RUNNING HEAD: Mothers' Predictions

Mothers' Predictions of their Son's Executive Functioning Skills:

Relations to Child Behavior Problems

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Abstract

This study examined mothers' ability to accurately predict their sons' performance on executive functioning tasks in relation to the child's behavior problems. One-hundred thirteen mothers and their 4 to 7 year old sons participated. From behind a one-way mirror, mothers watched their sons perform tasks assessing inhibition and planning skills. Before each task, mothers predicted how their sons would perform. Both the absolute discrepancy between mothers' predictions and their child's performance (summing both mothers' over- and under-estimations), and the mothers' under-estimations of their child's performance accounted for significant variance in reports of child behavior problems. These predictions were significant even with the child's age and level of task performance controlled. The results suggest that a mother's lack of ability to accurately predict her child's executive functioning skills may contribute to the development of child problems, perhaps through increased difficulties in parenting in a manner that is responsive to the child's abilities.

Keywords: accuracy of parental knowledge, executive functioning, child behavior problems

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This paper focuses on mothers' ability to accurately predict their son's performance on cognitive tasks assessing executive functions of planning and inhibition. Mothers' awareness of their children's cognitive skills in these areas is considered a fundamental component of sensitive parenting that is geared to meeting the child's needs and scaffolding the child's acquisition and demonstration of skill. As a first step in considering this important role of maternal knowledge of their child's executive functioning skills, this study tests the link between mothers' accuracy in predicting their children's performance on executive functioning tasks and child behavior problems.

Research examining the accuracy of parental knowledge regarding child cognitive skills has focused primarily on general intellectual or academic skills (1-3) or on parental knowledge of developmental levels in infants and very young children (4). These studies support the conclusions that parents are, at best, only moderately accurate in their knowledge of child cognitive skills, that the most common errors are parental over-estimations of their child's ability, and that more accurate parental knowledge is related to greater child cognitive ability. However, this previous research has typically assessed a rather narrow range of child developmental or cognitive skills, and has seldom incorporated a focus on the implications of accurate parental knowledge for broader child outcomes such as behavioral adjustment.

As with much of the previous research on parents' knowledge of child cognitive skills, the present investigation is framed within the context of a reciprocal, transactional model of parent and child influences, wherein it is argued that accurate parental knowledge of child skills forms the foundation for parenting decisions regarding how to best interact with the child (2, 5).

Although parental knowledge of a range of child skills and abilities is likely to be important, this study focused on the mothers' ability to accurately predict their own child's performance on tasks requiring the executive functioning skills of planning and inhibition. Knowledge of these domains is targeted because these executive functioning skills have been linked consistently to child behavior problems (6, 7). It is argued that this relation between executive dysfunction and behavior problems in the child may partially reflect the influence of parental knowledge of the child's executive functioning skills. Given the greater prevalence of behavior problems and executive functioning difficulties among young boys compared to girls (7–9), and the heavy involvement of mothers in the care-taking of young children (10), this study focuses on mothers and their young sons.

A mother who is able to accurately assess her son's degree of executive functioning skill in domains such as inhibition and planning is in a position to both proactively and reactively guide interactions with her child in order to best accommodate the child's skill level, and to move him toward optimum development. In contrast, a mother who does not accurately assess her child's skill in these domains may parent in a way that contributes to both externalizing child problems such as noncompliance or aggression, as well as internalizing child problems such as low self-regard or anxiety. For example, a mother who cannot accurately judge her son's executive functioning capabilities may place the child in situations that exceed his skill level and which generate child frustration or anger (e.g., expecting the child to wait when the child is unable to do so), or may fail to provide parental support when the child encounters difficulties (e.g., not recognizing that the child needs assistance in remembering complex instructions) leading to child feelings of inadequacy or anxiety. Thus, the first research question addressed in this study is whether maternal knowledge of her child's executive functioning skills is related to

reports of the child's behavior problems, above and beyond the relation of the child's executive dysfunction to behavior problems. Addressing this question extends previous research both by focusing on the accuracy of parental knowledge of important executive functioning skills in the child, and by linking the accuracy of parental knowledge to child behavioral adjustment, rather than just child cognitive skills.

