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## The role of language in Concern and Disregard for others in the first years of life

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### Abstract

We examined the associations between language skills and Concern and Disregard for Others in young children assessed longitudinally at ages 14, 20, 24, and 36 months, testing the hypothesis that language skills have a specific role (distinct from that of general cognitive ability) in the development of Concern and Disregard for Others. We found that higher language skills predicted higher Concern for Others and lower Disregard for Others even after controlling for general cognitive ability, whereas the association between general cognitive ability and Concern/Disregard for Others was not significant after controlling for language skills. Language skills at 14 months

predicted Concern for Others at 36 months, and results suggested that the relations between language skills and Concern and Disregard for Others begin early in development. Gender differences in Concern and Disregard for Others were at least partially explained by differences in language skills. These results support the specific role of language skills in Concern and Disregard for Others.

### Keywords

empathy; hostility; concern for others; disregard for others; intelligence; verbal ability; language skills; sex differences

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Empathy is “an affective response that stems from the apprehension or comprehension of another’s emotional state or condition and is similar to what the other person is feeling or would be expected to feel in the given situation” (p. 75, Eisenberg, 2005). Researchers have used the broader term “Concern for Others” to describe a composite construct encompassing the behavioral, affective, and cognitive factors associated with empathic and prosocial reactions (e.g., Grusec, 1991; Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). In contrast, children sometimes display behaviors that are the opposite of “Concern for Others” (i.e., reacting to others’ distress with physical attacks, anger, blame, and pleasure; Hastings, et al., 2000; Klimes-Dougan & Kistner, 1990; Main & George, 1985). These behaviors can be described as “Disregard for Others” (e.g., Hastings et al., 2000). Here, we use the term “Concern for Others” and “Disregard for Others” when referring to these composite constructs, and the term “empathy” when referring to specific studies examining the narrower construct.

Concern for Others is a protective factor against aggression, antisocial and externalizing behavior (Hastings et al., 2000; Lovett & Sheffield, 2007; Miller & Eisenberg, 1988), and child abuse (both inflicting and receiving child abuse; Miller & Eisenberg, 1988). Also, lack of empathy is one of the hallmarks of callous unemotional traits (Frick & White, 2008), a particularly stable (Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005) and heritable (Viding, Jones, Frick, Moffitt, & Plomin, 2008) form of antisocial behavior. Given these societal implications, better understanding of the predictors of Concern and Disregard for Others is important, and additional research examining the sources of individual differences in these constructs is needed. In the present study, we tested the hypothesis that language skills have a specific role as a predictor of Concern and Disregard for Others. We studied the development of Concern for Others and Disregard for Others from 14 to 36 months, examining the relations between individual differences in trajectories for language skills and Concern and Disregard for others. Also, we examined language skills as a mediator of gender differences in Concern and Disregard for Others.

Several researchers have reported an association between general cognitive ability and individual differences in Concern and Disregard for Others (e.g., Eisenberg-Berg, 1979; Millet & Dewitte, 2007; van der Mark, van Ijzendoorn, & Bakermans-Kranenburg, 2002). However, intelligence and Concern for Others are not always positively associated. For example, psychopathy, especially the interpersonal dimension of psychopathy reflecting selfishness, remorselessness, and exploitative use of others, is positively correlated with intelligence (e.g., Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; Cleckley, 1941; Harpur, Hare, & Hakstian, 1989), yet a deficit in empathy is one of the hallmark traits of psychopathy (e.g., Blair, 2005; Harpur, Hakstian, & Hare, 1988). In contrast, Williams syndrome is associated with mild to moderate mental retardation, but also with high sociability, friendliness, and empathy (Mervis & Klein-Tasman, 2000). Williams syndrome is also characterized by strengths in language and communication skills (Mervis & Klein-

Tasman, 2000), suggesting that language skills may have a specific role in the development in the Concern and Disregard for Others. Positive associations have also been found between verbal ability and prosocial behavior (Zahn-Waxler, Iannotti, & Chapman, 1982), and between a latent factor including cognition/language skills and empathy (Moreno et al., 2008). Thus, the positive association between general cognitive ability and Concern for Others demonstrated in previous studies may be due to the inclusion of assessment of language skills in the assessment of general cognitive ability.

## **The role of language skills in the development of emotional and cognitive components of Concern and Disregard for Others**

Here, we examine the literature supporting the role of language skills on the development of Concern for Others. Although many studies have used the term “empathy”, they are also relevant to “Concern for Others”, or the composite construct encompassing the behavioral, affective, and cognitive factors associated with empathic and prosocial reactions. A great deal of work supports the specific role of language skills in two capacities associated with empathy and Concern for Others: theory of mind (i.e., the ability to represent mental states) and emotion recognition (e.g., Dyck, Farrugia, Schochet, & Holmes-Brown, 2004; Milligan, Astington, & Dack, 2007; Ozonoff, Pennington, & Rogers, 1990; Prior, Dahlstrom, & Squires, 1990). Researchers posit that language skills are related to understanding others’ physical, mental, and emotional states because talking about others’ perspectives helps children develop a vocabulary for concepts such as feelings, ideas, memories, and mental explanations for behavior. Harris’ (1992) simulation theory, which suggests that theory of mind requires imagining another’s perspective, also posits that language has an important role in theory of mind development. Conversation exposes children to exchanges of differing points of view, facilitates the adoption of other people’s perspective, and provides rapid feedback regarding the accuracy of the simulation process of others’ perspectives. Language is also central to very young children’s abilities to talk about emotions, which, in turn, are important in interpersonal interactions (Bretherton, Fritz, Zahn-Waxler, and Ridgeway, 1986). Toddlers start using emotion language around 18–20 months of age, distinguish the emotions of self and other by age 28 months, and label others’ and their own emotions and discuss past and future emotions between 18 and 36 months (Bretherton et al., 1986). Toddlers’ talk about emotions also help to clarify the causes and consequences of emotions or facilitating interpersonal interactions (e.g., change another person’s behavior, alleviate another’s distress).

Several researchers have reported an association between greater talk about mental states by mothers and their children’s theory of mind (e.g., Ruffman, Slade, & Crowe, 2002; Ruffman, Slade, Devitt, & Crowe, 2006), and between mothers’ use of internal-state language to comment on their children’s putative states of mind and emotion and the children’s theory of mind (Meins et al., 2002; Meins et al., 2003). Dunn and colleagues have also demonstrated that participation in discourse about feelings, causality, and mental states is related to performance on several measures of social understanding, such as affective-labeling, perspective-taking, and false-belief tasks (e.g., Brown, Donelan-McCall, & Dunn, 1996; Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991; Dunn & Brophy, 2005).

Children’s Concern for Others is also enhanced by particular socialization experiences, and language may play a role there as well. Keenan and Shaw (2003) predicted that language skills should be associated with empathy because language is important in the socialization of empathy. Delayed language may impede the socialization process by increasing stress in interactions between the caregiver and child (Stansbury & Zimmermann, 1999). This prediction is consistent with studies showing that parental directiveness (Janssens & Gerris, 1992), parental encouragement of empathy (McDevitt, Lennon & Kopriva, 1991), and

parents' use of induction (i.e., explaining to the child how the victim feels; Hastings, Utendale, & Sullivan, 2007) are positively related to children's empathy, even in children as young as one to two years old (Zahn-Waxler, Radke-Yarrow, & King, 1979). Moreno et al. (2008) suggested another hypothesis regarding the role of language in the socialization of empathy: that language skills are necessary for accurate interpretation regarding positive parental messages regarding values such as prosocial behavior and moral reasoning. Positive parenting characterized by parental empathy, positive affect, and emotional availability is related to higher empathy (e.g., Eisenberg and McNally, 1993), and Moreno et al. found evidence suggesting that the relation between parenting (i.e., emotional availability) and empathy was mediated by the children's cognitive and language abilities.

In the present study, we focused on the role of language skills in the development of Concern and Disregard for Others between age 14 and 36 months. To date, there is only indirect evidence for the role of language skills on Concern for Others. Moreover, there is little research examining the correlates and predictors of Disregard for Others in comparison to the extensive research examining Concern for Others, and to our knowledge, no study has examined the role of cognitive ability or language skills on Disregard for Others. However, there is a great deal of evidence suggesting that lower verbal ability is a greater risk factor for antisocial behavior than lower intelligence in general (e.g., Moffitt & Silva, 1988; Nigg & Huang-Pollock, 2003; Quay, 1987), suggesting that language skills may be negatively associated with Disregard for Others as well. Many studies and theories linking language skills and the emotional and cognitive components of Concern for others have focused on early childhood and later development, and additional studies examining the specific role of language skills on Concern and Disregard for Others on very young children are needed.

