

Mothers' Implicit and Explicit Attitudes and Attributions in Relation to Self-Reported Parenting Behavior

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SYNOPSIS

Objective. Parenting behavior is presumed to be related to the thoughts about child behavior that parents report in a controlled and explicit manner and to more implicit parent cognitions that occur outside of conscious awareness and are less accessible to verbal report. **Design.** We examined mothers' attitudes toward their children as correlates of self-reported parenting behavior. We used a combination of a self-report questionnaire and a reaction-time method (the Implicit Association Test) to assess explicit and implicit attitudes, respectively. We also assessed mothers' implicit and explicit attributions for child misbehavior in relation to parenting, using a questionnaire measure of attributions completed under high-cognitive load (implicit attributions) or under low-cognitive load (explicit attributions). Mothers of 124, 6- to 10-year-olds (52% male) participated. **Results.** Attitudes assessed by self-report questionnaire and the Implicit Association Test were uniquely associated with negative parenting. The cognitive load manipulation moderated associations between attributions and parenting, such that child-blaming attributions were inversely associated with positive parenting only under conditions of high-cognitive load. **Conclusions.** Compared to traditional self-report questionnaires, methods such as the Implicit Association Test or cognitive load manipulations may more effectively assess implicit parent cognitions.

INTRODUCTION

Given the same child behavior, different parents often make very different choices as to how to respond. These parenting choices reflect, in part, parents' cognitions about the child and the child's behavior and have meaningful implications for parenting and child adjustment (Shai & Belsky, 2011). When parents hold relatively negative views of their children (e.g., seeing the child as bothersome or blameworthy), they are less likely to parent in a responsive fashion, which then contributes in an escalating cycle to more problematic child behavior. In contrast, if parents see their children in a positive light (e.g., seeing the child as helpful or interpreting misbehavior as a sign of growing autonomy), then they are better able to respond in a manner that promotes development.

Most existing studies of parent cognitions have utilized self-report methods of assessment, where parents' responses are likely to be influenced by effortful and intentionally controlled cognitive processes, and so are susceptible to self-presentational concerns and other reporting biases. In contrast, research on social cognition reveals that many of the cognitions that guide interpersonal behavior are automatically activated and may

operate outside of conscious awareness (Gawronski & Payne, 2011). As such, research relying on traditional self-report methods may provide an incomplete picture of parents' cognitions and their effects on parenting behavior.

Drawing from models within the social cognition literature that distinguish between these two types of cognitive processing (Andersen, Moskowitz, Blair, & Nosek, 2007; Uleman, Saribay, & Gonzalez, 2008), in this study we differentiate parent cognitions that reflect controlled, effortful, and intentional processes (which are readily accessible via verbal report) from cognitions that are more automatic, more likely to occur outside of conscious awareness, and less intentional in nature (and which may be poorly assessed via traditional self-report measures). For the sake of expository efficiency and consistency with other relevant research on parent cognitions (e.g., Sturge-Apple, Rogge, Skibo, Peltz, & Suor, 2015), we refer to the former as "explicit" and the latter as "implicit" cognitions. Abundant evidence supports the distinction between explicit and implicit cognitions, including their modest level of covariation, their relation to distinct patterns of neural activation, and their unique prediction of behavioral outcomes (e.g., Gawronski & Bodenhausen, 2014; Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Lieberman, 2007). Our overall goals in this study were to use methods that distinguish between explicit and implicit parent cognitions and to test the extent to which implicit cognitions are uniquely associated with parents' reported parenting behavior above and beyond the contribution of explicit cognitions.

We focused on two commonly studied types of parent cognitions, attitudes regarding the child and attributions about child misbehaviors. Attitudes are defined as pre-existing, general evaluations of the child or as the existing database in social information-processing models. Attributions are interpretations about the causes underlying specific child behaviors (e.g., seeing misbehavior as reflecting the child's intentions, rather than ascribing it to situational causes). Models of parent cognitions (Bugental, 2009; Milner, 2003) include attitudes and attributions as distinct constructs, and both are seen as important predictors of parent behavior. Including assessment of both attitudes and attributions in this study allows examination of how parenting is associated with parents' general evaluative views of the child and their more situation-specific cognitions about child behavior. Although models of parent cognition allow for implicit and explicit versions of both attitudes and attributions, little prior research has explored or compared implicit and explicit measures. Our study was designed to address this imbalance.

Explicit and Implicit Parent Attitudes

There is a long history of research using questionnaires to assess parents' attitudes toward their children, and the results reveal a mixed pattern of findings regarding the links between assessed attitudes and measures of parenting (e.g., Holden & Edwards, 1989; Rohner & Britner, 2002). Concerns have been raised that these self-report measures of parent attitudes have a number of potential shortcomings. For example, parents' effortful deliberations regarding how much they agree with specific statements about their child may be poor proxies for their more global, evaluative attitudes toward the child. In addition, self-report measures are readily influenced by reporting biases, such as tendencies to present misleadingly favorable impressions (e.g., Kendziora & O'Leary, 1998; Sturge-Apple et al., 2015).

Given these concerns, researchers have begun to test whether measures of implicit attitudes may be useful in understanding parenting decisions and behaviors. In a sample including both parents and non-parents, Senese and colleagues (2013) used a Single Category Implicit Association Test (SC-IAT) to show that adults form implicit associations of positive emotions with infant faces, more so than with adult or non-human faces. Within the full sample, the strength of these implicit associations modestly related to reports of parenting, although this was not the case within the smaller subsample of participants who were parents. Other studies have examined implicit associations specifically among parents and at older child ages. When parents are primed with hostile words (which may activate implicit negative attitudes), they subsequently perceive ambiguous child behaviors more negatively (Farc, Crouch, Skowronski, & Milner, 2008). In addition, parents who had relatively faster reaction times to negative versus positive words self-reported higher potential for child abuse (Crouch et al., 2012). In a sample of at-risk families, Smith, Dishion, Shaw, and Wilson (2014) coded relational schema from 5-min speech samples to characterize mothers' implicit negative attitudes toward their children and found these schema were predictive of the maintenance of negative parent-child interactions over time. In a community sample, Sturge-Apple et al. (2015) used a computer-based reaction time task (the go/no-go association task; GNAT) to assess mothers' implicit attitudes toward their children and found these to be significant predictors of both reported and observed parenting behavior, assessed both concurrently and longitudinally. The positive implicit attitudes were particularly strongly linked to maternal empathy and sensitivity and often were associated with parenting even when questionnaire measures of explicit attitudes were not. These studies suggest the promise of implicit parent attitudes about the child to provide a fuller understanding of parenting. However, much work remains to conceptually replicate and extend these findings and to explore other methodologies that may provide insight into these less controlled aspects of parents' cognitive processing.