It is not clear from previous literature which types of parental inaccuracies regarding their child's executive functioning are likely to be most important. Parental inaccuracies in predicting child skills may vary in both magnitude (i.e., the size of the discrepancy between parental knowledge and the child's actual skills) and directionality (i.e., whether the parent over- or under-estimates the child's skills). Although, as already noted, parents most commonly over-estimate their child's intellectual abilities, relations between parental accuracy and child performance have been demonstrated using both directional and absolute magnitude measures of parental accuracy (3). Indeed, the "match hypothesis" of Hunt and Paraskevopoulos (2) would argue that it is the absolute degree of discrepancy between parental knowledge and child ability which is important, as parental errors of either over- or under-estimation will result in insensitive parenting that is not matched to the child's ability. Consistent with this hypothesis, this study first examines whether the absolute magnitude of maternal inaccuracies is related to child problems. However, analyses also are conducted to explore the question of whether maternal over- or under-estimation of child skill is associated with increased child behavior problems.

Child executive functioning and accurate maternal knowledge also may interact in relation to child problems. For example, it may be easier for mothers to be accurate in their assessment of their son's executive functioning skills when these skills are particularly deficient. Although not focused on parental knowledge per se, several studies have reported such

interactions between parental sensitivity to the child and the child's level of difficulty. For example, Lahey et al. (11) reported that maternal responsive parenting was associated with later childhood conduct problems only for infants who were low on the temperament dimension of fearfulness. Therefore, the present study not only examines the accuracy of maternal knowledge and child skills as predictors of child behavior problems, but also considers the interaction of these variables.

In summary, it is hypothesized that mothers who are more accurate in predicting their son's performance on tasks measuring the executive functioning skills of inhibition and planning will have sons with fewer behavior problems, even after accounting for the children's executive functioning performance. Possible interactions of child executive functioning skills and the accuracy of mothers' predictions are explored.

Methods

Participants

Mothers of 4 to 7 year old boys were recruited. To expand the range of child problems and family social statuses in the sample, recruitment was conducted through community announcements, daycares, and a volunteer registry of families interested in research, as well as postings to support groups for parents of children with behavior problems. A total of 123 mothers participated. Of these, 113 families provided information on all of the primary measures and formed the sample for this study. Sample characteristics are presented in Table 1. The family socioeconomic status (SES) corresponds to a range of occupations from unemployed to physician, with the mean level reflecting occupations such as nursing assistants, mechanics, and construction managers. Families with complete and incomplete data did not differ significantly on SES or child behavior problems ($ps > .50$), but the children in families with complete data

were significantly older (mean age 71.39 months, $SD = 13.93$) than children in families with missing data (mean age 61.35 months, $SD = 11.00$), $t(121) = 2.22$, $p = .03$. Consistent with this age difference, it is noted that almost all of the missing data arose because children could not complete the executive functioning tasks.

Procedures

Information was gathered during a visit of the mother and son to a laboratory playroom equipped with a one-way mirror and audio and video recording equipment. Two female research assistants were present with each family. The study procedures were approved by the university's ethical review board and mothers and sons provided consent/assent for participation. Following consent, all mothers completed checklists describing child behavior and their family's characteristics. Then, in counterbalanced order across families, mothers and sons participated in an interaction task (data not included in this report) or the child completed a set of cognitive tasks while the mother watched and predicted his performance. At the conclusion of the study, mothers nominated another adult who knew the child well and were given a questionnaire for this person to complete and return directly to the lab. Mothers received \$35 for participation and their sons received a tee shirt.

Measures

Child Tasks and Mother predictions. Working with one of the research assistants, each child completed a series of tasks. Tasks were presented in a random order across children. These tasks are commonly used to assess aspects of executive functioning, including inhibition and planning, that are related to behavior problems in children and were chosen to represent situations with which the mother might be expected to have some familiarity (e.g., having the child wait for prizes).

Each task began with standard instructions provided to the child by the research assistant, and one or more practice trials to acquaint the child with the task¹. The research assistant did not provide feedback regarding the child's performance, although generic encouragement of participation was permitted. Accompanied by the second research assistant, each mother watched and listened to her son's performance on the tasks from behind the one-way mirror (thus, mothers did not communicate with their sons during these tasks). Prior to the child completing each task, the research assistant explained to the mother what the child would have to do and provided a demonstration of the task if necessary. Then, before the child began the task, the mother was asked to predict her son's performance on the task. The research assistant with the mother maintained a neutral stance throughout the procedure to avoid influencing the mother's predictions. Once the mother had made her prediction, the research assistant tapped on the one-way mirror to signal to the research assistant with the child that she could have the child begin the task.

