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Delving Beyond Conscious Attitudes: Validation of an Innovative Tool for Assessing Parental Implicit Attitudes toward Physical Punishment

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Abstract

Parenting scholars have long been interested in understanding the prevalence, determinants, and child outcomes associated with the use of physical discipline. To date, much of the empirical research in this area has utilized self-report measures to assess this construct. However, the subjective nature of participants' explicit reports presents an important confound to studying this issue. Thus, the overarching aim of this study was to provide the first test of an implicit assessment of physical discipline through using a Go/No-go Association Task (GNAT). A GNAT-Physical Discipline was developed and examined in two separate studies of mothers and their 2-3 year old child. One study was conducted in an online format and the second within a laboratory design. Across both studies, findings suggested that the GNAT-Physical Discipline distinguished between positive and negative implicit attitudes towards the use of physical discipline. In addition, negative implicit attitudes were uniquely linked to maternal reports of physical discipline when compared to other discipline practices. Results suggest the potential for the GNAT paradigm in research on parental attitudes around the use of physical discipline in parenting contexts. In addition, our use of an online format (with implicit assessments of key constructs) demonstrates that child and family researchers may be able to explore their hypotheses in larger, geographically diverse samples.

Keywords

Physical Discipline; Implicit Attitudes; Parenting

Psychologists, practitioners, and public policy makers have long been interested in the impact of parental discipline and, in particular, the use of physical discipline on child development (Baumrind, 1996; Benjet & Kazdin, 2003; Fine, Trentacosta, Izard, Mostrow, & Campbell, 2004; Gershoff, 2002; & Miner & Clark-Stewart, 2008). To date, research within the U.S. has documented that for parents of toddlers, physical punishment is a common disciplinary practice (e.g., MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel; Regalado, Sareen, Inkelas, Wissow, & Halfon, 2004; Wissow, 2001). Parental use of

physical discipline remains a controversial issue and is subject to considerable debate in the realm of social science (Baumrind, Larzelere, & Cowan, 2002; Ferguson, 2013; Gershoff, 2002) and in the general public (American Academy of Pediatrics, 1998; Kazdin, 2008). Across virtually all studies, parental self-report on their use of physical discipline with their child is utilized. This method offers several advantages in that it is relatively easy to administer and score and does not require training and rater interpretation when compared to interview methodologies. However, self-report assessments primarily tap controlled and explicit processing of events, and research has shown that questionnaire or interview measures are subject to interfering processes such as limits of awareness, distortion, and impression management (Stone et al., 2000). Moreover, this bias may be especially evident when there are social expectations and societal values concerning that attitude (Crosby, Bromley, & Saxe, 1984; Nosek, 2007). Given the potential social undesirability around reporting about the use of physical discipline, pen and paper measures may not accurately reflect parental mindsets or behavior as parents are likely to feel pressure to under-report their use of this increasingly stigmatized parenting technique.

This concern is reflected in discrepancies across studies in parental reports of how ‘often’ they use physical discipline with their child. For example, some research has reported rates of spanking over the course of the child's lifetime around 80% (Gershoff, Lansford, Sexton, Davis-Kean, & Sameroff, 2012). However, several large and nationally representative survey studies of parenting have reported rates ranging from 26% to 68% of parents using spanking to discipline their toddlers (e.g., MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel, 2011; Regalado, Sareen, Inkelas, Wissow, & Halfon, 2004; Wissow, 2001). Rates also vary due to how the questions are posed, the timeframe of the behavior, and who is reporting. In fact, recent research documenting downward trends as large as 18% in use of corporal punishment in the United States over the past few decades suggest that this phenomenon might be a consequence of increases in social stigma attached and its effects on parents’ willingness to disclose physical discipline rather than actual changes in the use of this practice (Zolotor, Theodore, Runyan, Chang, & Laskey, 2011). As a result, the confluence of the subjective nature of participants’ responses and methodological concerns continues to present an important confound to studying this important issue and increases the importance of gathering more objective data.

A Consideration of Implicit Attitudes of Physical Discipline

Dual-process models of social-cognition propose two qualitatively distinct processing structures, those that exist at an *explicit* level and those that exist at an *implicit* level. Within the dual-process framework, implicit attitudes are typically characterized as automatically activated affective reactions to environmental stimuli which use less cognitive capacity (Gawronski & Bodenhausen, 2006). Thus, implicit attitudes are proposed to be more automatic, impulsive, and stable across situations (Strack & Deutsch, 2004; Wilson, Lindsey, & Schooler, 2000), representing associations that may exist outside of individuals’ awareness or deliberate control.

In response to the limits of self-report approaches to measuring potentially controversial constructs, researchers have focused on developing implicit measures which tap into

automatic and implicit cognitions, enabling them to assess cognitions that may exist outside of the subject's awareness or their deliberate control. The field of implicit assessment has exponentially increased over the past decade given advances in computer methodology. To operationalize their conceptual distinction from explicit attitudes, implicit attitudes are generally tested *indirectly* via word-sorting tasks that use reaction times or accuracy rates to see how strongly a target concept is associated with opposing valences (e.g., good vs. bad). Since their introduction over a decade ago (Greenwald, McGhee, & Schwartz, 1998), these methodologies have been used to assess implicit associations in a number of domains which are considered socially provocative including racial stereotypes (e.g., McConnell & Leibold, 2001) and stigmatized behaviors such as smoking (e.g. Gray, MacCulloch, Smith, Morris, & Snowden, 2003; Robinson, Meier, Zetocha, & McCaul, 2005).

