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Corporal punishment and child behavioral and cognitive outcomes through 5 years-of-age: Evidence from a contemporary urban birth cohort study

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Abstract

This study examined the prevalence and determinants of spanking of children at 3 years-of-age, and the associations between spanking and externalizing behavior and receptive verbal ability at age 5. Overall, we find maternal spanking rates of 55.2% and paternal rates of 43.2% at age 3. Mothers facing greater stress and those who spanked earlier are more likely to spank at age 3, whereas those who report a supportive partner during pregnancy and those who were not U.S. born were less likely to spank. Mothers and fathers in communities where spanking was more normative were more likely to spank. Fathers were less likely to spank daughters at age 3. Frequent maternal spanking at age 3 was associated with externalizing behavior and receptive vocabulary at age 5, controlling for an array of ecological risks, earlier behavior, and verbal capacity. Taking advantage of the large and diverse sample we explored potential interactions and found no evidence that race, parental warmth, normativeness, or child gender moderated the association between spanking and externalizing or receptive vocabulary. These findings add to the literature on negative consequences associated with a widely endorsed parenting practice, and highlight the need for research that explores alternative effective discipline practices and addresses parent questions of what else they could, or even should, be doing.

Few domains of research on child development attract the attention and passions of the public to the extent of studies on parental discipline practices, and the use of physical discipline in particular. In any area of research focused on rearing practices so intimately tied to cultural and family traditions, evidence must be clear and studies conceptualized and measured in such a way that conclusions are firmly rooted in the results. Despite a large and growing literature spanning decades pointing toward an association between spanking and higher levels of aggression and behavioral regulation difficulties (Benjet & Kazdin, 2003; Berlin et al., 2009; Gershoff, 2002; Taylor, Manganello, Lee, & Rice, 2010), the use of corporal punishment remains a widely endorsed parenting tool in U.S. families (Straus & Stewart, 1999; Gershoff, 2002) and proponents of spanking have not been swayed by the research evidence to date (Baumrind, 1996a; Baumrind, 1996b; Baumrind, Larzelere, & Cowan, 2002). Research evidence is seldom the sole deciding factor in changing people's minds, but for data to play a more central role in guiding policy and family decision-making, the field must continue to endeavor to tackle some of the remaining measurement and

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methodological challenges inherent in studying causal issues in non-experimental correlational designs (Benjet & Kazdin, 2003).

These questions have relevance across cultures (Gershoff et al., 2010), but the United States stands out as one of the few peer advanced industrialized countries that have not followed Sweden's lead in banning corporal punishment (EPOCH-USA, 2010), and spanking rates in the U.S. remain high, with over 90% of parents reporting some use of physical discipline across childhood (Gallup, 1995; Straus & Stewart, 1999). The use of spanking is highest for preschoolers and school-age children, but even in the first year of life we see recent evidence of 11% of children spanked between 6–11 months-of-age (Wissow, 2001) and up to 15% of children being spanked at 12 months (MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel, 2011).

We focus the first part of this paper on examining both the prevalence and the determinants of spanking through 3 years-of-age. Identifying factors that increase the risk of spanking among families with young children may shed light not only on the role that spanking plays within such families but also on the factors that preventive programs might usefully target. The second focus of the current analysis is on the behavioral and cognitive outcomes at transition to school that might be associated with earlier use of spanking in the preschool period. We take advantage of a longitudinal dataset that follows a large and diverse sample from birth through 5 years-of-age in order to control for possible confounds across the family's ecology from child and parent factors to distal risk factors with the potential to impact parenting stress and more proximal family functioning. We begin with a brief review of prior research on the prevalence, determinants, and consequences of spanking of preschoolers. We then describe our empirical strategy, data, and methods. We then present results and conclusions.

