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Intergenerational Continuity in Child Maltreatment: Mediating Mechanisms and Implications for Prevention

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Abstract

In the interest of improving child maltreatment prevention, this prospective, longitudinal, community-based study of 499 mothers and their infants examined (a) direct associations between mothers' experiences of childhood maltreatment and their offspring's maltreatment, and (b) mothers' mental health problems, social isolation, and social information processing patterns (hostile attributions and aggressive response biases) as mediators of these associations. Mothers' childhood physical abuse - but not neglect - directly predicted offspring victimization. This association was mediated by mothers' social isolation and aggressive response biases. Findings are discussed in terms of specific implications for child maltreatment prevention.

Child maltreatment is a serious public health problem, most urgently for infants and toddlers. In the United States in 2006, 905,000 children, more than 12 of every 1,000 (1.2%) were identified as victims of abuse or neglect (U.S. Department of Health and Human Services [US DHHS], 2008). Victimization rates among children between birth and age 1 were twice as high (2.4%). Female parents (typically biological mothers), acting alone or with another, perpetrated 64% of child abuse and neglect cases (US DHHS, 2008). The most common pattern of maltreatment (40% of cases) was a child victimized by a female parent acting alone.

Child maltreatment not only results in acute physical injuries but also predicts later substance use problems (Kunitz et al., 1998), high-risk sexual behaviors (McCauley et al., 1997; Parillo et al., 2001), aggression and violent crime (Lansford et al., 2007), mental health problems (Cohen, Brown, & Smailes, 2001; Edwards, Holden, Felitti, & Anda, 2003; Widom, DuMont, & Czaja, 2007), and adult relationship problems, including intimate partner violence (Kunitz et al., 1998; Widom, Czaja, & Dutton, 2008). A history of child abuse has been identified as the strongest life-experience predictor of multi-problem behavior in adolescence (Lansford et al., 2002). The earlier in a child's life that maltreatment occurs, the more likely it is to recur, and the greater the physical, psychological, and social costs (Cicchetti & Toth, 1995; Keiley, Howe, Dodge, Bates, & Pettit, 2001; US DHHS, 2008).

Rigorous developmental science can be brought to bear on the pernicious problem of child maltreatment by examining developmental processes that may underlie the associations between well-documented risk factors and child victimization. In the interest of identifying proximal intervention targets for child maltreatment prevention, this prospective longitudinal study examines (a) mothers' history of childhood maltreatment (physical abuse or neglect) as a risk factor for their child's maltreatment during infancy and toddlerhood,

and (b) three theory- and evidence-based mediators of the associations between mothers' maltreatment history and offspring victimization: mothers' mental health problems, social isolation, and social information processing patterns.

Intergenerational Continuity in the Experience of Child Maltreatment

Child maltreatment is widely viewed as multiply determined. At the same time, scholars and practitioners repeatedly discuss a parent's history of childhood maltreatment as a key risk factor for the experience of maltreatment among his or her own children (Belsky, 1993; Egeland, Bosquet, & Chung, 2002; Kotch, Muller, & Blakely, 1999). Several studies demonstrate that a parent's history of maltreatment elevates the risk of her or his offspring's abuse or neglect, perpetrated by that parent and/or another caregiver (Dixon, Browne, & Hamilton-Giachritsis, 2005; Egeland et al., 2002; Pears & Capaldi, 2001; Sidebotham, Golding, & the ALSPAC Study Team, 2001). At the same time, documented rates of intergenerational continuity vary widely. In one prospective British study, the proportion of parents with a history of maltreatment whose children were subsequently referred to authorities for abuse and/or neglect was 6.7% by child age 13 months (versus 0.4% of parents without a history of maltreatment) (Dixon, Browne, et al., 2005; see also Browne & Herbert, 1997, for similar findings). A prospective U.S. study of high-risk families with boys reported that, by age 21, 23% of the sons of physically abused parents reported that their parent(s) had abused them (versus 10% of the sons of parents without a history of abuse) (Pears & Capaldi, 2001).

Methodological factors that clearly affect rates of intergenerational continuity include research design (e.g., prospective or retrospective, duration of longitudinal follow-up), the type of parental maltreatment history examined (physical abuse, neglect, or sexual abuse), and the analysis of socio-demographic co-factors which are often associated with both parental maltreatment history and offspring victimization, such as parental age and education and family income and structure (Ertem, Leventhal, & Dobbs, 2000; Sidebotham et al., 2001). In addition, there is considerable variation in – and often disagreement among -- methods for assessing both parental maltreatment history and child victimization (Manly, 2005; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998; Williams, Rosanbalm, Christopoulos, & Dodge, 2009). For example, in Dixon and her colleagues' (2005) study, parental abuse history was measured according to mothers' *or* fathers' responses to a broad "Index of Need" questionnaire distributed by nurse home visitors. Rather than answer specific questions about childhood maltreatment, parents simply reported on whether they had experienced physical and/or sexual maltreatment during childhood. Offspring victimization in this study was measured according to official case records, whereas offspring victimization in Pears and Capaldi's (2001) study was assessed through children's self-reports. These methodological variations can interfere with the overall estimation of intergenerational continuity.

