



Published in final edited form as:

*J Fam Psychol.* 2014 October ; 28(5): 645–654. doi:10.1037/fam0000023.

## Maternal Child-Centered Attributions and Harsh Discipline: The Moderating Role of Maternal Working Memory Across Socioeconomic Contexts

Melissa L. Sturge-Apple, Jennifer H. Suor, and Michael A. Skibo

University of Rochester

### Abstract

Cognitive models of parenting give emphasis to the central role that parental cognitions may play in parental socialization goals. In particular, dual process models suggest that parental attribution styles affect the way parents interpret caregiving situations and enact behaviors, particularly within the realm of discipline. Although research has documented the negative behavioral repercussions of dysfunctional child-centered responsibility biases, there is heterogeneity in the level of these associations. Research has also demonstrated that parental working memory capacity may serve as an individual difference factor in influencing caregiving behaviors. Thus, our first aim was to document how maternal working memory capacity may moderate the association between mother's dysfunctional child-oriented attributions and use of harsh discipline. In addition, from an ecological perspective, a second aim was to examine how socioeconomic risk may further potentiate the impact of maternal working memory. To accomplish these aims, a socioeconomically diverse sample of 185 mothers and their three-year old children were recruited to participate in a laboratory-based research assessment. Findings revealed that lower maternal working memory capacity may operate as a risk factor for attributional biases and harsh discipline, while higher working memory may serve as a protective factor in this relationship. Socioeconomic risk further moderated these findings. Results suggest that the moderating role of working memory may be particularly pronounced under conditions of socio-economic risk. The theoretical and clinical implications of these findings are discussed.

### Keywords

Harsh Discipline; Parent Attributions; Socioeconomic Risk; Working Memory

---

Over the past several decades, research investigating the consequences of harsh discipline has detailed its detrimental effect on children's development. Specifically, discipline which involves parental use of coercive and verbally aggressive commands as well as physical punishment has been linked with poorer outcomes in children including higher externalizing problems (e.g., Gershoff, 2002; Miner & Clarke-Stewart, 2008), elevated depression (e.g.,

Bender, et al., 2007), and peer difficulties (Strassberg, Dodge, Pettit, & Bates, 1994). This body of work has highlighted the high societal importance of further research towards understanding the nature of and the risk for perturbations in parental discipline behaviors. Towards this, models of parenting which emphasize parental cognitive processes have underscored how parental attributions may operate in understanding parental socialization goals and problematic caregiver behaviors (Bugental & Johnston, 2004; Milner, 1993; Stern & Azar, 1998).

In particular, parental attributions reflect the way in which parents interpret the causes of their child's misbehavior and have been dimensionalized in terms of their locus, controllability, and intent (e.g., Abramson, Metalsky, & Alloy, 1988; Slep & O'Leary, 1998). Specifically, parental attributions for child behaviors which are child-oriented coupled with the belief that the behavior is intentionally provocative and under a high level of control by the child may have particular ramifications for parental harsh discipline. This specific constellation of parental attributions has been referred to as 'dysfunctional child-oriented attributions' in the literature and has been associated with greater use of punitive and overreactive parenting behaviors (Dix, Ruble, Grusec, & Nixon, 1986; Leung & Slep, 2006; Smith & O'Leary, 1995; Strassberg & Treboux, 2000). In addition, parents' dysfunctional child-centered responsibility attributions have also been linked with increased likelihood of maltreatment (Milner, 2000). For instance, research suggests that abusive parents often have inappropriate developmental expectations regarding their own children's abilities and this impacts the extent to which the child is held responsible for negative behavior as well as the severity of punishment that follows (Azar, Robinson, Hekimian, Twentyman, 1984; Azar & Rohrbeck, 1986, Stern & Azar, 1998).

Although research has documented the negative repercussions of dysfunctional child-centered responsibility biases for caregiving behaviors (e.g., Leung & Slep, 2006; Slep & O'Leary, 1998), findings tend to be modest in nature, indicating that main effects may depend to a certain extent upon individual attributes or contextual conditions (e.g., Caspi, Roberts, & Shiner, 2005; Dopke & Milner, 2000; Wang, Deater-Deckard, & Bell, 2013). Research has increasingly demonstrated that parental executive functions, working memory capacity in particular, may serve as an important component for clarifying how individual factors may operate in influencing caregiving behaviors (e.g., Deater-Deckard, Sewell, Petrill, & Thompson, 2010; Gonzalez, Jenkins, Steiner, & Fleming, 2012). Thus, the first aim of the present paper was to document how individual differences in maternal working memory may influence the association between mother's dysfunctional child-oriented attributions and use of harsh discipline. In addition, ecological models of parenting suggest that contextual stress and risk may operate as a potent risk factor in parenting models (Dopke & Miner, 2000; McLoyd, 1980; Wilson, 1991). Also, empirical research has demonstrated that relationships between attributional biases and parenting may depend to a certain extent upon the level of contextual stress and risk (e.g., Wang, et al., 2013). Therefore, a second aim was to examine how socioeconomic risk may moderate the impact of maternal working memory on associations between attributional biases and harsh discipline.

## Maternal Working Memory, Dysfunctional Child-Oriented Attributions and Harsh Discipline

Working memory is regarded as cognitive processes which have evolved in order to facilitate goal-oriented behaviors through maintaining information in consciousness, allowing for active manipulation of information, and facilitating the incorporation of information from long term memory towards the enactment of decisions and behavior sequences (e.g., Baddeley & Hitch, 1974; Engle & Kane, 2004). Individuals differ in working memory capacity and these differences have been shown to have implications for real world functioning (e.g., Barrett, Tugade, & Engle, 2004). Given the cognitive demands required for parenting (e.g., Azar, Reitz, & Goslin, 2008), an examination of maternal working memory may reveal novel insights for understanding parenting behaviors. In the only paper to date to specifically test maternal working memory, Deater-Deckard and colleagues (2010) demonstrated that maternal working memory capacity was differentially associated with mothers' negativity towards their children during a frustrating task. Using a within-family quasi-experimental design to account for sibling effects, results suggested that that maternal negative reactivity was only evident in mothers with poorer working memory capacity. For mothers with higher levels of working memory capacity, there were no significant associations with diminished parenting. Testifying to the strength of this effect, they replicated these findings within a sample of adoptive mothers. This work demonstrates that working memory may help support effective, nonreactive parenting, however, no study has examined how working memory may influence associations between maternal attributions and parenting.

Dual-process theories of the mind offer a conceptual blueprint for delineating why working memory may operate as a moderator with respect to the association between dysfunctional attributions and harsh discipline (Barrett, Tugade, & Engle, 2004; Carver, 2005; Hofmann, Friese, & Strack, 2009). Specifically, dual process models stipulate that behavior is predicted through the interplay of automatic and controlled processing (e.g., Barrett, Tugade, & Engle 2004). At the automatic level, cognitive processes are considered fast, reflexive, responsive to activating stimuli, and initiate a predisposition to perform a certain behavior. Consistent with this, parental attributions are characterized as "stable knowledge structures that operate automatically and with little awareness" (Bugental & Johnston, 2000, p. 317). In this conceptualization, environmental stimuli (such as child misbehavior) grab attention and stimulate bottom-up attention processes which activate representational schemas (i.e., "the stable knowledge structures" referred to above) resulting in the initiation of a series of behaviors (e.g., Grusec, Hastings, & Mammone, 1994). Thus, the impulsive nature of automatic processes is proposed to potentially override more reflective, effortful and controlled processing. Within this framework, maternal dysfunctional child-oriented attributions, through their automaticity, may evoke more harsh and punitive responses as a response to child behaviors.