In this study, we administered a self-report questionnaire to tap mothers' explicit attitudes toward their child and a reaction-time task to assess mothers' implicit attitudes toward their child. We employed a version of the widely used and well-established IAT (de Houwer, Teige-Mocigemba, Spruty, & Moors, 2009; Greenwald, Nosek, & Banaji, 2003; Nosek, Greenwald, & Banaji, 2007) re-designed to assess the extent to which mothers' implicitly associate their child (relative to another child) with positive (versus negative) characteristics. The IAT has shown strong psychometric properties, often superior to those of other implicit measures such as the SC-IAT or the GNAT (Bar-Anan & Nosek, 2014). In addition, because the IAT is structured as a relative comparison, it allowed us to examine mothers' positive attitudes specific to their own child within a context that controlled for overall positive attitudes to unknown, unrelated children.

Explicit and Implicit Parent Attributions

Research on causal attributions indicates that a two-step process underlies attributional judgments about the causes of others' behavior (Gilbert, Pelham, & Krull, 1988). During the initial step, which is relatively effortless and may occur outside of conscious awareness, a preliminary attribution is automatically activated in working memory. This is followed by a more cognitively effortful second step in which perceivers consider additional information to "correct" the initial attribution to arrive at a final attribution judgment. Therefore, while the first step reflects a kind of implicit attribution, the

final attributional output reflects the additional effects of explicit processing. To assess implicit attributions, it is necessary to employ methods that limit the effects of the second (more effortful and deliberative) step in the attribution process.

Such methods are rarely used to study parents' attributions about child behaviors. As with attitudes, the most common means of measuring parent attributions are self-reports. Parents are typically presented with descriptions of child behavior and make ratings along attributional dimensions regarding the cause of the behavior (e.g., the child acted intentionally). These methods are usually employed in unconstrained contexts that tacitly encourage deliberative, controlled processing of information. Studies using such methods have shown that parent attributions do predict parenting behavior (e.g., Johnston, Hommersen, & Seipp, 2009; Snyder, Cramer, A Frank, & Patterson, 2005), although the strength of these associations tends to be modest and self-report attribution measures are subject to the shortcomings noted above regarding their deliberative nature and susceptibility to social desirability.

Several previous studies have employed measures that, in different ways, limit these shortcomings and may instead tap more implicit parent attributions. Johnston, Reynolds, Freeman, and Geller (1998) assessed parents' spontaneously generated attributions for child behavior using an open-ended response format. Although these attributions showed some congruence with attributional judgments on a questionnaire, both open-ended and questionnaire attributions offered unique information. Rodriguez, Cooke, and Jedrzewski (2012) used eye-tracking methods to covertly assess the amount of time parents spent reading vignettes of child behavior. Parents who reported using more punishment spent less time reading vignettes in which a child was blamed for misbehavior (presumably because the vignette was consistent with their implicit attributions). In addition, the eye-tracking measures demonstrated different relations to parenting behavior than did attributional judgments made on rating scales. Finally, and most directly relevant to the current study, Sturge-Apple, Suor, and Skibo (2014) found that mothers' self-reported attributions for child behavior were most strongly linked to dysfunctional parenting among mothers who were socioeconomically disadvantaged and had limited working memory capacity. One interpretation for these results is that limited working memory and socioeconomic risk are both associated with reduced cognitive resources available for effortful cognitive processing, thus yielding a better indicator of "uncorrected" implicit attributions in these mothers. Together, these studies suggest that implicit parent attributions may be uniquely associated with parenting behavior.

We employed a different methodology, an experimental manipulation, to assess explicit versus implicit attributions for child behavior. We randomly divided the sample of mothers into two groups. In one group, mothers completed a questionnaire assessing attributions for child misbehaviors while simultaneously completing another task that had low-cognitive demands. In the other group, mothers made their attributions while completing a simultaneous task with high-cognitive demands. Previous research using this type of experimental manipulation reveals that high-cognitive demands disrupt the second (controlled) step of the attributional process, resulting in judgments that more directly reflect initial, automatically activated attributions (Gilbert et al., 1988). Therefore, compared to attributions measured in mothers in the low-cognitive load group, the attributions provided by mothers in the high load group were expected to be more implicit in nature and, as such, to be better measures of the types of cognitions that influence behavior in typical busy, multi-tasking parenting situations.

The Current Study

In summary, this study was designed to test the general hypothesis that mothers' implicit cognitions about their child are uniquely associated with their reported parenting practices. One test of the hypothesis pertains to attitudes. For the hypothesis to be supported, implicit attitudes (assessed by the IAT) must be associated with parenting above and beyond any associations with explicit attitudes. The other test pertains to attributions. For this hypothesis to be supported, attributions assessed in mothers in the high-cognitive load group must be more strongly associated with parenting than attributions provided by mothers in the low-cognitive load group. Consistent with previous studies (e.g., Sturge-Apple et al., 2015), we measured both positive and negative aspects of parenting. Finally, in an exploratory fashion, we compared the relative associations of implicit attitudes versus attributions with parenting (using only the mothers who provided attributions under conditions of high-cognitive load).

METHOD

Participants

There were 127 mothers of 6- to 10-year-old children recruited using community advertisements and a registry of families interested in participating in research. Mothers needed sufficient English proficiency to complete the questionnaires. One mother was excluded because her questionnaire responses indicated language difficulties, one mother was excluded due to a programming error, and one mother was excluded because she did not respond to two of the primary measures, leaving a final sample of 124. If mothers had more than one child in the age range, they were asked to pick one to think about for the purpose of the study. Demographic information was collected via mothers' report, and descriptive characteristics of the sample are presented in [Table 1](#).

Measures

Mothers' Positive Attitudes Regarding Their Children. Measures of attitudes included a self-report questionnaire and an IAT designed to assess explicit and implicit attitudes, respectively. Both measures were scored such that higher values indicated more positive attitudes toward the child.

The questionnaire was the prosocial subscale of the Strengths and Difficulties Questionnaire (SDQ prosocial; Goodman, 1997). On the SDQ, mothers rate 25 child attributes on a 3-point scale (0: *not true*, 1: *somewhat true*, and 2: *certainly true*). There are five subscales, each with five items, and the measure has acceptable psychometric properties (e.g., Goodman, 1997). The five prosocial items assess parents' self-reported perceptions that their child exhibits highly desirable prosocial traits. This subscale (Cronbach's alpha of .71 in this sample) provided the measure of mothers' explicit positive attitudes toward their child.