Although much of the extant work has focused on using implicit assessments to tap into controversial attitudes, a small but growing number of studies have extended this work into the realm of relationships. For example, Lee and colleagues reported that implicit attitudes toward a romantic partner (assessed with a partner-focused GNAT) served as a more powerful predictor of relationship breakup over the following year than a set of self-reported indices of relationship quality (Lee, Rogge, & Reis, 2010). Crouch and colleagues (2012) demonstrated that parents who were at high risk for child abuse exhibited shortened latencies in responding to negative words as well as longer latencies in responding to positive words in an implicit word sorting task after losing in a competitive paradigm with an adult opponent. These results suggest that implicit assessments offer researchers a method of assessing attitudes of which subjects are not fully aware or which they are reluctant to fully report on self-report scales. In accord with the goal of this special issue on methodological innovation for the study of parenting, the overarching aim of this paper was to provide the first test of an implicit assessment of physical discipline.

Assessment of Implicit Attitudes

In the current study, we utilized the “Go/No-go Association Test” or GNAT paradigm to assess mother's implicit attitudes about physical discipline (Nosek & Banaji, 2001). The GNAT is a fast-paced, word-sorting task conceptually similar to the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) that assesses the accuracy with which respondents are able to pair target words (in this case words referring to physical discipline) with either good or bad words to determine how strongly the concept of physical discipline has automatic positive and/or negative associations for individual parents. We chose to use a GNAT rather than an IAT as it allowed us to assess attitudes toward a single target whereas the IAT traditionally uses opposing target categories (e.g., attitudes toward white vs. black individuals). Recent research conducted by Bar-Anan and Nosek (2013) provides substantial evidence for the psychometric properties of Go/No-go task demonstrating good internal consistency ($\alpha = .74$); test-retest reliability (average correlation = .42), and good discriminant validity.

The GNAT-Physical Discipline involves sets of word-sorting trials in which three types of words (good, bad, and discipline words) are presented one at a time in random order to participants at the center of a computer screen. Participants are asked to press the space bar

(a 'Go' response) if the word being presented falls into one of the target categories for that set of trials and to refrain from hitting the space bar (a 'No-go' response) during a short interval after each of the stimuli are presented. After each trial, feedback is briefly flashed on the screen indicating a correct or incorrect response on the trial. To assess how strongly discipline is automatically associated with a *positive* valence (e.g., a positive implicit association), one block of trials identifies *discipline* words and *good* words as the target categories, effectively assessing how accurately individuals can pair those two concepts when limiting the time for more elaborate and controlled thought. Similarly, to assess how strongly discipline is automatically associated with a *negative* valence, a separate block of trials identifies *discipline* words and *bad* words as the target categories. Therefore, the GNAT-Physical Discipline indexes an implicit association by determining the strength of associations between the concept of physical punishment and opposing (positive and negative) valence concepts.

In summary, the primary aim of the present paper was to test the construct validity of the Go/No-go Association Test for assessing parental positive and negative implicit attitudes about physical discipline. We conducted two separate studies of the GNAT-Physical Discipline. Both studies included mothers with their 2-3 year old child. We focused on examining implicit attitudes in mothers with preschool-aged children given evidence that parental use of discipline peaks during this time period (Straus & Stewart, 1999) and organizing child-rearing practices in a way that promotes parental sensitivity and responsiveness is particularly challenging (Holden, 2010). The same GNAT-Physical Discipline task was used in both studies to maintain consistency in our central construct of interest. To demonstrate the robustness of the GNAT measure, we utilized two different self-report measures of discipline across our two studies. To document the utility and flexibility of this method for research on parenting, Study 1 was conducted using an online, web-based format while Study 2 was conducted with a laboratory assessment. We had three primary aims: (1) examine whether the GNAT-Physical Discipline could reliably determine differences in negative and positive implicit attitudes about physical discipline (Study 1 and Study 2), (2) test the convergent validity of the GNAT-Physical Discipline with mother's report of physical discipline (Study 2), and (3) test the divergent validity of the GNAT-Physical Discipline with respect to other forms of discipline (Study 2).

Study 1

In Study 1, our first aim was to determine if differences in negative and positive implicit attitudes about physical discipline could be determined. In accordance with research using the GNAT for controversial subjects, we hypothesized that mothers would have higher negative implicit attitudes compared to positive implicit attitudes around physical discipline. Our second aim was to examine if mean differences in positive and negative implicit evaluations exist between mothers who endorse using physical discipline from those who don't. To the extent that differences were found, this would suggest that implicit attitudes may serve as a useful construct in understanding parental use of physical discipline. If differences were not found, this would suggest that implicit attitudes have little meaning for the use of physical discipline. We hypothesized that mothers who report using physical

discipline tactics would have higher positive attitudes and lower negative attitudes about physical discipline.

Method

Participants—Participants were part of a larger project examining family relationships in early childhood and included 253 mothers (M age = 34.59) with a 2-3 year old child (46% male) who were recruited from online/parenting forums (32%), emails to distribution lists (32%) and parenting/mothers groups across the country (36%). Median family income of participants ranged from \$30,001 – \$40,000 a year. Maternal education level was varied with most reporting earning a Bachelor's degree or above (84%). Many of the participants identified themselves as White (83.0%), with smaller percentages identifying themselves as African American (5.1%), Latino (5.5%), Asian/Pacific Islander (4.0%), and Biracial/Other (2.0%).

Procedure—Mothers completed a 20-minute online survey containing self-report measures and the GNAT- Physical Discipline assessment. Respondents were provided with feedback on several dimensions of their romantic relationship quality at the end of that initial survey as the primary recruitment incentive. All of the methods and procedures for this study were evaluated and approved by a university Institutional Review Board.