In turn, working memory capacity is hypothesized as a goal-directed, top-down process that dictates the degree to which these automatic processes influence thoughts, feelings, and behavior (e.g., Barrett, et al., 2004). In particular, working memory capacity may function as

a “gatekeeper by inhibiting the influence of automatic precursors and simultaneously fostering the influence of self-regulatory goal standards through maintaining the standards in an active, conscious state.” (Hofmann, Gschwendner, Friese, Wiers, & Schmitt, 2008 p. 973). It has been proposed that individuals with high working memory capacity may be more successful in enacting controlled, goal-directed processing in attention-demanding circumstances. Conversely, for individuals who possess lower working memory capacity, “controlled processing breaks down and less appropriate or undesired responses emerge” (Barrett et al., 2004, p. 556). Empirical work has supported this supposition through demonstrating the moderating role of working memory in associations between automatic cognitions and behaviors including alcohol use (Thrush, et al., 2008), eating behaviors (Hofmann, Gschwendner, et al., 2008), and anger expression in a provoking situation (Hofmann, Gschwendner, et al., 2008, Study 3). Given previous empirical work on the moderating role of working memory capacity, the present study examined whether maternal working memory capacity moderated the link between mother’s dysfunctional child-centered attributions and harsh discipline.

## The Role of Socioeconomic Context

Socio-ecological models promote the assertion that parenting does not occur within a vacuum and, importantly, environmental stressors have been shown to strongly influence family dynamics and parent-child relationships (Conger, Conger, & Martin, 2010; Margolin & Gordis, 2000; Martinez & Richters, 1993). In particular, socioeconomic adversity has been targeted as a key upstream mechanism with robust pathogenic effects on caregiving (e.g., Klebanov, Brooks-Gunn, & Duncan, 1994; Pinderhughes, Dodge, Zelli, Bates, & Petit, 2000), including greater difficulties in parental discipline (Conger, et al., 1992; Conger, Ge, Elder, Lorenz, & Simons, 1994; Conger, et al., 2002). Relatedly, family risk frameworks suggest there is an increasing gradient with respect to the impact that socioeconomic risk may have on family dynamics (e.g. McLoyd, 1990; Taylor & Seeman, 1999; Wilson, 1987). Specifically, economic adversity exposes parents to additional risk factors, erodes sources of support, and may result in greater deficits in parenting, whereas these associations may be more limited within more advantaged contexts. Several recent studies have documented the potential interactive nature of socioeconomic risk with respect to risk factors and parenting processes. For instance, Pereira and colleagues (Pereira, Vickers, Atkinson, Gonzalez, Wekerle, & Levitan 2012) reported that parenting stress and family conflict predicted higher levels of maternal harsh discipline only within families experiencing the highest level of socioeconomic deprivation. Also, of direct relevance to the current investigation, another study demonstrated that the role of maternal executive processes in association with home chaos was strongest under higher levels of socioeconomic adversity (Deater-Deckard, Chen, Wang, & Bell, 2012). Furthermore, research has shown that within more chaotic family environments (as a proxy of higher risk), associations between maternal attribution biases and parenting behaviors were evident compared to less chaotic contexts (Wang, et al., 2013). Thus, it is plausible that the moderating role of maternal working memory capacity on associations between dysfunctional child-oriented attributions and harsh discipline may be more pronounced within risky ecological contexts. Therefore in the current study, we

hypothesized that the moderating role of working memory capacity would be most evident under higher risk conditions.

In summary, the present study presents an initial test of a dual process framework of cognition and working memory in association with maternal harsh discipline practices. We hypothesized that maternal attributions emphasizing child responsibility for misbehavior would be associated with greater levels of maternal harsh discipline. Furthermore, we hypothesized that this link would be moderated by maternal working memory capacity, such that high levels of dysfunctional child-oriented attributions would be associated with maternal harsh discipline only for mothers with lower levels of working memory capacity. We further hypothesized that for mothers with higher working memory capacity, there would be no association between maternal dysfunctional child-oriented attributions and parenting, suggesting that these higher order control processes would be protective in controlling for the impact of attributions on parenting behavior. Guided by socio-ecological frameworks, we further hypothesized that these associations might be differentiated by socioeconomic status. In particular, the moderating effect of working memory on maternal dysfunctional child-oriented attributions and harsh discipline practices would be the most apparent among mothers living in adverse socioeconomic conditions whereas those with higher levels of working memory capacity would be buffered against these effects.

As a strong test of our hypotheses, we utilized a multi-method approach for operationalizing maternal harsh discipline. Observational assessments of maternal behaviors within a discipline-oriented task were coupled with maternal reports of physical discipline on parenting vignettes. Increasing our power to determine the operation of maternal working memory capacity across both resource-poor and resource-rich socioeconomic environments, the current study utilizes a sample recruited with a specific aim to obtain a wide range of socioeconomic experiences. Empirical examinations of socioeconomic status as a moderating variable require adequate variability in the environmental context (as is present in our sample) in order to draw conclusions regarding the viability of an ecological framework for explaining the processes under study.

## Method

### Participants

185 mothers ( $M$  age = 31.9) and their 3.5 year- old children (53% boys) from a medium-sized city in the Northeastern United States were recruited both by a recruiter at local Women, Infants, and Children (WIC) assistance offices and via flyers posted in community locations (e.g. doctor's offices, daycares, and libraries). These recruitment methods resulted in a socioeconomically diverse sample of mother-toddler dyads. Attesting to this diversity, although families reported a median income of \$55,000 a year, the range of income varied between \$0 – \$365,000, and 35% of families were receiving public assistance. Also, participants identified as European-American (64% of mothers and 59% of children), African-American (20% of mothers and 19% of children), Latino (8.0% of mothers and 3.0% of children), Biracial (5.0% of mothers and 15% of children), Asian-American (less than 1% of mothers, 1% of children), and Native American/Alaskan (2.0% of mothers, 3.0% of children).

## Procedures

Mothers and their children visited the laboratory for a 2.5-hour visit. During this visit, mothers completed a demographics interview, cognitive assessments, and questionnaires. Subsequently, mothers and their children were brought to a room made to resemble a living room/family room out of someone's home (sofa, chairs, child-themed artwork). In that room were some attractive, age-appropriate toys. Mothers were instructed to try to get their children to clean-up the toys and place them in the "Toy Bin" in the corner of the room. This clean-up portion lasted 5 minutes and was videotaped for later coding. The University's Institutional Review Board (IRB) approved research procedures prior to data collection.