Even when intergenerational continuity can be rigorously estimated, what is arguably most important to understand are the processes underlying intergenerational continuities and discontinuities, respectively (Egeland et al., 2002; Kaufman & Zigler, 1989). Better understanding of such mechanisms is particularly important for the design and implementation of preventive interventions. To date, however, only one study, conducted by Dixon and her colleagues, has examined such mediating processes (Dixon, Hamilton-Giachritsis, & Browne, 2005; Dixon, Browne, et al., 2005). Findings from this study, although important, require replication with a more objective operationalization of parents' maltreatment histories.

Mediators of the Associations between Parental Maltreatment and Offspring Victimization

In the current investigation, we test three mediators of intergenerational continuity in child maltreatment, one broad-based mediator and two more specific mediators. First, in light of the substantial research evidence linking (a) childhood maltreatment to later mental health problems (e.g., Cohen et al., 2001; Widom et al., 2007) and (b) parents' mental health problems to their offspring's victimization (Belsky, 1993; Kotch et al., 1999), we examine mothers' mental health problems as a mediator of the association between their childhood physical abuse and neglect and their child's victimization. Some evidence of parents' mental health problems as a mediator of the association between parental maltreatment and offspring victimization has come from Dixon and her colleagues' study (Dixon, Browne, et al., 2005). Parents' self-reported past or current treatment for mental illness or depression was associated with both parental maltreatment history and with infant victimization (physical abuse, emotional abuse, sexual abuse, or neglect, alone or in combination), and significant mediation was found.

The second mediator we examine is mothers' social isolation. In so doing, we build on the considerable research evidence demonstrating childhood maltreatment as a predictor of problematic adult relationships, lower social support, and higher social isolation (Elliott, Cunningham, Linder, Colangelo, & Gross, 2005; Muller, Gragtmans, & Baker, 2008; Weisbart et al., 2008). Problematic adult relationships and social isolation are not only predicted by childhood maltreatment but also frequently identified as predictors of childhood maltreatment (Belsky, 1993; Kotch et al., 1999). Thus, it follows that one mechanism underlying the association between mothers' and their children's experiences of maltreatment may be mothers' inability to form healthy adult relationships that offer both general support as well as support for parenting and child protection. Some evidence for this argument comes from one study in which adults' self-reported history of childhood physical abuse was indirectly associated with their "child abuse potential" (according to self-reported attitudes), through current social support (Crouch, Milner, & Thomsen, 2001). To our knowledge, the current study is the first to examine social isolation as a mediator of intergenerational continuity in child maltreatment, *per se*.

Last, we address mothers' social information processing patterns as mediators. According to social information processing theory and research (e.g., Dodge, 1986; Dodge & Pettit, 2003), social behaviors occur as a function of how an individual selectively attends to specific cues, interprets those cues, accesses behavioral responses to those cues, evaluates the potential consequences of various responses, and decides to enact a particular response. Several studies have shown that children who experience physical maltreatment are likely to develop biased patterns of processing social information, including hostile attributions about others' intentions, a propensity to access retaliatory aggressive responses, even to minor provocations, and a tendency to evaluate aggressive responses as morally acceptable and likely to lead to positive outcomes (Dodge, Bates, Pettit, & Valente, 1995; Gibb, Schofield, & Coles, 2009; Pollak & Tolley-Schell, 2003). Biased social information processing patterns, moreover, predict aggressive behaviors in children (Dodge et al., 1995), and have been found to be more prevalent among neglectful than non-neglectful mothers of infants (Hildyard & Wolfe, 2007).

Some evidence of parents' social information processing patterns as mediators of the association between parental maltreatment and offspring victimization has come from Dixon and her colleagues' study (Dixon, Hamilton-Giachritsis, et al., 2005). Nurse home visitors' perceptions of parents' negative attributions and unrealistic perceptions mediated the association between parental abuse history and infant maltreatment. In the present study, we

examine two aspects of mothers' social information processing, hostile attributions and aggressive response biases, as mediators of the associations between mothers' childhood maltreatment and their child's victimization.

The Present Study

The present study uses a prospective, longitudinal design to examine associations between mothers' childhood physical abuse and neglect and their child's victimization during the first two years of life. We focus on mothers as those most likely to be the primary caregivers of infants and as those responsible for perpetrating the majority of child abuse and neglect cases (US DHHS, 2008). In light of studies demonstrating differential sequelae of different types of childhood maltreatment (e.g., Sidebotham et al., 2001), all analyses examine mothers' childhood physical abuse and neglect separately. We first examine direct associations between mothers' histories of physical abuse and neglect and their child's victimization. We then examine the extent to which these associations are mediated by mothers' mental health problems, social isolation, and social information processing patterns (see Figure 1). Analyses of both direct and indirect effects include a comprehensive set of socio-demographic covariates that typically predict and/or are predicted by child maltreatment. For maximum statistical rigor, mediation is tested through the products-of-coefficients approach (MacKinnon, 2008; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

Method

Participants

Participants were 499 mothers and their infants from a small southeastern city and its surrounding county. Mothers were recruited during pregnancy by one of three trained female research assistants in the waiting rooms of prenatal care providers, including a large public health clinic and private OB/GYN practices. In addition, flyers were posted at these clinics and in other community locations. Potential participants were offered \$20 per interview. Of the 383 women approached, 351 (92%) agreed to participate. Another 148 were recruited after responding to the flyer.

