

Articles

Demographics, Parenting, and Theory of Mind in Preschool Children

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Abstract

This research examined associations among demographic variables, parenting strategies, and a theory of mind battery including measures of perception, desire, belief, and emotion understanding in 142 preschool-aged children. In correlational analyses, maternal education and, to a lesser extent, income were associated with a number of aspects of theory of mind. Additionally, mothers' use of instruction in response to child misbehavior was positively associated with perception and desire understanding whereas mothers' use of consequences and power assertion were negatively associated with aspects of theory of mind. In regression analyses controlling for children's cognitive ability and age, maternal education continued to be positively associated with perception understanding. Power assertion was negatively associated with belief understanding, but positively associated with emotion understanding. Finally, mothers' use of consequences in response to child misbehaviors was negatively related to emotion understanding.

Keywords: theory of mind; demographics; parenting; preschoolers

Interpreting action and interaction requires an understanding not only of how external events affect behavior, but also of the role that internal states like desires, beliefs, and emotions play in generating behavior. Children's development of such a 'theory of mind' has been studied intensively over the past 20 years (Flavell, 1999). Much of the early work focused on documenting normative developmental changes and revealed an understanding of simple desire at about 2 years of age (e.g., Wellman & Woolley, 1990), belief at 3 to 4 years of age (e.g., Wellman, Cross, & Watson, 2001; Wimmer & Perner, 1983), and more advanced aspects of theory of mind in middle childhood and beyond (e.g., Carpendale & Chandler, 1996). More recent work has begun to address factors generating individual differences in theories of mind in an effort to explain how knowledge of this kind develops. Relations have been found between theory of mind and within-child characteristics, such as language (Astington & Jenkins, 1991; Jenkins & Astington, 1996), fantasy (Taylor & Carlson, 1997), and

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executive function (Carlson & Moses, 2001; Hughes, Dunn, & White, 1998); demographic characteristics, such as parental education, SES, and number of siblings (e.g., Cutting & Dunn, 1999; Hughes, Deater-Deckard, & Cutting, 1999; Jenkins & Astington, 1996; Perner, Ruffman, & Leekam, 1994); and parenting variables such as discipline styles (Hughes *et al.*, 1999; Ruffman, Perner, & Parkin, 1999) and amount of parental mental-state talk (Dunn, Brown, & Beardsall, 1991a).

Demographic Characteristics and Theory of Mind

The present study sought to clarify relations among family background, parenting, and theory of mind in preschoolers. Before outlining the goals of the study, we first examine evidence suggesting links between demographic characteristics and theory of mind and between parenting and theory of mind.

Theory of mind might be associated with demographic variables for several reasons. Low income (Andersson, Sommerfelt, Sonnander, & Ahlsten, 1996; McLoyd, 1998), having a one-parent family (Dubow & Ippolito, 1994), large family size (Thomson, Hanson, & McLanahan, 1994), and, most particularly, low maternal education (Andersson *et al.*, 1996; Bee *et al.*, 1982) are linked to lower child IQ and lower academic achievement, and thus might indirectly influence theory of mind. Similarly, maternal education is positively associated with children's language abilities (Cutting & Dunn, 1999; Dollaghan *et al.*, 1999), which in turn are associated with greater theory of mind understanding (Astington & Jenkins, 1991; Jenkins & Astington, 1996). In addition, the amount that mothers talk about feeling states relates to their children's understanding of emotions and beliefs (Dunn *et al.*, 1991a; Dunn, Brown, Slomkowski, & Youngblade, 1991b), as well as to children's own feeling talk (Dunn, Bretherton, & Munn, 1987). Although studies have not specifically examined the relations between mothers' education and their talk about feelings, a positive association might plausibly exist between these two variables.

With respect to family income and family structure, having a higher income and two parents present in the home may give parents more time to spend with their children and thus more opportunities to talk with them about feelings and other matters relevant to perspective taking. Similarly, having more siblings probably heightens the chance of disagreements, thereby forcing those involved to acknowledge that others might have different desires and beliefs (Dunn *et al.*, 1991b; Ruffman *et al.*, 1999). Alternatively, older siblings might promote theory of mind understanding in their younger siblings by informally teaching or modeling skills that the older siblings have already developed (Ruffman, Perner, Naito, Parkin, & Clements, 1998).

Examinations of the links between demographics and theory of mind have produced mixed results. Although Cutting and Dunn (1999) found moderate positive associations between maternal education and both false belief understanding and affective perspective taking, other studies have not (Dunn *et al.*, 1991a; Ruffman *et al.*, 1999). With respect to socioeconomic status (SES) and theory of mind, Cutting and Dunn found that working-class children (as measured by parental occupational class) had lower mean theory of mind scores than middle-class children, even when language ability was controlled (see also Holmes, Black, & Miller, 1996). Similarly, Dunn *et al.* (1991b) found that fathers' occupational status was related to children's understanding of emotion, although not to false belief. Hughes *et al.* (1999) initially found an association between SES (as measured by parental education, occupational class, family crowding, and type of family home) and theory of mind abilities, although this association was no longer

significant when language abilities were taken into account. Moreover, Murray, Woolgar, Briers, and Hipwell (1999) failed to find an association between false belief performance and social class. Finally, in one of the only studies relating parental marital status to theory of mind, Cole and Mitchell (1998) found no relation to performance on a deception task, although language ability was not controlled.