## Measures

**Socioeconomic Status**—In order to create an index of socioeconomic status, we followed previous guidelines (Conger, Conger, & Martin, 2010; Dearing, McCartney, & Taylor, 2001) and created a composite variable comprised of a family income-to-needs ratio, maternal education, and maternal report of level of chaos in the neighborhood. Mothers completed a demographics survey in which they reported their level of education, number of people living in the household, and annual household income. Income-to-needs ratio ratings were computed by dividing total family income by poverty-level income based on the number of people living in the home. Poverty income guidelines per persons in household were based upon the 2012 Department of Health and Human Services Poverty Guidelines (*Federal Register*, Vol. 77, No. 17, January 26, 2012, pp. 4034–4035). Income-to-needs ratios below 1.00 indicate that the income of the individuals in the home is below the federal definition of poverty. There was substantial socioeconomic variability in the sample; maternal education ranged from some high school ( $n=29$ ) through advanced degrees ( $n=41$ ) and income-to-need ratios ranged from .00 through 43 ( $M = 2.906$ ,  $SD = 3.87$ ), with 44% of the mothers reporting an income-to-needs ratio below the poverty line. Neighborhood risk was measured using maternal report on the Neighborhood Organization and Affiliation scale (NOAA: Knight, Smith, Martin, Lewis, & the LOGSCAN Investigators, 2008). The subscale assesses problems in the respondents neighborhood (e.g., "There is open drug activity", "houses are broken into", "homes get broken into".) on a four- point scale ranging from strongly disagree to strongly agree. Internal consistency coefficient for the scale was high ( $\alpha = .93$ ). The three risk assessments were significantly correlated with one another ( $r$ 's ranged from .27 – .52) and were standardized and summed to create a composite measure of socioeconomic status. Higher scores indicated greater economic prosperity.

**Maternal Working Memory**—Mothers were administered the auditory digit span task from the Weschler Adult Intelligence Scale – Fourth Edition (WAIS-IV: Wechsler, 2008). The WAIS is one of the most frequently used neuropsychological instruments in clinical and empirical research (Rabin, Barr, & Burton, 2005), and research has demonstrated that that different WM tasks assess a common factor, suggesting domain-general capacity that is independent of any one processing task (e.g., Turner & Engle, 1989). The WAIS-IV contains three different subtests of working memory including digit span forward, backward and sequencing. For the digit span forward task, the examinee is read a sequence of numbers and is asked to recall the numbers in the same order. For digit span backward task, the examinee is read a sequence of numbers and is asked to recall the numbers in reverse order.

For digit span sequencing task, the examinee is read a sequence of numbers and is asked to recall the numbers in ascending order. The internal consistency coefficient for the three subscales was acceptable ( $\alpha = .70$ ), and the three risk assessments were significantly correlated with one another ( $r$ 's ranged from .49 – .52). The total raw score of the subtests were used in the analyses as an index of maternal working memory.

**Maternal Child-Oriented Attributions**—Mothers completed the Parent Cognition Scale (PCS; Snarr, Slep, & Grande, 2009), a 30-item measure designed to assess the degree to which parents endorse dysfunctional child-centered responsibility attributions for child misbehavior. Mothers were asked to think about their target child's behavior over the past two months and to rate various causes for misbehavior on a 6-point Likert-type scale ranging from 1 (always true) to 6 (never true). Ten items attribute child misbehavior to factors under the child's control, such as child willful intent to misbehave, and/or child desire to have a negative effect on the parent (e.g., "My child tries to push my buttons"). Internal consistency was high ( $\alpha = .91$ ). Items were recoded such that higher scores indicate higher levels of maternal dysfunctional child-responsible attributions of children misbehavior.

**Maternal Harsh Discipline**—Maternal report on a parenting questionnaire and observer ratings were used to assess maternal harsh discipline. First, mothers completed the Parenting Dimensions Inventory (PDI; Power, 1991). Scores were based on mothers' report of her likelihood to use corporeal punishment strategies in response to four child behavioral transgression vignettes (e.g., "After arguing after toys, your child strikes a playmate"). Mothers rated the likelihood of using the strategy on a 4 -point scale (0 = very unlikely to do, 3 = very likely to do). Internal consistency of the subscale was high ( $\alpha = .92$ ).

Second, observational ratings of maternal caregiving behaviors during the clean-up interaction were completed using subscales which were adapted from the Iowa Family Interaction Rating Scales (IFIRS; Melby & Conger, 2001) for the current project. Ratings were assessed on nine-point Likert-type scales ranging from 1 (not characteristic at all) to 9 (mainly characteristic). The *harsh discipline* scale assessed maternal use of commands and behaviors that were angry and hostile in tone in order to serve the purpose of gaining immediate and unquestionable compliance of the child. Commands issued in neutral but firm tones were not coded under this construct. The *coercive discipline* scale measured the extent to which mothers engage in critical, disapproving and/or rejecting behavior toward the child's behavior or emotional state during discipline. To determine inter-rater reliability within the compliance task, two coders both completed ratings on 25% of the interactions within each task. The intra-class correlation coefficients of shared ratings on the two scales were acceptable and ranged from .70 to .74.

## Results

Table 1 shows the means, standard deviations, and correlations for the main variables in the study. Prior to running analyses, predictor variables were centered to avoid problems with multicollinearity (Aiken & West, 1991). Multiplying the centered predictor variables created the interaction terms.

## Main Analyses

Path analysis was conducted within a structural equation modeling framework to test our hypothesized model. The path model was performed using MPlus software Version 7.0 (Muthén & Muthén, 2012). Missing data ranged from 2 to 11% across various assessments primarily due to equipment failure. To maximize our sample size, we utilized the multiple imputation using the EM algorithm procedure available in MPlus (e.g. Enders, 2001), this method is appropriate when the data are missing completely 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, 1988). Results showed that the data were MCAR [ $\chi^2 = 68.043$  (59), *ns*]. We also examined the data for the presence of outliers and found one case on our working memory assessment and two cases on the socioeconomic status variable which were greater than 3 standard deviations from the mean on their respective measures. There were no outliers on child attributions. We removed these cases and re-ran the analyses to determine if they were influential in findings involving the interaction terms. The results were identical to the ones with the cases included in the data. Given the similarity in findings, we elected to retain these cases in our analyses.

The hypothesized structural path model is represented in Figure 1. Model analyses were run in accordance with our study aims and in a step-wise fashion. First we examined the moderating role of maternal working memory capacity on the association between dysfunctional child-oriented attributions and harsh discipline. Second, we tested whether this effect was further moderated by the level of socioeconomic risk. We utilized four widely used indices to determine model fit. The chi-square test tests the null hypothesis that overidentified model fits the data as well as the fully saturated model, where there are paths from each variable to the other (Hu & Bentler, 1990). The relative chi-square statistic is the minimal sample discrepancy divided by the degrees of freedom (Wheaton, 1987) with values of less than 2.0 as indicative of good fit. The comparative fit index (CFI; Bentler, 1990) is a goodness of fit measure that compares the tested model to the fit of the independence model; CFI values above .90 are considered acceptable fit. Lastly, root-mean-square error of approximation (RMSEA; Steiger & Lind, 1980) is an absolute measure of fit based on the non-centrality parameter; values less than .08 are indicative of acceptable fit (MacCaullum, Browne, & Sugawara, 1996). Although not presented for brevity, loadings for the three indicator variables on the harsh discipline factor were significant across all models with standardized coefficients ranging from .30 to .79 ( $p < .001$ ).