## Gender Differences in Concern for Others

Several researchers have concluded that females have a higher level of empathy (e.g., Eisenberg, Fabes, Schaller, & Miller, 1989; Hoffman, 1977) and display more prosocial behavior (e.g., Eisenberg & Fabes, 1998) than males, on average, although the direction and the magnitude of the gender difference can vary depending on the type of behavior examined (see Eagly & Crowley, 1986 and Eisenberg & Fabes, 1998). Girls also have a higher level of language skills on average than boys, and this advantage occurs early in life (e.g., Reznick, Robinson, & Corley, 1997). These results suggest the possibility that the gender difference in Concern and Disregard for Others may be explained by girls' superior language skills.

Concern for Others may be higher for girls on average because their superior language skills on average may make their socialization of Concern for Others easier and more effective. This hypothesis has not been tested, but is supported by evidence demonstrating the importance of parental socialization in empathy (e.g., Hastings, Utendale, & Sullivan, 2007; Janssens & Gerris 1992; McDevitt, Lennon, & Kopriva, 1991; Zahn-Waxler et al., 1979). Keenan and Shaw (1997) suggested that the differences in the parenting of boys and girls become more pronounced in toddlerhood, when sex differences in language ability (e.g., Morisset, Barnard, & Booth, 1995) and Concern for Others (e.g., Zahn-Waxler et al., 1992) also become more pronounced. Parents put forth more effort at teaching girls a problem-solving task (Maccoby, Snow & Jacklin, 1984), and girls are socialized to yield to their peers (Ross, Tesla, Kenyon, & Lollis, 1990) and think of the personal consequences of their actions (Smetana, 1989) more than boys.

## The Present Study

The present study examined the relations among language skills, general cognitive ability, and Concern and Disregard for Others, using data from mother interviews and observations of both Concern for Others (e.g., “helps”, “approaches”, “concern for victim”, “hypothesis testing”) and Disregard for Others (e.g., “hits”, “runs”, “anger”, “hostility”). Given the evidence reviewed above, we hypothesized that higher cognitive ability and language skills should be related to higher Concern for Others and lower Disregard for Others. We hypothesized that higher general cognitive ability is associated with higher Concern for Others and lower Disregard for Others because assessment of general cognitive ability includes assessment of language skills. Also, we hypothesized that language skills should have a specific role in predicting Concern and Disregard for Others. Therefore, we predicted that language skills should predict Concern and Disregard for Others even after controlling for general cognitive ability, whereas general cognitive ability should not predict Concern and Disregard for Others after controlling for language skills.

The present study focused on the development of the association between language skills and Concern/Disregard for Others in very young children (ages 14 to 36 months). We examined this association at each age (i.e., 14, 20, 24, and 36 months), and tested whether language skills assessed at age 14 months predict Concern and Disregard for Others at age 36 months. A previous study examining the development of language skills in the same sample (Reznick et al., 1997) found that most infants had their greatest change in language skills between 14 and 20 months; thus, we were interested in examining whether language skills assessed very early in development had lasting effects on Concern and Disregard for Others.

We also examined the relations between individual differences in developmental trajectories for language skills and Concern and Disregard for others, using latent growth curve modeling. These analyses can address how aspects of growth in language are related to Concern and Disregard for Others. Using growth modeling, we tested whether children’s early level of language skills predicts their increases in Concern and Disregard for Others from 14 to 36 months, and whether changes in Concern and Disregard for Others parallel changes in language skills. In these growth analyses, we examined the relations between language skills and Concern/Disregard for Others while including general cognitive ability as a covariate, and the relations between general cognitive ability and Concern/Disregard for Others while including language skills as a covariate.

Finally, given evidence that girls have higher levels of Concern for Others and language skills than boys, we examined whether the sex differences in Concern and Disregard for Others are mediated by language skills. We also examined whether the relations between language skills and Concern/Disregard for Others are similar for girls and boys.

## Method

### Participants

The Longitudinal Twin Study (LTS) is a sample of same-sex twin pairs recruited through the Colorado Department of Health born between 1986 and 1990 in Colorado. Of the parents initially contacted, more than 50% of the families who lived within a 2-hour drive of Boulder, Colorado enrolled in the study. The ethnicity distribution of the LTS is 86.6% Caucasian, 8.5% Hispanic, 0.7% African-American, 1.2% Asian, and 2.9% other, and corresponds well to that reported for Boulder County, Colorado in the 1990 United States Census (89.5% Caucasian, 3.8% Hispanic, 0.9% African-American, 2.4% Asian, and 3.4% other, U. S. Census Bureau, 1990). The mean number of years of education was 14.29 years



for mothers and 14.42 years for fathers. Of all parents, 5% did not complete high school, 29% completed high school without post-secondary education, 49% had some post-secondary education, and 17% had some graduate-level education<sup>1</sup>. Further details regarding the LTS are available in Rhea, Gross, Haberstick, and Corley (2006).

The subset of the LTS examined in the present study consists of 824 toddlers (414 girls and 410 boys) for whom there are data either for Concern and Disregard for Others, general cognitive ability, or language skills at age 14, 20, 24, or 36 months. The sample size for these measures ranged from 746 to 789 at 14 months, 690 to 708 at 20 months, 680 to 714 at 24 months, and 660 to 687 at 36 months.

## Materials and Procedure

The participants were assessed during a home visit and a laboratory visit at ages 14, 20, 24, and 36 months. Home visits took place at the convenience of the mothers. Laboratory visits took place at the Institute for Behavioral Genetics at the University of Colorado at Boulder, usually within two weeks of the home visit. Further details regarding the procedures used in the LTS are available in Robinson, McGrath, and Corley (2001) and Emde and Hewitt (2001).

**Assessment of concern and disregard for others**—Concern and Disregard for Others were measured via observations of reactions to empathy probes and mother interviews. During the home visit, the mother pretended to hurt her knee as she got up from the floor, and the experimenter pretended to close a finger in a suitcase containing testing materials. During the laboratory visit, the mother pretended to catch her finger in a clipboard, and the examiner pretended to bump into a chair. Examiners and mothers were instructed to vocalize pain at low to moderate volume and to simulate pained facial expressions for 30 seconds, then simulate gradual subsiding of distress during the next 30 seconds. An additional empathy probe of a tape recording of an infant crying broadcast from a speaker on the wall in a room containing ten toys on the floor, including a baby doll, was used in the laboratory at 14, 20, and 24 months. Codes from the observational measures included in the present study are “concern for victim”, “helps victim”, “proximity to victim”, “hypothesis testing”, “anger”, “hits offending object”, and “hostility” (see Appendix 1 for the coding manual). These were coded once per enactment. The inter-observer reliability of the codes ranged from .76 to .99.

Codes across the two settings (i.e., home and laboratory visit) and three empathy probes (i.e., mother, examiner, and baby cry) were averaged for three reasons. First, we wanted to maximize reliability. One criticism of observational measures is that the behavior assessed may not be reliable because only a very short period of time is captured (e.g., Kendler & Baker, 2007), and averaging across multiple observations may lead to a more reliable measure. Second, many of the codes were significantly correlated across the five empathy probes (results available upon request). Third, three of the codes — “anger”, “hits offending object”, and “hostility” — occurred only once or twice across the five empathy probes for most individuals who exhibited these behaviors and emotions. Although this makes it impossible to calculate correlations across settings and probes for these codes, the fact that

<sup>1</sup>Socioeconomic status (SES) was assessed via the mean National Opinion Research Center rating of occupation status of the two parents (Hauser & Featherman, 1977). SES had a significant effect on the Intercept and Slope of general cognitive ability and the Slope of language skills. However, SES did not have a significant effect on the Intercept and Slope of the Concern and Disregard variables, with the exception of the Slope of observed Concern for Others. Therefore, the main growth model examining the relations between language skills and observed Concern for Others was tested while including SES as a covariate. In this model, SES did not have a significant effect on the Intercept and Slope of Concern for Others or language skills. Also, the main results remained the same, with the Intercepts for Concern for Others and language skills being significantly and positively correlated ( $r = .64, p < .01$ ).

“anger”, “hits offending object” or “hostility” occurred once or twice across the empathy probes provides valuable information. Moreover, “anger”, “hits offending object”, and “hostility” were positively and significantly (with a single exception) correlated with each other ( $r = .26$  to  $.71$ ).

The average scores (across the two settings and three empathy probes) for the seven observed codes were highly skewed; therefore, they were transformed into ordinal variables with three to four categories for “helps victims”, “proximity to victim”, and “hypothesis testing”, and two categories for “anger”, “hits offending object”, and “hostility”. For all variables, the number of categories in the ordinal variable was chosen to avoid small cell sizes.