Links between number of siblings and theory of mind have also been somewhat inconsistent. Perner *et al.* (1994) found that the more siblings a child had, the better their false belief performance. Neither the age of the siblings (older versus younger than the target child) nor the distance in age between the siblings and the target child seemed to affect the association. In other research, the age of the sibling has been found to be important. Specifically, Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, and Berridge (1996) found that the number of *older* siblings was positively associated with theory of mind. Ruffman *et al.* (1998) replicated these results controlling for language abilities. These findings are consistent with the idea that children acquire theory of mind skills through apprenticeships to older members of their culture (Lewis *et al.*, 1996). Jenkins and Astington (1996) found that the association between theory of mind and total number of siblings was strong when children's language abilities were low but weaker when these abilities were high. They suggest that for children who are lagging behind in language, and consequently in theory of mind, having siblings may ameliorate the deficit. Nevertheless, some studies (Carlson & Moses, 2001; Cutting & Dunn, 1999; Dunn *et al.*, 1991b) have failed to find any relation between number of older or younger siblings and theory of mind.

In sum, findings from these demographic studies have been equivocal, perhaps because both theory of mind and demographic characteristics have been measured in different ways across studies, and because children's general cognitive and language abilities have not always been controlled. A more systematic examination of the relation between demographics and theory of mind is clearly needed.

Parenting and Theory of Mind

Research on the relation between parental discipline strategies and cognitive abilities tends to focus on parental use of power assertion. Power assertive techniques (including physical punishment, yelling, and direct commands) are negatively associated with cognitive outcomes—such as academic achievement, language, and IQ (Bee *et al.*, 1982; Hess & McDevitt, 1984)—even when demographic characteristics are controlled. Such techniques may have deleterious consequences for cognitive development, because they do not allow children to learn how to solve problems by themselves, they direct children's attention to the parent-child power differential rather than to the potential effects of their behaviors, and they may cause children to attribute their own behaviors to external sources rather than to take personal responsibility for their actions (Hess & McDevitt, 1984).

Power assertive strategies should also be less effective in promoting theory of mind than strategies that help children to understand the effects of their behavior, especially effects on the thoughts and feelings of others. Consistent with this hypothesis, FitzGerald and White (1995) found that parents' observed use of 'victim-centered discipline,' which encouraged children to imagine what another person thought or felt about their actions, was positively associated with performance on perspective-taking tasks. Ruffman *et al.* (1999) obtained similar findings. They asked mothers how they would respond in various hypothetical discipline situations and found a positive asso-

ciation between the proportion of maternal responses that focused on how the preschoolers' behaviors made others feel and the children's performance on a false belief task. The proportion of responses that focused on the children's behavior in more general terms (e.g., telling them that a behavior was wrong) was not related to false belief performance.

With respect to power assertion itself, Ruffman *et al.* (1999) found that mothers' reported use of reprimands was negatively related to false belief performance, although this relation was no longer significant after verbal skills were controlled. However, their reprimand category was defined very broadly: it included giving the child consequences for his or her behaviors (e.g., sending the child to his or her room, having the child apologize to another), as well as the harsh discipline that is more central to power assertion (e.g., yelling at the child). In a study examining power assertion more specifically (Hughes *et al.*, 1999), two seemingly incompatible findings were reported. Hughes *et al.* found that global observer ratings of parents' use of negative control strategies during interaction with their child—i.e., commands and physical punishment—were negatively related to a theory of mind aggregate consisting of false belief and deception. In marked contrast, however, severity of discipline, as measured by observers' global ratings derived from a parental interview, was *positively* associated with theory of mind for boys. (For girls, there was no relation.) Consistent with this latter finding, mothers' use of controlling and intrusive discipline strategies with siblings has been found to positively correlate with a target child's understanding of false belief (Dunn *et al.*, 1991b). Dunn and her colleagues suggest that through witnessing disagreements and discipline situations involving parents and siblings, children learn that different people may have conflicting perspectives. Similar processes may underlie the findings of Hughes *et al.* with regard to severity of discipline: Children who are disciplined harshly may quickly learn that others have ideas that are very different from their own, although why this effect should be present only for boys and why it should be found for parent report, but not for direct observation, is unclear.

In sum, the findings on discipline strategies and theory of mind abilities are somewhat unclear. Teaching children about the effects of their behavior on others' feelings has been found to relate to theory of mind, but very few studies have examined this issue. Moreover, findings on the relation between power assertive discipline and theory of mind abilities are contradictory and, hence, in need of clarification.

Goals of the Study

The present study was designed to clarify and extend findings from past research in several ways. First, both parenting and demographic measures were included in the analyses. It is possible that the effects of demographic characteristics on theory of mind will no longer be found once parenting was controlled or that the effects of parenting will no longer be significant once demographic characteristics were controlled.

Second, as mentioned earlier, studies examining demographics and theory of mind may have produced inconsistent findings because different variables have been used as indices of SES across studies. Entwisle and Astone (1994) suggest that to fully account for the resources available for optimal child development, three demographic characteristics should be measured: (a) family income as an index of physical resources, (b) parental education as an index of how much intellectual stimulation children receive outside of school, and (c) availability of adults in the family to connect children to the outside world. In keeping with these suggestions, family income,

maternal education, and family structure (two parents versus one) were measured in this study. Number of siblings was also included as a separate measure. We hypothesized that family income, maternal education, family structure, and number of siblings would be positively related to theory of mind.

Third, earlier studies have typically examined the effects on theory of mind of one or two indices of parenting such as positive or negative parenting (e.g., Hughes *et al.*, 1999). In contrast, our approach was more fine-grained: discipline strategies including power assertion, use of consequences such as time out, general instruction about the effects of behaviors, and specific instruction about the effects of behaviors on others' feelings were examined. We hypothesized that theory of mind would relate positively to discipline strategies focusing on explanations about others' feelings, but would not be related to strategies in which parents more generally discussed the negative effects of behaviors (e.g., that a given behavior was dangerous without reference to feelings). As previous findings on power assertion and theory of mind have been mixed, and no studies have examined the specific effects of consequence responses on theory of mind, no predictions were made for either of these parenting strategies.

