one.
It is also possible that children found the wicked desire understanding tasks more challenging due to the materials used. Inadvertently, the child protagonist was drawn looking happy. Thus, when children who incorrectly reported a story protagonist to be happy were asked why they believed this to be true, a few pointed to the picture of the protagonist and explained that he had to be happy since he was smiling. However, children who had a firmer grasp on mental state understanding were able to still state that the protagonist who had not succeeded in his goal was unhappy, regardless of his facial expression. Future research might correct this technical error with more attention to emotion neutral stimuli.

Prosocial behavior

A recent meta-analysis performed by Fabes and Eisenberg (1996) suggests that as children get older, prosocial behavior is more likely to occur. Our data is consistent with this finding, as most of the ratings of prosocial behavior (specifically teacher and parent ratings of prosocial orientation, teacher ratings of selflessness, and composite teacher ratings) related significantly to age; those measures that did not relate significantly generally correlated in a consistent direction. Burleson (1984) postulates that this developmental pattern may reflect an underlying sociocognitive development that occurs in the child. However, extensive research on prosocial behavior by Eisenberg and Fabes (1998b) repeatedly emphasizes the multiple factors that may affect the development of prosocial behavior; a social-cognitive mechanism may only be one.

Our findings of a significant relationship between risk status and displayed prosocial behavior align with Eisenberg and Fabes’ multifactorial argument. Eisenberg and Fabes’ review sheds light on the environmental considerations in prosocial
development, as reflected in cultural factors. Our study provides particular insight into this area of research in its analysis of “subcultures” within American society; previous related research largely draws from “typical” populations in composing subject pools. “At risk” criteria consider the child’s background contexts of development; thus, the effect of “risk status” on prosocial behavior found in our results suggests an environmental influence on children’s prosocial behavior.

The leading environmental consideration throughout a child’s development tends to be his family life. One component of home life is family structure (Eisenberg & Fabes, 1998b). In one study on the effect of family structure, Musun-Miller (1991) found children to be more helpful in the presence of their mothers. Eisenberg and Fabes (1998b) draw on this data to postulate parents as facilitators of socialization within the home. Parents’ feedback to various sibling- and peer-related prosocial behaviors acts as social training for their children. The absence or marginal role of a family member is largely taken into consideration in “at risk” identification criteria, and so, as found in our results, children who fall into the “at risk” criteria are more likely to suffer these reported consequences of an un-ideal family structure.

The parent-child relationship is central to a child’s experience of life at home. The beginnings of this relationship can be traced back to early attachment, which is as important for the parent as for the child. The factors listed in the “at risk” criteria (e.g., long term or chronic illness, lack of a stable support system of residence, substance abuse or addiction) reflect significant stressors within the home environment, which may put enough strain on the mother’s resources to disrupt early attachment. Thus, the lower performance demonstrated by children in the “at risk” might be partially due to an
insecure early attachment.

There is moderate evidence of secure attachment as predicting more prosocial behavior later on (for a review, see Eisenberg & Fabes, 1998b). Attachment seems to act as a moderator in the parent-child relationship, in both directions: securely attached children generally give more positive feedback to their parents (Waters et al., 1986), which in turn seems to stimulate parental nurturance or warmth. Researchers claim that parental warmth, in the context of positive parenting styles, is passed down to offspring in the form of sympathetic tendencies (Eisenberg, Fabes, Carlo, Troyer, et al., 1992; Eisenberg, Fabes, Schaller, Carlo & Miller, 1991; Eisenberg & McNally, 1993; Fabes et al., 1990), particularly helpful (Eisenberg, Fabes, Carlo, Troyer, et al., 1992; Fabes, Eisenberg & Miller, 1990) and comforting (Burleson & Kunkel, 1995) behavior.

We must consider the subjectivities implicit in our measures of prosocial behavior. Parents and teachers each have their own agenda, and as such are likely to be biased in their perceptions and ratings of children’s behavior. Accounting for the significant effect found for “risk status” in teachers’ ratings of prosocial orientation, it is possible that the teachers’ perceptions of the meaning of the child’s “risk status” are more debilitating than the risks themselves. Teachers are familiar with the identification criteria that determines the child to be “at risk” of “being educationally disadvantaged and in need of special assistance” (Part G—Child Identification Criteria; see Appendix F). It is possible that a child’s “risk status” informs his teacher’s expectations of his performance, which in turn bias the teacher’s observations and reports of this subject’s behavior. It is likely that teachers communicate these expectations to their students, directly or indirectly, thus encouraging children to behave accordingly.
Overall, the discrepancy between parent and teacher ratings seems to suggest that a child’s prosocial behavior is highly context dependent, and thus difficult to generalize. It seems likely that a child’s inherent personality traits come into play in regulating the range of variation within his behavior; yet it seems that the child’s particular behavior patterns are strongly influenced by his environment.