Determinants of Spanking in the Preschool Period

The extensive body of work on spanking (see reviews by Gershoff, 2002; Berlin et al., 2009; Lansford et al., 2009) has examined the role of child and family factors in predicting the likelihood of spanking. Many studies, but not all, report that boys are more likely to be spanked than girls. Findings are also mixed with regard to child temperament, with some but not all studies finding that young children who are more irritable are more likely to be spanked. Other factors associated with increased use of spanking include the mother being young or inexperienced (Berlin et al., 2009), having a more aggressive or impulsive temperament, having symptoms of depression or anxiety, experiencing more parental stress or life stress (Deater-Deckard et al., 2003), growing up in a family that endorsed spanking (Chung et al., 2009), growing up or living in the South (Flynn, 1994), having more children in the home, being in a relationship that is conflictual or unhappy, or being a single parent. While studies generally find that socioeconomic status (SES) is negatively associated with spanking, such that rates of spanking decrease as family income or parental education increases, not all do (perhaps because studies differ in the distributions of SES they study). With regard to race, most (but not all) studies find that rates of spanking are higher in African-American families than in non-Hispanic white families, but since such studies often conflate SES and race, it is not clear to what extent these differences reflect race/ethnicity

versus SES (Horn, Cheng, & Joseph, 2004). Evidence on Hispanic families is also mixed, with studies reporting that Hispanic families are more likely, less likely, or as likely as non-Hispanic white families to use spanking. These discrepant results may in part be due to different samples being examined, as the Hispanic population is very diverse in terms of country of origin and immigration and acculturation status, and also has changed over time (Ispa et al., 2004).

In their elegant exploration of reciprocal transactional processes, Berlin and colleagues (2009) examined spanking in the past week at age 1, 2, and 3 in a large sample of more than 2,500 low-income African-American, non-Hispanic white, and Mexican-American families from the Early Head Start Study. Overall, 34% of 1-year olds had been spanked in the past week (by the mother or someone else in the household); this percentage rose to 49% at both age 2 and age 3. At all ages, African-American children were more likely than other children to be spanked. This result is consistent with prior research but is important given that prior studies, as discussed above, have typically conflated race/ethnicity with SES, whereas in this study, all the families (regardless of race/ethnicity) had incomes below the poverty line. The authors also carried out a more nuanced analysis of Hispanic families than is usually the case, examining only Mexican-Americans and distinguishing between those who were more or less acculturated. The results revealed that rates of spanking among Mexican-American families varied by acculturation: more acculturated Mexican-American parents spanked at about the same rate as non-Hispanic white parents, while those who were less acculturated spanked significantly less frequently at both age 2 and age 3. In addition, spanking rates were higher if mothers were younger, were depressed, or had lower family incomes, and if the child was a boy or reported to have a fussy temperament.

Child Outcomes Associated with Spanking

In her seminal review of 88 studies over a number of decades, Gershoff (2002) demonstrated an association between corporal punishment and 10 of the 11 child outcomes examined across childhood, with links to subsequent aggression most common (Taylor et al., 2010). Despite these associations with downstream aggressive behavior, the one positive association with immediate compliance noted by Gershoff (2002) speaks to the difficulty of parents coming to look at spanking in a new way in the face of temporally proximal positive feedback on their disciplinary practices. The meta-analysis also highlighted, however, several design issues in much of the literature that detract from the causal conclusions one can draw (Baumrind, Larzelere, & Cowan, 2002). In addition, studies are not consistent in their definition of spanking, further clouding the conclusions one can draw (Gershof, 2002; Larzelere, 2000).

Benjet & Kazdin (2003) challenged the field to continue to push beyond cross-sectional association studies through the inclusion of longitudinal samples that can address the temporal sequencing of spanking and child outcomes. They also call for greater inclusion of measures of ecological stress and socioeconomic variables. Gershoff (2002) was not able to test whether these negative associations were present regardless of the child's race/ethnicity for example, but other studies have found that the effects of spanking on child behavior may be less negative for African-American children (see review by Lansford, 2010), for whom

spanking may be more normative and/or used in the context of different parenting styles (see for e.g. Baumrind, 1996b; Deater-Deckard et al., 1996; Deater-Deckard & Dodge, 1997; Deater-Deckard, Dodge, & Sorbring, 2005; Lansford et al., 2004).