Finally, most previous studies have measured only limited aspects of theory of mind, typically understanding of false belief or deception (Cole & Mitchell, 1998; Holmes *et al.*, 1996; Hughes *et al.*, 1999; Murray *et al.*, 1999) and sometimes affective perspective taking as well (Cutting & Dunn, 1999; Dunn *et al.*, 1991b). The present study included a broader range of theory of mind abilities, including visual perspective taking, desire reasoning, belief reasoning, emotion recognition, and affective perspective taking. By doing so, we could specify more finely how theory of mind is related to demographic and parenting variables.

Method

Participants

The sample of 142 participants (74 males) was drawn from two sources. Forty-nine children were participants in a longitudinal study on the transmission of risk being conducted at the Oregon Social Learning Center. Most of these families were low in SES and headed by young parents with low educational attainment. The remaining 93 children were recruited from the community through newspaper advertisements and flyers. In order to recruit a sample with broad demographic characteristics, flyers were posted in local Head Start centers as well as in the offices of community programs serving families from lower socioeconomic strata.

The sample ranged in age from 36 to 62 months ($M = 46$ mos, $SD = 7$ mos). Seventy-six percent of the children were Caucasian, 13% were mixed race, 5% were Native American, 3% were Hispanic, 1% were African-American, and 1% were Asian. Data on ethnicity were missing for 1% of the sample.

Overview of Procedure

Children who were 3 years of age at the time of assessment accompanied their parents to the university laboratory and completed a battery of theory of mind (ToM) tasks and the Bayley Scales of Infant Development-Second Edition (BSID-II; Bayley, 1993). Children who were 4 years of age came to the laboratory to participate in playgroups one day a week for two-and-a-half hours for five consecutive weeks. On separate days,

children were taken individually from the playroom by an unfamiliar experimenter to complete the ToM tasks, the Wechsler Preschool and Primary Scales of Intelligence-Revised (WPPSI-R; Wechsler, 1989), and other tasks unrelated to the study. Parents also filled out demographic and parenting questionnaires at the time of assessment.

Demographic Measures

Mothers were classified as 'not single' if they were married or living with a domestic partner and 'single' if they were unmarried, divorced, or living with nondomestic partner roommates. Mothers indicated their highest level of education on a 7-point scale ranging from 'less than 7th grade' to 'graduate professional training or degree.' They were asked to give their gross annual household income on a 9-point scale ranging from 'less than \$4,999' to '\$50,000 or more.' Mothers also listed the ages of the children's siblings.

Parent Discipline

The Parent Daily Report (Chamberlain & Reid, 1987) asks whether a series of negative and positive child behaviors occurred in the past 24 hours and how the parent responded to these. Responses are then classified into a variety of different categories. Average inter-rater agreement for the classification of the parents' response was assessed for approximately 15% of the sample and was 79% ($\kappa = .71$).

For the purposes of this study, all child negative behaviors were summed. These included touching things that should not have been touched, breaking standing rules, being moody or rejecting, eating problems, being selfish, being noisy or yelling, engaging in dangerous behavior, saying no or not minding when asked to do something, being clingy or whiny, throwing temper tantrums, hitting others, biting others, throwing things, and any other difficult behaviors that parents wanted to list. With respect to these behaviors, only the parents' power assertive responses (e.g., physically and verbally negative responses such as spanking and yelling), general instructional responses (e.g., talking to the child about how dangerous a behavior was), responses involving explanations of how the behavior affected others' feelings (feeling responses), and responses that involved giving consequences (consequence responses: e.g., time-out, withdrawing privileges, removing a toy) were analyzed. If the mother listed more than one strategy for dealing with a given behavior, only the most power assertive was included.¹ The total within each response subcategory for each child was divided by the total number of all responses to yield proportion scores for each type of response.

Theory of Mind Tasks

The tasks are described in the order that they were presented to children.

Perception Tasks. The Level 1 Perspective-Taking tasks (Flavell, Botkin, Fry, Wright, & Jarvis, 1968) assessed children's understanding that two people see different things if there are differences in their physical positions or physical barriers to prevent them from seeing what the other sees. For example, in one task, children were first shown a picture of a mouse. A piece of cardboard was then placed vertically, such that the experimenter (E) could see only the mouse's head, and the child could see only its

feet. E then said, 'Now, can you tell me what I am looking at? Am I looking at the mouse's head or at the mouse's feet?', followed by 'What are you looking at? The mouse's head or the mouse's feet?' Children received credit only if they answered both questions correctly. The other task consisted of a card with a picture of a cat on one side and a picture of an ice cream cone on the other. The child first saw both sides of the card and then it was held so that the cat was visible only to the child and the ice cream only to E. The child was told, 'In this game, I am looking at a picture. See if you can tell me what picture I am looking at. Am I looking at a cat or an ice cream cone?'² Children were given a point if they answered correctly.