The IAT is a computer-based reaction-time task in which, over the course of many trials, participants are presented with stimuli (either a word or a photo) and are asked to categorize each stimulus into one of two categories by pressing specified computer keys. The elapsed time from stimulus onset to key-press is recorded, and these reactions

TABLE 1
Sample Characteristics

	<i>M (SD)</i>	Range	Percentage
Child gender			
Female			52.4
Male			47.6
Child age in years	8.42 (1.48)	6 – 10	
Mother age in years	38.21 (5.93)	26 – 51	
Marital status			
Married			83.9
Single			16.1
Mother education			
Less than high school			2.4
High school			7.3
Partial college/University			25.0
College/University			45.2
Graduate/Professional			20.2
Mother ethnicity			
European-North American			63.9
Asian-North American			25.4
Other			10.7
Family SES	2.35 (1.16)	1 – 5	

Note. SES: Socioeconomic status score calculated using the Hollingshead Four-Factor Index (1975). Higher scores indicate lower social status.

times can be used to draw inferences about implicit associations between different kinds of stimulus items (for more extensive descriptions of this methodology and its applications, see Greenwald et al., 2003). To compare mothers' implicit positive attitudes toward their own child versus implicit positive attitudes toward an unknown, unrelated child, we devised an IAT that employed two kinds of stimuli: photographs of children's faces (the mothers' own children and an unknown child) and words describing personal characteristics (positive and negative characteristics).

Mothers provided recent facial photographs of their own child, following specific instructions to have the child exhibit a neutral facial expression, with hair pulled back, and standing against a neutral background. A convenience sample of students provided ratings of the facial expressions in the mother's own child's photographs and these were not correlated with mothers' scores on the IAT, $r(122) = .01, p = .88$, indicating no influence of the child's facial expression on IAT performance. Photographs of the faces of children unknown to mothers were obtained from the National Institutes of Mental Health child emotional faces picture set (Egger et al., 2011). A male and female child were chosen so that the gender of the unknown child could be matched to the mother's own child. The unknown faces were chosen as depicting a neutral expression and direct gaze and were rated by a convenience sample of graduate and undergraduate students as being close in age to the age range of the mothers' own children. The photographs of children, including mothers' own children and the unknown children, were cropped and placed into a series of cartoon drawings, to generate a set of eight images showing the child engaged in various activities (e.g., jumping, reading). For each mother, these

cartoons (one set containing the face of the mother's own child and a parallel set containing the face of the unknown child) composed the photograph stimuli employed in the IAT task (samples of the faces and cartoons are available from the first author).

The other stimuli employed in the IAT, words describing positive and negative personal attributes, were chosen based on pilot testing. A convenience sample of students rated a larger set of 29 adjectives describing personal attributes, and, based on their ratings, eight positive adjectives and eight negative adjectives were selected as stimuli. These two sets of words were rated as being equally descriptive of girls and boys and equally appropriate for 6- to 10-year-old children; they also all had high word frequency (Davies, 2012) and were clearly positive or negative in valence. The eight positive words were helpful, loving, friendly, cheerful, smart, imaginative, confident, and agreeable; the eight negative words were jealous, argumentative, irritable, uncooperative, demanding, stubborn, immature, and grumpy.

The picture and word stimuli were presented to each mother across a series of trials, and on each trial the mother was asked to make a binary, categorical judgment about the stimulus by pressing one of two computer keys. Mothers categorized each facial picture as depicting either their own child or the unknown child and they categorized each word as being either positive or negative. There were four critical blocks of trials with the order and specific response key pairings counterbalanced across mothers. In two blocks (Blocks 1 and 2), the response key used to identify the mother's own child also was used to identify positive words (and a different response key was used to identify both the unknown child and negative words). If a mother's own child is cognitively associated with positive characteristics, then this response key arrangement that uses the same key for own child and positive characteristics is psychologically consistent, resulting in relatively short reaction times. In the other two critical blocks of trials (Blocks 3 and 4), the pairings and response keys were switched (i.e., the response key used to identify the mother's own child also was used to identify negative words). If the mother's own child is cognitively associated with positive characteristics, then this arrangement of using the same key for own child and negative characteristics is psychologically conflicting, resulting in longer reaction times. The greater the cognitive association between one's own child and positive characteristics compared to the association of the unknown child with positive characteristics, the greater the divergence in average reaction times across the two types of trials. Therefore, the difference in average reaction times across the congruent Blocks (1 and 2) versus incongruent Blocks (3 and 4) of trials indicates the mothers' implicit positive attitudes toward their child.

Following the scoring algorithm provided by Greenwald et al. (2003), several steps outlined below were undertaken to calculate a *D* score reflecting the strength of this implicit positive attitude for each mother. First, to reduce error or noise responses, trials with a response latency greater than 10,000 ms were removed and mothers for whom more than 10% of trials had a latency less than 300 ms were removed ($n = 0$, in this case). Then, we calculated the inclusive standard deviation for all trials in Blocks 1 and 3 and for Blocks 2 and 4 (where Blocks 1 and 2 present the positive characteristics/own child versus negative characteristics/unknown child pairings, and Blocks 3 and 4 present the opposite pairings). We also calculated the mean response latency for each block. The two mean differences of (MeanBlock 3–MeanBlock 1) and (MeanBlock 4–MeanBlock 2) were divided by their inclusive standard deviations to produce *D*. *D* can be either positive or negative in value, with positive scores indicating that the mother associated positive characteristics more with her own child (relative to the unknown child) and thus had

a positive implicit attitude regarding her own child. In sum, the IAT score used in our analysis is an index of the strength of the mother's positive, implicit attitude toward her child.

Mothers' Negative Attributions for Child Misbehavior Under High- or Low-Cognitive Load. Attributions for child behavior problems were measured in a concurrent memory load paradigm (e.g., Bugental, Lyon, Krantz, & Cortez, 1997; Gilbert et al., 1988). In this paradigm, participants engage in a primary task that measures the desired construct (attributions), while they are simultaneously asked to complete an unrelated, secondary task that, depending on the group they are assigned to, either is or is not cognitively demanding. Mothers were randomly assigned to one of two groups: High-cognitive load or low-cognitive load and completed a measure assessing negative attributions for child misbehavior. In the high-cognitive load group, mothers made attributional ratings for child misbehaviors while simultaneously being tasked with memorizing a difficult eight-digit string (e.g., 84592716). In the low-cognitive load group, mothers read the same child misbehaviors and completed attribution ratings, but did so while memorizing an eight-digit string that consisted of a single repeated digit (e.g., 55555555). For mothers in both groups, there was practice trial and then nine trials which each followed the same format. The mother was presented, for 20s, with a new digit string that she was to remember for the remainder of the trial; she was then presented with a written scenario depicting a child misbehavior and asked to respond to six rating scales assessing attributions about the behavior; and, finally, she was asked to report the digit string that she had been tasked with memorizing at the beginning of the trial. At the end of the nine trials, each mother rated how easy or difficult it had been for her to remember the digit strings across all trials.