Sixty percent of the mothers were primiparous. Mothers selected from a list of racial/ethnic groups to identify themselves as White (non-Latina) (35%), Black (non-Latina) (34%), Latina (23%), Asian (3%), bi- or multi-racial (3%) or other (1%). Mothers ranged in age from 12 to 41 ($M = 27$, $SD = 5.88$). Twenty-eight percent of the mothers had not completed high school, 13% had completed high school or a GED, and 17% had completed some college or vocational training. Twenty-three percent (23%) of the mothers had graduated from college, and 18% had completed a post-graduate degree. Annual family income ranged from \$0 to \$400,000, with a median of \$35,000. Seventy-six percent (76%) of the mothers lived with a husband, boyfriend, or partner. Comparison to population statistics for race, ethnicity, and education for mothers giving birth in the county during the year that study participants were interviewed indicated that the sample is representative of the county from which it is drawn.

Procedures

During the second half of pregnancy, participants completed an hour-long, face-to-face interview assessing family demographics, history of childhood maltreatment, mental health problems, social isolation, and two aspects of social information processing: hostile attributions and aggressive response biases. Interviews were conducted in English or Spanish, according to the participant's preference; Spanish interviews were conducted by a native Spanish speaker. As part of standard informed consent procedures, participants

provided written consent for the research team to access county child protective service records for up to seven years after their child's birth. Since the birth of the child, county records of allegations and substantiations of child maltreatment have been reviewed regularly for the presence of participants' target infants.

Measures

Maternal race/ethnicity—Based on mothers' self-reported race/ethnicity, three dummy codes were created: White/non-White, Black/non-Black, and Latina/non-Latina.

Mothers' history of maltreatment during childhood—Mothers responded to 11 items adapted from the Parent-Child Conflict Tactics Scale (PC-CTS; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). The PC-CTS asks adults about the extent to which they have used specific types of physical discipline. It also addresses several aspects of neglect. Several studies using this scale have illustrated its strong psychometric properties (Straus & Hamby, 1997; Straus et al., 1998). The PC-CTS is also used to ask adults about types of discipline that they experienced as a child. For the purposes of the present study, mothers were asked if, during their childhood, they had *never*, *sometimes*, or *often* experienced each of 11 parental disciplinary or neglectful actions described by the PC-CTS. Mothers were classified as having experienced childhood physical abuse if they reported that they were *often* hit on the bottom or on some other part of the body than the bottom "with something like a belt, hairbrush, a stick, or some other hard object," or if they reported that they were *sometimes or often* "beat up (hit over and over as hard as [their parent] could)." This classification indicated that 9.6% ($n = 48$) of the mothers were victims of childhood physical abuse.

Mothers were classified as having experienced childhood neglect if they reported that they were *often* "left alone when an adult should have been with you" during the day *or* during the night, if they reported that they were *sometimes* left alone during the day *and* during the night, or if their parent or caregiver was *often* "so drunk or high that they could not take care of you." This classification indicated that 10.6% ($n = 53$) of the mothers were victims of childhood neglect.

Seventeen mothers experienced both physical abuse and neglect (3.4% of all mothers, 35.4% of the 48 mothers who had experienced any physical abuse, and 32.1% of the 53 mothers who had experienced any neglect). In order to examine differential sequelae of different types of childhood maltreatment, mothers' childhood physical abuse and neglect were entered into our regression models as simultaneous predictors, with each controlling for the effect of the other.

Mental health problems—Three questions concerning mental health problems during the past year were adapted from the Composite International Diagnostic Interview Short Form (CIDI-SF; Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998; Kessler et al., 1998b). Mothers indicated whether they had felt sad, blue, or depressed for two or more consecutive weeks, whether they had lost interest in most things that usually give them pleasure for two or more consecutive weeks, and whether they had felt worried, tense, or anxious most of the time for one month or longer. Responses were summed to create a 4-point index of total mental health problems (range = 0-3; $M = 0.85$, $SD = 1.10$). Forty-four percent (44%) of the mothers reported at least one mental health problem during the past year.

Social isolation—Four vignettes were adapted from the Early Head Start Research and Evaluation Project (Mathematica Policy Research, Inc., 1996). Mothers were asked about the number of people, if any, to whom they could turn for help under each of four scenarios:

needing someone to talk to when feeling anxious or depressed, needing a \$100 loan, needing an opinion about an important decision, and needing parenting advice. Responses to each scenario were coded on a 3-point scale with higher scores indicating fewer people to whom to turn (0 = 2 or more people, 1 = 1 person, 2 = no people) and averaged to create a single score for social isolation ($M = 0.40$, $SD = 0.50$).

Social information processing patterns—Four vignettes were adopted from the work of Dodge and his colleagues (Coccaro, Noblett, & McCloskey, in press). Each vignette described a potentially provocative scenario with ambiguous social cues from another adult: being injured by an unfamiliar karate partner during a class demonstration, dropping an armful of materials after being bumped by a co-worker from behind, being cut off in traffic, being cut in line at a busy coffee shop. To assess mothers' hostile attributions, mothers were asked to imagine themselves in each of the scenarios and to rate how likely it was that the other person was being mean to them. Responses were coded on a 3-point scale (0 = not at all likely, 1 = possibly likely, 2 = very likely) and averaged to create a single score for hostile attributional bias ($M = 0.76$, $SD = 0.41$). To assess mothers' aggressive response biases, in response to each vignette, mothers chose from a list of 5 increasingly aggressive behavioral responses (0 = "do nothing" to 5 = physical aggression). Each response was then classified as aggressive (including verbally or physically aggressive) or non-aggressive, and averaged to create a single score indexing the proportion of total aggressive responses (range = 0-1, $M = 0.07$, $SD = 0.14$).