GNAT- Physical discipline

Stimuli: Maternal implicit attitudes about physical punishment were assessed using the GNAT-Physical Discipline which was created for the current study. As mentioned above, the GNAT-Physical Discipline tasks were nearly identical across Studies 1 and 2. The GNAT- Physical Discipline utilized three types of stimuli; (1) positive words (peace, vacation, gift, lucky, health, laughter, freedom, cheer, heaven, loyal, honest, paradise, diamond, pleasure, rainbow, honor, miracle, and sunrise), (2) negative words (death, accident, tragedy, vomit, crash, filth, grief, poison, stink, sickness, murder, evil, disaster, jail, poverty, ugly, cancer, agony, rotten), and (3) physical discipline words (swat, spank, smack, whooping, slap, hit). To maintain comparable levels of exposure and habituation, we selected positive and negative words from lists of good and bad words used for other word sorting tasks (Greenwald et al., 1998).

Word Sorting Task: In each block of trials, mothers were given random mixtures of words from the different categories. The words were presented one at a time in light colors and large (20-40 point) fonts at the center of a screen with a black background, and mothers were asked to sort them by pressing the spacebar for words in the target categories (a Go response) and to refrain from pressing the spacebar for words in the distracter category (a No-go response). The category labels for the target categories were presented in the upper left-hand corner of the screen during each block of trials. Following guidelines outlined by the developers of GNAT (Nosek & Banaji, 2001), stimuli were presented for 650 ms in Study 1 and for 675 ms in Study 2, with an intertrial interval of 400 ms, creating a rapid task with an average sorting accuracy rate of roughly 80%. After each trial, a green O (for a correct response) or a red X (for an incorrect response) flashed on the screen for 100 ms during the intertrial interval.

Blocks of Trials: The GNAT-Physical Discipline began with two practice blocks of 16 trials. For each trial, participants were asked to sort positive stimuli from negative stimuli. These trials were followed by two critical 49-trial blocks, in which participants had to discriminate among three sets of stimuli (positive, negative, discipline). In one 49-trial block, both positive stimuli and discipline stimuli were identified as targets, thereby indirectly assessing the implicit positive associations toward physical discipline; in the other 49-trial block, negative stimuli and discipline stimuli were targets, assessing implicit negative associations toward physical discipline. The order of the practice and critical blocks was fully counterbalanced across respondents to control for ordering effects.

Measures

D' performance indices—Accuracy of sorting within each block of trials on the GNAT served as the main performance index. To control for inflated hit rates resulting from indiscriminant responding, we calculated d' (d-prime) values by subtracting the false alarm rate from the hit rate (in each block) after they were standardized with a probit function. Extreme cell values (0 or 1) were corrected following recommendations by Banaji and Greenwald (1995). Negative d' values indicated below chance levels of performance and were consequently treated as missing data following established guidelines (e.g., Nosek & Banaji, 2001).

Physical Discipline—In order to obtain an explicit report of physical discipline, mothers answered items on the Endorsement of Corporal Punishment subscale from the Adolescent-Adult Parenting Inventory (AAPI; Bavolek, 1984). The items of this subscale are used to gauge mothers' evaluation of corporate punishment as an acceptable and appropriate form of discipline (e.g., "children should always be spanked when they misbehave"). Items were presented on a 5-point scale (strongly disagree to strongly agree). Internal consistency was satisfactory in the present study ($\alpha = .90$). The validity of the measure is supported by its associations with related parenting constructs (Bavolek, 1984; Fischer & Corcoran, 2007).

Results

Table 1 shows the correlations for the main variables in the study. We first examined maternal d' scores on the GNAT-Physical Discipline assessment. As expected, the average score on negative implicit attitudes about physical discipline ($M = 2.90$, $SD = 1.13$) was higher than positive implicit attitudes ($M = 1.37$, $SD = 0.83$). Controlling for family income, a one-way within subjects ANCOVA was conducted to compare the mean difference in positive and negative attitudes. There was a significant difference, Wilks' Lambda = .66, $F(1,169) = 87.64$, $p = .001$, $\eta_p^2 = .34$. These results indicated that mothers had higher negative implicit evaluations of physical discipline compared to positive ones with a moderate effect size. In addition, family income did not have a significant main effect on differences ($p = .53$).

We next examined whether there were differences in positive and negative attitudes towards physical discipline between mothers who endorsed physical punishment compared to those who did not. Prior to running analyses, we performed a transformation on the d' scores to control for shared method variance (e.g., general levels of ability, effort expended, sustained

attention). Following previous recommendations, we calculated a reciprocally residualized variable for both positive and negative associations about discipline (e.g., Boldero, Rawlings, & Haslam, 2007). We accomplished this by regressing the d' score for the discipline-good trials on the d' score for discipline-bad trials and then saving the unstandardized residual score. This residual score reflects an individual's performance on the discipline-bad trials after taking into account performance ability on the task. We then ran the reciprocal regression to create a residualized index of performance on the discipline-good trials. This approach has been shown to effectively control for shared method variance.

Transformed scores were submitted to one-way within-subjects ANCOVA controlling for family income. The between-subjects factor was parental endorsement of physical discipline (endorse vs non-endorse). To determine this, mothers who indicated that they disagree with the use of physical punishment across all items on the AAPI were coded as not endorsing the use of physical punishment (e.g., averages item responses ≤ 3.0 , $n = 191$). Mothers who indicated that they agreed with the use of physical punishment on any item were coded as endorsing the use of physical punishment (e.g., averages item responses > 3.0 , $n = 57$). The within-subject factors reflected performance on the discipline-good and discipline-bad blocks of trials in the GNAT- Physical Discipline task.