The nine child behavior scenarios, presented in random order across mothers, depicted common child misbehaviors (scenarios were based on previous studies; e.g., Johnston, Chen, & Ohan, 2006; Johnston & Freeman, 1997). Mothers were asked to read each scenario as if it were a new behavior on a new day and to imagine themselves and their child in the described situation. The misbehaviors were appropriate for 6- to 10-year-old children and equally applicable to girls and boys;

e.g., Your child enters the kitchen just as you have finished sweeping the floor and gathering the dust in a pile to pick up. Your child does not wait for you to finish and heads straight to the fridge. As he/she rushes through the kitchen, the pile of dirt scatters across the floor.

For each scenario, mothers rated the cause of the child's behavior on six dimensions assessing causal locus ("My child's behavior was due to something about him/her."), stability ("My child will behave like this in the future."), globality ("This behavior of my child affects other areas of our relationship."), intent ("My child behaved like this intentionally."), motivation ("My child was thinking only about him/herself when s/he behaved like this."), and blame ("My child should be blamed for this behavior."). Mothers reported their agreement with each statement on a 6-point scale, ranging from 1 = *strongly disagree* to 6 = *strongly agree*. Mean ratings were computed across the six dimensions and across the nine scenarios to generate a single score assessing negative attributions for child misbehavior. For mothers in the low-cognitive load group, the internal consistency of this score was .76 and for mothers in the high-cognitive load group, the internal consistency was .78.

Positive and Negative Self-Reported Parenting. To provide a broad assessment of parenting, we used two self-report questionnaires, one focused on specific self-reported parenting practices and the other on the quality of the parent-child relationship. The Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996) measures parenting practices. Mothers rated their use of parenting behaviors on a 5-point scale (0: *never*, 1: *almost never*, 2: *sometimes*, 3: *often*, and 4: *always*). The APQ includes two scales assessing positive parenting practices, *involvement* (e.g., friendly talk, help with homework) and *positive parenting* (e.g., praise, compliment), and three scales tapping negative parenting practices, *poor monitoring/supervision* (e.g., child out after dark without adult, child out with friends unknown to parent), *inconsistent discipline* (e.g., empty threats of discipline, child talks him/herself out of punishment), and *corporal punishment* (not used in this study). The APQ has satisfactory psychometric properties (Shelton et al., 1996), and in the current sample Cronbach's alphas for the four scales ranged from .76 to .94. The brief version of the Parent-Child Relationship Questionnaire (PCRQ; Furman & Giberson, 1995) was used to measure the perceived quality of the parent-child relationship. This 40-item scale assesses perceptions of parent-child relationship qualities on a 5-point scale (1: *hardly at all*, 2: *not too much*, 3: *somewhat*, 4: *very much*, and 5: *extremely much*). The PCRQ yields a positive score based on three scales: (1) disciplinary warmth—shared decision making and praise; (2) personal closeness—companionship and intimacy; (3) warmth—affection and admiration for and by the parent; and a negative score based on two scales (4) possessiveness—protectiveness and control; and (5) power assertion—physical punishment and quarrelling. The measure has good psychometric properties (e.g., Furman & Giberson, 1995; Gerdes, Hoza, & Pelham, 2003). In this study, the positive and negative scales of the PCRQ had internal consistency estimates of .90 and .85, respectively.

Procedures

The study was approved by the university Research Ethics Board. Interested mothers contacted the laboratory to receive information about the study. If mothers met the study criteria and were interested, they were given a link to participate in the study online. After signing a consent form online, mothers accessed and completed the tasks and questionnaires, all online. With order counterbalanced across mothers, all mothers completed the IAT and then, depending on random assignment to group, mothers completed the attribution measure under either high- or low-cognitive load. Finally, mothers completed questionnaires assessing attitudes regarding their child (SDQ prosocial) and parenting (the APQ and PCRQ), presented in a random order across mothers. Upon completion, mothers received a \$15 honorarium.

Data Analytic Plan

Variable distributions were inspected for normality. We assessed the relations with study variables to determine which covariates to include in subsequent statistical models. The hypothesis regarding implicit and explicit positive attitudes toward the child was tested by examining bivariate correlations between the attitude and self-reported parenting variables and then using structural equation modeling (SEM). SEM was conducted using the lavaan package (Rosseel, 2012) for the R programming language in RStudio Version 0.98.501. To test whether implicit attitudes were uniquely associated

with self-reported parenting when controlling for explicit attitudes, we examined associations of the two measures of positive attitudes toward the child (SDQ prosocial and IAT) with the latent variables reflecting positive and negative self-reported parenting (constructed from the relevant subscales of the APQ and PCRQ). We also modeled covariances among the attitude variables, including demographic variables (child age, child gender, mother education) when these were significantly correlated. Model fit was considered good with a non-significant Chi-square test, a root mean square error of approximation (RMSEA) value of .08 or less, and a confirmatory fit index (CFI) of .90 or more (Marsh, Hau, & Wen, 2004).

Before testing the hypothesis regarding implicit and explicit attributions, possible demographic differences between mothers assigned to the high- and low-cognitive load groups were examined using independent samples *t*-tests. The success of the cognitive load manipulation was checked by examining the accuracy of recall and mothers' ratings of the memory task's difficulty. To test the hypothesis that attributions obtained in the high-cognitive load group would be more strongly associated with measures of parenting than attributions made by mothers in the low-cognitive load group, we first examined bivariate correlations, and then constructed an SEM model with the attributions and covariates associated with the positive and negative self-reported parenting composites. In this model we examined the moderating role of cognitive load on the relations between attributions and parenting using cognitive load group as a grouping variable. Using Chi-square difference testing, we compared the Chi-square value from analyses where all model parameters (i.e., regression coefficients, residual variances, and covariances) were constrained to be equal across the two load groups to the Chi-square value from analyses that allowed separate regression estimates for the two load groups (i.e., residual and covariance estimates constrained to be equal; regression estimates allowed to vary between groups). A significant difference between the Chi-square values indicates that the regression coefficients for the two groups are significantly different, and that cognitive load moderates the relation between attributions and self-reported parenting.