Other recent work with larger samples and national studies, however, has not replicated this moderating role for race/ethnicity (see e.g., Berlin et al., 2009; Grogan-Kaylor, 2004; Mulvaney & Mebert, 2007). These discrepant results may be reflective of racial/ethnic differences in the broader endorsement of spanking across the socioeconomic spectrum in Black families (MacKenzie, et al., 2011b). Similar mixed results have been found for the protective moderating role of family factors such caregiver warmth (Deater-Deckard, Ivy, & Petrill, 2006; McCloyd & Smith, 2002; Smith & Brooks-Gunn, 1997 Berlin et al., 2009).

Much of the focus in the literature has been on aggressive child outcomes, with a more rare focus on internalizing problems, and cognitive developmental outcomes have received little attention (Gershoff, 2002). Bugental, Martorell and Barraza (2003) found associations between spanking in infancy and child stress reactivity, which is suggestive of one of the potential mechanisms by which physiological organization patterns may underlie downstream child outcomes that extend beyond the externalizing domain. Berlin and colleagues (2009) established connections not only with behavioral outcomes, but also child Bayley scores. Potential mechanisms underlying a connection between spanking and child cognitive outcomes are only beginning to be elucidated (Gershoff, 2010), but a small number of studies have established an association between frequency and severity of corporal punishment and child cognitive deficits (Berlin et al., 2009; Smith & Brooks-Gunn, 1997; Straus & Paschall, 2009). Spanking could be associated with later cognitive development in an indirect manner, serving as a proxy signal for nurturing/invested parenting, or directly through trauma and neural development (Tomoda et al., 2009). The nascent literature on cognitive outcomes associated with spanking has suffered from some of the same design limitations as work on aggressive behavior, with comparisons between spanked and unspanked populations without adequate controls for the predictors of spanking, risk factors which themselves could be contributing to the cognitive outcomes.

The current study sought to address limitations in the literature in a few key ways. First, we included fathers' use of spanking in our analysis, something that has received limited attention in the literature to date, taking advantage of the fact that the Fragile Families and Child Well-Being Study (FFCW) measures maternal and paternal spanking at the same points in time in the same way. The diversity and breadth of the FFCW dataset, following a birth cohort sample of children in 18 medium to large U.S. cities, also lends itself to addressing some of the representation and stratification issues in other datasets, as the sample includes a racially/ethnically diverse sample, which makes it well-suited to examine potential moderation effects of race/ethnicity.

We also are able to address some of Baumrind et al.'s (2002) and Benjet & Kazdin's (2003) call to the field to move beyond a simple yes or no dichotomy for spanking to examine a range of frequency. In addition, the FFCW study dataset allowed us to look longitudinally at the characteristics predictive of spanking and how those might explain some of the observed effect differences, while also being able to control for potential confounds across the

family's ecology, including family structure/size, SES, education, work, parenting stress, caregiver mental health and emotionality, substance use, warmth, child temperament, and earlier child behavior. Moreover, we were able to integrate perspectives emerging in the literature on the application of cumulative risk perspectives to harsh parenting and child maltreatment (MacKenzie, Kotch, & Lee, 2011). The cumulative risk perspective (Sameroff, Seifer, Zax & Barocas, 1987), which looks at the total level of adversity faced by families, has demonstrated that a cumulative risk index provided enhanced predictive capacity in prospectively identifying families at risk for maltreatment across early childhood when compared to individual risk factors (MacKenzie et al., 2011a). The current analysis incorporates cumulative risk frameworks into analyses examining the etiology of parental spanking behavior. Finally we explore the subsequent effects of spanking on the child's behavioral and cognitive development controlling for an array of factors across the family's ecology.