Six items from the mother interview were included. The first item is “helps”; mothers were asked regarding twins’ tendency to help each other (“Do you ever see \_\_\_\_\_ spontaneously help \_\_\_\_\_ (prompt: pick up things, getting dressed, offering toy)?”). The possible responses were “almost never”, “hardly ever”, “occasionally - less than once a week”, “sometimes - a couple of times a week”, “pretty often - nearly daily”, and “regularly - several times a day”. Items two to six assessed whether the twins show a particular response (i.e., “approaches”, “comforts”, “hits”, “runs”, and “laughs”) when either the co-twin or mother is distressed. Mothers were asked to answer “yes” or “no” to the possible responses shown by their children. Items across situations (i.e., co-twin’s or mother’s distress) were averaged, and the average scores, which were significantly skewed, were transformed into ordinal variables with four to six categories for “helps”, “approaches”, and “comforts”, and four categories for “hits”, “runs”, and “laughs”, with the number of categories chosen to maximize variability while avoiding small cell sizes.

**Assessment of general cognitive ability and language skills**—General cognitive ability was assessed via the Mental Developmental Index of the Bayley Scales of Infant Development (Bayley, 1969) at age 14, 20, and 24 months, and the intelligence quotient score from Stanford-Binet, Form L-M (Terman & Merrill, 1973) at age 36 months. The Bayley and the Stanford-Binet assesses a wide range of cognitive abilities, including visual discrimination, memory, and problem solving. In addition to these other constructs, the Bayley and the Stanford-Binet include assessment of language skills, including verbal comprehension and expression, as do nearly all tests of general cognitive ability.

In contrast, the Sequenced Inventory of Communication Development (SICD; Hedrick, Prather, & Tobin, 1975) assesses only language skills. The SICD was administered at age 14, 20, 24, and 36 months. Expressive language was assessed via items that required imitation or production of sounds and words. For example, children are asked, “What do you wear on your feet?” Receptive language was assessed by testing the ability to understand words and comments. For example, the examiner asked the child, “Give me the cup and the ball”. At each age, a subset of items designated for children several months above and below the target age was used in order decrease the length of the test. At 14, 20, and 24 months, the same set of items were given, except that at age 20 and 24 months, testers began by testing with items the child had failed at the earlier age, and age-relevant items were added. The subset of items optimal for children at age 36 months was different from those given at age 14 to 24 months. An average of the receptive and expressive language score was examined in all analyses. First, there was a significant correlation between the receptive and expressive language scores at each age (ranging from  $.46$  to  $.71$ ). Second, results of preliminary analyses examining receptive and expressive language separately and together were very similar.

At 14, 20, and 24 months, the raw (rather than age-normed) language scores and general cognitive scores were examined in order to examine the growth of language skills and general cognitive ability from 14 to 24 months. Given that a different measure of general cognitive ability (i.e., the Stanford Binet) was used at 36 months and a different set of items was tested in the assessment of language skills at 36 months, change from 24 to 36 months was not meaningful, and could not be examined in growth analyses.

## Analyses

Given the large number of analyses, specific details regarding the analyses are presented along with the results, whereas this section describes general analytic issues. All analyses were conducted in Mplus (Muthén & Muthén, 1998–2007). Mplus allows the analyses of a combination of ordinal and continuous data, an important advantage because the Concern and Disregard for Others data were ordinal, and the general cognitive ability and language skills data were continuous. Given that the data from the two twins in each pair are correlated, the data were treated as non-independent and twins were considered as nested within twin pairs. Mplus takes into account non-independence of observations when computing standard errors and model fit (i.e., an alternative  $\chi^2$  that takes non-independence into account). The  $p$ -values are for the ratio of each parameter estimate to its standard error, which yields a  $z$ -statistic<sup>3</sup>.

Given that the Concern and Disregard for Others data were ordinal, analyses were conducted using the weighted least square mean and variance (WLSMV) estimation method. In the latent growth curve modeling, maximum likelihood with robust standard errors (MLR) estimation was used. MLR, which is also appropriate for ordinal data, is preferred over WLSMV in the presence of missing data (Linda Muthén, personal communication), but is not feasible in models with large numbers of variables such as confirmatory factor analyses. When MLR is used, Mplus treats missing data as missing at random utilizing the EM algorithm (Little & Rubin, 2002), which allows missingness to be a function of observed covariates and outcomes<sup>2</sup>. When WLSMV is used, pairwise deletion is used. Given the sensitivity of the  $\chi^2$  to sample size, we examined additional fit indices, including the Tucker-Lewis index (TLI; Bentler, 1990) and the root mean square error of approximation (RMSEA; Browne & Cudeck, 1993). Hu and Bentler (1998) suggested that a TLI greater than .95 and RMSEA less than .06 indicate good model fit.

## Results

### Factor Structure of Observed and Mother Interview Data

We conducted exploratory factor analyses with oblique promax rotation to evaluate the factor structure of the Concern and Disregard for Others variables. At each age (14, 20, 24, and 36 months), there was evidence of two factors for both the mother interview and observed Concern and Disregard for others, as there were two eigenvalues greater than one<sup>4</sup>. Table 1 indicates that for both the mother interview variables and the observed variables, loading on factor 1 are items that assess empathic concern for others and prosocial behavior, and loading on factor 2 are items that assess hostile disregard for others. We labeled factor 1

<sup>3</sup>The  $p$ -values were used to determine parameter significance, except when there was an inconsistency between the conclusion regarding the parameter significance reached from the  $p$  value and the result of the chi-square difference test (between the full model and the reduced model where the parameter estimate was dropped). In these exceptions, the parameter significance was determined by the chi-square difference test.

<sup>2</sup>The main analyses shown in Figure 3 were repeated after restricting the sample to those who participated in at least two time points ( $N = 763$ ). The overall results and the parameter estimates were very similar to those from analyses where everyone was included ( $N = 824$ ).

<sup>4</sup>An exception was observed Concern for Others at 24 months, with three eigenvalues greater than one, but convergence could not be achieved for the three-factor solution.



“Concern for Others” and factor 2 “Disregard for Others”. The correlations among the variables that loaded on mother interview Concern for Others, observed Concern for Others, mother interview Disregard for Others, and observed Disregard for Others at age 14, 20, 24, and 36 months were positive and statistically significant with very few exceptions.

Next, we conducted confirmatory factor analyses to estimate the correlations among the two latent traits (Concern and Disregard for Others) assessed by the two different methods (mother interview and observations) at each age. Figure 1 presents this model, which fit the data well at each age. All factor loadings were statistically significant with two exceptions (help and hits offending object at age 20 months). The correlations between Concern and Disregard for Others was negative and significant for observations at each age except age 36 months and positive and significant for mother interview at each age except age 36 months.

For both Concern and Disregard for Others, the correlations between the mother interview and observations are far from 1.0, indicating that mother interviews and observations provide unique information regarding Concern and Disregard for Others. Given these results, we examined four separate latent factors: mother-rated Concern for Others, observed Concern for Others, mother-rated Disregard for Others, and observed Disregard for Others.

### **Creation of Composite Concern and Disregard for Others Variables**

In the growth analyses (which are discussed later in the Results section), the 14, 20, 24, and 36 month data were analyzed simultaneously. In these analyses, the four latent factors with loadings on the individual Concern and Disregard items could not be analyzed, given several cases of bivariate missingness (e.g., there were no individuals who had a positive score for “hits offending object” at age 14 months *and* a positive score for “anger” at age 24 months). Therefore, we created four composite variables (mother interview Concern, observed Concern, mother interview Disregard, and observed Disregard) by summing the ratings of the relevant items (e.g., “hits”, “laughs” and “runs” for mother-rated Disregard for Others) at each time point. These sums, which were skewed, were transformed into ordinal variables with four categories for mother-rated concern, mother-rated disregard, and observed concern, and three categories for observed disregard, with the number of categories in the ordinal variable chosen to avoid small cell sizes. They were calculated only for individuals with data for all items.

### **Descriptive Results**

Table 2 shows the descriptive results for the composite Concern for Others and Disregard for Others variables, language skills, general cognitive ability, and at 14, 20, 24, and 36 months. The percentage of individuals in each category of the ordinal variables (i.e., Concern and Disregard for Others) and the means and standard deviations for the continuous variables (i.e., general cognitive ability and language skills) are shown.

Table 3 shows the longitudinal correlations for the summary Concern and Disregard for Others variables, language skills, and general cognitive ability. Overall, the correlations suggest that these constructs are stable across age. Exceptions were nonsignificant correlations for Disregard for Others, especially Disregard for Others assessed via observations.