Finally, we explored the relative associations of implicit attitudes and implicit attributions with the self-reported parenting variables. As it was only in the high-cognitive load group that attributions were hypothesized to be implicit, we used only the mothers in this group and constructed an SEM model examining relations between IAT scores, attributions, and the parenting variables.

RESULTS

Descriptive Statistics and Preliminary Analyses

Descriptive statistics for the variables are presented in Table 2. Consistent with the community nature of the sample, on the SDQ prosocial scale, on average, children were rated as higher than approximately 40% of children in a normative U.S. sample (<http://www.sdqinfo.org/norms/USNorm.html>). On the attribution measure, mothers gave average ratings at the mid-point of the scale, and average APQ and PCRQ scores indicated relatively high levels of reported positive parenting and low levels of negative parenting.

The distributions for all variables were considered and only the APQ Poor Monitoring scale and the SDQ prosocial score indicated potential issues with non-normality. The

TABLE 2
Descriptive Statistics for Cognition and Parenting Measures

	<i>M (SD)</i>	Range
Positive attitudes		
Strengths and difficulties	1.71 (.36)	.60–2.00
Questionnaire prosocial scale ^a		
Implicit Association Test D		
Score ^b	.6035 (.3714)	–.6027–1.5211
Negative attributions ^c		
Low-cognitive load group	3.13 (.67)	1.48–4.70
High-cognitive load group	3.17 (.72)	1.13–4.59
Alabama Parenting Questionnaire ^d		
Parent involvement	3.21 (.49)	1.60–4.00
Positive parenting	3.37 (.51)	2.00–4.00
Poor monitoring	.44 (.64)	0–3.60
Inconsistent discipline	1.27 (.68)	0–3.67
Parent–child relationship questionnaire ^d		
Positive	3.18 (.43)	1.60–4.00
Negative	1.73 (.47)	.67–2.92

Notes. ^aAverage item score on a 0–2 scale on the Strengths and Difficulties Questionnaire.

^bImplicit Association Test D score.

^cAverage rating on a 1–6 scale.

^dAverage item score on a 0–4 scale.

APQ Poor Monitoring scale was transformed and normalized using a square root; however, the SDQ prosocial scale was not amenable to transformation given the clustering of scores in the maximum range. Therefore, in the analysis using this scale, we utilized maximum likelihood estimation with robust (Huber–White) standard errors to correct for non-normal data. Across all measures, including covariates, the percentage of missing scores ranged between .8 and 24.6%. Little's missing completely at random test (Little, 1988) supported the assumption that the data are missing completely at random and not associated with participant characteristics, $\chi^2(57) = 69.54, p = .12$. We used full maximum likelihood estimation in all analyses to handle missing data. The mothers' education level and child age were each significantly related to at least one of the parenting scales and were included as covariates in all models. Mothers' education level was a 5-level ordinal variable (1: *less than high school* to 5: *graduate/professional level*), but was treated as continuous in analyses.

Implicit and Explicit Attitudes and Self-Reported Parenting

To examine bivariate relations between parent attitudes and parenting, composite indices of self-reported positive and negative parenting were created by standardizing and averaging scores on the positive and negative subscales of the APQ and the PCRQ. As expected, the positive and negative parenting composites were significantly negatively related, $r(122) = -.23, p < .05$. Bivariate correlations for the implicit and explicit attitude measures and parenting composites are shown in Table 3. At this bivariate level, both the SDQ prosocial and IAT measures of attitudes were significantly inversely related to self-reported negative parenting and the SDQ was positively related

TABLE 3
Correlations Between Attitudes and Self-Reported Parenting in the Full Sample and Between Attributions and Self-Reported Parenting in the High- and Low-Cognitive Load Groups

	Attitudes		Parenting Composite	
	SDQ	IAT	Positive	Negative
Positive attitudes ($N = 124$)				
SDQ	–	–.01	.33***	–.35***
IAT		–	.11	–.18*
Negative attributions				
Low-cognitive load group ($n = 61$)			–.08	.05
High-cognitive load group ($n = 52$)			–.38***	.23

Notes. SDQ: Strengths and Difficulties Questionnaire, IAT = Implicit Association Test.

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

to positive parenting. The implicit and explicit attitude measures were not significantly related.

Prior to testing the associations of the two attitude measures with self-reported parenting in the SEM model, we first assessed the validity of the measurement model by performing a confirmatory factor analysis on the two latent parenting variables. Results indicated the measured parenting variables loaded adequately onto their respective positive and negative parenting latent variables, $\chi^2(8) = 10.83$, $p = .21$, CFI = .99, RMSEA = .05. All factor loadings were of adequate strength and significantly contributed to the latent variable (range .49–.86). To test the extent to which implicit attitudes toward the child were associated with mothers' self-reported positive and negative parenting, even with the contribution of explicit attitudes considered, we constructed a model examining SDQ prosocial scores (explicit attitudes) and IAT scores (implicit attitudes) along with maternal education and child age in association with the two latent variables representing positive and negative parenting (see Figure 1). The fit of the model was good, $\chi^2(24) = 35.68$, $p = .06$; CFI = .95; RMSEA = .06. The SDQ prosocial scale was significantly associated with both positive and negative parenting. In addition, mothers' IAT score was significantly associated with negative parenting. These results confirm unique associations of implicit attitudes with self-reported parenting.

Implicit Versus Explicit Attributions

Before testing whether the cognitive load manipulation moderated relations between attributions and self-reported parenting, we first ascertained whether the cognitive load manipulation was successful. Following the example of previous research (Gilbert & Hixon, 1991), we excluded from analyses 11 mothers, all in the high-cognitive load group, who demonstrated large errors in recall (accuracy less than 50%), leaving 52 mothers in the high-cognitive load group eligible for analysis. This exclusion criterion eliminated mothers who, on the basis of their poor recall, appeared not to be effortfully attempting to memorize the digit string, and thus were not actually under high-cognitive load while making their attributions. Comparing excluded mothers to those we retained indicated no significant differences in child age or gender, mother age,