Methods

Data

We use data from the Fragile Families and Child Well-Being Study (FFCW) (see Reichman, Teitler, Garfinkel, & McLanahan, 2001, for a complete description of the sample and study design). FFCW is a longitudinal birth cohort study of approximately 4,200 children born between 1998 and 2000 in 18 medium to large U.S. cities, over-sampling for children born to unmarried parents. Baseline in-person interviews with both the mother and father took place in the hospital shortly after the child was born. Follow-up interviews were conducted by telephone when the child was 12-months of age, 3-years of age, and 5-years of age. In addition, in-home interviews and visits were held with the mothers and children at age 3 and 5 to supplement the phone interviews.

We use the data from FFCW to estimate three sets of models. The first set of models examines the prevalence and etiology of maternal spanking and paternal spanking when the child is 3 years old. The second set of models analyzes the child's Child Behavior Checklist (CBCL) externalizing behaviors at age 5. The focal outcome for the third set of models is the child's score on the Peabody Picture Vocabulary Test (PPVT) at 5 years-of-age.

The data used in the analyses draw upon items from all six of the interviews with the mother as well as the 3 years-of-age phone interview with the child's father. The study's analytic sample is limited to families in which there were valid responses on the key variables from these interviews including the outcome variables. In addition, the analytic sample is limited to families in which the mothers reported being either black, non-Hispanic; white, non-Hispanic; or Hispanic. Respondents that report being Asian, Native American, or Other and non-Hispanic are just under 4% of the total FFCW and would be far too few to provide robust results.

The resultant sample included 1,110 families for the spanking prevalence and child behavior analyses, and a sub-sample of 779 families for the PPVT analyses. In results not shown but available on request, we have compared the main analytic sample (and PPVT sub-sample) to the total FFCWS sample to determine the sources of the missing data and the extent to

which our analytic sample (and PPVT sub-sample) differ from the main sample. The largest source of missing data is due to father absence; although FFCWS made special efforts to contact fathers even if not resident in the home. With regard to sample characteristics, the families in our analytic samples do differ from the total FFCWS sample in some respects. For example, the families in the analytic samples were less likely to have babies with a low birth weight and the child was less likely to be the mother's first; the mothers were slightly older, more likely to be white non-Hispanic, more likely to have attended college/technical school or completed college, more likely to have lived with both parents at age 15, and more likely to be living with the child's father at baseline. Based on this comparison, the families making up the analytic sample have more resources in general and appear more stable at baseline than the rest of the FFCW sample. Nevertheless, as shown in the descriptive statistics below, they remain a fairly disadvantaged urban sample.

Outcome Variables

Spanking is measured by a question asked of the mother and the father in the age 3 telephone interviews. Specifically, the mother is asked "…(i)n the past month, have you spanked (CHILD) because (HE/SHE) was misbehaving or acting up?" (Fragile Families, 2005a). The parent's yes or no response is the basis for the dichotomous spanking variable. Parents who reported spanking were also asked about frequency of spanking. As shown in Table 1, within the full study sample, approximately 55% of the mothers reported spanking at 3 years-of-age – 11% two times a week or more, and 44% less than two times a week. This is in contrast to the 24% of these same mothers who reported spanking their child at the 1 year-of-age phone interview.

The CBCL Externalizing behavior score at age 5 draws upon 30 items asked of the mother across the in-home and phone interviews; 25 of the items were asked of the mother during the in-home interview while the remaining five were asked during the phone interview. These items comprise the aggression (20 items) and rule-breaking (10 items) subscales available in the CBCL. The mother responds Not True (0), Sometimes True (1), or Often True (2) to questions on specific behaviors for her child. For the full study sample the average score was 12.2 out of a possible 60.

The child's standardized score for receptive vocabulary came from the Peabody Picture Vocabulary Teast (PPVT; Goldman, Stein & Guerry, 1983). The PPVT has been standardized against a national sample of children based on age (Goldman, et al., 1983). During both the age 3 and 5 in-home interviews, the field researcher administered the PPVT instrument directly to the child. Because PPVT scores are not available for the full study sample we use a sub-sample (N=779), where the mean PPVT score was 88.0 at age 3 and 96.4 at age 5.

Control Variables

There is considerable consistency across the sets of models for predicting any use of spanking and for associating spanking with later externalizing behavior and receptive vocabulary in the control variables used. Below we describe the control variables used in the

models. Descriptive statistics provided are shown in Table 1 and refer to the full study sample (N=1,110) unless otherwise noted.