### **Correlations between Concern/Disregard for Others and Language Skills/General Cognitive Ability**

Table 4 presents the correlations from structural equation models examining the associations between language skills/general cognitive ability and the latent Concern and Disregard for Others factors (i.e., the latent mother-rated Concern for Others, observed Concern and for

Others, mother-rated Disregard for Others, and observed Disregard for Others factors shown in Figure 1). The correlations at each age (i.e., 14, 20, 24, and 36 months) and the correlations between 14-month cognitive ability and 36-month Concern and Disregard for Others are presented. In general, results suggest that language skills and general cognitive ability are positively correlated with Concern for Others and either unrelated or negatively correlated with Disregard for Others. Also, 14-month language skills were significantly correlated with 36-month mother-rated and observed Concern for Others, but not with 36-month Disregard for Others.

### Growth Modeling

Figure 2 presents the results of the basic growth models for the composite Concern and Disregard variables, language skills, and general cognitive ability. The models contained a latent Intercept, with loadings on all time points fixed at 1.0. In this parameterization, the Intercept captures the variance in the initial level. In addition, because loadings are equated to 1.0 at all times points, the latent Intercept captures variance at later time points that covaries with (i.e., is stable with) the initial level. The latent Slope has loadings constrained to zero for the 14 month time point, 1.0 for the last time point, and freed loadings for the intermediate time points<sup>5</sup>. The Slope represents change from the initial level of the variable, as the Slope loading for the first time point is fixed to zero.

Table 5 presents the parameters from the growth models. These models illustrate what form the overall trajectories take and whether there are individual differences in trajectories. In all six growth models, the variances of the Intercept variables were significantly greater than zero, indicating significant individual differences in the Intercept of Concern and Disregard for Others, general cognitive ability, and language skills. For mother interview and observed Concern for Others, language skills, and general cognitive ability, the means of the Slope variables were positive and significantly higher than zero, and the variances of the Slope were also significant. These results indicate that Concern for Others, language skills, and general cognitive ability increased significantly with time, and that there were individual differences in rates of change. The mean Slope for observed Disregard for Others was negative and significantly different from zero, indicating its decrease across time; however, this Slope did not have significant variance, suggesting that the rate of decrease was essentially the same for all children. In contrast, the mother interview Disregard for Others Slope mean was not significantly different from zero, but its variance was significant, indicating that although average reported Disregard for Others remained constant across time across all children, there were individual differences in how reports of Disregard for Others changed across time. The correlation between the Intercept and Slope was non-significant for observed Concern and Disregard for Others and general cognitive ability. It was negative and significant for mother interview Concern and Disregard for Others and language skills, indicating that those with high initial scores changed less across time.

### Relations Between Language Skills and Concern/Disregard for Others

Latent growth curve models including both Concern and Disregard for Others and language skills in the same models were tested to examine the relations between growth in language skills and growth in Concern/Disregard for Others (see Figure 3). These results are depicted in Figure 3. In these models, the Intercepts reflect individual differences in initial levels of the traits (and stable variance correlated with those initial levels), and Slopes reflect individual differences in change across time.

<sup>5</sup>At least two Slope loadings need to be fixed for model identification. Freeing the Slope loadings, rather than fixing them to conform to a linear trajectory, allows the trajectories to be nonlinear. This “freed model” provides a more efficient model of such non-linear changes than estimating additional latent variables representing Slope curves (such as quadratic, cubic, etc.; Bollen & Curran, 2006).

The language Intercept was significantly and positively related to both the mother-interview Concern for Others and observed Concern for Others Intercepts. In contrast, the language Intercept was negatively related to the Intercept for the observed, but not mother-interview Disregard for Others. These results (and the significant correlations between language skills and Concern/Disregard for Others at age 14 months; see Table 4) indicate that the relations between language and Concern and Disregard for Others are evident as early as 14 months.

The Slopes for Concern and Disregard for Others and language were regressed on the Intercepts for these variables. The cross paths from the Intercepts to Slopes indicate the extent to which the initial levels of one trait influence the rate of change in the other, after controlling for the correlation between the Intercepts of the two traits. None of these paths were significantly different from zero. There was a significant negative path from the Intercept for language skills to the Slope for language skills in all models, from the Intercept for mother interview Concern to the Slope for mother interview Concern, and from the Intercept for mother interview Disregard to the Slope for mother interview Disregard. These results indicate that individuals with higher initial score on a construct show less growth in that same construct over time.

Finally, the question of whether changes in language parallel changes in Concern and Disregard for Others is answered by the correlation between the residual variances in the Slopes (the numbers on the right side of the models), which reflect the extent to which the rate of change in Concern and Disregard for Others is associated with the rate of change in language, after controlling for the influences of the Intercepts. This correlation was only significant for mother interview Concern for Others and language skills, indicating that as language skills increased, so did mother-rated Concern for Others.

Overall, the models indicate that the primary relations between language skills and Concern and Disregard for Others begin early in development. There was only slight evidence that changes in language skills were related to changes in Concern or Disregard for Others (with only one of the four correlations being significant). These patterns suggest that despite considerable growth in both language skills and Concern for Others, there is substantial stability in their inter-relations (which is also reflected in the significant correlations at each time point shown in Table 4).

### **The Specific Role of Language Skills on Concern and Disregard for Others**

We hypothesized that language skills (rather than general cognitive ability) have a specific role in the development of Concern and Disregard for Others. In contrast, the association between general cognitive ability and Concern and Disregard for Others found in the literature may be due the inclusion of assessment of language skills in the assessment of general cognitive ability. (In this sample, general cognitive ability and language skills were correlated significantly at each age; 14 months,  $r = .56$ ,  $p < .01$ ; 20 months,  $r = .76$ ,  $p < .01$ , 24 months,  $r = .76$ ,  $p < .01$ ).

To test this hypothesis, we conducted growth models examining the relations between general cognitive ability and Concern/Disregard for Others, with language skills included as a covariate at each age. When language skills were not included as covariates, there was a significant association between the Intercepts of general cognitive ability and mother interview Concern for Others ( $r = .29$ ,  $p < .01$ ) and a significant association between the Intercepts of general cognitive ability and observed Concern for Others ( $r = .44$ ,  $p < .01$ ). When these analyses were repeated with language skills included as covariates, neither the correlation between the Intercepts of general cognitive ability and mother interview Concern for Others ( $r = .08$ ,  $p = .46$ ) nor the correlation between the Intercepts of general cognitive ability and observed Concern for Others ( $r = .01$ ,  $p = .95$ ) was statistically significant.

Hence, no association between general cognitive ability and Concern for Others was significant after controlling for language skills, supporting the hypothesis that the inclusion of assessment of language skills is the primary reason for the association between general cognitive ability and Concern for Others.

In contrast, language skills were significantly associated with Concern and Disregard for Others, even in analyses where general cognitive ability at each age were included as covariates. Figure 3 shows the results from these growth models, with the parameters from models where general cognitive ability is not included as a covariate are shown on the left, and parameters from models where general cognitive ability is included as a covariate are shown on the right. The results from these models are very similar.

### Gender Differences in Concern and Disregard for Others

We examined the regression of language skills, Concern for Others, and Disregard for Others on gender at each time point, and in general, girls had a higher level of language skills and Concern for Others and a lower level of Disregard for Others than boys (results available upon request). Figure 4 shows the results of analyses examining language skills as a mediator of the gender differences in Concern and Disregard for Others. In this mediation model, there are two ways that gender has an effect on Concern/Disregard for Others. The first is the direct effect of gender on Concern/Disregard for Others, and the second is the indirect effect of gender on Concern/Disregard for Others via language skills. Figure 4 shows the magnitude and statistical significance of both the direct effect and the indirect effect. Figure 4 also shows the direct effects of gender and the indirect effects of gender via language on both the Intercepts and Slopes of Concern and Disregard for Others, although gender did not significantly affect any of the slopes.

There was no evidence of gender differences, either direct or indirect via language skills, on mother-rated Disregard for Others. Gender differences in mother-rated Concern for Others were partially mediated by language skills, given that there were both direct and indirect effects (via language skills) of gender on mother-rated Concern for Others. Gender differences in observed Concern and Disregard for Others were fully mediated by language skills, as the indirect effects of gender via language skills were significant, but the direct effects of gender were not statistically significant.

Given significant gender differences in language skills and Concern/Disregard for Others, we examined whether the magnitude of the relations between language skills and Concern/Disregard for Others was similar in girls and boys. Multiple-group analyses, with girls and boys in separate groups, were conducted. First, we tested models where parameters were allowed to vary between boys and girls. These results are presented in Figure 5, where parameters on the left are those for girls and parameters on the right are those for boys. Overall, the results separated by gender were similar to those shown in Figure 3, which presents results for the entire sample. There was a significant correlation between language Intercept and Concern for Others Intercept in both sexes for both the mother interview and observations, and a lack of a significant correlation between language Intercept and mother-rated Disregard for Others in both sexes.