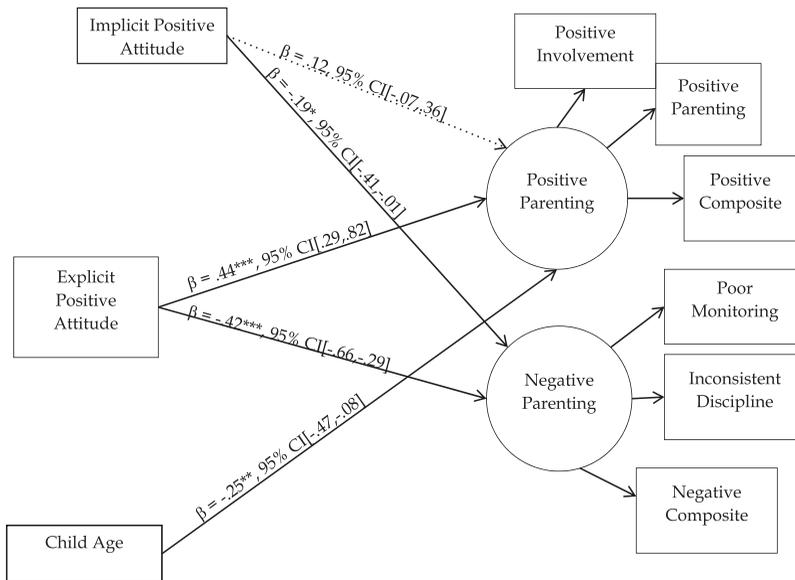


FIGURE 1

Mothers' attitudes in relation to self-reported positive and negative parenting. Implicit positive attitudes were assessed using the Implicit Associations Test. Explicit positive attitudes were assessed using the Strengths and Difficulties Questionnaire Prosocial Scale. Positive involvement, positive parenting, poor monitoring, and inconsistent discipline were assessed using the APQ. Positive and negative composites were assessed using the PCRQ. Although mothers' education was included as a covariate, all paths were not significant. Non-significant paths for main variables indicated by dotted lines. For the covariates, only significant paths are shown. * $p < .05$; ** $p < .01$; *** $p < .001$.

education, marital status, or ethnicity (all $ps > .27$), although excluded mothers had significantly lower family socioeconomic status, $t(61) = 2.98$, $p = .004$. We then compared included mothers in the high- and low-cognitive load groups on demographic variables and found no significant differences in child age or gender or mother age, education, marital status, ethnicity, or family socioeconomic status (all $ps > .30$).

As a further check of the cognitive load manipulation, we tested the effect of the manipulation on recall accuracy and mothers' ratings of the memory task's difficulty. As expected, t -tests revealed that mothers in the high-cognitive load group ($M = 5.82$, $SD = 1.14$) had poorer recall accuracy than mothers in the low-cognitive load group ($M = 7.81$, $SD = .33$), $t(111) = 13.01$, $p < .001$; and mothers in the high-cognitive load group rated the memory task as substantially more difficult ($M = 4.13$, $SD = 1.12$) than mothers in the low-cognitive load group ($M = 1.62$, $SD = .78$), $t(111) = 13.99$, $p < .001$. These results indicate successful manipulation of the cognitive load.

We examined bivariate correlations between attributions and the parenting composites within each of the cognitive load groups (see Table 3). Attributions were associated with the self-reported parent composite indices (especially positive parenting) within the high-cognitive load group, but these correlations were negligible in the low-cognitive load group. We then constructed a model examining the covariates, as well as mothers' negative attributions for child misbehavior score in association with the latent positive and negative parenting variables. The cognitive load manipulation

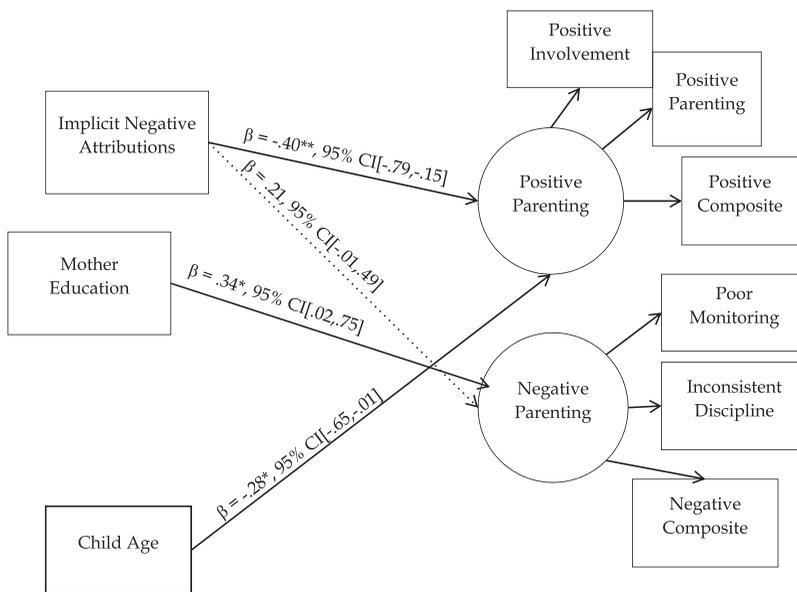


FIGURE 2

Mothers' attributions in relation to positive and negative self-reported parenting for the high-cognitive load group. Positive involvement, positive parenting, poor monitoring, and inconsistent discipline were assessed using the APQ. Positive and negative composites were assessed using the PCRQ. Non-significant paths for main variables indicated by dotted lines. For the covariates only significant paths are shown. * $p < .05$; ** $p < .01$; *** $p < .001$.

(high- versus low-cognitive load group) was tested as a moderator of the relations in this model by comparing Chi-square values from a model where all parameters were constrained to be equal across the two load groups to the Chi-square value from a model that allowed separate regression estimates for the two load groups. The overall model fit well, $\chi^2(58) = 49.55$, $p = .78$; CFI = 1.00; RMSEA = .00, and a significant Chi-square difference test indicated that cognitive load group significantly moderated the relations ($p = .003$). We examined the model separately for mothers in the two experimental groups. In the low-cognitive load group, relations between attributions and the parenting variables were weak and non-significant. As shown in Figure 2, in the high-cognitive load group, attributions were significantly negatively associated with the positive parenting variable (and marginally related to negative parenting). These results support the hypothesis that, compared to explicit attributions, implicit attributions are associated stronger with self-reported parenting, especially positive parenting.