The fit of the model testing the interaction between dysfunctional child-oriented attributions and maternal working memory capacity was acceptable  $\chi^2(8, N = 185) = 11.68, p = .17$ , RMSEA = .05, CFI = .95,  $\chi^2/df = 1.46$ . There was a significant effect of the interaction between attribution and working memory capacity on maternal harsh discipline. To probe this effect, simple slope analyses with maternal working memory capacity as the moderator variable were conducted using an online utilities program (Preacher, Curran, & Bauer, 2006; <http://www.quantpsy.org/interact/mlr2.htm>). Dysfunctional child-oriented attributions and maternal working memory capacity were plotted at  $\pm 1$  SD. Results showed that the



simple slope for mothers with lowest levels of working memory capacity was significantly different from zero ( $\beta = .34, t = -2.6, p = .01$ ) whereas the simple slope for mothers with the highest levels of working memory capacity was not significantly different from zero ( $\beta = -.16, t = 1.22, p = .24$ ) (See Figure 2).

Our final model tested the moderating effect of socioeconomic risk on the interaction of maternal working memory capacity and child-oriented attributions. We entered the main effect of SES risk, the two-way interactions associated with SES risk, and the three-way interaction of SES risk, maternal working memory capacity, and dysfunctional child-oriented attributions on maternal harsh discipline. The model fit the data was acceptable  $\chi^2(16, N = 185) = 24.29, p = .08, RMSEA = .05, CFI = .92, \chi^2/df = 1.52$ . Results of the main analyses showed that there was a significant main effect of both socioeconomic status ( $\beta = -.42, p < .001$ ) and maternal working memory capacity ( $\beta = -.19, p = .011$ ) on maternal harsh discipline. Mothers with higher levels of working memory capacity and higher socioeconomic status displayed lower levels of harsh discipline toward their children on average. Second, the results showed a significant three-way interaction of socioeconomic context, dysfunctional child-oriented attributions, and maternal working memory capacity on maternal harsh discipline ( $\beta = .24, p < .01$ ).

In order to probe the locus of the three-way interaction, socioeconomic context was set as the moderator of the moderating effect of working memory capacity on dysfunctional child-oriented attributions and maternal harsh discipline (Figure 3). Results showed that at lower levels of socioeconomic status, the simple slope for mothers with lower levels of working memory capacity ( $\beta = .44, t = -2.14, p < .05$ ) was significant, however the slope for mothers with higher levels of working memory capacity ( $\beta = -.30, t = 1.51, p = .13$ ) was not significantly different from zero (See Figure 3). Lastly, results showed that at higher levels of socioeconomic status, the simple slopes detailing the association between child attributions and harsh discipline for mothers with lower levels of working memory capacity ( $\beta = -.05, t = .28, p = .78$ ) and for those with higher levels of working memory capacity ( $\beta = .09, t = -.45, p = .65$ ) were not significantly different from zero (See Figure 3). Taken together, these results suggest that, within contexts of high socioeconomic stress, higher levels of working memory capacity might serve as a protective factor against the influence of dysfunctional child-oriented attributions of child misbehavior on the use of harsh discipline. On the other hand, in this same context, mothers with lower levels of working memory capacity might be prone to use harsh discipline strategies as function of the impact of dysfunctional attributions about child misbehavior. Finally, it appears that these associations are not observed in rich-resourced environments in which contextual support might lessen the interactional effects of working memory and dysfunctional child-oriented attributions on the use of harsh discipline in difficult caregiving situations.

## Discussion

For several decades, family researchers have focused on explicating the determinants of harsh parenting practices. These efforts have yielded critical insights into the ways in which maternal attributions may operate as potent risk factors (e.g., Slep & O'Leary, 1988). In concert with these efforts, a small corpus of research, guided by emerging neurocognitive

frameworks of caregiving behaviors (e.g., Barrett & Fleming, 2011), has also highlighted how parents' working memory may serve a critical components in determining harsh parenting (e.g., Deater-Deckard, et al., 2010). However, no work to date has combined these two approaches. To address this gap, the present study represents the first attempt to examine how working memory may influence associations between maternal dysfunctional child-centered responsibility attributions about child misbehavior and the endorsement of harsh/punitive discipline. Furthermore, the present study further advances knowledge through delineating how these relationships may depend upon the level of socioeconomic risk surrounding the family context.

From a risk and resilience perspective, the findings here offer compelling support for the potential protective effect of maternal working memory capacity for parenting. In line with recent conceptualizations outlining the moderating role of working memory capacity within dual process approaches to behavior regulation (Hofmann, et al., 2009; Hofmann, Schmeichel, & Baddeley, 2012), the current study indicates that maternal working memory may operate as a potent individual difference variable in understanding the nature of the association between maternal child-oriented attribution biases and harsh discipline. As a testament to this, our simple slope analyses revealed that mothers who held strong negative child-oriented attributional biases evidenced lower levels of harsh parenting in the context of higher maternal working memory capacity. Thus, mothers with higher working memory capacity may be better able to disaggregate negative child-oriented attributions and parenting behaviors in discipline situations and mothers with poorer working memory skills may be more susceptible to the influence of negative child attributions with respect to parenting.

These findings raise the question of why working memory capacity is a potential key variable to consider in attribution models of parental discipline. To start, working memory is a critical construct for reasoning – a necessity when faced with challenging child discipline situations. Working memory enables an individual to hold active representations of goals and standards, facilitates control of attention away from stimuli and towards goal-relevant information, and finally relates all of this to potential consequences regarding course of action (e.g., Diamond, 2013; Hofmann, et al., 2012). Thus, greater working memory capacity may facilitate a mothers' ability to process environmental cues associated with discipline situations, dampen automatic response biases, consider the effectiveness, appropriateness, and rewards/costs of utilizing a caregiving response to address child misbehavior, and match their response to the nature of the transgression at hand (Barrett & Fleming, 2011). Contrary to this, mothers with lower levels of working memory capacity may be less likely inhibit automatic evaluations of parent-child interactions and by extension be less likely to tap into alternative parenting responses, relying instead on more punitive discipline practices that will likely ensure immediate child compliance. Although future work should examine the multiple domains of the executive suite in concert with working memory and implications for self-regulation in parenting models (e.g., inhibitory control and set-shifting), the present study takes a critical first step in demonstrating that maternal executive functions may facilitate or degrade a mother's ability to in-vivo inhibit automatic, internal attributions of their child's characteristics from driving their behavioral response.

Findings in the present study also suggest that the moderating role of working memory capacity is conditionally dependent on the level of contextual risk associated with socioeconomic deficits. Specifically, within relatively resource rich socioeconomic contexts, there was no effect of maternal working memory capacity on associations between dysfunctional maternal attributions and harsh parenting. However, interactive findings emerged with mothers experiencing more significant economic adversity in our sample. In particular, mothers who were under substantial economic strain coupled with lower working memory capacity were more likely to employ harsh discipline when experiencing negative child-oriented attributions. In contrast, mothers with higher working memory capacity were better able to disentangle associations between negative child-oriented attributions and harsh parenting under challenging environmental conditions. Thus, our findings suggest that the role of maternal cognitive capacities may depend upon the broader ecological contexts and operate in supporting optimal parenting in high risk, resource poor environments. This finding adds further support to the recent research demonstrating the potentiating effects of environmental risk on associations between negative child-centered attributions and risk for negative, harsh, and overreactive parenting (e.g., Wang et al., 2012).