Desire Tasks. These tasks, derived from Wellman and Woolley (1990), assessed children's understanding of how fulfilled and unfulfilled desires might affect a character's feelings. The stories described a character's search for a desired object in a particular location. The character either found the object, did not find the object, or found a different object. For example, in one story, the character was looking for her dog because she wanted to take it to the park. She looked in the garage and found it. E then asked, 'Does she feel happy or does she feel sad?' There were a total of six stories, two in which the character found the desired object (a dog and mittens) and so should be happy, two in which he or she did not find anything (after looking for a horse and a bike) and so should be sad, and two in which he or she found another object instead (mittens when looking for crayons and a dog when looking for a rabbit) and so should be sad. The stories were accompanied by drawings in a book in which flaps could be opened so that the children could see whether the character found the desired object. The characters in the desire stories (and in the following belief stories) matched the child's sex. For each correct answer, children received one point.

Belief Tasks. These included discrepant belief and explicit false belief tasks. For the two discrepant belief tasks (Wellman & Bartsch, 1988), illustrations revealed that identical objects were in two different locations. For example, in one story, children were shown and told that there were bananas in a cupboard and bananas in a refrigerator. Then a character was introduced who wanted bananas but thought that they were only in the cupboard. Children were asked, 'Where will Jimmy look for a banana?' followed by 'Are there bananas in the (location that the child did not indicate), too?' The character in the other story was looking for a hat (in a coat pocket and a drawer).

In the two explicit false belief tasks (Siegal & Beattie, 1991; Wellman & Bartsch, 1988), illustrations revealed that an object was in only one location. For example, in one story, children were shown and told that there was a ball under a table. Then they were introduced to a character who wanted the ball but thought it was behind the couch. Children were asked, 'Where will Mary look first for her ball?' followed by 'Where is it really?' In the other story the sought-after object was a kitten (in the kitchen versus the playroom). For both types of belief task, if children answered the reality question incorrectly, they failed the task.

Emotion Tasks. These tasks were adapted from Denham (1986). The emotion-recognition task was divided into two parts. For the four expressive emotion-recognition items, children were shown four faces depicting happy, sad, angry, and scared emotions. The experimenter pointed to each face in turn and asked, 'How does s/he feel?' matching the sex of the face to the child's sex. Children were not corrected if they gave the wrong answer. For the four receptive emotion-recognition items,

children were shown a strip with the same four faces in different positions and told to 'Point to the happy face,' 'Point to the mad face,' and so on. In this task, children were corrected if they pointed to the wrong face. Following Denham's scoring conventions, they received two points for every correctly answered question and were given one point if they chose the wrong face, but at least pointed to a face of the correct valence.

The affective perspective-taking tasks consisted of a series of stories told with three puppet characters: a main character who always matched the sex of the child, a sibling who was always the opposite sex, and a mother puppet. The puppets acted out 16 scenes portraying various events that might provoke happiness, fear, sadness, or anger (e.g., getting an ice cream cone, seeing a big dog, being left out of an outing, or having a fight with a sibling, respectively). For the stereotypical stories, the main puppet acted out an emotion that most people would be expected to feel in the situation. For the nonstereotypical stories, the parents were asked to indicate how their children would react to eight given situations (e.g., 'Please circle the emotion that your child would be most likely to display [in situation X]: Happy or Sad.'). The puppet then acted out the opposite emotion.

After each story, children were asked to choose a face that described how the puppet was feeling from a strip of faces depicting four emotions: happy, sad, angry, and scared. Four different strips were used with the faces in different orders to minimize location biases. Vocal cues to emotion were stressed. The experimenter was trained not to exaggerate facial affect so as to avoid turning the perspective-taking task into one of simply matching the experimenter's face to the choices given. Children received two points if they matched the puppet's expressed emotion to the correct face, and one point if they picked the wrong face but correctly made a distinction between positive and negative emotion.

Measures of General Cognitive Ability

Children received one score for general cognitive ability derived either from the Bayley Scales of Infant Development-Second Edition (BSID-II) or the Wechsler Preschool and Primary Scales of Intelligence-Revised (WPPSI-R).

BSID-II. Children who were between 36 and 42 months of age completed the mental scales of the BSID-II (Bayley, 1993), a well-validated measure of intellectual status (e.g., Nutall, Romero, & Kalesnik, 1992). The scales yield a Mental Development Index (MDI) score that measures the sensory perception, object constancy, and early verbal abilities of children up to 42 months of age.³ The average reliability for the MDI is $\alpha = .88$ (Bayley, 1993).

WPPSI-R. Children who were above 43 months of age at the time of assessment completed the block design and vocabulary measures from the WPPSI-R (Wechsler, 1989). These tasks are considered to be the strongest of the verbal and performance subscales, respectively, because they correlate most highly with other measures of general intelligence (Wechsler). The average reliabilities for the vocabulary and block design subscales are $\alpha = .84$ and $\alpha = .85$, respectively (Wechsler). The subscale scores were converted to yield scores that were normally distributed using a transformation based on a norming sample with a mean of 100 and a standard deviation of 15, thus making them equivalent to the Bayley scores (Sattler, 1988).

Results

Descriptive results for the individual measures will be presented first, followed by analyses of their interrelations and regression analyses.

Demographics

The median educational status for mothers was 1 to 3 years of college (range = '7th–9th grade' to 'graduate work or degree'), and the median gross family income was \$25,000 to \$29,000 (range = 'less than \$4,999' to '\$50,000 or above'). Income information was missing for two families. Twenty-three percent of mothers were single. The mean number of siblings for children was 1.18 ($SD = 1.26$) with a range from 0 to 11.

Parental Discipline

Ten mothers failed to return their PDR questionnaires, so analyses for this measure include 132 children. Mothers reported a mean number of 5.39 discipline encounters with a standard deviation of 3.14 (range = 0 to 13). The means and standard deviations for the proportion scores are shown in Table 1.⁴ As can be seen from the table, feeling and power assertion responses occurred with relatively low frequency whereas instructional and consequence responses were more frequent.