The main effect of GNAT-Physical Discipline block was not significant, Wilks' Lambda = 0.99, $F(1, 169) = 0.82$, $p = .37$, $\eta_p^2 = .005$. In addition, family income did not have a significant main effect on group differences ($p = .99$). However there was a significant interaction, Wilks' Lambda = 0.97, $F(1, 169) = 4.65$, $p = .03$, $\eta_p^2 = .03$. This interaction (see Figure 1) revealed that mothers who endorsed physical punishment had less negative implicit attitudes towards discipline words compared to mothers who did not endorse physical punishment. In addition, mothers who endorsed physical punishment had a significant mean difference in good ($M = .05$) and bad ($M = -.44$) residual d' values, $t(34) = 2.05$, $p < .05$. In contrast, mothers who did not endorse physical discipline did not differ in residualized d' values reflecting positive ($M = -.01$) and negative ($M = .11$) implicit attitudes, $t(133) = -1.01$, $p = .32$.

Discussion

Findings from Study 1 offered preliminary evidence supporting the validity of the GNAT-Physical Discipline as a measure of attitudes toward physical punishment. Specifically, the results revealed that differences in positive and negative implicit attitudes towards physical discipline could be determined using the GNAT paradigm. Furthermore, results also suggested that mothers who endorsed physical discipline and those who did not had diverging implicit evaluations of physical discipline. For mothers who did not endorse physical discipline, mean differences between negative and positive attitudes were not significant. Further examination of these scores showed that these mothers held lower positive implicit attitudes when compared to negative implicit attitudes towards physical discipline; however, this difference did not reach significance. Conversely, for mothers who endorsed physical discipline, GNAT scores comparing positive and negative associations with physical discipline were significantly different from zero. It appeared that the primary driver of differences in mothers was the relatively low negative association with physical

discipline in mothers who endorse this practice. Thus, for these mothers, it appears that the use of physical discipline is not viewed in a negative light at an implicit level. Taken together, this set of findings demonstrates that implicit attitudes may provide an important source of information regarding the use of physical punishment.

Study 1 also represents a novel contribution to the family literature as it was conducted entirely online. There is a robust tradition within the child and family literature of collecting data with laboratory visits. Although this provides researchers with the ability to standardize assessments and collect rich sources of data beyond just self-report measures (e.g., behavioral observations, interview data), it is a very labor intensive and costly approach. Lab visits (typically spanning several hours) involve the coordination of the researchers, parents and children's schedules, require substantial subject payments, and involve a substantial time investment for both the researchers and family members. The findings of Study 1 (supporting the GNAT-Physical Discipline) offer family researchers another method of enriching their assessments beyond self-report data that can be conducted entirely online, without the need for a laboratory visit. Following a more general trend of researchers taking advantage of the tremendous online resources for conducting inexpensive and yet highly effective online studies (see Maniaci & Rogge, 2013 for a review), these findings open up novel avenues for family researchers. Conducting online surveys (with implicit assessments of key constructs) could allow child and family researchers to explore their hypotheses in larger samples and even possibly with more frequent waves of follow-up assessment while still ensuring that those studies cost markedly less in terms of both subject payments and in terms of the time involved for the researchers and the participating families.

Study 2

In Study 2, we sought to replicate the findings from Study 1 regarding differences in positive and negative attitudes about physical discipline in mothers from data collected in a laboratory visit. In order to build upon our first study, Study 2 was also conducted to provide evidence for the convergent and discriminant validity of the GNAT-Physical Discipline with mother's self-report of discipline. Convergent validity would be support if the GNAT was associated with maternal report of physical discipline. Discriminant validity would be supported if the GNAT was not associated with other discipline strategies. To test this, we obtained maternal reports on physical discipline, inductive discipline (e.g. explaining reasons to child for why misbehavior is not appropriate), and social consequences (e.g., isolation). To test for convergent and discriminant validity, we utilized a path model approach which allows for the simultaneous examination of multiple predictors and outcomes. This method controls for co-linearity among the implicit and explicit measures being evaluated, which allows for a stronger tests of association. In addition, it allows for tests comparing the strength of the associations between the GNAT and maternal report on discipline strategies. We hypothesized that the GNAT-Physical Discipline would be associated with maternal report of physical discipline but not with reports on alternative discipline strategies.

Method

Participants—Participants were part of a larger project examining mother-child relationships and included 101 mothers (M age = 34.36) with a 3.5 year old child (53% male) from a mid-sized city in the Northeastern United States. Participants were recruited both through posting flyers in community locations (e.g. doctor's offices, daycares, and libraries). Median family income of participants was \$75,000. Maternal education level was varied with half reporting earning a Bachelor's degree or above (64%). Many of the participants identified themselves as White (91%), with smaller percentages identifying themselves as African American (7%), Latino/Hispanic (1%), and Asian/Pacific Islander (1%).

Procedures—Data were collected during one 3-hour laboratory session that included both mother and child. Mothers completed an intake interview, the GNAT-Physical Discipline assessment, and a battery of questionnaires. Families were compensated \$75 for their time. All of the methods and procedures for this study were evaluated and approved by a university Institutional Review Board.

Measures

d' Performance indices: Maternal implicit attitudes about discipline were assessed with the same GNAT-Physical Discipline used in Study 1. D' performance scores as discussed in the measures section of Study 1 were used as indicators of implicit attitudes

Maternal discipline strategies: To assess discipline strategies, mothers completed the Parenting Dimensions Inventory (PDI; Power, 2003). Scores were based on mother's report of likelihood to use different strategies in response to two child behavioral transgression vignettes including, "After arguing over toys, your child strikes a playmate", and "You see your child playing at a busy street which you have forbidden him/her to go near for safety reasons." Mothers rated the likelihood of using three different strategies on a 4 -point scale (0 = very unlikely to do, 3 = very likely to do). The three strategies were inductive discipline ("Talk to your child, discuss alternatives, discuss your reasons for wanting the child to do or not do something"), social consequence ("Send your child to room or isolate by sitting in a chair"), and physical punishment ("Spanking or hitting"). Internal consistencies for each subscale were acceptable (α s ranged from .68 to .74) and items were moderately correlated within scales and were summed to create a composite for each strategy.