It is important to consider why socioeconomic status may operate as a potent moderator of working memory capacity in parenting models. One interpretation may be that within less stressful ecological niches there are fewer competing demands on maternal attention and regulatory capacities. Thus, the impact of working memory capacity on functioning may be minimized. This does not suggest that working memory capacity does not have an effect on caregiving, rather, that the protective effects of working memory are merely reduced. Conversely, high risk environments are associated with a range of potential distractors, pressures, and insults. As a result, the increased variability of stressors within the environmental milieu may place greater load on a mother's resources. Thus, maternal working memory capacity may have a more pronounced effect in modulating automatic responses in challenging parenting situations in higher risk contexts. This interpretation is consistent with research demonstrating that environmental effects on cognitive performance may be 'at ceiling' within higher socioeconomic contexts. In contrast, environmental variability within lower socioeconomic niches may be associated with wider differences in cognitive processing (e.g., Harden, Turkheimer, & Loehlin, 2007; Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman, 2003).

Moreover, our findings have important implications for clinical interventions towards the amelioration of punitive, physical and harsh caregiving. Experimental studies have demonstrated evidence for the presence of plasticity in adult working memory capacity (Olesen, Westerberg, & Klingberg, 2004) and that clinical intervention may potentially enhance adult working memory (e.g., Harrison, et al., 2013). Furthermore, recent intervention efforts have documented that improvements in working memory capacity can generalize and show positive effects on reducing problematic behavior (e.g., Houben, Wiers, & Jansen, 2011). Taken together, these findings suggest that targeting improvement in parental working memory in parenting prevention and intervention efforts may assist efforts in the amelioration of problematic parenting behaviors. Given that parent attributions in the context of difficult childrearing situations is currently a central goal of parenting

interventions (e. g., Sanders, 2012), our findings indicate that enhancing working memory capacity particularly within higher risk ecologies may enhance these efforts.

Despite the potential utility of the present research in informing clinical parenting interventions, there are several limitations which warrant discussion. First, because fathers were not assessed in the present study, we were not able to examine the role of working memory with respect to paternal caregiving. Research examining gender differences in parent attributions has reported equivocal findings as to whether mothers and fathers differ in their attributions for their children's misbehavior (e.g., Chen, Seipp, & Johnston, 2008; Mills & Rubin, 1990), however work is needed to determine the stability of the findings in the present study and whether there are differential implications depending upon the gender of the parent. Second, the cross-sectional design cannot definitively address the temporal ordering of relationships in our process model. As such, our conclusions would be bolstered through examining the model processes over time. Third, our assessment of working memory was constrained to span tasks. Although these tasks have been reported as reliable and valid assessments of working memory capacity (e.g., Conway, Kane, Bunting, Hambrick, Wilhelm, & Engle, 2005), we recognize that it is important to assess working memory capacity using multiple tasks. Finally, the null findings in the present study within higher socioeconomic contexts is not consistent with previous research demonstrating an association between maternal attributions and harsh discipline using samples from moderate to high socioeconomic status (e.g., Slep & O'Leary, 1998). Although inconsistencies may be the result of differences in the structure of observational tasks and the measures employed, understanding the nature of this discrepancy is an important area for future research.

In summary, our findings suggest that models of maladaptive parenting may benefit from moving the question away from a predominant focus on documenting linear main-effect models of parental cognitions on parenting and turn towards the delineation of the individual factors which may mitigate or potentiate experience and outcomes. The strength of the current study lies in the demonstration of the potential for working memory to operate as a key individual difference variable in process-oriented approaches to understanding the determinants of parenting behaviors. In addition, we identified how the mitigating effects of working memory for parenting models may be particularly pronounced within higher risk environments.

## Acknowledgments

This research was supported by funding from the National Institute of Nursing Research (Grant R21NR010857). We thank the mothers and children who participated in this project. We also thank the staff on the project, including: Caryn Stark, Samantha Spivey, Jennifer Torres, Janise Carmichael, Katie Kao, and Michael Fittoria.

## References

- Abramson, L.Y.; Metalsky, G.I.; Alloy, L.B. The hopelessness theory of depression: Does the research test the theory?. In: Abramson, L.Y., editor. *Social cognition and clinical psychology: A synthesis*. New York: Guilford; 1988. p. 33-65.
- Aiken, L.S.; West, S.G. *Multiple regression: Testing and interpreting interactions*. Thousand Oaks: Sage; 1991.