Table 1. Means and Standard Deviations for Parent Discipline Variables and Theory of Mind Tasks

	M	SD
<i>Parenting Variables</i>		
Proportion of Instructional Responses	.16	.19
Proportion of Feeling Responses	.02	.06
Proportion of Power Assertion	.03	.06
Proportion of Consequence Responses	.27	.25
<i>Theory of Mind Tasks</i>		
Perception Tasks	1.53 (2)	.64
Desire Tasks	4.45 (6)	1.72
Discrepant Belief Tasks	.97 (2)	.76
Explicit False Belief Tasks	.77 (2)	.77
Stereotypical Affective Perspective Taking	10.97 (16)	4.29
Nonstereotypical Affective Perspective Taking	10.62 (16)	4.63
Expressive Emotion Recognition	5.46 (8)	2.14
Receptive Emotion Recognition	6.92 (8)	1.91

Note: The total possible score for each of the Theory of Mind variables is in parentheses.

Theory of Mind Tasks

The means and standard deviations for the ToM tasks are also presented in Table 1. One child did not receive the emotion-recognition and affective perspective-taking tasks due to experimenter error, leaving 141 subjects in analyses involving emotion-understanding scores. Preliminary analyses indicated that discrepant belief and explicit false belief were significantly related ($r = .25, p < .01$), so these variables were averaged to form one belief measure ($M = .87, SD = .61$). Additionally, the stereotypical and nonstereotypical affect, and the expressive and receptive emotion scores, were significantly intercorrelated ($r_s = .73$ and $.70, p_s < .001$) and so were averaged to yield one affective perspective-taking score and one emotion-recognition score. These combined scores were also significantly intercorrelated ($r = .55, p < .001$), and so they were standardized and averaged to produce a single emotion-understanding aggregate.

Correlations among the ToM variables were generally significant. Perception was significantly correlated with desire, emotion, and belief understanding ($r_s = .35, .50$, and $.19, p_s < .01, .01$, and $.05$, respectively). Desire understanding was, in addition, significantly correlated with emotion but not belief understanding ($r_s = .44$ and $.14, p_s < .01$ and $.10$, respectively). Finally, emotion understanding and belief understanding were significantly positively correlated ($r = .19, p < .05$).

Correlations Among Age, General Cognitive Ability, and Theory of Mind

The mean score for the measure of general cognitive ability was 96.81 ($SD = 14.52$). As expected (see Table 2), most of the ToM variables showed moderate to strong associations with general cognitive ability and also with age, although these correlations were somewhat weaker for belief.

Table 2. Correlations Between Theory of Mind and Predictor Variables

	Perception	Desire	Belief	Emotion
<i>Demographic Variables</i>				
Maternal Education	.47**	.27**	.11	.38**
Income	.17*	.11	.06	.24**
Marital Status	.06	.13	-.04	.18*
Number of Siblings	-.02	.19*	.03	.10
<i>Parenting Variables</i>				
Instructional Responses	.18*	.25**	.01	.13
Feeling Responses	.07	.12	-.12	.14
Power Assertion	.02	-.08	-.28**	.06
Consequence Responses	-.19*	-.05	-.04	-.30**
<i>Age and Cognitive Ability</i>				
Child's Age	.46**	.49**	.21*	.64**
Cognitive Ability	.43**	.44**	.13	.53**

* $p < .05$; ** $p < .01$.

Correlations Between Theory of Mind and Demographic Variables

Table 2 also displays correlations between ToM and demographic variables. Mothers' education was significantly correlated with perception, desire, and emotion understanding. Income was significantly associated with perception and emotion understanding. Marital status showed a positive association with emotion understanding (children with higher scores were somewhat more likely to have two parents in the home). Total number of siblings was significantly associated with desire understanding. (There was no relation between any of the ToM variables and number of older siblings, or between ToM and whether children had *any* older siblings at all.)

Correlations Between Theory of Mind and Parenting Variables

Table 2 also summarizes the relations between the parenting and ToM measures. Contrary to expectations, mothers' general instructional responses were significantly related to both perception and desire understanding, whereas mothers' responses to misbehaviors that focused on how the child made another feel were not significantly associated with any of the ToM variables. Power assertion was significantly negatively associated with belief understanding. Finally, the proportion of consequences that mothers dictated for misbehaviors was negatively related to perception and emotion understanding.

Regression Analyses

Table 3 presents the correlations among the demographic variables, parenting variables, age, and general cognitive ability. Maternal education was significantly positively correlated with income, marital status, children's age, and cognitive ability, and significantly negatively correlated with consequence responses. There was a marginal positive correlation between maternal education and instructional responses. Income was also positively associated with marital status, number of siblings, child's age, and cognitive ability. Marital status was additionally correlated with number of siblings and child's age. Number of siblings was positively correlated with child's age. Mothers' use of instructional responses was positively correlated with child's age. Power assertive responses were negatively correlated with child's age, whereas the use of consequence responses was negatively correlated with cognitive ability.

These intercorrelations among the predictors raised the questions of whether the demographic and parenting variables would contribute unique variance to children's ToM scores above and beyond age and intelligence, and whether the parenting variables would do so above and beyond the demographic variables. A series of hierarchical regressions was conducted to answer these questions. Each ToM variable served as the dependent variable in separate analyses. At the first step of each regression, child's age and cognitive ability were entered; at the second step the demographic variables (education, income, marital status, and number of siblings) were entered; and at the final step the parenting variables (use of instruction, feeling response, power assertion, and consequences) were entered.