Second, we tested a series of models to examine whether each parameter shown in the model can be equated between boys and girls. Parameters that were significantly different between boys and girls are shown in bold and larger font in Figure 5. First, there was a significant negative path from the Intercept for Concern for Others to the Slope for Concern for Others was significant and negative, indicating that individuals with higher initial Concern for Others show less growth in Concern for Others over time, and this negative path was significantly greater in girls than boys. Second, there was a significant negative

path from the Intercept for mother-rated Concern for Others to the Slope for language skills in girls, but not in boys, suggesting that girls with higher initial Concern for Others show less growth in language skills. Third, the correlation between changes in Concern for Others and changes in language skills (i.e., the correlation between the Slopes) was significantly higher in girls than in boys, and statistically significant only in girls. Finally, the association between lower initial language skills and higher initial observed Disregard for Others was significant only in girls.

## Discussion

We examined whether language skills have a specific role in predicting Concern and Disregard for Others assessed via two assessment methods: mother interviews and observations. Higher language skills were associated with higher levels of Concern for Others and lower levels of Disregard for Others. These associations were similar whether based on mother interviews and observations, although they were stronger and more consistent for the observations. As hypothesized, language skills predicted Concern and Disregard for Others, even after controlling for general cognitive ability, whereas general cognitive ability no longer predicted Concern and Disregard for Others after controlling for language skills. Also, 14-month language skills predicted 36-month Concern for Others, whereas 14-month general cognitive ability did not predict either 36-month Concern for Others or Disregard for Others. Thus language skills (vs. general cognitive ability) may play a specific role in early Concern and Disregard for Others.

Results from structural equation models indicated that Concern and Disregard for Others are significantly related to language skills at each age (see Table 4). Results from latent growth models suggested that there were strong associations between the Intercepts for language skills and Concern/Disregard for others, and that there was little evidence that initial language skills predicted changes in Concern and Disregard for others. Taken together, these results suggest that the associations between language skills and Concern/Disregard begin very early in development, and that they are stable across development.

The results of the present study support our hypothesis that language skills, rather than general cognitive ability, have a specific role in explaining Concern and Disregard for Others. Additional research examining whether language skills affect Concern or Disregard for Others, whether Concern or Disregard for Others affect language skills, and whether common variables affect both is needed. Other important next steps include examining how the several language-based skills, including theory of mind, emotion recognition, use of emotion language, and empathy, are related. Researchers disagree regarding the degree to which theory of mind or capacity for perspective taking is necessary for Concern for Others (see review by Nichols, 2001). However, the significant associations between language skills and theory of mind (e.g., Milligan, Astington, & Dack, 2007) and emotion recognition (e.g., Dyck et al., 2004) suggest the possibility that the association between language skills and Concern or Disregard for Others may be mediated by better perspective taking and emotion recognition. Also, at least one study has suggested that use of emotion language mediates the association between verbal ability and prosocial behavior (e.g., Ensor & Hughes, 2005). Additional longitudinal research examining the development of these associations across age would be useful.

It would be useful to examine mediators that may further explain the association between language skills and Concern and Disregard for Others in the children's environment. Researchers have posited that language skills and Concern/Disregard for Others may be associated because parents may put forth more effort in socializing children who have greater language skills (e.g., Keenan & Shaw, 2003). These socialization efforts may include



encouraging empathy, being more directive to be prosocial, and explaining to the child how a victim of aggression may feel. For children with delayed language, such socialization processes may be impeded by stressful interactions between parents and children. In contrast, socialization efforts may be more efficacious in children with greater language skills (e.g., Moreno et al., 2008).

### **Gender differences in Concern and Disregard for Others**

As predicted, there were significant gender differences in language skills and Concern/Disregard for Others. On average, girls had higher levels of language skills, higher levels of Concern for Others, and lower levels of Disregard for Others. Results of mediation analyses suggested that, gender differences in Concern and Disregard for Others are at least partially explained by differences in girls' and boys' language skills. As noted earlier, girls' superior language skills on average may make them more reinforcing and easier to socialize in an empathic manner, which in turn leads to greater Concern and less Disregard for Others. Evidence confirming that gender differences in language skills lead to gender differences in socialization, which in turn lead to gender differences in Concern for Others, has yet to be demonstrated.

Models examining potential gender differences in the association between language skills and Concern or Disregard for Others indicated few significant gender differences, and these significant gender differences were not consistent between mother ratings and observations (see Figure 5). Although there are gender differences in the level of language skills, Concern for Others, and Disregard for Others on average, it is important to remember that there are significant individual differences in both language skills and Concern or Disregard for Others within each gender, and that there is overlap in their distributions of language skills and Concern/Disregard for Others.

On the other hand, the few gender differences in the parameters indicated a stronger association between language skills and Concern/Disregard for Others in girls than in boys. Specifically, the association between higher Intercept for Concern for Others and less growth in Concern for Others was stronger in girls than in boys. Also, the association between higher Intercept for Concern for Others and less growth in language skills, the parallel changes in Concern for Others and language skills, and the association between lower Intercept for language skills and higher Intercept for observed Disregard for Others, were significant only in girls. It is possible that these stronger associations in girls than boys is a function of the earlier development of language skills in girls during the age range examined here, and it would be interesting to examine whether these gender differences persist at older ages.

### **Can the Level of Concern and Disregard for Others be Changed?**

Several researchers have suggested that language skills are associated with the successful socialization of empathy (e.g., Keenan & Shaw, 2003; Moreno et al., 2008). Could language-mediated instruction or improvement of children's language skills lead to increased Concern for Others and decreased Disregard for Others? Although there are no studies examining this question regarding Concern and Disregard for Others to our knowledge, researchers have demonstrated that language-mediated psychoeducational programs led to improvements in both theory of mind and emotion recognition performance in deaf children (e.g., Dyck & Denver, 2003; Greenberg & Kusché, 1998).

Although these studies' results are consistent with the hypothesis that improving children's language skills will lead to later increased Concern for Others and decreased Disregard for Others, studies examining this question have not yet been conducted. Moreover, all of the

studies cited above are based on older children. Our study shows that the association between language skills and Concern/Disregard for Others begins early in life, suggesting the need to examine the effects of providing language-rich environments or specific language training in very young children. Given previous evidence of the association between use of emotion language and empathy in toddlers (e.g., Ensor & Hughes, 2005; Garner, 2003; Nichols, Svetlova, & Brownell, 2009), it would be interesting to examine whether training designed to increase the ability to understand and use emotion language is effective in increasing Concern for Others and decreasing Disregard for Others. Also, given hypotheses regarding the role of socialization of empathy, it would be valuable to examine whether training to increase parents' knowledge and use of socialization strategies for Concern for Others would be effective in increasing Concern for Others and decreasing Disregard for Others.

### Limitations and Strengths

Our results should be interpreted with the following limitations in mind. A positive correlation between mother interview Concern and Disregard for Others suggests the possible role of rater bias (e.g., the mother interview assessing the tendency to answer "yes" to a question no matter what is being asked).

To our knowledge, the present study is the first to demonstrate a significant association between language skills and Disregard for Others. However, the associations between language skills and Concern for Others were more consistent and stronger than those between language skills and Disregard for Others. There are several possible reasons for this result. First, the assessment may have included more valid indicators of Concern for Others than Disregard for Others; the evidence for convergent validity, as indicated by significant correlations between mother interview and observed data, was stronger for Concern for Others than for Disregard for Others. On the other hand, analyses conducted as part of another study indicate that Disregard for Others was more related to later antisocial behavior than was Concern for Others (Rhee et al., 2011), suggesting that the Disregard for Others construct does have sufficient reliability and validity. Second, Disregard for Others from age 14 to 36 months was not as stable as Concern for Others (as indicated by lower, non-significant longitudinal correlations; see Table 4), and individual differences in the change in observed Disregard for Others was not significant, suggesting possible greater external influences on Disregard for Others. Third, it is possible that the increased socialization efforts that are associated with higher language skills may be more successful in increasing Concern for Others than decreasing Disregard for Others.

The fact that the children examined in the present study are twins may be another limitation. First, generalization may be an issue, as language delay is more prevalent in twin children than singletons (e.g., Thorpe, 2006). Second, the influence of having a same-age sibling on the development of Concern and Disregard for Others is unclear.