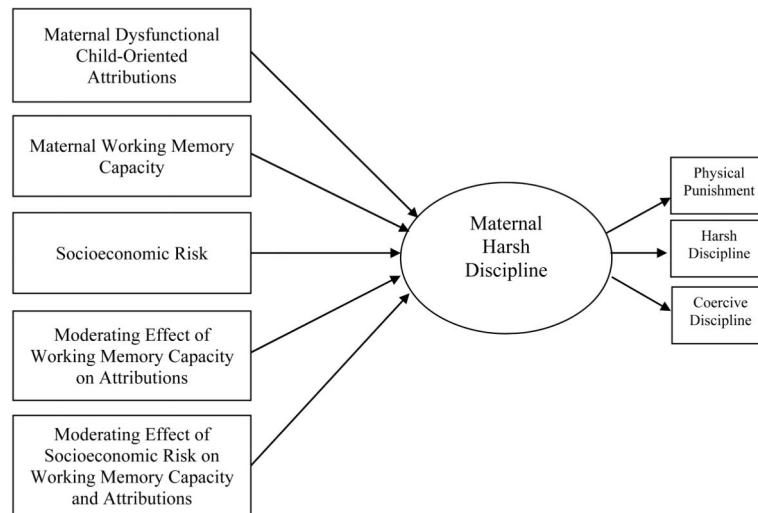
- Azar ST, Reitz EB, Goslin MC. Mothering: Thinking is part of the job description: Application of cognitive views to understanding maladaptive parenting and doing intervention and prevention work. *Journal of Applied Developmental Psychology*. 2008; 29:295–304.10.1016/j.appdev.2008.04.009
- Azar ST, Robinson DR, Hekimian E, Twentyman CT. Unrealistic expectations and problem-solving ability in maltreating and comparison mothers. *Journal of Consulting and Clinical Psychology*. 1984; 52:687–691.10.1037/0022-006X.52.4.687 [PubMed: 6470295]
- Azar ST, Rohrbeck CA. Child abuse and unrealistic expectations: Further validation of the Parent Opinion Questionnaire. *Journal of Consulting and Clinical Psychology*. 1986; 54:867–868.10.1037/0022-006X.54.6.867 [PubMed: 3794037]
- Baddeley, AD.; Hitch, G. Working memory. In: Bower, GA., editor. *The psychology of learning and motivation*. Vol. 8. New York, NY: Academic Press; 1974. p. 47-89.
- Barrett J, Fleming AS. All mothers are not created equal: Neural and psychobiological perspectives on mothering and the importance of individual differences. *Journal of Child Psychology and Psychiatry*. 2011; 52:368–397.10.1111/j.1469-7610.2010.02306.x [PubMed: 20925656]
- Barrett LF, Tugade MM, Engle RW. Individual differences in working memory capacity and dual-process theories of the mind. *Psychological Bulletin*. 2004; 130:553–573.10.1037/0033-2909.130.4.553 [PubMed: 15250813]
- Bender HL, Allen JP, McElhaney KB, Antonishak J, Moore CM, Kelly HO, Davis SM. Use of harsh physical discipline and developmental outcomes in adolescence. *Development and Psychopathology*. 2007; 19:227–242. [PubMed: 17241492]
- Bentler PM. Comparative fit indices in structural models. *Psychological Bulletin*. 1990; 107:238–246.10.1037/0033-2909.107.2.238 [PubMed: 2320703]
- Bugental DB, Johnston C. Parental and child cognitions in the context of the family. *Annual Review of Psychology*. 2000; 51:315–344.10.1146/annurev.psych.51.1.315
- Carver CS. Impulse and constraint: Perspectives from personality psychology, convergence with theory in other areas, and potential for integration. *Personality and Social Psychology Review*. 2005; 9:312–333.10.1207/s15327957pspr0904\_2 [PubMed: 16223354]
- Caspi A, Roberts BW, Shiner R. Personality development. *Annual Review of Psychology*. 2005; 56:453–484.
- Chen M, Seipp CM, Johnston C. Mothers' and fathers' attributions and beliefs in families of girls and boys with attention-deficit/hyperactivity disorder. *Child Psychiatry and Human Development*. 2008; 39:85–99.10.1007/s10578-007-0073-6 [PubMed: 17619142]
- Conger RD, Conger KJ, Elder GH Jr, Lorenz FO, Simons RL, Whitbeck LB. A family process model of economic hardship and adjustment of early adolescent boys. *Child Development*. 1992; 63:526–541.10.1111/j.1467-8624.1992.tb01644.x [PubMed: 1600820]
- Conger R, Ge X, Elder G, Lorenz F, Simons R. Economic stress, coercive family process and developmental problems of adolescents. *Child Development*. 1994; 65:541–561.10.1111/j.1467-8624.1994.tb00768.x [PubMed: 8013239]
- Conger RD, Wallace LE, Sun Y, Simons RL, McLoyd VC, Brody GH. Economic pressure in African American families: A replication and extension of the Family Stress Model. *Developmental Psychology*. 2002; 38:179–193.10.1037/0012-1649.38.2.179 [PubMed: 11881755]
- Conger RD, Conger KJ, Martin MJ. Social status, family processes, and individual development. *Journal of Marriage and Family*. 2010; 72:685–704.10.1111/j.1741-3737.2010.00725.x [PubMed: 20676350]
- Conway AR, Kane MJ, Bunting MF, Hambrick DZ, Wilhelm O, Engle RW. Working memory span tasks: a methodological review and user's guide. *Psychonomic Bulletin & Review*. 2005; 12:769–786.10.3758/BF03196772 [PubMed: 16523997]
- Dearing E, McCartney K, Taylor BA. Change in family income-to-needs matters more for children with less. *Child Development*. 2001; 6:1779–1793.10.1111/1467-8624.00378 [PubMed: 11768145]
- Deater-Deckard K, Sewell M, Petrill SA, Thompson LA. Maternal working memory and negative reactivity in parenting. *Psychological Science*. 2010; 21:75–79.10.1177/0956797609354073 [PubMed: 20424026]

- Deater-Deckard K, Wang Z, Chen N, Bell MA. Maternal executive function, harsh parenting, and child conduct problems. *Journal of Child Psychology and Psychiatry*. 2012; 53:1084–1091.10.1111/j.1469-7610.2012.02582.x [PubMed: 22764829]
- Diamond A. Executive functions. *Annual Review of Psychology*. 2013; 64:135–168.10.1146/annurev-psych-113011-143750
- Dix T, Ruble DN, Grusec JE, Nixon S. Social cognition in parents: Inferential and affective reactions to children of three age levels. *Child Development*. 1986; 57:879–894. [PubMed: 3757607]
- Dopke CA, Milner JS. Impact of child noncompliance on stress appraisals, attributions, and disciplinary choices in mothers at high and low risk for child physical abuse. *Child Abuse and Neglect*. 2000; 24:493–504. [http://dx.doi.org/10.1016/S0145-2134\(00\)00110-1](http://dx.doi.org/10.1016/S0145-2134(00)00110-1). [PubMed: 10798839]
- Enders CK. The impact of nonnormality on full information maximum-likelihood estimation for structural equation models with missing data. *Psychological Methods*. 2001; 6:352–370.10.1037/1082-989X.6.4.352 [PubMed: 11778677]
- Engle, RW.; Kane, MJ. Executive attention, working memory capacity, and a two-factor theory of cognitive control. In: Ross, B., editor. *The psychology of learning and motivation*. Vol. 44. New York: Elsevier; 2004. p. 145-199.
- Gershoff ET. Corporal punishment by parents and associated child behaviors and experiences: A meta-analytic and theoretical review. *Psychological Bulletin*. 2002; 128:539–579.10.1037/0033-2909.128.4.539 [PubMed: 12081081]
- Gonzalez A, Jenkins JM, Steiner M, Fleming AS. Maternal early life experiences and parenting: The mediating role of cortisol and executive function. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2012; 51:673–682.10.1016/j.jaac.2012.04.00 [PubMed: 22721590]
- Grusec, JE.; Hastings, P.; Mammone, N. Parenting cognitions and relationship schemas. In: Smetana, JG., editor. *Beliefs about parenting: Origins and developmental implications*. Jossey-Bass; San Francisco: 1994. p. 5-19.
- Harden KP, Turkheimer E, Loehlin JC. Genotype by environment interaction on adolescents' cognitive aptitude. *Behavior Genetics*. 2007; 37:273–283.10.1007/s10519-006-9113-4 [PubMed: 16977503]
- Harrison TL, Shipstead Z, Hicks KL, Hambrick DZ, Redick TS, Engle RW. Working memory training may increase working memory capacity but not fluid intelligence. *Psychological Science*. 2013.10.1177/0956797613492984.
- Hofmann W, Friese M, Strack F. Impulse and self-control from a dual-systems perspective. *Psychological Science*. 2009; 4:162–176.10.1111/j.1745-6924.2009.01116.x
- Hofmann W, Schmeichel BJ, Baddeley AD. Executive functions and self-regulation. *Trends in Cognitive Sciences*. 2012; 16:174–180. [PubMed: 22336729]
- Houben K, Wiers RW, Jansen A. Getting a grip on drinking behavior: Training working memory to reduce alcohol abuse. *Psychological Science*. 2011; 22:968–975.10.1177/0956797611412392 [PubMed: 21685380]
- Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*. 1999; 6:1–55.10.1080/10705519909540118
- Klebanov PK, Brooks-Gunn J, Duncan GJ. Does neighborhood and family poverty affect mothers' parenting, mental health, and social support? *Journal of Marriage and the Family*. 1994; 56:441–455.
- Knight, Smith; Martin, Lewis. the LOGSCAN Investigators. 2008
- 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.
- Leung DW, Slep AMS. Predicting inept discipline: the role of parental depressive symptoms, anger, and attributions. *Journal of Consulting and Clinical Psychology*. 2006; 74:524–534.10.1037/0022-006X.74.3.524 [PubMed: 16822109]
- MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods*. 1996; 1:130–149.10.1037/1082-989X.1.2.130