For perception understanding, the first step (age and cognitive ability) was significant, $\Delta R^2 = .29$, $F_{\text{inc}}(2,128) = 27.31$, $p < .001$. The addition of the demographic variables produced a significant increment in R^2 at the second step, $\Delta R^2 = .09$, $F_{\text{inc}}(4,124) = 4.47$, $p < .01$. However, when the parenting variables were entered at the third step, the change in R^2 was not significant ($\Delta R^2 = .02$; $F_{\text{inc}}(4,120) = .91$, $p = \text{n.s.}$). Table 4

Table 3. Intercorrelations Among the Parenting and Demographic Variables

	1	2	3	4	5	6	7	8	9
<i>Demographic Variables</i>									
1. Maternal Education									
2. Income	.36**								
3. Marital Status	.20*	.43**							
4. Number of Siblings	.03	.25**	.24**						
<i>Parenting Variables</i>									
5. Instructional Responses	.16 ⁺	.12	.05	.07					
6. Feeling Responses	.04	.05	.07	−.03	.08				
7. Power Assertion	−.14	.07	.00	−.16 ⁺	−.13	−.02			
8. Consequence Responses	−.27**	−.05	.03	.13	−.14	−.05	−.15		
<i>Age and Cognitive Ability</i>									
9. Child's Age	.34**	.18*	.22*	.22**	.24**	.02	−.19*	−.08	
10. Cognitive Ability	.42**	.26**	.09	.02	.13	.07	.03	−.29**	.33**

⁺ $p < .07$; * $p < .05$; ** $p < .01$.

Table 4. Summary of the Final Step of the Hierarchical Regressions Analyses Predicting ToM from Demographics and Parenting

	Perception		Desire		Belief		Emotion	
	β	sr^2	β	sr^2	β	sr^2	β	sr^2
<i>Age and Cognitive Ability</i>								
Child's Age	.30**	.06	.33**	.08	.19 ⁺	.03	.57**	.24
General Cognitive Ability	.17*	.02	.38**	.10	.09	.005	.24**	.04
<i>Demographic Variables</i>								
Maternal Education	.36**	.08	.05	.001	-.03	.001	.07	.003
Income	-.01	.00	-.15	.02	.16	.02	.04	.001
Marital Status	-.06	.003	-.01	.001	-.15	.02	.02	.00
Number of Siblings	-.04	.001	.10	.01	-.04	.001	.01	.00
<i>Parenting Variables</i>								
Instructional Responses	.06	.003	.14	.02	-.10	.01	-.06	.003
Responses Explaining Others' Feelings	.04	.001	.10	.01	-.14	.02	.11 ⁺	.01
Power Assertion	.13	.01	.04	.002	-.29**	.07	.14*	.02
Consequence Responses	.01	.00	.12	.01	-.05	.002	-.15*	.02
R^2	.40		.40		.18		.62	
Adj. R^2	.36		.35		.11		.58	
	$F(10,120) = 8.18^{**}$		$F(10,120) = 8.18^{**}$		$F(10,120) = 2.63^{**}$		$F(10,119) = 19.15^{**}$	

Note: β represents the standardized regression weight; sr^2 represents the squared semi-partial correlation.

⁺ $p < .07$; * $p < .05$; ** $p < .01$.

shows the standardized regression weights and the squared semi-partial correlations for the final model for perception understanding (and for the other ToM variables) after all predictor variables were entered. As can be seen from the table, and consistent with hypotheses, maternal education significantly predicted perception, as did age and cognitive ability. Income, instruction, and consequence responses, which had been positively associated with perception understanding in the correlational analyses, no longer significantly predicted perception.

For desire understanding, only the first step in the equation was significant, $\Delta R^2 = .35$, $F_{\text{inc}}(2,128) = 34.33$, $p < .001$. Neither the addition of the demographic variables ($\Delta R^2 = .02$; $F_{\text{inc}}(4,124) = .92$, $p = \text{n.s.}$) nor the addition of the parenting variables ($\Delta R^2 = .04$; $F_{\text{inc}}(4,120) = 1.76$, $p = \text{n.s.}$) resulted in a significant increment in R^2 . Age and cognitive abilities were the only significant predictors of desire understanding in the final model. Maternal education, number of siblings, and instructional responses, which had been significant in the correlational analyses, no longer predicted desire understanding over the other variables.

For belief understanding, the first step was significant, $\Delta R^2 = .06$, $F_{\text{inc}}(2,128) = 4.06$, $p < .05$. The addition of the demographic variables failed to produce a significant change in R^2 ($\Delta R^2 = .02$; $F_{\text{inc}}(4,124) = .85$, $p = \text{n.s.}$). However, with the addition of the parenting variables, the change in R^2 was significant, $\Delta R^2 = .10$, $F_{\text{inc}}(4,120) = 3.48$, $p < .05$. As can be seen from Table 4, power assertion was significantly negatively associated with belief understanding whereas child's age was a marginally significant predictor.

Finally, for emotion understanding, the first step was significant, $\Delta R^2 = .55$, $F_{\text{inc}}(2,127) = 76.82$, $p < .01$. The addition of the demographic variables did not result in a significant increment in R^2 ($\Delta R^2 = .01$; $F_{\text{inc}}(4,123) = .74$, $p = \text{n.s.}$). However, with the addition of the parenting variables, there was a significant increment in R^2 , $\Delta R^2 = .06$, $F_{\text{inc}}(4,119) = 4.56$, $p < .01$. As can be seen from Table 4, both age and cognitive ability were strong predictors of emotion understanding. Additionally, the mothers' use of consequences in response to child misbehavior was a significant negative predictor of emotion understanding whereas parental power assertion was a *positive* predictor of emotion understanding. Mothers' use of feeling responses was additionally a marginally significant positive predictor of emotion understanding. Maternal education, income, and marital status, which had been positively related to emotion understanding in the correlational analysis, no longer predicted emotion understanding once other variables were controlled.