Results—We first examined maternal d' scores on the GNAT assessment. Similar to our findings in Study 1, the average d' score on negative implicit attitudes about physical discipline ($M = 3.38$, $SD = 1.14$) was higher than the corresponding d' score representing positive implicit attitudes ($M = 2.02$, $SD = 1.12$). A one-way within subjects ANCOVA, controlling for family income, was conducted to compare the difference in positive and negative attitudes. There was a significant difference, Wilks' Lambda = .70, $F(1,69) = 29.40$, $p = .001$, $\eta_p^2 = .30$. Thus, our findings replicated Study 1 in demonstrating that mothers generally had higher negative implicit evaluations of physical discipline compared to positive ones. Furthermore, the effect size of this difference as indicated by the partial eta-squared in the current study was similar in magnitude to Study 1 (.30 vs. .33, respectively).

We next examined whether GNAT d' scores were differentially associated with discipline strategies. Given that we wanted to simultaneously estimate regression parameters for multiple outcomes, we utilized path analysis within an SEM framework using AMOS software to analyze our model (SPSS Inc., Chicago, 2007). The strength of this approach over hierarchical regression methods is that all pathways are estimated simultaneously in model analyses. Although the study design was cross-sectional, missing data was present due to equipment failure the GNAT assessment (26% missing). To maximize our sample size, we utilized Full Information Maximum Likelihood estimation available in AMOS (e.g., FIML; Enders, 2001). FIML estimates the model as though the full sample was present and is appropriate when the data are missing at random (e.g., no identifiable pattern exists in the missing data) and the amount of missing data is as high as 50% (Schlomer, Bauman, & Card, 2010). To evaluate whether data were missing completely at random (MCAR), we examined the patterns of missing data using Little's MCAR test (Little, 1998). Results showed that the data were indeed MCAR ($\chi^2 = 0.49$ (3), $p > .05$) and suitable for FIML estimation.

Path model findings are presented in Figure 2. All possible covariances and regression paths were estimated, thus the model was fully identified with 0 degrees of freedom meaning that all relationships among variables were included in the model. For ease of presentation, non-significant paths are not included in the figure (p -values for paths ranged from .27 to .92). Model analyses revealed that only the d' score for negative implicit attitudes about discipline was associated with maternal endorsement of physical punishment ($\beta = -.34$, $B = -.20$, $SE = .07$, $p = .006$). Furthermore, this pathway explained 10% of the variance in maternal physical discipline. Thus, higher negative implicit attitudes (assessed by the GNAT- Physical Discipline) predicted lower levels of self-reported physical punishment behavior, demonstrating the convergent validity of the GNAT-Physical Discipline with more traditional self-report measures.

We utilized pairwise parameter comparisons available in AMOS's Critical Ratio of Differences command for testing differences in the magnitude of the pathways from discipline negative d' scores to discipline strategies. Pairwise parameter comparisons test whether two parameters are significantly different from one another by calculating the difference between the two estimates divided by the estimated standard error of the difference. The resulting difference statistic is normally distributed and tested against the z -score distribution ($CR > 1.96$). We report the difference statistic (indicated by ds in results section) for pairwise tests. When examining differential associations among the three parenting strategies and negative attitudes on the GNAT-Physical Discipline, results showed that negative attitudes on the GNAT were a marginally stronger predictor compared to inductive discipline ($d = 1.74$) and social consequences ($d = 1.70$). Thus, negative implicit attitudes were strongly associated with the corresponding self-reported rates of physical punishment demonstrating evidence of discriminant validity for the GNAT- Physical Discipline. Interestingly, negative implicit attitudes were a stronger predictor of physical discipline when compared to positive attitudes about discipline ($d = 1.96$).

Discussion—The results of Study 2 replicated the main effect findings of Study 1 through demonstrating that overall negative implicit attitudes about physical discipline were higher

than positive implicit attitudes. Given the differences in study modality with one within a laboratory and another conducted online, the consistency in these findings provide strong evidence for the potential of implicit assessments of parental discipline in parenting research.

In addition, Study 2 provided initial evidence for the construct validity of the GNAT-Physical Discipline as an assessment of implicit attitudes around the use of physical discipline. First, our findings suggested specificity with respect to the assessment of implicit attitudes about physical discipline and maternal discipline strategies. In support of convergent validity, the GNAT-Physical Discipline was associated with maternal report of physical discipline. Specifically higher negative implicit attitudes in mothers were associated with lower use of physical discipline with their child. It is interesting to note that positive attitudes were not associated with physical discipline. This replicates our findings in Study 1 and suggests that negative implicit attitudes about physical discipline may hold more information with respect to parental cognitions about this discipline practice when compared to positive implicit attitudes. We discuss the implications for this further in our general discussion. Second, findings demonstrated to a certain extent, the ability of the GNAT-Physical Discipline to discriminate physical discipline from other forms of behavioral control. Precision in measurement is a key consideration when developing constructs. Our demonstration of discriminant validity for physical discipline in Study 2 suggests that the GNAT-Physical Discipline may be a potent tool in tapping implicit attitudes around physical discipline. It will be interesting for future work to determine if implicit assessments of other forms of discipline may tap into parental endorsement of these techniques, or if an implicit measure is more potent for more controversial discipline practices.