One task (puppet task) was adapted from Sonuga-Barke, Dalen, Daley and Remington (12) to assess child inhibition. As a variation of the popular children's game "Simon Says," for this task the child's research assistant used two hand puppets. The child was told to follow the instructions given by one of the puppets and to not follow any instructions from the second puppet. Each puppet requested eight actions. For each request made by the puppet that the child was to *not* follow (an inhibition trial), the child was scored as 0 = performs the action, 1 = starts the action, but then self-corrects, or 2 = does not perform the action. Thus, higher scores indicate greater inhibition. Before the task began, the mother was asked to predict the child's performance on each trial using the same 3-point rating scale. Child performance was averaged across the eight trials ($\alpha = .92$). A difference score also was calculated for each trial,

reflecting the mother's estimation minus the child's performance. These difference scores were averaged over the trials ($\alpha = .87$) and higher scores reflected the mother over-estimating the child's inhibition abilities. Finally, for each trial, the absolute difference of the child performance and mother predictions was calculated and these absolute difference scores also were averaged across trials ($\alpha = .83$).

Another task (prize task) assessed the child's ability to inhibit responding while waiting for a prize (adapted from Kochanska, Murray, Jacques, Koenig, & Vandegest (13)). The child's research assistant placed a small prize under a clear plastic cover and told the child he had to wait until the bell sounded before he could take the prize. The delay to ringing the bell was 10, 15, 20, or 30 seconds (presented in random order) and midway through each delay the research assistant moved her hand from her lap to over top of the bell. For each trial, the child's behavior was scored as 0 = took the prize before the research assistant touched the bell, 1 = took the prize after the research assistant put her hand over the bell but before the bell was rung, 2 = did not take the prize, but touched the bell or the plastic cover before the research assistant put her hand over the bell, 3 = did not take the prize, but touched the bell or the plastic cover before the bell rang, 4 = lifted his hand, but did not touch anything before the bell rang, and 5 = did not lift his hand and waited for the bell to ring before touching the cover or prize. Before the task began the mother's predictions for each trial were made on the same 5-point rating scale. The child performance scores were calculated by averaging over trials ($\alpha = .86$), a difference score was calculated for each trial reflecting the mother's prediction minus the child's performance and these were averaged across trials ($\alpha = .81$) and finally, the absolute difference of these two scores also was averaged across trials ($\alpha = .81$).

The tower task was a planning task, adapted from Sonuga-Barke et al. (12). The task uses a board with three pegs of different heights and three balls of different colors that each have drilled holes that allow them to be placed on the pegs. The small peg can hold one ball, the medium peg can hold two balls, and the large peg can hold three balls. The child's research assistant presented the child with a picture of the coloured balls arranged on the pegs in a particular order and asked the child to make the balls match the picture. The child was to move one ball at a time and to make sure all balls were on a peg after each move. Three pictures that required two moves to complete were presented, three pictures requiring three moves, and three pictures requiring four moves. Child performance and mother prediction scores reflected the number of problems correctly solved on each of the sets of three pictures. The alphas for the child performance (.74) and the mother prediction minus child performance (.72) scores averaged across trials were acceptable. However, the alpha for the absolute difference between mother prediction and child performance averaged across the four trials was low, at .59. Although this score was retained for analysis, caution must be used in interpreting the results.

Child Behavior Problems. To secure a report of child problems that reflected the child's behavior in multiple settings, we used both mothers' reports of the child's behavior and ratings by another adult who knew the child well. Sixty-three percent of these other raters were elementary or preschool teachers, 15% were daycare or childcare workers, and 22% were family friends or relatives. Mothers completed the Child Behavior Checklist (14) and the total behavior problem score was used. This older version of the Child Behavior Checklist was chosen because it allowed the same scale to be used across the 4 to 7 year child age range. This scale, similar to its later versions, has solid psychometric properties. Other raters described the child's behavior using the Strengths and Difficulties Questionnaire (SDQ: 15). The SDQ is a 20 item scale to be

completed by parents or teachers of 4 to 16 year old children and measures emotional, conduct, and peer problems, as well as hyperactivity-inattention. Respondents rate each behavior problem item from 0 = *not true* to 2 = *certainly true* of the children. The total behavior problem score was used in this study. This measure has good psychometric properties (16), with a recent meta-analysis (17) indicating internal consistency and test-retest averages above .80 for teacher reports, as well as evidence of meaningful relations with other measures of child behavior and sensitivity to psychiatric diagnoses. The total behavior problem score had an internal consistency of .82 in this sample. Mother CBCL and other adult SDQ scores were significantly correlated, $r(112) = .36, p < .001$, and were standardized and averaged into a single score reflecting child behavior problems².