**Relationship between desire understanding and prosocial behavior**

As hypothesized, children’s scope of desire understanding was found to be positively related with their observed prosocial behavior. Results demonstrated a significant correlation between subjects’ overall desire understanding score and teacher-rated prosocial behavior. When analyses were run with subjects divided by “risk status,” a strong, though insignificant, trend remained that revealed very similar desire-prosocial relationships within both groups. This suggests a universal relationship between desire understanding and prosocial behavior for all children, regardless of “risk status.” Still, it should be noted that this relationship did seem to be more robust for our mainstream subjects. Taken together, these findings suggest that desire understanding may be somewhat related to “risk status,” but also that a greater number of other factors might be involved as well.

It is important to be cognizant of the direct implications of our findings. As Cassidy et al. (in press) remind us, neither desire understanding nor its implications of theory of mind can be said to cause prosocial behavior. Slomkowski and Dunn (1996) propose that experimental tasks of mental and social understanding both require and tap into similar social-cognitive skills.

In addition, we must further situate our findings by noting the complexity of the
mental processes that underlie children’s social interactions. In acting as an information processing mechanism, psychological understanding advises a child’s social decisions; yet a child’s perception and subsequent evaluation that constructs these decisions is an involved process. Dodge (1991) outlines the stages of children’s social information processing. The first stage is encoding, in which the child attends and perceives a social cue. Next is interpretation, in which the child appraises the consequences the cue holds for him. Building upon their interpretation, the child will conduct a response search, in which he considers his options of an appropriate response. The child then evaluates the likely costs and benefits of his response options, and finally enacts the one he finds optimal.

We thus see that the mental understanding mechanism, as reflected in desire understanding, informs social information processing but does not independently prescribe behavior. This is supported by the modest relationship we found, and once again we arrive at the conclusion that desire understanding is just one aspect determining prosocial behavior. Moreover, the child’s personality seems to come into play in his evaluation (or at least enactment) of an appropriate response, as reflected in findings from studies that provided the impetus for our selfishness control: children with poor social processes may still demonstrate normal developing theories of mind (Hughes et al., 2001; Sutton et al., 1999). In the context of our study, lead a child who is selfish and enjoys a sophisticated theory of mind has a clear understanding of his peers’ desires. These selfish behavioral tendencies in conjunction with insight into others’ desires may advise a child to in fact avoid peer interactions, as these translate into potential opportunities for sharing (which is any selfish child’s least favorite activity). While
children’s selflessness, as informed by a sophisticated desire understanding, did not appear to impact display of prosocial behavior in the current study, trends in previous research suggest the potential for such a finding, which may be evident in a stronger study.

Out of the three components of social competence measured by our rating scale, it was essentially only items loading on prosocial orientation that correlated significantly with children’s performance on desire understanding tasks. Previous research offers a clue as to why. Lalonde and Chandler (1995) found that not all items of social-emotional skills and behaviors relate to theory of mind. Rather, quite logically, it is only those items that demand a consideration of the mental lives of others that significantly correlate with psychological understanding. We see this kind of consideration more in items of prosocial orientation than anywhere else. A child who is able to sympathize with peers, comfort peers, and even has the ability to decode peers’ feelings, as per prosocial orientation items on our rating scale, is demonstrating sophisticated mental insight.

As per Lalonde and Chandler’s hypothesis, the remainder of the items on our prosocial behavior rating scale would seem to be indications of the child’s socialization. As the only significant relationship found was between prosocial and desire understanding, it seems reasonable to conclude that Rydell et al.’s (1997) measure of social initiative and our own measure of selflessness are not in fact components of prosocial behavior; rather, these measures may be more accurately described by Lalonde and Chandler’s “Conventional” social behaviors. In fact, Rydell et al.’s study presents unconvincing findings of the degree of interrelatedness between prosocial orientation and social initiative. The research is only able to group these factors under the umbrella term
of “a broader social competence aspect.” The exclusive relationship between desire understanding and true prosocial behavior that we observe here may help explain the moderate correlations found in studies relying on more general measures of social skills as correlated with theory of mind (e.g., Cassidy et al., in press; Watson et al., 1999), as such measures may have weighed heavier on items of social competence over items of prosocial behavior.