Exploratory Analysis of Implicit Attitudes and Attributions in Association with Self-Reported Parenting

To examine the unique associations of implicit attitudes and attributions to self-reported parenting, we constructed a model testing the associations of the measures of implicit attitudes (IAT score) and of implicit attributions (from the high-cognitive load group), as well as covariates, to the self-reported parenting variables. As it was only within the high-cognitive load group that we assumed attributions were implicit,

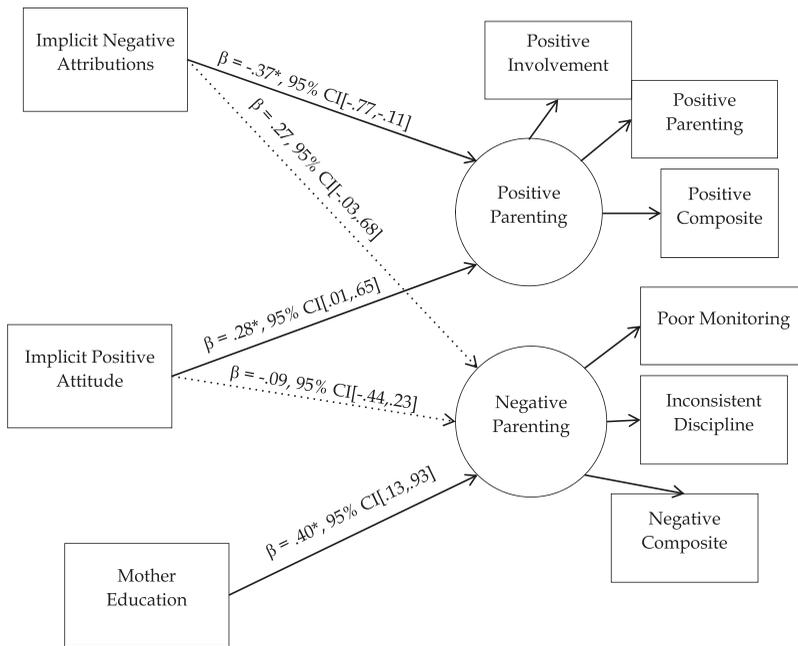


FIGURE 3

Mothers' attributions and attitudes in relation to self-reported positive and negative parenting for the high-cognitive load group. Positive involvement, positive parenting, poor monitoring, and inconsistent discipline were assessed using the APQ. Positive and negative composites were assessed using the PCRQ. Non-significant paths for main variables indicated by dotted lines. For the covariates only significant paths are shown. * $p < .05$; ** $p < .01$; *** $p < .001$.

this was the only group of mothers included in this exploratory analysis. The overall model fit well, $\chi^2(24) = 20.97, p = .64$; CFI = 1.00; RMSEA = .00. In the model (shown in Figure 3), mothers' attributions and IAT scores both were significantly associated with positive self-reported parenting. These findings suggest the unique importance of both implicit attitudes and attributions as correlates of self-reported parenting.

DISCUSSION

Our results are consistent with models of social cognition, referred to as dual-process models, that emphasize both implicit and explicit aspects of cognition (e.g., Andersen et al., 2007). We found that mothers' more implicit attitudes and attributions regarding their child are associated with self-reported parenting in ways distinct from the associations between parenting and explicit parent cognitions. As in previous studies (e.g., Crouch et al., 2012; Sturge-Apple et al., 2015), mothers' implicit positive attitudes about their children were significantly associated with less negative parenting, even with explicit self-reports of positive attitudes controlled. Similarly, consistent with previous studies examining implicit attributions regarding child misbehavior (e.g., Rodriguez et al., 2012; Sturge-Apple et al., 2014), when mothers offered child-blaming attributions

while simultaneously completing a taxing cognitive memory task (which was presumed to reduce cognitive resources available for attribution formation and correction and to yield more implicit attributions), these attributions were significantly associated with less self-reported positive parenting, in contrast to the more explicit attributions generated in a less cognitively demanding condition. This work not only confirms an emerging literature pointing to the importance of implicit parent cognitions, our exploratory analysis extends this literature by demonstrating the importance of implicit versions of both general parenting attitudes and child-behavior specific attributions.

Our findings also support the methodological utility of both the IAT and a cognitive load manipulation for assessing implicit parent cognitions. The comparative nature of the IAT that we used allowed us to examine mothers' positive attitudes toward their own children in comparison to attitudes to unknown children. Although this structure of the IAT makes scores dependent on the nature of the comparative stimuli (in this case, the faces of the unknown children) (Greenwald & Farnham, 2000), it also offers a potentially advantageous control for the overall positivity bias that adults may show toward all children. In addition, we believe that the cognitive load manipulation we used bears face validity with respect to the types of busy parenting situations in which parents must form attributions regarding their children's behavior (e.g., trying to remember an important phone number or a grocery list while responding to child misbehavior). These two methodologies are now added to the arsenal of such measures reported in previous studies, including single category versions of the IAT, go/no go association tests, eye-tracking, and coding of parents' speech samples. Each of these methods has advantages and disadvantages, and future studies are needed to compare their utilities and their abilities to provide useful information in response to particular research questions.

Both the implicit and explicit positive attitudes that mothers held about their children were each uniquely associated with self-reported parenting, although not significantly related to each other, supporting the independent contributions of these types of cognitive processing (e.g., Greenwald et al., 2009; Nosek & Smyth, 2007). Positive assessments of the child on the SDQ prosocial subscale, our explicit attitude measure, were significantly associated with more positive and less negative parenting consistent with previous studies and with models of parenting that emphasize transactional linkages among child adjustment, positive parental attitudes, and more adaptive parenting behavior (e.g., Bugental & Johnston, 2000; Holden & Edwards, 1989). However, even with these more commonly measured explicit attitudes accounted for, mothers' scores on the IAT measure of more implicit positive attitudes remained significantly associated with positive parenting. These unique associations of self-reported parenting with both the explicit and implicit attitude measures support the contribution of each of these types of parent attitudes, and the value of assessing implicit cognitions, at least in understanding positive parenting.

Mothers' attributions for child misbehavior made under conditions of limited cognitive resources (presumed to be implicit attributions) were significantly or marginally associated with the self-reported parenting variables. In contrast, mothers' attributions measured in the low-cognitive load group (presumed to be explicit attributions) were not significantly related to self-reported parenting. Although the moderation of the relation between attributions and parenting by the cognitive load manipulation supports the independent importance of implicitly formed attributions, the lack of significant associations in the low-cognitive load group is somewhat contrary to previous studies (e.g., Johnston et al., 2009; Snyder et al., 2005). However, associations between parent

attributions and parenting are seldom strong and factors such as the presence of other tasks or measures and the normative nature of the sample may account for these non-significant findings. In particular, in this community sample, mothers may have been particularly reluctant to blame the child for misbehavior, and, in contrast to mothers under high-cognitive load constraints, the attributional processing of mothers in the low-cognitive load group may have allowed for greater consideration of social desirability in their attributional judgments. The attribution measure demonstrated similar internal consistency in both cognitive load groups, and thus measurement differences do not offer a ready explanation for the different results. However, further probing of the construct validity of attributions formed under the two conditions would be useful.