These limitations notwithstanding, the present study also has several strengths. First, Concern and Disregard for Others were measured via maternal interviews and observations across four ages in a large sample. There was also evidence suggesting the validity of both assessment methods, as the variables chosen had statistically significant loadings on two latent factors, Concern for Others and Disregard for Others. While the two different methods assess the same latent constructs, they also provide unique information regarding Concern and Disregard for Others. The associations between language skills and Concern for Others were largely consistent for mother interviews and observations, and across time. Second, the association between the language skills and Concern and Disregard for Others cannot be due to method covariance, as different assessment methods were used to assess language skills and Concern/Disregard for Others. Third, the availability of longitudinal data allowed us to

examine 14-month cognitive ability as a predictor of 36-month Concern and Disregard for Others, and conduct growth modeling examining the relations between language skills and Concern and Disregard for Others.

## Conclusions

Language skills (vs. general cognitive ability) appear to play a specific role in individual differences in Concern for Others and Disregard for Others. Relations between language skills and Concern and Disregard for Others occur early in development, with little evidence of initial language skills predicting changes in Concern and Disregard for Others or changes in language skills predicting changes in Concern and Disregard for Others. Girls' higher level of Concern for Others and lower of level of Disregard for Others were explained at least partially by their higher level of language skills. In general, higher language skills were associated with higher Concern for Others and lower Disregard for Others in both boys and girls. These results are consistent with the hypothesis that language skills may make socialization of Concern for Others easier, and the possibility that improving language skills may also result in increase in Concern for Others and decrease in Disregard for Others.

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**Appendix 1. Coding of observational measure of Concern and Disregard for Others. Inter-observer reliability was estimated by calculating tetrachoric correlations (for dichotomous variables) or polychoric correlations (for**

## ordinal variables) on a sample of 236 reactions to empathy probes coded by two different coders

### Concern for victim (inter-observer reliability - .87)

1. Absent
2. Fleeting or slight change of expression that includes brow furrow
3. Some concern expressed in face or voice plus verbal content
4. Moderate concern, prolonged furrow of brows or vocalizations expressing dismay, different than score of 3 mostly on duration
5. Great concern, sadness clearly expressed, sympathetic face

### Helps victim (inter-observer reliability - .98)

1. Absent
2. Present - child performs an action to relieve distress (“I will put a band-aid on”), suggests actions to relieve distress (“You need a band-aid” or “Do you want a band-aid?”), child attempts to soothe, patting victim, code also when actions appear prosocial but unclear.

### Proximity to victim (inter-observer reliability - .76)

1. Avoids victim, turns away, attempts to leave the room (even if the victim must be passed in order to do so)
2. Withdraws from victim, backs away, recoils (but does not turn away)
3. Stationary, child neither approaches or withdraws, simple gaze aversion without physically turning away is scored a 3
4. Approaches victim with at least one step toward, or child touches victim. If seated, child leans toward the victim.

### Hypothesis testing (inter-observer reliability - .79)

1. None
2. Brief, non-verbal gestures, touches on own body parts analogous to victim, looks back and forth from victim’s face to hurt part or other adult, looking very intently (head does not need to move)
3. Same as above but prolonged OR one or more moderate non-verbal attempts. Looking plus at least one clear verbal attempt.
4. Repeated and/or relatively intense/sophisticated attempts to understand the distress, both verbal, e.g., “Owie?” “Hurt?” “Okay?” and non-verbal attempts such as looking at another person in the room, intent looking at own or victim’s injured body part, etc.

### Anger (inter-observer reliability - .88)

1. Does not occur
2. Child has tight lips, may also bang or throw toy

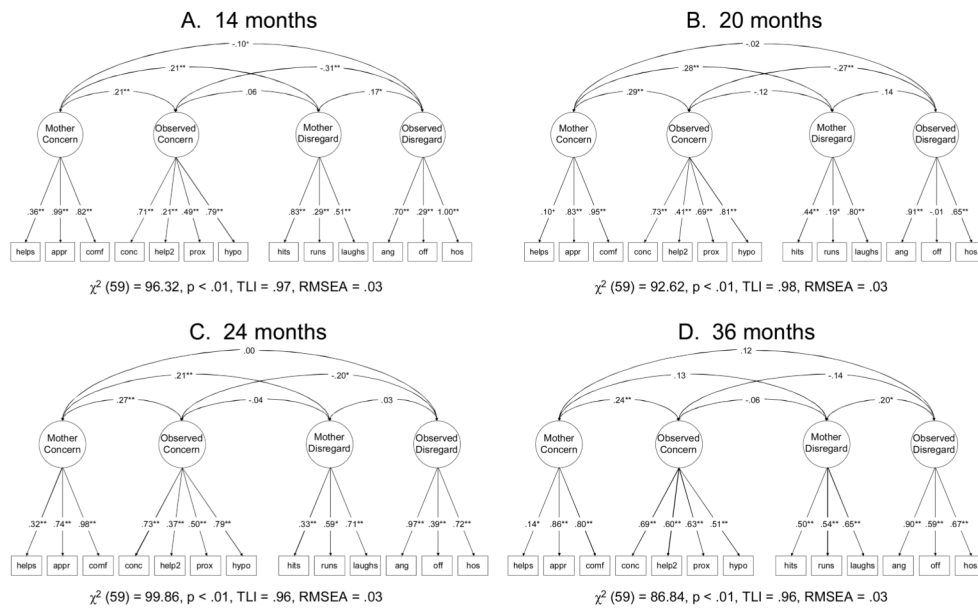
### Hits offending object (inter-observer reliability - .99)

1. Absent

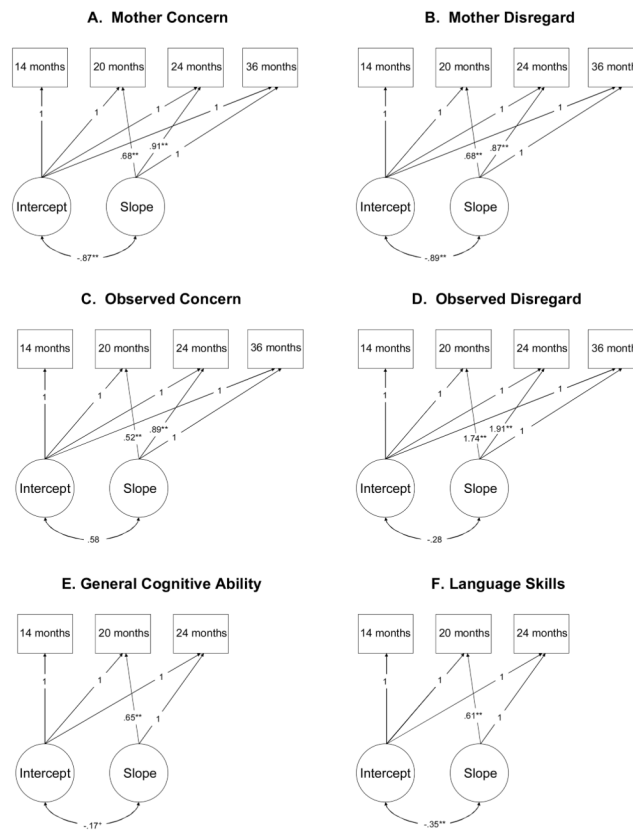
2. Present - defensive action or verbalization toward clipboard or chair (e.g., hits clipboard or says “bad chair”)

Hostility (inter-observer reliability - .94)

1. Does not occur
2. Child hits nearby object, throws something on the floor intentionally, a callous laugh (not just embarrassed giggling)
3. Child is judgmental or hostile, may hit victim, say “You shouldn’t have done that” or “That was stupid”