Victimization of offspring—County records of child maltreatment, organized according to child victims, were reviewed. In accordance with county regulations, information about perpetrators was explicitly excluded from the records available to our research team. Allegations and substantiations of child maltreatment were reviewed through December, 2006, at which point the youngest children in the sample were 26 months old. In order to examine maltreatment during the same developmental period for all children, we included only the cases of maltreatment that occurred when the child was 26 months old or younger. We identified 40 individual children (8%) with at least one incident of alleged or substantiated abuse or neglect. There was a total of 79 incidents for these 40 children, with 17 (43%) of the children having more than one allegation or substantiation. Of these 79 incidents, 62 (78%) were allegations only, 17 (22%) were substantiations. Of these 17 substantiations, 14 (82%) were substantiated for neglect, 2 (12%) were substantiated for abuse (physical, sexual, or emotional), and 1 (6%) was classified "in need of services." "In need of services" is a relatively new sub-classification introduced through the implementation of a statewide child welfare reform, the Multiple Response System. The high proportion of neglect substantiations reflects the county's stringent criteria for abuse substantiations and relatively loose criteria for neglect substantiations. For example, to be substantiated for physical abuse, a child must have a currently visible bruise or physical injury, which might have disappeared by the time of investigation. Substantiations for neglect include "inappropriate discipline," including inappropriate physical discipline. These distributions are consistent with county patterns.

For analytic purposes, children were classified as victimized if they had at least one allegation or substantiation of abuse or neglect during or before age 26 months. As noted, 40 (8%) of the children met this criterion. We combined allegations and substantiations for several reasons. First, analysis of these county data as well as those from a national probability study has indicated that allegations predict subsequent allegations as well as substantiations (Durham Family Initiative, 2009; Kohl, Jonson-Reid, & Drake, 2009). Second, several studies have demonstrated that the developmental outcomes of alleged versus substantiated maltreatment do not differ significantly (Black et al., 2002; Hussey et al., 2005; Leiter, Myers, & Zingraff, 1994), and that both alleged and substantiated cases in

fact substantially underestimate the true prevalence of child abuse and neglect and associated developmental risks (Theodore et al., 2005; Straus et al., 1998; Williams et al., 2009). Third, analyzing substantiated maltreatment only has been shown to result in limited representation, presumably from biases in the often highly unsystematic substantiation processes (Black et al., 2002; Cross & Casaneuva, 2009). Thus, including children with alleged maltreatment should result in more generalizable findings (Manly, 2005).

Results

Analytic Strategy

For all variables except family income, between 99% and 100% of the data were present. The family income variable was missing 13% of the data due to nonresponse. To accommodate these missing data, all principal analyses were conducted using full information maximum likelihood (FIML) estimation.

To test the direct associations between the mothers' history of childhood maltreatment and their child's victimization, we used probit regression with FIML estimation. To test mediation, we used MacKinnon's product-of-coefficients approach, including tests of asymmetric confidence intervals (MacKinnon, 2008; MacKinnon et al., 2002). The product-of-coefficients approach is preferable to the traditional causal steps test of mediation (Baron & Kenny, 1986) because the product-of-coefficients test provides a joint estimation of the effects of mediating variables, and because the causal steps test has been demonstrated to be underpowered (Fritz & MacKinnon, 2007; MacKinnon et al., 2002). Unlike the causal steps test, MacKinnon's approach is not contingent on first demonstrating a direct association between the independent and dependent variables. Rather, significant mediation can be detected in the absence of a direct relation between the independent variable and the dependent variable, because in some circumstances, the test of the mediated effect has more statistical power than the test of the direct effect (MacKinnon, 2008).

There are three steps, starting with the analysis of the association between the independent variable and the hypothesized mediator (Figure 1, path *a*). If path *a* is significant, the second step is to test the association between the mediator and the dependent variable, adjusting for the independent variable (Figure 1, path *b*). If path *b* is also significant, the final step is to compute the product-of-coefficients test statistic (ab [coefficient for path *a* * coefficient for path *b*]/SE of the product) (MacKinnon et al., 2002). Because the distribution of the test statistic is not expected to be normal, asymmetric confidence intervals for each test statistic are computed based on the distribution of the product of the two variables. Mediated effects are statistically significant when these asymmetric confidence intervals do not contain zero (MacKinnon, 2008).

Preliminary Analyses

Table 1 provides descriptive information for key socio-demographic, independent, and dependent variables and the bivariate correlations between these variables. Because of the wide variability in family income, the family income variable was standardized for all ensuing analyses. As noted earlier, given that approximately one third of the mothers who had experienced one type of maltreatment also reported experiencing the other type (35.4% of abused mothers also reported neglect, 32.1% of neglected mothers also reported abuse), in order to examine differential sequelae of the different types of childhood maltreatment, mothers' childhood physical abuse and neglect were entered into our regression models as simultaneous predictors, with each controlling for the effect of the other. In addition, given significant associations in previous studies as well as numerous significant associations in this study between several maternal socio-demographic characteristics and the key

dependent variable (offspring victimization) and/or independent variables (mothers' childhood physical abuse and neglect), all regressions covaried maternal race/ethnicity (Black/non-Black and Latina/non-Latina), age, education, and family income.