Correlations with prosocial behavior were only found to be significant when including teachers’ ratings. This reflects a generally high degree of disagreement between parent and teacher evaluations of children’s prosocial behavior; parents and teachers only agreed on ratings of social initiative. Previous analyses of parent and teacher ratings of social skills (Winsler & Wallace, 2002) and other various types of behavior (e.g., Garrison & Earls, 1985; Hoover, 2001; Lindholm & Touliatos, 1982) have also found little to no agreement between the two raters.

This pattern of interrater disagreement works in the teachers’ favor. Our results are consistent with the idea that teachers are more reliable raters than parents are. Out of a possible three correlations between prosocial behavior subtypes, two were found to be significant within teacher ratings, and at a higher level of significance than the one that was found to be significant for parent ratings. Furthermore, much previous research on social processes, as related to mental understanding, favors teachers over parents as reporters (e.g., Capage & Watson, 2001; Cassidy et al., in press; Lalonde & Chandler, 1995; Watson et al., 1999). In fact, the authors’ literature review failed to uncover studies in this field that relied on parent ratings in determining results. These trends lend support to results in present research that are significant exclusively in terms of teacher
There are two main possible explanations for discrepancy between parent and teacher ratings, and the subsequent results finding significant correlations only with teacher ratings. First, it is possible that children’s prosocial behavior is context dependent and varies between home and school. Previous research speaks to the significant impact of characteristics of a context of development upon emergence of social understanding (e.g., Dunn et al., 1991; Eisenberg & Fabes, 1998b; Jenkins & Astington, 1996), and lends support to our proposal. Perhaps desire understanding is a high predictor of prosocial behavior only at school.

Study results also give us reason believe parent unreliability to be a factor in the absence of correlation between their ratings of prosocial behavior, and children’s performance on desire understanding tests. That is, it is possible that desire understanding is predictive of prosocial behavior in the home as well as school, but this does not appear in findings as parents are an unreliable source. One possible explanation for this is that parents do not see their children in social contexts as often as do their children’s teachers; thus, parents have less experience to draw from when assessing their children in terms of prosocial behaviors. This seemed to hinder the ability of parents in our study to (accurately) complete the prosocial ratings scale: several parents left items blank on the rating scale, and one parent even noted that it was difficult for her to complete the rating scale as she rarely observed her child interacting with her peers.

When parents do see their children interacting with their peers, it tends to be under optimal conditions. Play dates are the most common social context in which parents observe their children. In this situation, children only have to consider the needs
of one other child, who is likely to be a preferred friend. At school, the nature of group social processes means that children often find themselves in situations that, much to our selfish children’s dismay, compromise the priority of their own preferences in the name of learning to share. The classroom context is thus observed to impose stricter social demands upon students. This offers a possible explanation for parents’ overestimation of their children’s prosocial capacity, in relation to teachers’ perceptions.

Parents were also found to underestimate their children’s prosocial tendencies. We explain this in terms of the differing social structure of home versus school environments. Within the classroom, social expectations are explicitly stated, along with a system of behavior reinforcement. Children may feel more comfortable misbehaving at home within a less rigid social agenda.

It was also noted that parents’ ratings may have been inaccurate due to confusion with the language of the scale. Several parents skipped the rating of altruism, perhaps owing to their confusion regarding the term; it is possible that this confusion carried over to other item ratings, which would result in inaccurate parent ratings of prosocial behavior.

The effect of “risk status” on teacher rating of prosocial orientation suggests additional explanations for our findings. When correlations between teacher rating of prosocial orientation and overall desire understanding were separated by class, the relationship only remained significant within the mainstream group. Overall, the teachers reported the mainstream class to behave more prosocially than the “at risk” class. It is possible that the teachers are right: the relationship between prosocial orientation and desire understanding is class-specific, and desire understanding predicts
prosocial behavior for mainstream kids, but not for “at risk” children. This is a valid explanation, meaning that there are other factors untapped by our measures that determine prosocial behavior for “at risk” kids.