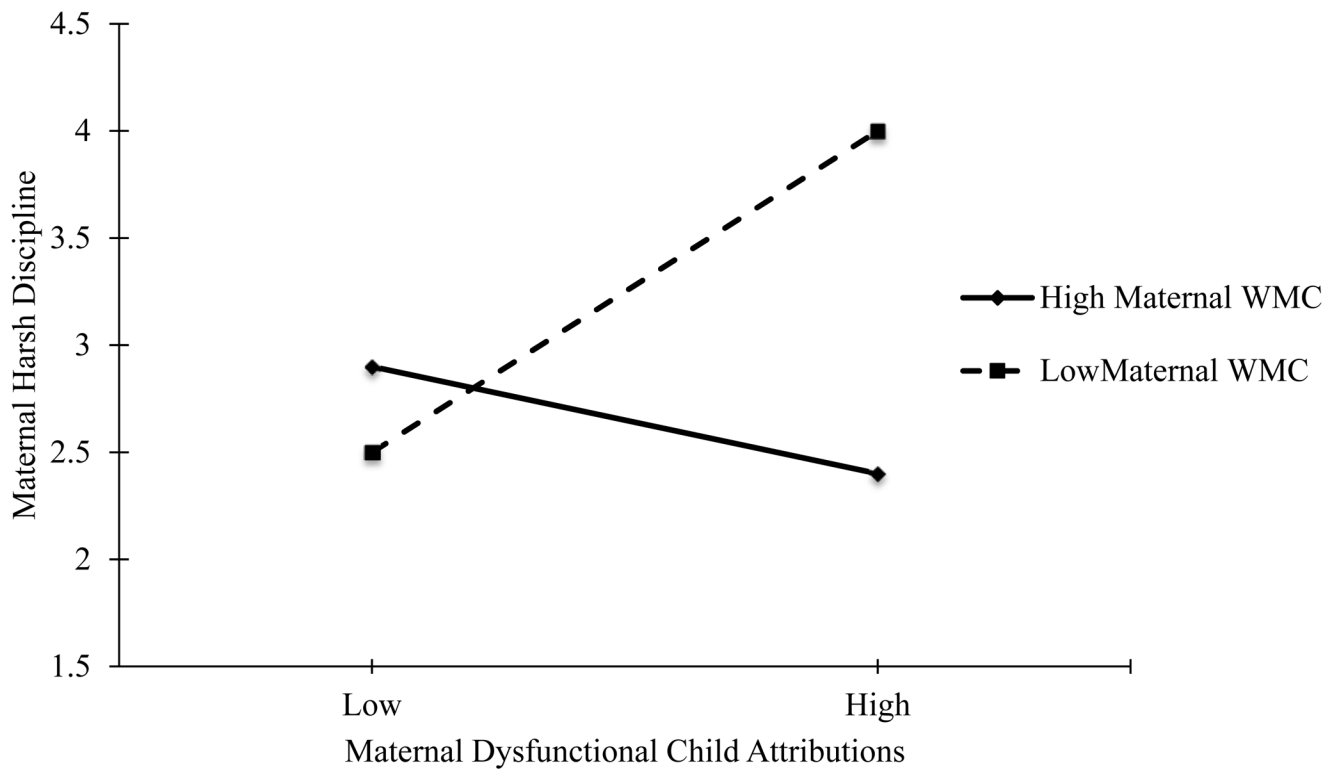
- Margolin G, Gordis EB. The effects of family and community violence on children. *Annual Review of Psychology*. 2000; 51:445–479.10.1146/annurev.psych.51.1.445
- Martinez P, Richters JE. The NIMH community violence project: II. Children's distress symptoms associated with violence exposure. *Psychiatry Interpersonal and Biological Processes*. 1993; 56:22–35.
- McLoyd VC. The impact of economic hardship on Black families and development. *Child Development*. 1990; 61:311–346.10.1111/j.1467-8624.1990.tb02781.x [PubMed: 2188806]
- Melby, JN.; Conger, RD. The Iowa family interaction rating scales: Instrument summary. In: Kerig, PK.; Lindahl, KM., editors. *Family observational coding systems*. 2001. p. 33-58.
- Mills RSL, Rubin KH. Are behavioural and psychological control both differentially associated with childhood aggression and social withdrawal? *Canadian Journal of Behavioural Science*. 1998; 30:132–136.10.1037/h0085803
- Milner JS. Social information processing and physical child abuse. *Clinical Psychology Review*. 1993; 13:275–294. <http://dx.doi.org/10.1016/0272-735828932990024-G>.
- Milner, JS. Social information processing and child physical abuse: Theory and research. In: Hansen, DJ., editor. *Nebraska symposium on motivation*. Vol. 46. University of Nebraska Press; Lincoln, NE: 2000. p. 39-84.
- Miner JL, Clarke-Stewart KA. Trajectories of externalizing behavior from age 2 to age 9: Relations with gender, temperament, ethnicity, parenting, and rater. *Developmental Psychology*. 2008; 44:771–786.10.1037/0012-1649.44.3.771 [PubMed: 18473643]
- Muthén, B.; Muthén, L. *Mplus User's Guide*. 7. Los Angeles, CA: Muthén & Muthén; 2012.
- Olesen PJ, Westerberg H, Klingberg T. Increased prefrontal and parietal activity after training of working memory. *Nature Neuroscience*. 2004; 7:75–79.10.1038/nn1165
- Pereira J, Vickers K, Atkinson L, Gonzalez C, Wekerle C, Levitan R. Parenting stress mediates between maternal maltreatment history and maternal sensitivity in a community sample. *Child Abuse & Neglect*. 2012; 36:433–437. <http://dx.doi.org/10.1016/j.chiabu.2012.01.006>. [PubMed: 22633056]
- Pinderhughes E, Dodge K, Bates J, Pettit G, Zelli A. Discipline responses: Influences of parents' socioeconomic status, ethnicity, beliefs about parenting, stress, and cognitive-emotional processes. *Journal of Family Psychology*. 2000; 14:380–400.10.1037//0893-3200.14.3.380 [PubMed: 11025931]
- Power, TG. Parenting dimensions inventory: A research manual. University of Houston; 1991. Unpublished manuscript
- Preacher KJ, Curran PJ, Bauer DJ. Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*. 2006; 31:437–448.10.3102/10769986031004437
- Rabin LA, Barr WB, Burton LA. Assessment practices of clinical neuropsychologists in the United States and Canada: A survey of INS, NAN, and APA division 40 members. *Archives of Clinical Neuropsychology*. 2005; 20:33–65.10.1016/j.acn.2004.02.005 [PubMed: 15620813]
- Sanders I. Development, evaluation, and multinational dissemination of the Triple P-Positive Parenting Program. *Annual Review of Clinical Psychology*. 2012; 8:345–379.10.1146/annurev-clinpsy-032511-143104
- Schlomer GL, Bauman S, Card NA. Best practices for missing data management in counseling psychology. *Journal of Counseling Psychology*. 2010; 57:1–10.10.1037/a0018082 [PubMed: 21133556]
- Slep AMS, O'Leary SG. The effects of maternal attributions on parenting: An experimental analysis. *Journal of Family Psychology*. 1998; 12:234–243.10.1037/0893-3200.12.2.234
- Smith AM, O'Leary SG. Attributions and arousal as predictors of maternal discipline. *Cognitive Therapy and Research*. 1995; 19:459–471.
- Snarr JD, Slep AMS, Grande VP. Validation of a new measure of parental attributions. *Psychological Assessment*. 2009; 2:390–401.10.1037/a0016331 [PubMed: 19719350]
- Steiger, JH.; Lind, J. Statistically based tests for the number of common factors. Paper presented at the Annual Meeting of the Psychometric Society; Iowa City. 1980.