Although our overall pattern of results is consistent with previous findings, the different patterns of relations to positive and negative aspects of self-reported parenting behavior revealed for implicit parent attitudes and attributions in the SEM models were somewhat unexpected. For attitudes, IAT scores were significantly, uniquely linked to negative parenting, but not to positive parenting. In contrast, attributions in the high-cognitive load group (presumed to be the more implicit attributions) were significantly associated with positive parenting, but only marginally to negative parenting. These differential links to positive and negative self-reported parenting might suggest that implicit general attitudes about the child are important in driving harsh or rejecting parenting, whereas implicit attributions that blame the child for specific child misbehaviors play a role in also reducing parental acceptance or warmth. However, in the exploratory analysis model both implicit attitudes and attributions maintained significant links only to positive parenting. It is important to note that we did not directly test for differences in the magnitude of these relations across models. The SEM model for attitudes (Figure 1) includes all mothers, but those for attributions (Figure 2) and the comparison of attributions and attitudes (Figure 3) contain only the mothers in the high-cognitive load group. The pathways in the SEM models are influenced by these differences in samples and by the presence of other variables included in the models. Therefore, we are hesitant to draw conclusions suggesting that the non-significant or marginal associations in our models would not emerge as significant in larger or different samples or models. Replication is clearly needed before we would have confidence in this differential pattern of associations. We believe this pattern of associations is best taken as evidence, not necessarily of the uniqueness of links to positive versus negative parenting, but rather as confirming the importance of attending to positive, as well as negative dimensions of parenting. Although it is understandable that much of the parenting literature has focused on parenting difficulties, our results point to the importance of a perspective that also incorporates positive aspects of parenting, such as involvement or warmth. Particularly in community samples, such as the one tested here, where negative parenting behaviors are relatively mild or infrequently reported, implicit parent attitudes and attributions may be more closely linked to variations in parent reports of behaviors, such as warmth or closeness, with the child.

Within the context of its contributions to advancing an understanding of parent cognitions, there are limitations to the present study that must be noted. One critical limitation is the use of questionnaires to measure parenting behavior, presumably yielding explicit and potentially biased self-reports of parenting behavior. However, the explicit parent cognitions did not hold more significant relations to explicitly measured parenting than did the implicit cognitions, suggesting that shared measurement method (explicit reports of both cognitions and parenting) was not a concern. Still, the

explicit and self-reported nature of the parenting measures leaves us without a sense of how both explicit and implicit cognitions would predict more automatic or reflexive (i.e., implicit) types of parenting actions that might only be accessible by observations. Research incorporating observational or other-informant measures of parenting will be useful in providing insight into how cognitions may impact aspects of parenting that are less accessible to the parent's awareness or which parents are reluctant to report.

We also acknowledge that, although measures such as the IAT or methods such as cognitive load manipulations are thought to increase the impact of implicit processing of information, they do not provide purely implicit responses (e.g., Conrey, Sherman, Gawronski, Hugenberg, & Groom, 2005). Parents' cognitive processing, regardless of method of assessment, is best viewed as always reflecting a combination of more implicit processing that occurs relatively outside of conscious awareness as well as more controlled or effortful explicit processing. Procedures such as the IAT and cognitive load serve only to tip the balance of these two types of processing slightly in favor of the more implicit.

Although we included both female and male children in the study, the limited sample size prevented analysis of how child gender may moderate the associations between mothers' cognitions and their self-reported parenting behavior. Similarly, our exclusion of fathers prohibits analysis of parent gender effects or interactions with child gender. Although research has not yet provided a clear picture of how such gender effects may manifest in parent cognitions or in the relations between parent cognitions and behavior, previous studies have demonstrated that these gender effects do exist (e.g., Bugental & Johnston, 2000). Possible gender differences remain an area in need of further study.

Finally, the relatively modest effect sizes demonstrated in this study reinforce the need for replication, and the community nature of this sample limits confidence in generalization of the results to families characterized by greater difficulties in either child behavior or parenting. Although online recruitment provides access to a broad range of participants and evidence suggests that the reliability and validity of data collected by this method is consistent with face to face methods (e.g., Bjornsdotter, Enebrink, & Ghaderi, 2013; Casler, Bickel, & Hackett, 2013), whether our reliance on an online procedure would influence the generalizability of our results remains unknown.

Conclusions

Our findings support the value of applying models of implicit and explicit cognitive processing to the context of parenting and add to a growing literature on the importance of more automatic, uncontrolled cognitive processing as a determinant of parenting actions. Mothers' implicit attitudes toward their child and their implicit attributions of child-blame were both related to self-reported parenting, independent of the relations between parenting and explicit attitudes and attributions. Moreover, our results confirm previous findings and demonstrate the utility of two additional implicit measurement methods as applied to parenting; a cognitive load manipulation and the IAT. We speculate that the high-cognitive load task and the IAT both decreased mothers' use of controlled, effortful processing in the formation of their attitude and attribution responses, and instead required a reliance on the types of mental processes that occur more outside of conscious awareness. As Baldwin, Lydon, McClure, and Etchison (2010) highlighted in a review of implicit processes in close relationships, many social cognitions are formed under natural conditions of time pressure or multi-tasking,

and these conditions mimic the relatively automatic, rapid processing of information required by the IAT or under high-cognitive load. In this regard, the parent cognitions tapped by the implicit measures are argued to resemble the parent cognitions that occur in day-to-day parenting situations, and it is then understandable that they are significantly related to the parenting behaviors that mothers may use in interacting with their children.

IMPLICATIONS FOR PRACTICE, APPLICATION, AND POLICY

Understanding parents' thoughts about their children, in both explicit and implicit forms, has the potential to provide a fuller picture of the determinants of parenting, and thus, to guide our efforts to improve parenting and child outcomes. Given the potential of implicit parent cognitions to inform aspects of parenting and parent-child relationships that may be particularly subject to impression management biases (e.g., harsh parental discipline), the evaluation of these cognitions in clinical samples presents itself as an obvious next step for research. The preliminary work of Milner and colleagues (e.g., Crouch et al., 2012; Farc et al., 2008) with families at risk for abuse and of Sturge-Apple et al. (2014) with socially disadvantaged families demonstrates the promise of such work in assessing parent cognitions in populations where explicit self-reports may be compromised. As research continues to replicate and extend our understanding of the function and importance of both explicit and implicit parent cognitions, the relevance of implicit cognitions in parenting interventions also may be realized. For example, efforts to alter more automatic or implicit biases in parent attributions about child behavior may prove a useful adjunct to interventions designed to assist families at risk for abusive parenting.

ADDRESSES AND AFFILIATIONS

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