Direct Associations between Mothers' History of Childhood Maltreatment and Offspring Victimization

Of the 48 mothers who experienced childhood physical abuse, 16.7% ($n = 8$) had offspring who became victims of maltreatment by age 26 months, compared to 7.1% ($n = 32$) of the 451 mothers who did not experience childhood physical abuse. Of all 40 child victims, 20% ($n = 8$) had mothers who had experienced childhood physical abuse ($\chi^2 [1] = 5.39, p < .05$). Probit regression revealed a significant, positive association between mothers' childhood physical abuse and their child's victimization (see Table 2). In probability terms, the positive probit coefficient (0.49) indicates that, after accounting for maternal race/ethnicity, age, education, family income and childhood neglect, the mothers who experienced physical abuse were 19% more likely than those who did not experience physical abuse to have children who were victimized by the age of 26 months.

Of the 53 mothers who experienced childhood neglect, 9.4% ($n = 5$) had offspring who became victims of maltreatment by age 26 months, compared to 7.7% ($n = 34$) of the 442 mothers who did not experience childhood neglect. Of all 40 child victims, 12.5% ($n = 5$) had mothers who had experienced childhood neglect ($\chi^2 [1] = 0.20, p = .66$). According to probit regression, mothers' childhood neglect did not significantly predict their child's victimization (see Table 2).

Mediated Associations between Mothers' History of Childhood Maltreatment and Offspring Victimization

Mediated associations between mothers' physical abuse and offspring victimization—We first examined mothers' mental health problems as a mediator of the association between mothers' childhood physical abuse and their child's victimization. Mothers' childhood physical abuse predicted mental health problems ($B = 0.48, SE = 0.17, p < .01$). Mental health problems did not predict offspring victimization, however. Therefore, we did not proceed with further testing of mothers' mental health problems as a mediator.

We next examined social isolation as a mediator of the association between mothers' childhood physical abuse and their child's victimization. Mothers' childhood physical abuse predicted social isolation, and social isolation predicted offspring victimization (see Table 3). The product-of-coefficients test demonstrated significant mediation ($ab = 0.10$; $CI = 0.018 - 0.199$) such that the association between mothers' childhood physical abuse and their child's victimization was explained in part by greater social isolation.

We next examined social information processing patterns as mediators. First we investigated the role of hostile attributions. Mothers' hostile attributions were not predicted by childhood physical abuse nor were they predictive of offspring victimization. Therefore, we did not proceed with further testing of hostile attributions as a mediator.

Mothers' childhood physical abuse did predict aggressive response biases, and aggressive response biases predicted offspring victimization (see Table 4). The product-of-coefficients test demonstrated significant mediation ($ab = 0.12$; $CI = 0.036 - 0.228$) such that the association between mothers' childhood physical abuse and their child's victimization was explained in part by mothers' aggressive response biases.

Mediated associations between mothers' childhood neglect and offspring victimization—We first examined the associations between mothers' childhood neglect and the four mediating variables (mental health problems, social isolation, hostile attributions, and aggressive response biases). Mothers' childhood neglect predicted social isolation, and social isolation predicted offspring victimization (see Table 3). The product-of-coefficients test was not significant, however. In addition, there were no significant associations between mothers' childhood neglect and any other. Therefore, we did not conduct any further tests of mediation.

Discussion

In the interest of improving the prevention of child maltreatment, this study examined (a) direct associations between mothers' experiences of childhood maltreatment and their offspring's maltreatment, and (b) mothers' mental health problems, social isolation, and social information processing patterns as mediators of these associations. Given the potential value of understanding such developmental processes for improving child maltreatment prevention, and the paucity of rigorous research examining these processes, the current study offers an important next step in the application of developmental science to improving children's wellbeing.

Direct and Indirect Associations between Mothers' History of Child Maltreatment and Offspring Victimization

We found that mothers' childhood physical abuse - but not neglect - directly predicted offspring victimization, and that this association was mediated by mothers' social isolation and aggressive response biases. The association between mothers' childhood physical abuse and their offspring's maltreatment was robust, emerging after accounting for maternal race/ethnicity, age, education, family income, and co-occurring childhood neglect. Compared to mothers who did not experience childhood physical abuse, the mothers who did experience childhood physical abuse were 19% more likely to have children who were victimized by the age of 26 months. Moreover, given evidence in the literature that rates of intergenerational continuity of maltreatment increase with the duration of longitudinal follow-up (e.g., Egeland et al., 2002), it is quite possible that the rate of intergenerational continuity in this sample will increase as participants are followed longer. At the same time, it is important to note that the vast majority of mothers who experience physical abuse do not go on to have children who become victim of maltreatment themselves. In this study, 83% of the mothers who experienced physical abuse did *not* have offspring who became victims of maltreatment by age 26 months. Thus, mothers' histories of physical abuse increase the risk of their children's victimization but by no means ensure it.