Results

Descriptive analysis

Descriptive statistics for all variables are shown in Table 2. Reflecting the recruitment of children with a range of behavior problems, the average CBCL Total Problems score corresponds to a *T* score of 56, with a range of 30 to 77 (14). On the other-adult completed SDQ, on average, the children fell at the upper end of the normal range (scores of 9 to 10 fall at the 68th to 73rd percentile for 4 to 7 year old boys in the United States; <http://www.sdqinfo.com/bbb3.pdf>), but there was a wide variation in scores. Child performance scores on the executive functioning tasks generally indicated good inhibition skills and an average number of planning problems solved correctly. There was reasonable variability in performance on all tasks. Mothers' predictions of the children's performance, on average, indicated under-estimation on the inhibition tasks (mothers' predictions, on average, were lower

than child performance) and over-estimation of child planning. There was good variability for both difference and absolute difference scores across mother-child dyads.

Data Reduction

To reduce the number of variables derived from the three executive functioning tasks, principal components analyses were conducted. Mother prediction minus child performance scores for the puppet, prize, and tower tasks yielded two components with eigen values greater than 1, and together these accounted for 73.30% of the variance in scores. Both the puppet and prize task difference scores loaded on the first component (loadings of .73 and .78 respectively), and the tower task difference score compromised the second component (loading at .94). Similar results appeared in principal component analyses of the absolute difference scores between mothers' predictions and child performance (two components with eigen values greater than 1, accounting for 81% of the variance, with prize and puppet tasks loading on the first component at .85 and .85 and the tower task loading on the second component at 1.00), and the child performance scores (again two components with eigen values greater than 1, accounting for 76% of the variance, with prize and puppet tasks loading on the first component at .78 and .80 and the tower task loading on the second component at .96). Therefore, in all further analyses, scores for the prize and puppet tasks were standardized and averaged to form one score while the tower task scores were kept separate.

Possible Confounding Variables. To examine possible influences due to demographic characteristics, correlations were calculated between the child's age and the family's SES, and all other measures. Child age was significantly correlated with the child behavior problems score, $r(112) = .22, p < .02$, and with child performance on the tower task, $r(112) = .45, p < .001$. Child age also was significantly correlated with the difference score on the tower task, $r(112) = -$

.21, $p < .04$. SES was significantly related only to the absolute difference scores for the puppet/prize tasks, $r(112) = .19, p < .04$. Because child age was correlated with both predictor and outcome variables it was controlled in all further analyses.

Correlational Analyses. Partial correlations were conducted between all of the variables, controlling for child age, and are shown in Table 3. In general, child behavior problems were significantly related to lower inhibition and planning performance by the child, to mothers' over-estimation of the child's planning abilities, and to greater absolute differences in mothers' estimations of both child inhibition and planning. Within the executive functioning tasks, the better children performed, the lower the mothers' over-estimates and the less the absolute difference between mothers' predictions and child performance.

Regression analyses. Two hierarchical regressions were conducted to predict child behavior problems based on the mothers' predictions of the child's performance on the executive functioning tasks. The first regression examined the absolute difference scores between mothers' prediction and child performance (for both puppet/prize and tower tasks) as predictors and the second regression used the mothers' prediction minus child performance difference scores (directional difference) for these same tasks as predictors of child problems. In each regression, at the first step, child age and child performance on the executive functioning tasks were entered as control variables. Entering child performance variables allowed examination of whether the accuracy of mothers' predictions added variance above and beyond that accounted for by the child's level of inhibition or planning skills. At step 2, the difference scores between mothers' predictions and child performance were entered and at step 3, terms representing the interactions of child performance and the difference scores were entered. The interaction terms at step 3 did not add significant unique variance to either prediction model, and only the first two steps are

presented in the Tables 4 and 5. For all regressions testing the study hypotheses, *a priori* power calculations indicated that a sample size of 113 yielded power greater than .80 to detect medium effects ($f^2 = .15$) with an alpha level of .05.