- Stern SB, Azar ST. Integrating cognitive strategies into behavioral treatment for abusive parents and families with aggressive adolescents. *Clinical Child Psychology and Psychiatry*. 1998; 3:387–403.10.1177/1359104598033005
- Strassberg Z, Dodge KA, Pettit GS, Bates JE. Spanking in the home and children's subsequent aggression towards kindergarten peers. *Development and Psychopathology*. 1994; 6:445–461. DOI: <http://dx.doi.org/10.1017/S0954579400006040>.
- Strassberg Z, Treboux D. Interpretations of child emotion expressions and coercive parenting practices among adolescent mothers. *Social Development*. 2000; 9:80–95.10.1111/1467-9507.00112
- Taylor SE, Seeman TE. Psychosocial resources and the SES–health relationship. *Annals of the New York Academy of Sciences*. 1999; 896:210–225.10.1111/j.1749-6632.1999.tb08117.x [PubMed: 10681899]
- Thrush C, Wiers RW, Ames SL, Grenard JL, Sussman S, Stacy AW. Interactions between implicit and explicit cognition and working memory capacity in the prediction of alcohol use in at-risk adolescents. *Drug and Alcohol Dependence*. 2008; 94:116–124.10.1016/j.drugalcdep.2007.10.019 [PubMed: 18155856]
- Turkheimer E, Haley A, Waldron M, D'Onofrio B, Gottesman II. Socioeconomic Status Modifies Heritability of IQ in Young Children. *Psychological Science*. 2003; 14:623–628.10.1046/j.0956-7976.2003.psci\_1475.x [PubMed: 14629696]
- Turner ML, Engle RW. Is working memory capacity task dependent? *Journal of Memory and Language*. 1989; 28:127–154.10.1016/0749-596X(89)90040-5
- Wang Z, Deater-Deckard K, Bell MA. Household chaos moderates the link between maternal attribution bias and parenting. *Parenting: Science and Practice*. 2013; 13:233–252.10.1080/15295192.2013.832569
- Wechsler, D. Wechsler Adult Intelligence Scale. 4. San Antonio, TX: Pearson; 2008.
- Wheaton B. Assessment of fit in overidentified models with latent variables. *Sociological Methods & Research*. 1987; 16:118–154.10.1177/0049124187016001005
- Wilson, WJ. *The truly disadvantaged*. Chicago: University of Chicago Press; 1987.
- Wilson WJ. Studying inner-city social dis-locations: The challenge of public agenda research. *American Sociological Review*. 1991; 56:1–14.



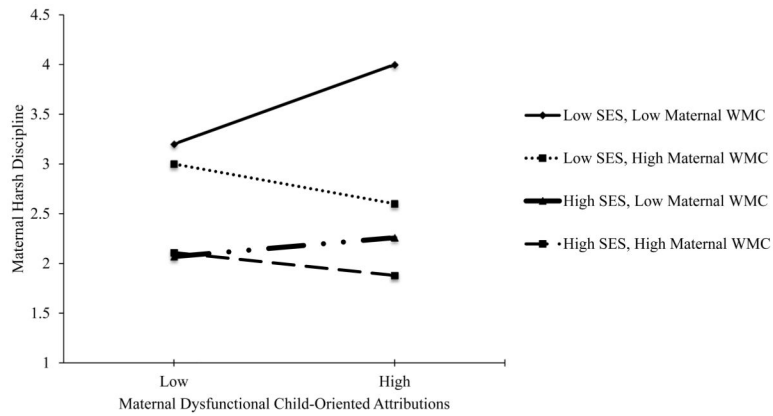


**Figure 1.** Hypothesized model testing moderating effects of maternal working memory capacity and socioeconomic risk on the association between maternal dysfunctional child-oriented attributions and maternal harsh discipline.



**Figure 2.**

Plot of the simple slopes of the moderating role of maternal working memory capacity on associations between child-responsible attributions and maternal harsh discipline. Dashed line denote simple slope significantly different from 0,  $p < .05$ . High and low values are calculated at  $\pm 1$  standard deviation. WMC=Working Memory Capacity.



**Figure 3.**

Plot of simple slopes of significant three-way interaction effects of socioeconomic status, maternal working memory, and maternal child-responsible attributions on maternal harsh discipline. Solid line denotes simple slope significantly different from 0,  $p < .05$ . High and low values are calculated at  $-/+$  1 standard deviation. SES= Socioeconomic Status. WMC=Working Memory Capacity.

Table 1

Means, standard deviations, and correlations of the primary variables in the analyses.

Variable	Range	Mean	SD	1	2	3	4	5	6	7
1. Male Child	---	53%	---	---						
2. Socioeconomic status	0–99	0.00	2.27	.02	---					
3. Maternal Working Memory Capacity	16–43	27.05	5.08	-.03	.22**	---				
4. Maternal C-R Attributions	1–6	2.53	1.04	-.03	-.07	-.05	---			
5. Harsh Discipline	1–8	1.42	1.31	-.01	-.35**	-.25**	.08	---		
6. Coercive Discipline	1–9	3.01	2.49	.04	-.38**	-.08	.09	.52**	---	
7. PDI Physical Punishment	0–3	.61	.73	-.06	-.31**	-.19*	.20**	.20*	.23**	---

Note. PDI= Parenting Dimension Inventory, Maternal C-R Attributions= Maternal Child-Responsible Attributions.

\*  $p < .05$ ,

\*\*  $p < .01$

**Table 2**

Hierarchical path models examining the moderating roles of maternal working memory capacity and socioeconomic risk on the association between dysfunctional child-oriented attributions and maternal harsh discipline.

<b>Independent Variables</b>	<b><math>\beta</math></b>	<b>B</b>	<b>SE</b>	<b>p-value</b>
<u>Maternal Working Memory Moderator Model</u>				
1. Child Gender	0.01	0.02	0.18	0.92
2. Child Attributions	0.10	0.09	0.08	0.30
3. Working Memory Capacity	-0.29	-0.06	0.02	0.0003*
4. Child Attributions X Working Memory Capacity	-0.24	-0.05	0.02	0.009*
<u>Socioeconomic Risk Moderator Model</u>				
1. Child Gender	0.04	0.09	0.16	0.58
2. Child Attributions	0.05	0.04	0.08	0.58
3. Working Memory Capacity	-0.19	-0.04	0.02	0.02*
4. SES	-0.42	-0.19	0.04	0.001*
5. Child Attributions X Working Memory Capacity	-0.17	-0.03	0.02	0.06
6. Child Attributions X SES	-0.02	-0.01	0.05	0.82
7. Working Memory Capacity X SES	0.22	0.02	0.00	0.01*
8. Child Attributions X WMC X SES	0.24	0.02	0.01	0.01*

Note. SES = Socioeconomic Risk, WMC = Working Memory Capacity.

\*  $p < .05$