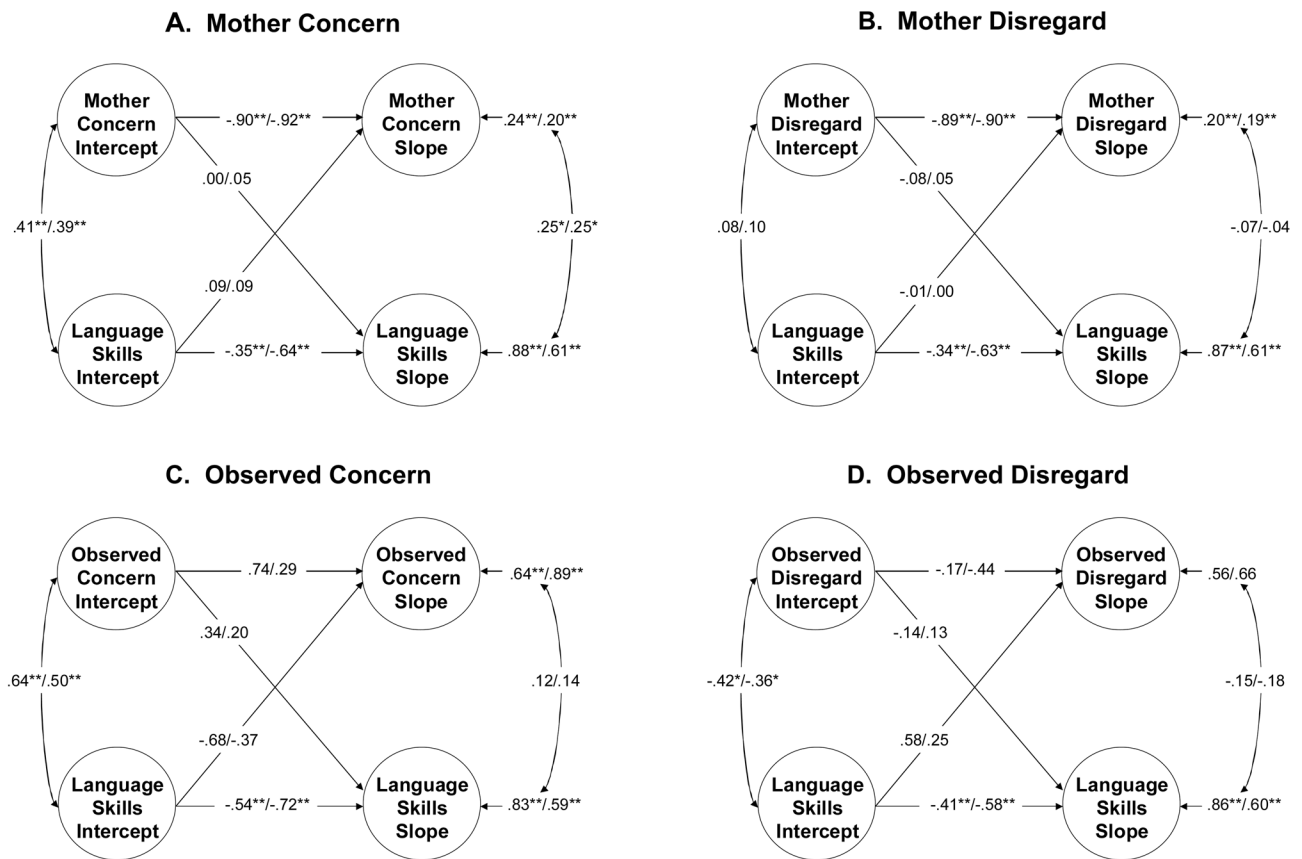


**Figure 1.** Results from confirmatory factor analyses examining the correlations among the latent mother interview Concern for Others, observed Concern for Others, mother interview Disregard for Others, and observed Disregard for Others factors. appr = approaches; comf = comforts; conc = concern for victim; help2 = helps victim; prox = proximity to victim; hypo = hypothesis testing; ang = anger; off = hits offending object; hos = hostility. Standardized parameters are shown. <sup>+</sup> p < .10, \* p < .05, \*\*p < .01.

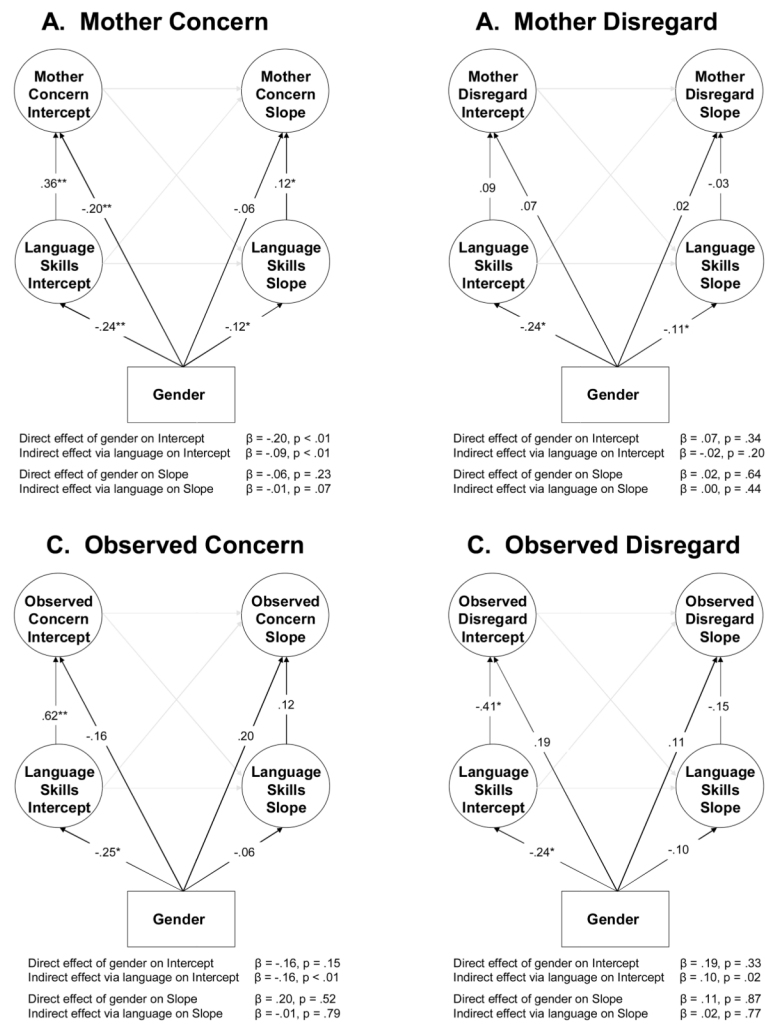


**Figure 2.** Results from growth models for concern, disregard, general cognitive ability, and language skills. For language skills and general cognitive ability, only the first three time points were examined, as a different measure was used to assess general cognitive ability and different items were used to examine language skills at age 36 months. Unstandardized parameters are shown, with the exception of the standardized correlation between Intercept and Slope. <sup>+</sup>  $p < .10$ , \*  $p < .05$ , \*\* $p < .01$ .