For the model using the absolute difference between mothers' predictions and child performance (Table 4), the absolute difference scores added unique variance to predicting child problems at step 2. Greater child problems were predicted by greater overall discrepancies between mothers' predictions and child performance on the puppet and prize tasks. Absolute difference scores on the tower task were not a significant predictor. For the model using mother prediction minus child performance difference scores (Table 5), these directional difference scores also added unique variance to predicting child behavior problems. Higher levels of behavior problems were predicted by greater mother under-estimation of the child's performance on the puppet and prize tasks. Again, difference scores based on the tower task were not a significant predictor.

Discussion

Mothers' ability to accurately predict their sons' performance on tasks assessing executive functioning skills, particularly inhibition, was significantly associated with greater behavior problems in the sons, even with relevant child executive functioning performance controlled. This result extends previous research on parental knowledge of child cognitive and developmental levels, to include parental assessment of executive functioning skills. It also links inaccuracies in maternal knowledge of these child skills to the child's overall level of adjustment. Although speculative, it can be argued that less accurate parental knowledge of the child's skill leads to parenting behaviors that are dysynchronous with the child's needs and which fail to promote optimal child development and adjustment.

Consistent with previous research linking inaccurate parental knowledge to lower child cognitive or developmental levels (2-4), results from this study indicate that greater maternal inaccuracies in predicting the child's level of executive functioning are associated with more child behavior problems. In addition, the inaccuracy in maternal knowledge of the child's skills accounted for variance in the child's problems, over and above that accounted for by the child's executive functioning difficulties. Thus, the status of parental knowledge regarding the child's abilities appears to make a contribution to child problems that is independent from the prediction afforded by the child's actual skill level. The results also confirm previous studies (6-7) showing that children with difficulties in the executive functioning areas of inhibition and planning show elevated levels of behavior problems.

Both the absolute discrepancy between mothers' predictions and child performance, as well as the direction of the difference were examined as predictors of child behavior problems. At the bivariate level, absolute discrepancies between mothers' predictions and child performance on both types of tasks (inhibition and planning) were positively associated with child problems. However, the directional difference score only for the planning task was significantly associated with child behavior problems. Mothers who over-estimated their child's planning ability had children with more behavior problems. In contrast to the bivariate relations, in the regression analyses the difference scores for only the inhibition tasks (puppet/prize) were significant, unique predictors of child problems. Both greater overall discrepancies in mothers' predictions, and mothers' under-estimations of the child's inhibition skills predicted increased reports of child behavior problems. Thus, when placed together in the regression analyses, scores based on the inhibition tasks appeared as better predictors of child behavior problems than scores based on the planning task. The lower internal consistency for the absolute difference scores on

the planning task offers a partial explanation for this finding. In addition, it may be that mothers are more familiar with how their children perform in the situations represented by the puppet and prize tasks (e.g., playing games such as Simon Says, waiting to touch things such as gifts or treats) than with the planning skills required by the tower task. This greater familiarity for the mothers may have made their predictions for the inhibition tasks a particularly sensitive marker of their knowledge of the child's executive functioning skills.

On average, the directional difference scores indicated that mothers over-estimated the child's performance on the planning task, but under-estimated their performance on the inhibition tasks. These average results conform only partially to previous findings which show that parents are most likely to over-estimate child performance (3). There are numerous methodological and sample differences between this study and previous research that may account for this finding. In particular, as noted above, the inhibition tasks used in this study might be considered relatively more familiar to mothers than the cognitive ability tasks used in many previous studies. It also was the case that, although absolute discrepancies on both types of tasks were associated with child problems at the bivariate level, in the more stringent regression analyses it was only mothers' under-estimation of the child's inhibition that was associated with problems. The bivariate relations provide support for the match hypothesis that any type of discrepancy between mothers' knowledge and child performance may be associated with insensitive or unresponsive parenting and to child problems. The regression analyses of the directional difference scores, in contrast, suggest that maternal under-estimation of child inhibition skills is associated with child problems. Perhaps mothers who believe their children are less capable of showing restraint fail to provide sufficiently demanding or challenging experiences for the child, or respond to child impulsivity with lax or permissive parenting, and

thus create a context that promotes or exacerbates the development of child problems. Given that the different analyses in this study support both absolute and directional differences between maternal predictions and child skill as being potentially important predictors of child problems, further study is obviously necessary.