Discussion

The aim of this study was to clarify links among demographic factors, parenting practices, and various aspects of children's theory of mind during the preschool period. We first discuss the findings for demographic characteristics before turning to parenting.

Demographic Variables and Theory of Mind

Past studies have often used aggregates of education, income, and occupational status to measure social class and have found inconsistent links to theory of mind (e.g., Cutting & Dunn, 1999; Hughes *et al.*, 1999; Murray *et al.*, 1999). In the present study, we took a different approach, attempting to isolate the specific effects of a range of demographic factors. Maternal education appears to be the strongest predictor of ToM,

correlating moderately with perception, desire, and emotion understanding. These findings are broadly consistent with those of Cutting and Dunn (1999) who found significant correlations between maternal education and both belief and emotion understanding.

Maternal education could affect theory of mind in one of two ways. First, it might do so indirectly, through its association with the child's general cognitive ability. The findings for desire and emotion understanding fit this hypothesis. Maternal education no longer predicted these abilities once cognitive ability was controlled in the regression analyses. Second, maternal education might also have a direct effect on children's theory of mind. Mothers who are more highly educated may spend more time explaining causes of social phenomena to children than less educated mothers. Evidence for a direct association of this kind was found in the link between perception understanding and maternal education, which held up even when age and intelligence were controlled. That said, it is not clear why education should relate directly to perception understanding and only indirectly to desire and emotion understanding.

Ours is the first study to specifically examine the relation of income to theory of mind. Income was significantly positively correlated with perception and emotion understanding. However, these effects disappeared once education and other factors were controlled. Given that income was strongly associated with both maternal education and children's cognitive abilities, its effects on theory of mind may be mediated through these other predictors. Marital status was related only to emotion in the raw correlational analyses, but this relation did not survive in the regression analyses when other factors were controlled. This finding is consistent with that of Cole and Mitchell (1998) who did not find an association between marital status and understanding of deception.

Finally, number of siblings was positively correlated with desire understanding. However, once age and other factors were controlled, this effect disappeared. These weak findings for siblings are consistent with some studies (e.g., Carlson & Moses, 2001; Cutting & Dunn, 1999; Dunn *et al.*, 1991b) but not others (e.g., Lewis *et al.*, 1996; Ruffman *et al.*, 1998). The conditions under which siblings do and do not influence theory of mind remain unclear but could well include factors such as child and sibling temperament, general cognitive abilities, and closeness of the sibling relationship. Moreover, even when positive relations have been found for siblings, it may be that other demographic variables and parenting variables are more influential. These other factors have rarely been controlled in studies of sibling effects on theory of mind.

Parenting and Theory of Mind

As noted earlier, the literature on power assertion and theory of mind has produced two findings showing negative relations between power assertion and belief (Hughes *et al.*, 1999; Ruffman *et al.*, 1999) and one showing a positive association between severity of discipline and theory of mind, at least for boys (Hughes *et al.*, 1999). Our results for belief understanding are consistent with the former findings. Power assertive discipline techniques, such as yelling and spanking, were negatively associated with belief understanding, even when age, cognitive ability, and demographics were controlled. Our findings are also consistent with other work showing that children's general cognitive abilities are adversely affected by power assertive parenting techniques (e.g., Bee *et al.*, 1982; Hess & McDevitt, 1984). It is somewhat surprising that

the negative relation to power assertive discipline was not found for the other theory of mind variables. This may be due to the fact that belief understanding was the least well established of the theory of mind abilities: children who are often confronted with strong negative affect or coercive behavior may be unable to use skills that they are beginning to develop, even in supportive situations.

The most natural interpretation of the correlation between power assertion and theory of mind is that power assertion has negative effects on theory of mind. However, the causal direction may run the other way. Perhaps parents are more likely to use power assertive techniques with children who have weaker theory of mind abilities because such children are not easily influenced by other strategies. In this regard, it is worth noting that power assertion was negatively correlated with the child's age, and age was positively correlated with belief understanding. As children mature, parents may feel less need to rely on power assertion as a discipline technique. Against this interpretation, however, is the fact that in the regression analyses, power assertion was negatively associated with belief even when age was controlled. The relation between power assertion and belief understanding appears to be more than a developmental by-product of waning reliance on power assertive techniques.

Recall that Hughes *et al.* (1999) found a *positive* relation between power assertion and belief, at least for boys. We did not find such a relation for belief (in fact, the opposite, as just discussed). However, in the case of emotion understanding, power assertive discipline did, in fact, show a positive association in the regression analyses. This relation thus provides some indirect support for the Hughes *et al.* finding. Power assertive strategies are likely to involve expression of strong affect. For instance, people rarely yell without showing anger or some other strong feeling. Thus, these strategies may engender a specific understanding of others' feelings (as opposed to other mental states such as beliefs). Consistent with this interpretation, Zahn-Waxler, Radke-Yarrow, and King (1979) found that mothers who expressed strong affect over their children's transgressions had children who showed more reparative and altruistic behaviors to other people in distress. Moreover, if power assertive parents continually use strategies that require children to bend to their wills or make clear that they consider the children's behavior to be unacceptable, then children may quickly learn that others have different feelings about the situation than they do. In this regard, Dunn *et al.* (1991a) similarly suggested that people may learn more about others' feelings when engaged in interpersonal conflicts.