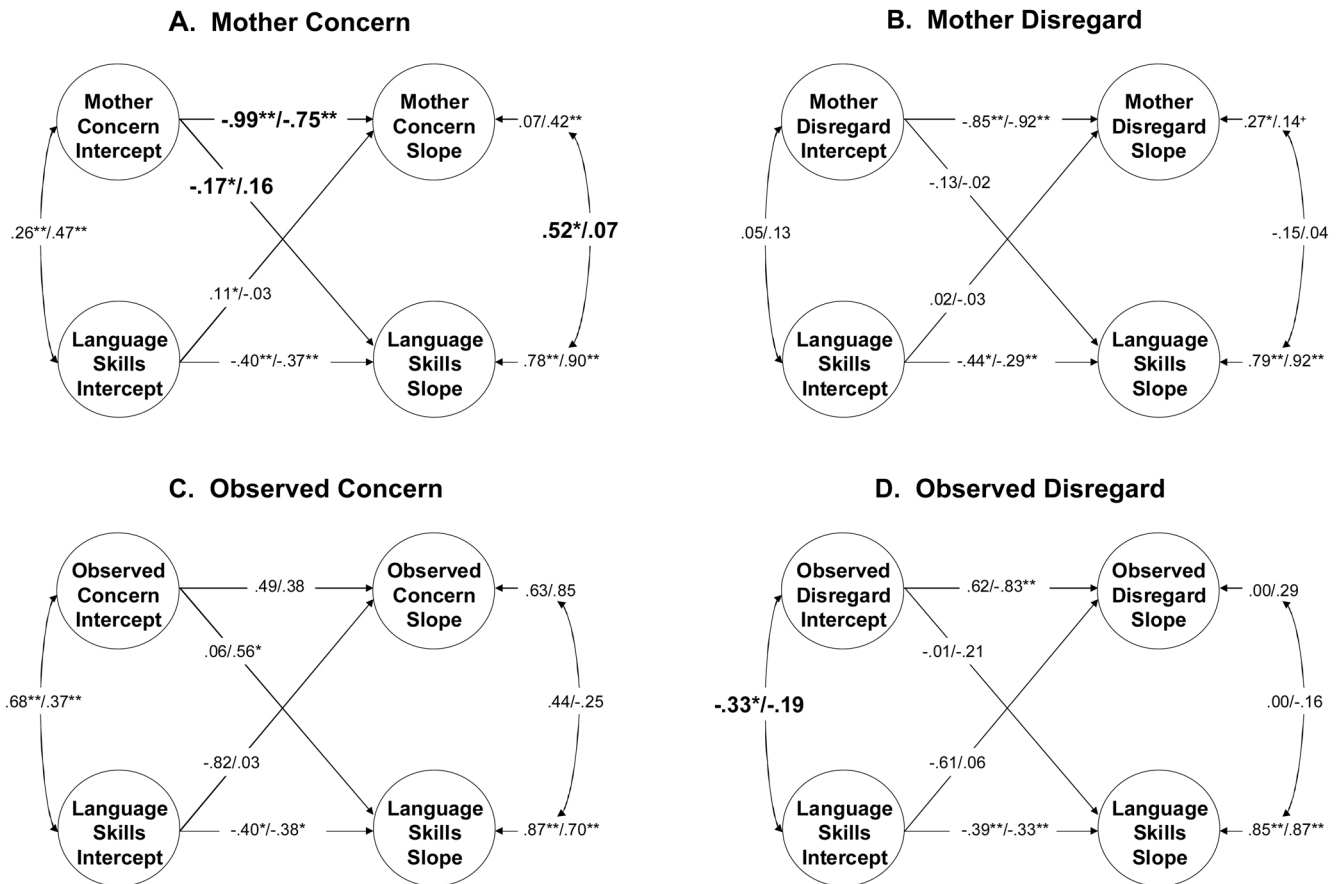




**Figure 3.** Results for growth analyses examining the relations between language skills and Concern/Disregard for Others. Parameters from the main analyses are on the left, and parameters from analyses where general cognitive ability at each age is included as a covariate at each age are on the right. Standardized parameters are shown. +  $p < .10$ , \*  $p < .05$ , \*\* $p < .01$ .



**Figure 4.** Results of growth model examining language skills as a mediator of the effect of gender on Concern and Disregard for Others. Only parameters relevant to the effect of gender are shown. Standardized parameters are shown.  $^+ p < .10, * p < .05, **p < .01$ .



**Figure 5.** Results for growth analyses examining the relations between language skills and Concern/Disregard for Others in models allowing sex differences in parameters. Parameters for girls are presented on the left of the slash (/), and the parameters for the boys are presented on the right of the slash (i.e., girls/boys). Standardized parameters are shown. Parameters that were statistically different between boys and girls are shown in bold and bigger font. <sup>+</sup> p < .10, \* p < .05, \*\*p < .01.

Table 1

Factor loadings from exploratory factor analyses

	Mother Interview		Observations		
	Factor 1	Factor 2	Factor 1	Factor 2	
14 months					
Helps	.36	-.02	Concern for victim	.75	-.05
Approaches	.91	.03	Helps victim	.29	.19
Comforts	.88	.00	Proximity to victim	.45	-.11
Hits	.02	.76	Hypothesis testing	.74	-.12
Runs	-.01	.33	Anger	.01	.72
Laughs	.00	.53	Hits offending object	.20	.36
			Hostility	-.24	.97
20 months					
Helps	.13	-.02	Concern for victim	.74	.04
Approaches	.93	-.04	Helps victim	.42	.13
Comforts	.86	-.02	Proximity to victim	.68	-.09
Hits	-.10	.81	Hypothesis testing	.80	-.14
Runs	.05	.18	Anger	-.08	1.30
Laughs	.17	.43	Hits offending object	.29	.36
			Hostility	-.10	.44
24 months					
Helps	.31	.05	Concern for victim	.70	-.11
Approaches	.75	.03	Helps victim	.42	.22
Comforts	.96	.00	Proximity to victim	.54	.12
Hits	-.20	.51	Hypothesis testing	.76	-.21
Runs	.08	.51	Anger	-.13	1.09
Laughs	.08	.70	Hits offending object	.08	.47
			Hostility	-.06	.59
36 months					
Helps	.18	-.08	Concern for victim	.69	.00
Approaches	.79	.04	Helps victim	.58	.08
Comforts	.87	-.01	Proximity to victim	.63	-.09

	Mother Interview		Observations	
	Factor 1	Factor 2	Factor 1	Factor 2
Hits	.07	.51	.53	-.05
Runs	-.06	.58	-.10	.89
Laughs	.01	.60	-.04	.47
			Hostility	.74

Table 2

Descriptive statistics (Percentage of sample for ordinal variables and means and standard deviations for continuous variables).

	14 months	20 months	24 months	36 months
Concern for Others				
Mother Interview	0 – 35.5%	0 – 7.2%	0 – 5.4%	0 – 2.1%
	1 – 29.9%	1 – 24.6%	1 – 16.0%	1 – 13.8%
	2 – 24.5%	2 – 44.4%	2 – 42.1%	2 – 47.1%
	3 – 10.1%	3 – 23.8%	3 – 36.5%	3 – 37.0%
Observations	0 – 30.4%	0 – 13.8%	0 – 8.4%	0 – 10.3%
	1 – 41.1%	1 – 36.3%	1 – 26.3%	1 – 19.8%
	2 – 19.8%	2 – 27.0%	2 – 27.6%	2 – 25.8%
	3 – 8.7%	3 – 22.9%	3 – 37.7%	3 – 44.1%
Disregard for Others				
Mother Interview	0 – 43.7%	0 – 35.2%	0 – 35.1%	0 – 37.4%
	1 – 23.5%	1 – 33.9%	1 – 36.0%	1 – 36.7%
	2 – 17.3%	2 – 18.5%	2 – 17.7%	2 – 15.2%
	3 – 15.5%	3 – 12.4%	3 – 11.2%	3 – 10.8%
Observations	0 – 78.5%	0 – 87.9%	0 – 88.5%	0 – 84.4%
	1 – 15.5%	1 – 9.7%	1 – 8.8%	1 – 11.9%
	2 – 6.1%	2 – 2.4%	2 – 2.7%	2 – 3.6%
Language Skills	19.05 (4.22)	32.48 (5.59)	41.05 (5.36)	10.07 (4.26)
General Cognitive Ability	112.43 (5.50)	136.06 (8.54)	148.78 (8.30)	103.13 (17.70)

Note. A different assessment was administered at age 36 months to assess general cognitive ability, and a different set of items were administered at age 36 months to assess language skills. Therefore, the change in general cognitive ability and language skills between 24 and 36 months is not meaningful.



**Table 3**

Longitudinal correlations. Polychoric correlations are shown for the ordinal variables.

		14 months	20 months	24 months
Concern for Others				
Mother Interview	20 months	.39**		
	24 months	.32**	.34**	
	36 months	.21**	.24**	.30**
Observations	20 months	.18**		
	24 months	.19**	.34**	
	36 months	.18**	.20**	.28**
Disregard for Others				
Mother Interview	20 months	.30**		
	24 months	.17*	.32**	
	36 months	.08	.09	.22**
Observations	20 months	.16*		
	24 months	.07	.11	
	36 months	.08	.03	.21*
Language Skills				
	20 months	.57**		
	24 months	.44**	.72**	
	36 months	.30**	.53**	.56**
General Cognitive Ability				
	20 months	.48**		
	24 months	.44**	.69**	
	36 months	.32**	.57**	.63**

Note.

+ p &lt; .10,

\* p &lt; .05,

\*\* p &lt; .01.

Table 4

Correlations between cognitive ability and Concern and Disregard for Others

	Mother Concern	Observed Concern	Mother Disregard	Observed Disregard
Language Skills				
14 months	.34**	.35**	.05	-.19**
20 months	.24**	.31**	.00	-.05
24 months	.15*	.29**	-.02	-.24**
36 months	.06	.20**	-.23**	-.08
14-36 months	.14*	.12*	.00	-.06
General Cognitive Ability				
14 months	.21**	.14**	-.07	-.07
20 months	.10 <sup>+</sup>	.17**	-.03	-.12
24 months	.05	.23**	.00	-.22**
36 months	.05	.14**	-.13 <sup>+</sup>	-.04
14-36 months	.09 <sup>+</sup>	.05	-.07	-.06

Note.

<sup>+</sup> p < .10.

\* p &lt; .05.

\*\* p &lt; .01.

Table 5

Results from growth models. Unstandardized parameters are shown, with the exception of standardized correlations between Intercept and Slope.

	Variance of Intercept	Mean of Slope	Variance of Slope	Correlation between Intercept and Slope
Concern for Others				
Mother Interview	4.61**	2.97**	3.12**	-0.87**
Observations	0.42**	2.06**	0.51**	0.58
Disregard for Others				
Mother Interview	4.04**	.20	4.11**	-0.89**
Observations	0.45*	-.43**	0.05	-0.28
Language Skills	17.88**	21.92**	26.64**	-.35**
General Cognitive Ability	26.48**	36.24**	50.56**	-.17 <sup>†</sup>

Note.

<sup>†</sup>  $p < .10$ ,

\*  $p < .05$ ,

\*\*  $p < .01$ .