The lack of a direct association between mothers' childhood neglect and their offspring's maltreatment is also notable. As with physical abuse, it is possible that the intergenerational effects of mothers' childhood neglect will increase as our participants are followed longer. Recent research demonstrating effects of early neglect (allegations and substantiations) – but not early physical abuse - on later child aggression illustrates the negative effects that early neglect can have (Kotch et al., 2008), and emphasizes the importance of continued research into the differential sequelae of different types of maltreatment. In addition, it is important to remember that approximately one third (32%) of the neglected mothers in this sample also reported childhood abuse, and that this comorbidity was covaried in our analysis of the effects of mothers' neglect histories. Thus, when coupled with childhood physical abuse, mothers' childhood neglect may have different implications for their children's victimization than mothers' neglect alone. Last, we note that our method of assessing mothers' maltreatment histories, self-reported childhood experiences according to the PC-

CTS, may have been better suited to assessing childhood physical abuse than neglect. The PC-CTS items concerning neglect are somewhat more subjective (e.g., asking about being left alone “when an adult should have been with you,” without specifying at age at which this occurred). In addition, explicit memories of physical abuse may be more accessible than those of neglect.

In addition to finding a direct association between mothers’ experiences of childhood physical abuse and their offspring’s victimization, we find that two relationship-specific processes, social isolation and aggressive response biases, both reported during pregnancy, mediate this association. It is consistent with what is understood about the influence of childhood maltreatment on adult relationships and social networks (e.g., Weisbart et al., 2008), and about the role of parental social isolation in childhood maltreatment (e.g., Kotch et al., 1999), that mothers’ perceptions of others being less available to help in times of need mediate the association between physical abuse and child victimization. Outside of the realm of maltreatment, even more normative variations in the quality of early child-parent relationships have strong implications for children’s later relationships (Berlin, Appleyard, & Cassidy, 2008). To the extent that the negative effects of early physical abuse on relationship skills are not remediated, women who were abused during childhood are at risk of developing inadequately supportive friendships, romantic partnerships, and social networks, all of which can hinder their abilities to support and protect their own children.

It is consistent with social information processing theory and research about aggressive tendencies, as both predicted by physical abuse and predictive of later aggression (e.g., Dodge et al., 1990), that mothers’ aggressive response biases were found to mediate the association between physical abuse and child victimization. Furthermore, for mothers who had been physically abused, aggressive response biases mirror a history of aggressive parenting. Thus, our findings raise the question of whether mothers who were physically abused may be repeating - intergenerationally – not only maltreatment but also the very behavioral tendencies that were inflicted on them. At the same time, we note that the low frequency of aggressive response biases in this sample makes it necessary to interpret this finding with caution. Moreover, in the current study, because we assessed social information processing patterns during pregnancy, we focused on mothers’ hostile attributions and aggressive response biases towards other adults. Future child maltreatment research should also examine mothers’ hostile attributions and aggressive response biases towards children, as such biases may be more directly related to childrearing and maltreatment. Mothers’ tendencies to make hostile attributions about their children’s ambiguous behaviors have in fact been found to predict harsh disciplinary practices (e.g., Nix, Pinderhughes, Dodge, Bates, Pettit, & McFadyen-Ketchum, 1999) and less positive mother-infant interaction (e.g., Burchinal, Skinner, & Reznick, in press).

We also note that our finding of two significant mediators raises the question of how these mediators, which are weakly positively correlated (see Table 1), might interact with one another. For example, there may be indirect effects through both mediators simultaneously, or there might be double mediation (e.g., childhood physical abuse → aggressive response biases → social isolation → offspring victimization). There may also be conditions that affect the magnitude of one or another mediated pathway (i.e., moderated mediation or mediated moderation). Future research examining these possibilities will be valuable.

Unlike our relationship-specific mediators of social isolation and aggressive response biases, our broader-based mediator, mothers’ mental health problems, did not mediate the association between mothers’ physical abuse and offspring victimization, although mental health problems were predicted by mothers’ childhood physical abuse. Compared to previous research which has reported mothers’ mental health *treatment* as a mediator of

intergenerational continuity in maltreatment (Dixon, Browne, et al., 2005), it may be that our measure of mental health problems, which identified a sizable proportion (44%) of the sample as having at least one mental health problem during the past year, was overly liberal, especially given the mood swings that often accompany pregnancy. Thus, our measure of mental health problems may not have adequately targeted the more severe mental health problems that both result from maltreatment and impinge on parenting and child protection.

Similarly, the lack of evidence for mothers' hostile attributional biases as a mediator was somewhat surprising. It may be that this study's measure of hostile attributions was overly general and did not tap attributions that were adequately relevant to parenting an infant or toddler.

Limitations and Suggestions for Future Research

As noted earlier, child maltreatment research is rife with methodological complexity, especially vis-a-vis the measurement of both parents' and offspring's victimization. Specifically, legally-defined cases of maltreatment underestimate prevalence (e.g., Theodore et al., 2005), whereas self-report data are subject to reporting distortions that themselves may be a product of childhood maltreatment (e.g., Chu, Frey, Ganzel, & Matthews, 1999). The use of multiple measures to assess maltreatment in both generations is ideal, and helps to avoid the problem of method variance. The current study is limited by its reliance on maternal report for both independent and mediating variables, although it is strengthened by its use of non-maternal report assessments for its dependent variable. At the same time, this approach means that we used different metrics to assess maltreatment in mothers than in their children, which may be criticized as an "apples to oranges" comparison. In order to create more parallel measures, even if studies cannot provide prospective, official data on both parents' and children's victimization, parents could be asked if their parent(s) were ever reported for abuse or neglect, a step we recommend for future research on intergenerational continuity in child maltreatment.