The regression models also examined whether poor child executive functioning and less accurate maternal knowledge regarding the child's skill level would interact to predict the highest levels of child behavior problems. However, neither of the interaction terms was significant, indicating that, at least in this sample, such an interaction of mother and child contributions did not occur. Several methodological differences are apparent between this study and previous research that has demonstrated such interactions between child characteristics and maternal sensitivity to the child (11). In particular, other studies have focused on child temperament dimensions, such as low effortful control or fearfulness, rather than the executive functioning measures used in this study and have measured overall maternal sensitivity rather than focusing on the accuracy of maternal knowledge of child skills. Further research is needed to examine whether these differences in the child or maternal characteristics that are assessed are important parameters determining the predictive power of accurate maternal knowledge of child skills. Alternately, the failure to find interaction effects in this sample may reflect the overall statistical limitations to detecting such interaction effects (18).

The results of the study must be considered within the context of its limitations. Obviously, the cross sectional design prevents any conclusions regarding the causal links between the accuracy of maternal knowledge and child problems. Important third variables, such as the heritability of executive functioning skills, may underlie these associations; and the direction of influence between maternal inaccuracies and child behavior problems is likely to be

bidirectional and reciprocal. In addition, the study procedures required that mothers be provided detailed information about the tasks prior to making their predictions, and this restriction meant that the mother needed to be separated from the child and not teaching or interacting with the child. Thus, assessment of the mother's behavior as she might try to assist her child with these tasks was not possible. As such, potential links between maternal inaccurate predictions of the child's executive functioning skills and observations of less sensitive parenting responses awaits further study. The study focused on mothers and preschool sons due to both practical considerations of time and money, supported by the heavy involvement of mothers in caretaking of preschool children and the greater frequency of executive functioning and behavior problems among boys at this age. Whether similar findings would emerge with samples of older children, girls, and/or fathers, awaits further study.

In conclusion, the accuracy of mothers' knowledge of their young sons' executive functioning abilities emerged as a significant and unique predictor of the children's level of behavior problems. Should further research confirm the importance of this cognitive aspect of parenting, there are important implications for incorporation of training in this skill in parenting programs aimed at increasing sensitive parenting and improving child outcomes (19). Efforts at both the preventive and intervention levels could be directed to assisting parents in accurately identifying aspects of executive functioning in their children. Such training might take the form of increasing parenting knowledge of executive functions and well as direct training in identifying and monitoring the child's engagement in the use of these functions. With such parental awareness and skill in place, parents could then be assisted in using this awareness of their child's skills to more effectively guide parenting efforts to support and scaffolding appropriate child behavior. Such an increase in the sensitivity of parental responding to the child

would be expected to serve to reduce the potential for child frustration or for parent-child conflict related to a mismatch between the parent's expectations and the child's performance.

Summary

Research has shown that the accuracy of parents' knowledge of children's cognitive or developmental skills is positively related to the child's skill. This study examined the accuracy of mothers' knowledge of their young son's executive functioning on inhibition and planning tasks, and found the accuracy of mothers' predictions of their son's abilities was negatively related to child behavior problems, even with child age and executive functioning performance controlled. Both the absolute discrepancy between mothers' predictions and their son's inhibition and the extent to which mothers under-estimated their son's ability were predictive of the child's level of behavior problems. The results are interpreted as supporting a hypothesized pathway by which accurate parental knowledge of child executive functioning skills supports responsive parenting which is related to lower levels of child problems.

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Footnotes

¹Seven tasks were used in total, and were presented in randomized order across the families.

However, only three of the tasks are included in this report. The remaining tasks were excluded because estimates of the internal consistency of scores across the trials of the task were unacceptable or because the tasks involved only a single trial and thus estimates of internal consistency could not be made.

² The regression analyses were re-run separately for both mother and teacher ratings of the child's behavior problems. For the models using directional difference scores, the results were the same as with those using the composite mother/teacher ratings as the dependent variables. For the models using the absolute difference scores, results were essentially the same, except that the R^2 change statistics were only marginally significant. The composite child behavior rating, but incorporating variation in child behavior as noted by both raters, was chosen as the strongest measure.

Table 1

Sample Descriptives

Variable	Mean	SD	Range
Child age in months	71.39	13.93	48 – 96
Mother's age in years	36.2	6.41	22 – 49
Family socioeconomic status ^a	47.30	15.61	17.81 – 86.51
Percentage			
Marital Status			
Married/common-law		74.3	
Divorced or never married		25.7	
Family Ethnicity			
Canadian/European		64.5	
Asian		24.5	
Other (e.g., Aboriginal, Mexican)		10.9	

^a Measured using the index reported by Blishen, Carroll, and Moore (20).