General Discussion

In accordance with the aims of this special issue, the primary goal of the present paper was to introduce and provide initial validation of an implicit assessment of maternal attitudes of physical discipline. Our novel integration of the dual-process conceptual framework along with the translation of GNAT methodology to the realm of parental physical discipline answers a call made almost two decades ago. In a special section in *Child Development*, Miller (1988) advocated for parenting scholars to utilize the field of social psychology for guidance on the assessment of parental attitudes stating, “The question of how attitudes relate to behaviors is a longstanding issue in social psychology. So too are the questions of how to assess people's beliefs about people, as well as how to determine the accuracy of such beliefs.... Thus far this larger literature has had little impact on the study of links between parental beliefs and parental behaviors (pg. 772).” Our findings suggest that a GNAT assessment technique, widely used in the field of social psychology, may yield new insights into future research endeavors aimed at identifying the prevalence, antecedents and developmental sequelae of parental endorsement of physical discipline.

Importantly, across both studies we were able to distinguish differences in negative and positive attitudes about physical discipline through the GNAT-Physical Discipline task. In both studies, mothers held higher negative associations with physical discipline compared to

positive evaluations. This finding is consistent with the larger literature on controversial attitudes and was replicated in the current study. In addition, our findings across both studies revealed that negative implicit attitudes around physical discipline, as opposed to positive attitudes about discipline, may be a mechanism underlying why parents endorse this discipline strategy with their child. In Study 1 we documented how attitudes may differ across mothers who endorsed using physical discipline compared to those who did not and provided insights into the relevancy of these dimensions for mothers. Specifically, mothers who reported using physical discipline had significantly lower negative implicit associations compared with positive implicit associations about this construct. In addition, mothers who endorsed using physical discipline had significantly lower negative implicit attitudes compared to mothers who did not endorse using physical discipline. These findings provided preliminary support for the notion that lower negative attitudes may be a key operating factor in the endorsement of physical punishment. This was corroborated in Study 2 which found that negative implicit attitudes about physical discipline, as opposed to positive implicit attitudes, were associated with maternal report on the acceptability of physical discipline as a tactic. Taken together, these studies converge on the notion that negative attitudes about physical discipline, as opposed to positive attitudes, may be a driving force in shaping whether parents use physical discipline with their child. This finding demonstrating an association between negative attitudes and physical discipline stands somewhat in contrast to empirical work which has suggested that parents who use physical punishment believe that this technique is socially acceptable and effective (e.g., Taylor, Hamvas, & Paris, 2011). Although future research investigating the power of both positive and negative attitudes at an explicit and implicit level may shed light upon the nature of this discrepancy, our results suggest that a focus on negative implicit attitudes about physical discipline may offer additional explanatory power in understanding why parents choose to use physical discipline or not.

Testifying to the potential utility for the GNAT in empirical work on parental attitudes, Study 2 provided evidence of the construct validity of the GNAT-Physical Discipline assessment. The ability of the GNAT to align with explicit reports of physical discipline demonstrates precision in assessment of attitudes around physical discipline. Our documentation of both convergent and discriminant validity of the GNAT suggests that this assessment may be another tool in the research arsenal when examining physical discipline. Specifically, the use of a computerized assessment of implicit attitudes around physical discipline helps address a longstanding criticism that research findings on associations between this discipline technique and child outcomes is biased by shared method variance. Many studies in this area utilize the same respondent for both physical punishment and child adjustment which can inflate correlations between these variables (e.g., Ferguson, 2013). The GNAT circumvents this limitation to a certain extent through measuring associations with a different assessment modality. Furthermore, the use of a GNAT assessment may address concerns about potential reporting biases on the use of physical discipline given the controversial nature of this topic. As identified by Zolotor and colleagues (2012), parents may be very aware that the reporting of physical discipline is subject to social stigma and potentially reportable which may reduce their endorsement of this behavior. The GNAT bypasses the explicit control processes associated with self-reports and offers evidence of

how parents may implicitly perceive physical discipline. To the extent that future research can replicate associations found in the extant literature using an implicit GNAT assessment of physical discipline will provide supportive evidence for the association between physical discipline and child outcomes.

A balanced interpretation of the findings requires discussion of the limitations of the current studies. First, both studies were cross-sectional in design and therefore the directional nature of processes is open to alternative explanations. Our findings would be bolstered by the examination of implicit attitudes over time in order to better define the nature of predictive pathways. Second, mothers were the focus of both studies and future work should examine these processes within fathers to determine the stability of the findings and whether there are differential implications depending on the gender of the parent. Third, both samples were moderately homogenous with respect to ethnicity and socioeconomic status. Given evidence of ethnic and cultural differences in the use of physical punishment, tests of ecological validity of the GNAT-Physical Discipline are required as there may be important individual, ethnic, cultural, and socioeconomic moderators of the impact of implicit evaluations on maternal physical discipline. Finally, we were not able to determine the predictive validity of the GNAT over traditional explicit measures. This will be an important and interesting avenue for future research on this construct.

Despite these acknowledged limitations, our findings provide initial evidence for the potential of the GNAT assessment of implicit attitudes about physical discipline. Testifying to the flexibility and ease of integration in research with families, the present study also demonstrated that the GNAT can be utilized within a laboratory based setting as well as through an online utility. Recent work with the GNAT has also begun examining a portable version (Bassett, & Dabbs, 2005) which may enable family researchers to assess these attitudes ‘in the moment’ as well as within different parenting contexts. In summary, the present study demonstrates that the GNAT may offer a flexible and innovative tool to add to the methodological ‘toolbox’ for research on parenting and child development.