However, this explanation is not entirely well-founded. The “at risk” class is focused as a prevention program, not an intervention program. Barring effect of attachment on early development of prosocial behavior, the “at risk” children are not expected to be demonstrating the effects of their disadvantaged situation. Therefore, theoretically, there should be no difference in their display of prosocial behavior, in relation to that of the mainstream children.

Perhaps a more plausible explanation for this finding may be teacher bias. Teacher reports of a difference between the two classes suggest that their expectations are distorting their observations, as proposed earlier. It is also possible that teacher bias works in a different way. Teachers report that the “at risk” children enter the class with underdeveloped prosocial behavior, in relation to age-appropriate norms. Throughout the course of the school year, these children’s prosocial competency approaches that of their mainstream peers (personal communication with L. Martinez, April 12, 2003). Experimental ratings used for analysis in this study were taken in the spring, when teachers would have already expected the “at risk” students to demonstrate an improved prosocial competency. As the teachers’ ratings did not reflect very high prosocial behavior for the “at risk” class, it seems likely that their ratings were influenced by the children’s earlier poor prosocial behavior, thus confounding the relationship between these ratings and the children’s current scope of desire understanding.

Alternatively, teachers may not have noticed their students’ developmental leaps.
This might be explained by lack of perspective (teachers are too immersed in classroom culture), or by teachers’ “dysfunction bias”: as the “at risk” program is focused on prevention, it is likely that the teachers concentrate exclusively on students’ potential weaknesses and do not attend to these children’s strengths (i.e., demonstrations of prosocial behavior).

**Implications for future research**

Considering the proposed effect of rater unreliability within our measure of prosocial behavior, research could be improved by the addition of an objective observer, such as through experimenter naturalistic observation both in the home and at school. In addition, to determine the implications of our findings, it would be important to conduct a longitudinal study. Individual differences in mental understanding and prosocial behavior may become even more pronounced as the child matures and the requisite forms of interaction become increasingly advanced. An examination of the extent to which the reported significant relationships “endure the test of time” and continue throughout the child’s life would shed light on the meaningfulness of our study’s results.

In addition, the effect of a child’s “risk status” found in our research merits further investigation. Future, more expansive studies might engage in a closer examination of the unique contexts encountered by “at risk” children, and the pathways through which these different factors impact different facets of children’s mental and social developments. These additional studies would better situate our findings, and make our results more meaningful. Moreover, this research would better inform outreach programs to make for more successful interventions.
References


Appendices

**Appendix A. Sample Stories for Simple Desire Tasks (Wellman & Woolley, 1990).**

*Finds – Wanted Situation.*

Here’s Johnny. He wants to find his dog to take his dog to the park, ‘cause that’s what he really wants to do. His dog might be in the house, or it might be in the garage. So, he’s looking for his dog to take it to the park. Watch, he’s looking for his dog in the garage. Look. He finds his dog.

**Action Question** (counterbalance order asked):

Will he go to the park or will he look in the house?

Will he look in the house or will he go to the park?

**Emotion question** (counterbalance order asked):

Does he feel happy or does he feel sad?

Does he feel sad or does he feel happy?
Finds – Substitute Situation.

Here’s Sam. He wants to find his crayons to take his crayons to his friend’s house, ‘cause that’s what he really wants to do. His crayons might be in the desk, or they might be in the toy box. So, he’s going to look for his crayons to take them to his friend’s house. Watch, he’s looking for his crayons in the toy box. Look, he finds some mittens.

Action Question (counterbalance):

Will he go to his friend’s house or will he look in the desk?
Will he look in the desk or will he go to his friend’s house?

Emotion question (counterbalance):

Does he feel sad or does he feel happy?
Does he feel happy or does he feel sad?
Finds – Nothing Situation.

Here’s Peter. He wants to find his horse to take his horse to the pond, ‘cause that’s what he really wants to do. His horse might be in the red barn, or it might be in the green barn. So, he’s going to look for his horse to take it to the pond. Watch, he’s looking for his horse in the green barn. Look. He doesn’t find his horse.

Action Question (counterbalance):

Will he go to the pond or will he look in the red barn?

Will he look in the red barn or will he go to the pond?

Emotion question (counterbalance):

Does he feel happy or does he feel sad?