A second recommendation for future research centers on the importance of testing not only mediators but also moderators of intergenerational continuity in child maltreatment. For example, what processes account for the fact that 83% of the physically abused mothers in this sample did *not* have a child who was victimized by age 2? What buffering factors help physically abused women not to be socially isolated, and instead to form supportive friendships, romantic partnerships, and social networks? Research that addresses these questions will also help to inform prevention efforts.

Finally, we note that it is a limitation of the present data set – to be overcome by future studies – that neither the perpetrator nor the type(s) of maltreatment experienced by the offspring could be rigorously analyzed. It would be extremely valuable to know if mothers' maltreatment histories lead them to perpetrate maltreatment, themselves, and/or to have children who are victimized by others. It is likely that a good proportion of intergenerational *continuity* in the experience of child maltreatment is accounted for by intergenerational *transmission* (mother history → mother perpetration), because often mothers are the actual perpetrators, and, even when they are not, they may be defined as such for failing to protect their child from being victimized by someone else. These issues remain to be tested. In terms of promoting public health, however, what are especially valuable are findings that speak to proximal intervention targets for improving child maltreatment prevention. This study begins to offer such findings.

Raising Healthy Children: Implications for Policy and Practice

Taken as a whole, our study has two key implications for the prevention of child maltreatment. First, it suggests that a mother's history of childhood physical abuse should be considered an important risk factor by maltreatment prevention programs. Widely disseminated home visiting programs such as the Nurse-Family Partnership (implemented in over 250 U.S. counties; Olds, 2006) and Healthy Families (implemented under the auspices of Prevent Child Abuse America in over 400 communities throughout the U.S.; Healthy Families America, 2007) define mothers' risk for maltreatment (and program eligibility) on the basis of their demographic characteristics or cumulative psychosocial risks. Our findings suggest that early in the course of intervention, ground-level service providers should have a thorough understanding of mothers' maltreatment histories. Of course, such information must be carefully and sensitively elicited, and may require specific training. In addition, such intimate information may or may not be provided by mothers until significant trust in their home visitor (or social worker) is established. At the same time, in focus groups conducted by our research team, home visitors and social workers have commented that when they ask mothers about their own childhoods, mothers are often extremely forthcoming because it is the first opportunity that they have had to tell their "story," and they are eager for a caring professional to listen.

Mothers' social isolation and aggressive response biases, while particularly relevant to mothers with histories of physical abuse, can also be examined as general risk factors by maltreatment prevention programs. Moreover, assessing social isolation through discussion of the mother's support system, and aggressive response biases through the use of hypothetical vignettes, may elicit less discomfort or defensiveness than more direct assessments of mothers' maltreatment histories.

Second, this study responds to program evaluations that have highlighted the need for child maltreatment prevention programs to improve the fit of their services to the particular strengths and challenges of families served. For example, although the Nurse-Family Partnership has demonstrated effects in reducing early maltreatment, these effects are typically concentrated among mothers who are poor, unmarried, or have fewer "psychological resources" (Olds et al., 1997; Olds, Henderson, Chamberlin, & Tatelbaum, 1986). Randomized evaluations of the Healthy Families program have indicated limited efficacy and/or effects for specifically defined subgroups only (Duggan, Berlin, Cassidy, Burrell, & Tandon, in press; Duggan et al., 2007). Thus, more carefully fitted services are required.

Our findings suggest specific strategies for tailoring services to participants' needs. For mothers who were victims of physical abuse, our findings underscore the importance of reducing mothers' social isolation. Empirical support for an intervention strategy of increasing social support as a mechanism for "breaking the cycle" of child maltreatment has come from several descriptive studies. For example, Hunter and Kilstrom (1979) found that "non-repeating" mothers were more likely to have supportive social networks than "repeating" mothers (see also Egeland, Jacobvitz, & Sroufe, 1988).

The goal of engaging isolated families and increasing social support is, in fact, part of the rationale for home visiting programs, including the Nurse-Family Partnership and Healthy Families. Yet, as demonstrated by evaluations of these programs' effects and by other studies, the programmatic provision of social support is a challenging endeavor (Thompson & Ontai, 2000). One particular challenge concerns the mother's ability to commit to treatment (Spieker, Solchany, McKenna, DeKlyen, & Barnard, 2000). That is, individuals' histories of maltreatment may directly inhibit their ability to trust and rely on others for support. Maltreatment prevention programs need to continue to develop their approaches for

actively engaging participants and for enhancing and sustaining social support, especially for mothers with a history of physical abuse.

Our findings also suggest that mothers who were victims of physical abuse require help in reducing aggressive response biases. Such help may take the form of cognitive reframing exercises, such as those developed by Bugental and her colleagues that have been found, in a randomized trial, to reduce mothers' self-reported harsh parenting and physically abusive behaviors (Bugental et al., 2002).

Finally, because child maltreatment is, at its core, a malfunctioning relationship, and because both social isolation and aggressive response biases could be improved through enhancing mothers' relationship skills, interventions that directly target mothers' relationship skills may be especially valuable for mothers with histories of child maltreatment. Such interventions may be as brief as Dozier's *Attachment and Biobehavioral Catch-up*, a 10-session, home-based protocol that has shown positive effects on infant-mother attachment and infants' stress regulation (Dozier, Peloso, Lewis, Laurenceau, & Levine, 2008; Dozier, Peloso, Zirkel, & Lindheim, 2007). Such brief yet powerful interventions may increase the effectiveness of existing maltreatment prevention programs. Such interventions may also be powerful tools in and of themselves for preventing child maltreatment.