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References

- American Academy of Pediatrics. Guidance for effective discipline. *Pediatrics*. 1998; 4:723–728.
- Bar-Anan Y, Nosek BA. A comparative investigation of seven indirect attitude measures. *Behavior Research Methods*. 2013
- Bassett JF, Dabbs JM. A portable version of the go/no-go association task (GNAT). *Behavioral Research Methods*. 2005; 37:506–512. Doi: 10.3758/BF03192721.
- Baumrind D. The discipline controversy revisited. *Family Relations*. 1996; 45:405–414.
- Baumrind D, Larzelere R, Cowan P. Ordinary physical punishment: Is it harmful? Comment on Gershoff. *Psychological Bulletin*. 2002; 4:580–589. <http://dx.doi.org/10.1037/0033-2909.128.4.580>. [PubMed: 12081082]
- Bavlovek, SJ. Handbook of the AAPI-Adult-Adolescent Parenting Inventory. Family Developmental Resources, Inc.; Eau Claire, WI: 1984.

- Fischer, J.; Corcoran, K. Measures for clinical practice: A sourcebook. 4th Ed.. Vol. 2. Oxford University Press; New York: 2007.
- Benjet C, Kazdin A. Spanking children: the controversies, findings, and new directions. *Clinical Psychology Review*. 2003; 23:197–224. [http://dx.doi.org/10.1016/S0272-7358\(02\)00206-4](http://dx.doi.org/10.1016/S0272-7358(02)00206-4). [PubMed: 12573670]
- Boldero JM, Rawlings D, Haslam N. Convergence between GNAT-assessed implicit and explicit personality. *European Journal of Personality*. 2007; 21:341–358.
- Crosby F, Bromley S, Saxe L. Recent unobtrusive studies of Black and White discrimination and prejudice: A literature review. *Psychological Bulletin*. 1980; 87:546–563. doi: 10.1037/0033-2909.87.3.546.
- Crouce JL, Irwin LM, Wells BM, Shelton CR, Skowronski JJ, Milner JS. The Word Game: An innovative strategy for assessing implicit processes in parents at risk for child physical abuse. *Child Abuse & Neglect*. 2012; 36:498–509. DOI: 10.1016/j.chiabu.2012.04.004. [PubMed: 22749613]
- Dovidio JF, Kawakami K, Gaertner SL. Implicit and explicit prejudice and interracial interaction. *Journal of Personality and Social Psychology*. 2002; 82:62–68. doi: 10.1037/0022-3514.82.1.62. [PubMed: 11811635]
- Enders C. The impact of nonnormality on full information maximum-likelihood estimation for structural equation models with missing data. *Psychological Methods*. 2001; 6:352–370. doi: 10.1037/1082-989X.6.4.352. [PubMed: 11778677]
- Ferguson CJ. Spanking, corporal punishment and negative long-term outcomes: A meta-analytic review of longitudinal studies. *Clinical Psychology Review*. 2013; 33:196–208. [PubMed: 23274727]
- Fine SE, Trentacosta CJ, Izard CE, Mostow AJ, Campbell JL. Anger perception bias, caregivers' use of physical discipline, and aggression in children at risk. *Social Development*. 2004; 13:213–228.
- Gawronski B, Bodenhausen GV. Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin*. 2006; 132:692–731. [PubMed: 16910748]
- Gershoff ET. Parental corporal punishment and associated child behaviors and experiences: A meta-analytic and theoretical review. *Psychological Bulletin*. 2002; 128:539–579. doi: 10.1037/0033-2909.128.4.539. [PubMed: 12081081]
- Gershoff ET. More harm than good: A summary of scientific research on the intended and unintended effects of corporal punishment on children. *Law and Contemporary Problems*. 2010; 73:33–58.
- Gershoff ET, Lansford JE, Sexton HR, Davis-Kean PE, Sameroff AJ. Longitudinal links between spanking and children's externalizing behaviors in a national sample of White, Black, Hispanic, and Asian American Families. *Child Development*. 2012; 83:838–843. DOI: 10.1111/j.1467-8624.2011.01732.x. [PubMed: 22304526]
- Gershoff ET, Lansford JE, Sexton HR, Davis-Kean PE, Sameroff AJ. Longitudinal links between spanking and children's externalizing behaviors in a national sample of White, Black, Hispanic, and Asian American Families. *Child Development*. 2012; 83:838–843. DOI: 10.1111/j.1467-8624.2011.01732.x. [PubMed: 22304526]
- Gray NS, MacCulloch MJ, Smith J, Morris M, Snowden RJ. Violence viewed by psychopathic murderers. *Nature*. 2003; 423:497–498. [PubMed: 12774112]
- Greenwald AG, Poehlman TA, Uhlmann EL, Banaji MR. Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *Journal of Personality and Social Psychology*. 2009; 97:17–41. doi: 10.1037/a0015575. [PubMed: 19586237]
- Greenwald AG, McGhee DE, Schwartz JLK. Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*. 1998; 74:1464–1480. [PubMed: 9654756]
- Holden GW. Childrearing and developmental trajectories: Positive pathways, off-ramps, and dynamic processes. *Child Development Perspectives*. 2010; 4:197–204.
- Holden GW, Brown AS, Baldwin AS, Croft Cadereo K. Research findings can change attitudes about corporal punishment. *Child Abuse & Neglect*. 2013