Does he feel sad or does he feel happy?
Appendix B. Conflicting Desire Understanding (Cassidy et al., under review).

Implicit Conflict Trial.

Let’s look at these four things to do (go to the zoo, go to the bank, go to the post office, go to the supermarket). Show me the one that you like to do best, the one that you REALLY, REALLY like to do (Child chooses go to the zoo). Now point to the one that you hate to do, the one that you don’t like to do. (Child chooses the post office). OK. So you REALLY like this one (go to the zoo) and you REALLY don’t like this one (go to the post office). Now I am going to read you a story and ask you some questions.

“This is Brian. One day Brian’s mommy took Brian to the post office. Brian smiled when his mommy let him put money in the stamp machine. The mailperson gave Brian his favorite color balloon. Next, Mommy took Brian to the zoo. The zoo smelled yucky. Brian got hot and tired from all of the walking and he cried. The next day Brian’s mommy asked him what he would like to do.”

Test Question (Counterbalance): Will Brian choose to go to the post office or to the zoo?

Will Brian choose to go to the zoo or the post office?

Participant Preference Question (counterbalance): Which thing do you like to do best?

Which thing do you really hate to do the most?
**Implicit No Conflict Trial.**

Let’s look at these four things to do (go to the beach, go to the playground, go on a picnic, go to the pool). Show me the two that you like to do best, the ones that you REALLY, REALLY like to do. OK. So you REALLY like to do these two (Child chooses go to the beach and go to the playground). Now I am going to read you a story and ask you some questions.

“This is Josh. One day Mommy took Josh to the beach. Josh got to splash in the cool water. Josh also laughed when he jumped over the big waves. Next, Josh and Mommy went to the playground. First, Josh fell off the swing. Then, there was a long line for the slide and Josh didn’t get to go down. The next day Mommy asks Josh what he will do.”

**Test Question** (counterbalance): Will Josh choose to go to the playground or to the beach?

Will Josh choose to go to the beach or to the playground?

**Participant Preference Question:** Which two things do you like to do best?
Appendix C. Sample Stories for Wicked Desire Task (Yuill & Perner, 1996)

Bicycle Context, Bad Motive, Match.

These children are riding on the playground. This big boy in the green shirt does not like the little boy in the yellow shirt. He wants to make him mad. The big boy in the green shirt gives the little boy in the yellow shirt a big bump. The little boy in the yellow shirt is so mad that he gets off of his bicycle and stomps his feet.

Test Question (counterbalance): Is the boy that gave a big bump happy, sad, or in between?

Is the boy that gave the big bump sad, happy, or in between?
Desire Understanding and Prosocial Behavior
### Appendix D. Prosocial Behavior Inventory (Ryделл et al., 1997; Odessey, Carlson & Martinez, 2003)

Please rate your child on these items following the scale provided.

1 - never  2 - seldom  3 - sometimes  4 - often  5 - almost always

<table>
<thead>
<tr>
<th>ITEM</th>
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<tbody>
<tr>
<td>1. Has capacity for generosity with peers</td>
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<td>2. Has capacity to be helping</td>
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<td>3. Has capacity to be altruistic</td>
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<td>4. Shares toys with others when asked by peer</td>
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<td>5. Has capacity to sympathize with peers</td>
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<td>6. Criticizes peers</td>
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<td>7. Helpful with adults</td>
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<td>8. Helps peers tidy up</td>
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<td>9. Initiates sharing without prompting</td>
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<td>10. Helps peers search for lost items</td>
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<td>11. Shares his/her feelings</td>
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<td>12. Good at preventing conflicts</td>
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<td>13. Comforts peer who is upset</td>
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<td>14. Behaves selfishly</td>
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<td>15. Comforts peer who is sick</td>
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<td>16. Includes shy children in play</td>
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<td>17. Has ability to decode peers’ feelings</td>
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<td>18. Tries to intervene in peer conflicts</td>
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<td>19. Gives compliments to peers</td>
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<td>20. Finds solution when in conflict</td>
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<td>21. Has the capacity to play well with others</td>
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<td>22. Takes things from others without asking</td>
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<td>23. Has the capacity to work well with others</td>
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<td>24. Can give and take in interactions</td>
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<td>25. Shares peers’ joy</td>
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<td>26. Leads play activities</td>
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<td>27. Thinks world revolves around them</td>
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<td>28. Socially withdrawn with peers</td>
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<td>29. Makes contact easily with unfamiliar children</td>
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<td>30. Hesitant with peers</td>
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<td>31. Spectator while others play</td>
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<td>32. Shy/hesitant with unfamiliar adults</td>
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<td>33. Is patient when his/her needs cannot be met first</td>
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<td>34. Suggests activities to peers</td>
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<td>35. Dominated by peers</td>
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Appendix E. Social Competence Inventory (Rydell et al., 1997).