To be clear, our finding of a positive relation between power assertion and emotion understanding should not in any way be taken as an endorsement of power assertive discipline. There is ample evidence that such discipline leads to adverse consequences for children, including poor cognitive outcomes, social aggression, and other social problems (e.g. Bee *et al.*, 1982; Hess & McDevitt, 1984; Patterson, 1982; Weiss, Dodge, Bates, & Pettit, 1992). These adverse consequences are likely to far outweigh any limited, quite possibly temporary, gains that children might make in emotion understanding as a consequence of power assertive discipline. Indeed, our results for belief understanding are consistent with these other findings.

Interestingly, we found that use of consequences was negatively associated with emotion understanding in both the correlational and regression analyses. Consequences were also negatively associated with perception understanding, although the associations did not hold up in the regression analyses. Using consequences, such as time out or the removal of privileges, does not necessarily involve either the expression of affect or discussions about others' feelings. In fact, parents are often encour-

aged not to express affect when giving consequences. Hence, although the use of consequences may well be effective in modifying children's behavior, it does little by itself to teach children about others' feelings.

An alternative explanation for the relation between consequences and theory of mind is that parents who have children with well-developed theory of mind abilities do not need to use consequence responses. In this regard, consequence responses were negatively correlated with cognitive ability, perhaps because other disciplinary techniques are more effective as children mature intellectually. However, the use of consequence responses was negatively correlated with emotion understanding, even when cognitive ability was controlled. Hence, the relation is not merely an offshoot of the decline in the use of this technique as children mature cognitively.

Further exploration of the association between giving consequences for misbehaviors and theory of mind is warranted as the use of consequences is a widely advocated parent behavior and, in our data, a very frequent one (see Table 1). Observational studies of how parents deliver consequences might further clarify this relation. For instance, it is likely that parents vary in the amount of explanation and commentary that they give while administering consequences, and this factor may generate important individual differences in theory of mind.

In general, discussion of feelings did not relate to theory of mind. That said, mothers' talk about the effects of children's behavior on others' feelings was at least marginally related to emotion understanding in the regression analyses. This result is broadly consistent with Ruffman *et al.*'s (1999) finding that the proportion of mothers' feeling responses was positively associated with children's scores on a belief task. Our marginal result would clearly need to be replicated, but it is not surprising that feeling responses would be more strongly associated with emotion understanding than with the other theory of mind variables. In addition, because very few of the mothers in this study used feeling responses, the effects might be stronger, given a measure with greater variability.

It is possible that responses that offer *any* sort of explanation as to why a behavior may be unacceptable are just as useful as feeling responses to theory of mind development. In this regard, instructional responses were positively associated with both perception and desire understanding in the correlational analyses. However, they were also related to age, and once age was controlled, instructional responses were no longer significantly associated with theory of mind.

A possible limitation of the current study is that the discipline measure was based on parent report of discipline encounters with the children in the past 24 hours. Thus, the reports were affected only by the children's activities on that particular day. However, unlike other studies (e.g., Ruffman *et al.*, 1999), the measure was based on reports of how parents handled actual discipline situations rather than on parental responses to hypothetical situations. Nonetheless, it would be beneficial to obtain microsocial observational measures of parents and children engaged in disciplinary situations. As noted earlier, examining exactly *how* parents use given strategies might further clarify relations between parenting and theory of mind.

In conclusion, this research helps to elucidate the origins of individual differences in theory of mind. Importantly, we examined different aspects of theory of mind and demonstrated that these appear to be differentially related to various demographic and parenting factors. That said, the amount of theory of mind variance explained by the factors was often small. Clearly, many other variables are implicated in theory of mind development. Nonetheless, the findings of this study are perhaps especially interest-

ing in suggesting which parenting techniques may be *less* effective in promoting theory of mind development. In particular, power assertive disciplinary techniques and the use of consequences appear to be detrimental to aspects of theory of mind (although not all of them). As noted earlier, research has demonstrated that power assertive discipline leads to adverse cognitive and social consequences for children (Bee *et al.*, 1982; Patterson, 1982; Weiss *et al.*, 1992). There is also ample reason to suspect that advances in theory of mind are tied to important social outcomes for children (e.g., Denham, 1986; Dunn, 1995). Thus, a possible point of intervention to enhance theory of mind and hence positive social outcomes may be to teach parents to avoid power assertive discipline techniques.

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Notes

1. Power assertive techniques took highest priority, followed by consequence, instructional, and feeling responses, in that order. Only 1% of the total responses contained multiple strategies.
2. Children were also given two Level 2 perspective-taking tasks (Flavell *et al.*, 1968). However, due to limited variability in the scores (performance was close to floor), the tasks were dropped from the analyses.
3. Seven children from the longitudinal study were unable to come to the lab to complete the BSID-II at 36 months of age. All seven had been given the BSID-II at 18 months of age. Thus, their standardized scores on this measure were substituted. For one additional child, no scores were available at any age.
4. For power assertive discipline and instructional and feeling responses, the distributions were positively skewed. Additionally, for perception and desire understanding, the distributions were negatively skewed. When the scores were transformed to remove the skewness, the pattern of results remained the same. Analyses based on the nontransformed scores are presented for ease in interpretation. There were two outliers (more than three standard deviations above the mean) on power assertive discipline, three outliers on feeling responses, and one on instructional responses. To avoid reducing sample size, these outliers were recoded to be within three standard deviations of the mean. The pattern of results did not significantly change if the outliers were removed from the analyses.