- Holden GW, Miller PC, Harris SD. The instrumental side of corporal punishment: Parents' reported practices and outcome expectancies. *Journal of Marriage and Family*. 1999; 61:908–919. <http://dx.doi.org/10.2307/354012>.
- Kazdin A. Spare the rod: Why you shouldn't hit your kids. *Slate*. 2008
- Lee S, Rogge RD, Reis HT. Assessing the Seeds of Relationship Decay: Using Implicit Evaluations to Detect the Early Stages of Disillusionment. *Psychological Science*. 2010; 21:857–864. [PubMed: 20483827]
- Little RJA. A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*. 1998; 83:1198–1202.
- MacKenzie MJ, Nicklas E, Brooks-Gunn J, Waldfogel J. Who spans infants and toddlers? Evidence from fragile families and child well-being study. *Children and youth services review*. 2011; 8:364–1373.
- Maniaci, M.; Rogge, RD. Conducting Research on the Internet.. In: Reis, HT.; Judd, CM., editors. *Handbook of research methods in social and personality psychology*. 2nd ed.. Cambridge University Press; New York: 2013.
- McConnell AR, Leibold JM. Relations among the Implicit Association Test, discriminatory behavior, and explicit measures of racial attitudes. *Journal of Experimental Social Psychology*. 2001; 37:435–442.
- Miller SA. Parents' beliefs about children's cognitive development. *Child Development*. 1988; 59:259–285. doi: 10.2307/1130311.
- Miner JL, Clark-Stewart KA. Trajectories of externalizing behavior from age 2 to age 9: Relations with gender, temperament, ethnicity, parenting, and rater. *Developmental Psychology*. 2008; 44:771–786. doi: 10.1037/0012-1649.44.3.771. [PubMed: 18473643]
- Nosek BA. Understanding the individual implicitly and explicitly. *International Journal of Psychology*. 2007; 42:184–188.
- Nosek BA, Banaji MR. The Go/No-go Association Task. *Social Cognition*. 2001; 19:625–664.
- Power, TG. Parenting Dimensions Inventory (PDI): A research manual. University of Houston; 1991. Unpublished manuscript
- Regalado M, Sareen H, Inkelas M, Wissow LS, Halfon N. Parents' discipline of young children: results from the National Survey of Early Childhood Health. *Pediatrics*. 2004; 13:1952–1958. [PubMed: 15173466]
- Robinson MD, Meier BP, Zetocha KJ, McCaul KD. Smoking and the implicit association test: When the contrast category determines theoretical conclusions. *Basic and Applied Social Psychology*. 2005; 27:201–212. DOI:10.207/s15324834basps2703_2.
- Schlomer GL, Bauman S, Card NA. Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology*. 2010; 57:1–10. [PubMed: 21133556]
- Stone, AA.; Turkan, JS.; Bachrach, CA.; Jobe, JB.; Kurtzman, HS.; Cain, VS. *The science of self-report: Implications for research and practice*. Erlbaum; Mahwah, NJ: 2000.
- Strack F, Deutsch R. Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*. 2004; 8:220–247. doi: 10.1207/s15327957pspr0803_1. [PubMed: 15454347]
- Swanson JE, Rudman LA, Greenwald AG. Using the Implicit Association Test to investigate attitude-behavior consistency for stigmatized behavior. *Cognition and Emotion*. 2001; 15:207–230.
- Taylor CA, Hamvas L, Paris R. Perceived instrumentality and normativeness of corporal punishment use among black mothers. *Family Relations*. 2011; 60:60–72. <http://dx.doi.org/10.1111/j.1741-3729.2010.00633.x>. [PubMed: 22707816]
- Wilson TD, Lindsey S, Schooler TY. A model of dual attitudes. *Psychological Review*. 2000; 107:101–126. doi: 10.1037/0033-295X.107.1.101. [PubMed: 10687404]
- Wissow LW. Ethnicity, income, and parenting contexts of physical punishment in a national sample of families with young children. *Child Maltreatment*. 2001; 6:118–129. doi: 10.1177/1077559501006002004. [PubMed: 16705787]
- Yang Y. Examining Chinese undergraduates' attitudes towards their parents with the Implicit Association Test. *Social Behavior and Personality: An International Journal*. 2013; 41:387–394. DOI: <http://dx.doi.org/10.2224/sbp.2013.41.3.387>.

Zolotor AJ, Theodore AD, Runyan DK, Chang JJ, Laskey AL. Corporal punishment and physical abuse: Population-based trends for three-to-11 year old children in the United States. *Child Abuse Review*. 2010; 20:57–66. DOI: 10.1002/car.1128.

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Figure 1.

Plot of the mean residualized d' scores for the GNAT-Physical Discipline test. PD = Physical Discipline.

Figure 2.

Path model testing the specificity of prediction for maternal GNAT Physical Discipline on discipline strategies. For ease of presentation bolded lines represent significant pathways while dashed lines represent non-significant pathways. $* = p < .05$.

Table 1

Intercorrelations of the primary variables in Study 1.

Variable	1	2	3	4	5	6
1. GNAT Positive Attitude Toward Discipline	---					
2. GNAT Negative Attitude Toward Discipline	.24*	---				
3. GNAT Residualized Positive Attitude Toward Discipline	.97*	.01	---			
4. GNAT Residualized Negative Attitude Toward Discipline	.00	.97*	-.23*	---		
5. AAPi Discipline	.01	-.22*	.06	-.23*	---	
6. Family Income	.12	.13	.10	.12	-.14*	---

Note. GNAT = Go-No-go Association Test; AAPi = Adolescent Adult Parenting Inventory.

* $p < .05$

Table 2

Intercorrelations of the primary variables in Study 2.

Variable	1	2	3	4	5	6	7	8
1. GNAT Positive Attitude Toward Discipline	---							
2. GNAT Negative Attitude Toward Discipline	.46*	---						
3. GNAT Residualized Positive Attitude Toward Discipline	.87*	-.02	---					
4. GNAT Residualized Negative Attitude Toward Discipline	-.04	.87	-.53*	---				
5. PDI Physical Discipline	.06	-.29*	-.09	-.27*	---			
6. PDI Inductive Discipline	.14	-.12	.09	-.05	-.15*	---		
7. PDI Social Consequences Discipline	-.05	.02	-.04	.01	-.01	.19*	--	
8. Family Income	.21*	.01	.23*	.11	-.02	.11	.08	--

Note. GNAT = Go-No-go Association Test; PDI = Parenting Dimensions Inventory

* $p < .05$