Prosocial orientation items

Load positively
- Has capacity for generosity to peers
- Has capacity to be helping/altruistic
- Has capacity to sympathize with peers
- Helpful with adults
- Helps peers tidy up/search for lost items
- Shares his/her belongings
- Good at preventing conflicts
- Comforts peer who is upset/sick
- Includes shy children in play
- Has ability to decode peers’ feelings
- Tries to intervene in peer conflicts
- Gives compliments to peers
- Finds solution when in conflict
- Has capacity to play/work well with peers
- Can give and take in interactions
- Shares peers’ joy

Loads negatively
- Criticizes peers

Social initiative items

Load positively
- Leads play activities
- Makes contact easily with unfamiliar children
- Suggests activity to peers

Load negatively
- Socially withdrawn with peers
- Hesitant with peers
- Spectator while others play
- Shy/hesitant with unfamiliar adults
- Dominated by peers
Appendix F. Child Identification Criteria for “At Risk” Status

**PART G -- CHILD IDENTIFICATION CRITERIA**

**DIRECTIONS:**
1. Children eligible for the state funded preschool program must be four, but less than five, years of age as of December 1 of the year in which the program is offered. Children must be identified by two or more of the following characteristics which place them “at risk” of being educationally disadvantaged and in need of special assistance.

2. Identify the “at risk” factors which the agency will be using for screening and selecting four year olds to be eligible for the project, including the priority system that the program has developed.

<table>
<thead>
<tr>
<th>&quot;AT RISK&quot; FACTORS:</th>
<th>FACTORS TO BE USED</th>
<th>PRIORITY RANKING</th>
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<tbody>
<tr>
<td>1. LOW BIRTH WEIGHT</td>
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<td>2. DEVELOPMENTALLY IMMATURE*</td>
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<td>3. PHYSICAL AND/OR SEXUAL ABUSE AND NEGLECT</td>
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<td>4. NUTRITIONAL DEFICIENCY</td>
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<td>5. LONG-TERM OR CHRONIC ILLNESS</td>
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<td>6. DIAGNOSED HANDICAPPING CONDITION (mainstreamed)</td>
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<td>7. LACK OF A STABLE SUPPORT SYSTEM OF RESIDENCE</td>
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<td>8. Destructive or violent temperament</td>
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<td>9. Substance Abuse or addiction</td>
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<td>10. LANGUAGE DEFICIENCY OR IMMATUREY</td>
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<td>11. NON-ENGLISH OR LIMITED ENGLISH SPEAKING HOUSEHOLD</td>
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<td>12. FAMILY HISTORY OF LOW SCHOOL ACHIEVEMENT OR DROP-OUT</td>
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<td>13. FAMILY HISTORY OF DELINQUENCY</td>
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<td>14. FAMILY HISTORY OF DIAGNOSED FAMILY PROBLEMS*</td>
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<td>15. LOW PARENTAL-SIBLING EDUCATIONAL ATTAINMENT OR ILLITERACY</td>
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<td>16. SINGLE PARENT</td>
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<td>17. UNEMPLOYED PARENT/PARENTS</td>
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<td>18. LOW FAMILY INCOME</td>
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<td>19. FAMILY DENSITY</td>
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<td>20. PARENTAL-SIBLING LOSS BY DEATH OR PARENTAL LOSS BY DIVORCE</td>
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<td>21. TEENAGE PARENT</td>
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<td>22. CHRONICALLY ILL PARENT/SIBLING (physical, mental, or emotional)</td>
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<td>23. INCARCERATED PARENT</td>
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<td>24. HOUSING IN RURAL OR SEGREGATED AREA</td>
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<td>25. OTHER (as identified by the applicant and presented to the State Board of Education to justify funding)</td>
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*Preschool Screening test should not be used as a sole indicator of risk for the criteria of developmental immaturity. Other indicators of risk must also be present for enrollment.