Note: N = 113.

Table 2

Descriptive Statistics for All Variables

Variable	Mean	SD	Range
Child Performance			
Puppet Task	1.82	.44	0 - 2
Prize Task	4.55	.81	0 - 5
Tower Task	1.46	.90	0 - 3
Difference between Mother Prediction and Child Performance			
Puppet Task	-.35	.62	-2 - 2
Prize Task	-.40	1.06	-4 - 3.75
Tower Task	.69	1.00	-2 - 3
Absolute Difference between Mother Prediction and Child Performance			
Puppet Task	.56	.49	0 - 2
Prize Task	.89	.83	0 - 4
Tower Task	1.04	.72	0 - 3
Mother CBCL	35.07	21.40	1 - 95
Other adult SDQ	9.62	6.92	0 - 32

Note: CBCL = Child Behavior Checklist Total Problems Raw Score; SDQ = Strengths and Difficulties Questionnaire Total Problems.

N = 113.

Table 3

Partial Correlations Among All Variables Controlling for Child Age

	2	3	4	5	6	7
1. Child Behavior Problems ^a	-.23*	-.23*	.30**	.22*	-.13	.23*
2. Puppet/Prize Child Performance	--	-.03	-.51***	.05	-.57***	-.01
3. Tower Child Performance		--	-.08	-.55***	.14	-.75***
4. Puppet/Prize Mother/Child Absolute Difference			--	-.04	-.24*	-.03
5. Tower Mother/Child Absolute Difference				--	-.03	.73***
6. Puppet/Prize Mother – Child Difference					--	.04
7. Tower Mother – Child Difference						

^a Average of Mother Child Behavior Checklist and Other Adult Strengths and Difficulties Questionnaire ratings. N = 113.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 4

Multiple Regression Predicting Child Behavior Problems

Variable	Unstandardized B (SE)	Standardized B	t	Part Correlation

Absolute Difference Scores Between Mothers' Predictions and Child Performance as Predictors				
Step 1, $R^2 = .15$, $F(3, 109) = 6.51$, $p < .001$				
Child age	.04 (.01)	.35	3.56, $p = .001$	.31
Child Tower Perf.	-.42 (.16)	-.25	2.58, $p = .01$	-.23
Child Puppet/Prize Perf.	-.24 (.09)	-.23	2.64, $p = .01$	-.23

Step 2, R^2 change = .20, F change (2, 108) = 3.29, $p = .04$				
Child age	.04 (.01)	.35	3.57, $p < .001$	.31
Child Tower Perf.	-.22 (.19)	-.13	1.15, ns	.10
Child Puppet/Prize Perf.	-.13 (.11)	-.13	1.23, ns	-.11
Mother/Child Tower Abs.	.37 (.24)	.16	1.53, ns	.13
Mother/Child Pupp/Priz Abs.	.43 (.20)	.22	2.18, $p = .03$	.19

Note: Perf = Performance. Mother/Child Tower Abs. = Absolute difference of mothers' prediction minus child performance on Tower Task. Mother/Child Pupp/Priz Abs. = Absolute difference of mothers' prediction minus child performance on Puppet and Prize Tasks.

Table 5

Multiple Regression Predicting Child Behavior Problems

Variable	Unstandardized B (SE)	Standardized B	t	Part Correlation
Mothers' Predictions minus Child Performance Scores as Predictors				
Step 1, $R^2 = .15$, $F(3, 109) = 6.51$, $p < .001$				
Child age	.04 (.01)	.35	3.56, $p = .001$	.31
Child Tower Perf.	-.42 (.16)	-.25	2.58, $p = .01$	-.23
Child Puppet/Prize Perf.	-.24 (.09)	-.23	2.64, $p = .01$	-.23
Step 2, R^2 change = .11, F change (2, 107) = 7.54, $p = .001$				
Child age	.04 (.01)	.38	3.91, $p < .001$	.33
Child Tower Perf.	.01 (.24)	.01	.01, ns	.01
Child Puppet/Prize Perf.	-.47 (.11)	-.46	4.45, $p < .001$	-.37
Mother – Child Tower	.39 (.22)	.24	1.80, ns	.15
Mother – Child Puppet/Prize	-.87 (.23)	-.41	3.78, $p < .001$	-.32

Note: Perf = Performance. Mother – Child = Difference of mothers' prediction minus child performance.