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Figure 1. Hypothetical relations among mothers' history of childhood maltreatment, mental health problems, social isolation, social information processing patterns, and offspring victimization.

Table 1

Descriptive Statistics and Correlations

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Possible range	0-1	0-1	0-1	12-41	0-7	\$0-400,000	0-3	0-2	0-2	0-1	0-1	0-1	0-1
M	.35	.34	.23	27.31	4.36	\$46,073	.85	.40	.76	.07	.10	.11	.08
SD	.48	.48	.42	5.88	2.08	\$40,987	1.10	.50	.41	.14	.23	.31	.27
Percent of yes responses	35%	34%	23%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	9.6%	10.6%	8%
1. White	-												
2. Black	-.54***	-											
3. Latina	-.41***	-.40***	-										
4. Maternal age	.34***	-.15**	-.18***	-									
5. Maternal education [†]	.53***	-.09#	-.55***	.54***	-								
6. Family income	.46***	-.14**	-.36***	.43***	.56***	-							
7. Mental health problems	-.10*	.06	.09*	-.13**	-.24***	-.22***	-						
8. Social isolation	-.37***	-.002	.47***	-.31***	-.57***	-.39***	.32***	-					
9. Hostile attributions	-.23***	.11*	.17***	-.17***	-.32***	-.17***	.11*	.21***	-				
10. Aggressive responses	-.12**	.18***	-.04	-.15**	-.20***	-.08	.17***	.09*	.15**	-			
11. Childhood phys. Abuse	-.07	.04	.01	-.03	-.14**	-.12*	.17***	.22***	.04	.16***	-		
12. Childhood neglect	-.08#	.03	.05	-.02	-.07	-.12*	.09#	.16***	.04	-.02	.27***	-	
13. Offspring victimization	-.11*	.16***	-.06	-.13**	-.17***	-.15**	.12*	.16***	.07	.22***	.10*	.02	-

Note.

[†] Maternal education was rated on a scale of 0 (no formal schooling) to 7 (post-graduate degree).

$p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

Table 2

Results of Probit Regression Testing the Association between Mothers' History of Childhood Physical Abuse and Offspring Victimization

	B (SE)	β
Black	0.11 (0.20)	0.05
Latina	−0.78 (0.28)	−0.32 *
Maternal age	−0.01 (0.01)	−0.03
Maternal education	−0.13 (0.05)	−0.26 *
Family income	−0.33 (0.08)	−0.32 ***
Childhood neglect	−0.04 (0.27)	−0.01
Childhood physical abuse	0.52 (0.23)	0.15 *
R^2	.26	

Note. Regression conducted using FIML estimation.

*
 $p < .05$

 $p < .001$

Table 3

Summary of Regressions Testing Associations among Mothers' Childhood Physical Abuse, Social Isolation, and Offspring Victimization

	Path <i>a</i> (linear regression): Mothers' Childhood Physical Abuse → Social Isolation		Path <i>b</i> (probit regression): Mothers' Social Isolation → Offspring Victimization	
	B (SE)	β	B (SE)	β
Black	0.06 (0.05)	0.06	0.09 (0.20)	0.04
Latina	0.32 (0.06)	0.27***	−0.96 (0.29)	−0.39**
Maternal age	−0.004 (0.004)	−0.05	0.01 (0.01)	0.03
Maternal education	−0.09 (0.01)	−0.35***	−0.11 (0.05)	−0.22*
Family income	−0.02 (0.03)	−0.03	−0.32 (0.08)	−0.31***
Childhood neglect	0.12 (0.06)*	0.08*	0.09 (0.26)	0.03
Childhood physical abuse	0.24 (0.06)	0.14***	0.48 (0.22)	0.14*
Social isolation			0.40 (0.16)	0.19*
<i>R</i> ²	.40		.29	

Note. Regressions conducted using FIML estimation.

*
p < .05

**
p < .01

p < .001

Table 4

Summary of Regressions Testing Associations among Mothers' Childhood Physical Abuse, Aggressive Response Biases, and Offspring Victimization

	Path <i>a</i> (linear regression): Mothers' Childhood Physical Abuse → Aggressive response biases		Path <i>b</i> (probit regression): Mothers' Aggressive response biases → Offspring Victimization	
	B (SE)	β	B (SE)	β
Black	0.03 (0.02)	0.11 *	0.08 (0.21)	0.03
Latina	−0.04 (0.02)	−0.11 #	−0.63 (0.29)	−0.25 *
Maternal age	−0.001 (0.001)	−0.05	−0.004 (0.02)	−0.02
Maternal education	−0.02 (0.01)	−0.27 ***	−0.09 (0.05)	−0.18 #
Family income	0.01 (0.01)	0.09	−0.34 (0.09)	−0.31 ***
Childhood neglect	−0.03 (0.02)	−0.06	0.09 (0.26)	0.03
Childhood physical abuse	0.07 (0.02)	0.15 **	0.20 (0.25)	0.05
Aggressive responses			1.69 (0.49)	0.23 **
<i>R</i> ²	.10			.27

Note. Regressions conducted using FIML estimation.

p < .10

*
p < .05

**
p < .01

p < .001