Child-level Variables—Four child-level demographic variables were included in the models – age, gender, low birth weight indicator, and first-born child indicator. Age is a continuous variable for child age (in months) at the time of the relevant interview (mean of 60.7 months, range from 57 months to 73 months at the age 5 interview). The other three variables are dummies where being a girl, being low birth weight, and being first born were assigned as 1. An additional child-level variable is the mother's report about the infant's emotional temperament assessed at age 1. The measure used three items rated on a 5 point scale (not at all to very much): whether the child often fusses/cries, is easily upset, and reacts strongly when upset. The responses are summed to derive one score where 15 is the highest possible value (indicating a highly difficult temperament) and 3 is the lowest possible value (indicating not at all difficult). Mean score for the sample was 8.2.

Maternal and family characteristics—Controls for maternal and family characteristics include a continuous variable for the mother's age at the time of the birth (in years); a set of dummy variables for the family structure over the five-year period - from baseline to the age 5 phone interview (these include married at both points-in-time, cohabiting at baseline and married or cohabiting at follow-up, not married or cohabiting at baseline or follow-up, married or cohabiting at baseline but not at follow-up, or not married or cohabiting at baseline but married or cohabiting at follow-up); a set of dummy variables for the mother's racial/ethnic affiliation (these include white, non-Hispanic; black, non-Hispanic; Hispanic); a set of dummy variables for the mother's level of education at baseline (these include less than high school education, high school or high school equivalency only, some college/ technical school, BA/BS degree or higher); household income-to-needs ratio at baseline (household's annual income divided by the relevant poverty line level); whether the mother was born outside the U.S.; whether the mother reported living with both her parents when she herself was 15 years-of-age; whether the mother was employed in the week prior to the age 5 phone interview; the number of other adults living in the household at age 5; and the number of other children living in the household at 5 years-of-age.

Prenatal risks—Four variables measure potential risk or protective factors to which the mother was exposed prenatally. Late onset of prenatal care was indicated if care was initiated after the first trimester or not initiated at all. If the mother reported either smoking, taking any drugs or moderate to heavy alcohol use during pregnancy, the risky health behavior variable was coded 1. The mother's experience with IPV at the hands of the father prior to the child's birth is drawn from her responses to two questions. At baseline, the mother was asked how often the birth father "hit or slapped you when he was angry" (Fragile Families, 2004). At the age 1 interview the mother was asked if she was "ever cut, bruised or seriously hurt in a fight with the (FATHER)" and whether this occurred before, during or after her pregnancy (Fragile Families, 2003). This was coded as IPV exposed if the mother responded affirmatively to the baseline question, or responded affirmatively to the age 1 question and specifically indicated that the violence occurred before or during the pregnancy. Finally, mothers rated the birth father's supportiveness during pregnancy based

on four questions. These items include willingness to be fair or compromise, expresses love or affections, insults or criticizes her ideas, and encourages or supports her on things important to her. A 3-point scale was used – often (3), sometimes (2), and never (1) – and the 4 scores were summed.

Maternal risk factors—Mother's parental stress at age 5 is measured using a 16-point scale based on 4 items from the Panel Study of Income Dynamics—Child Development Supplement's Aggravation in Parenting Scale (Mainieri & Grodsky, 2006). Items are measured on a 4-point scale ascertaining the extent to which the mother agrees that being a parent is harder than she expected, she feels trapped by her responsibilities as a parent, she finds taking care of her children much more work than pleasure, and she often feels tired, worn out, or exhausted from raising a family. Next is the mother's report of her own mental health. A dummy variable was set to 1 if the mother reports symptoms that potentially indicate depression or generalized anxiety disorder at any of the interviews where these concerns were included – i.e. ages 1, 3 or 5. At Age 1 and 3 items assessing both depression and anxiety were included, whereas at age 5, the interview only contained items pertaining to depression. Maternal depressive symptoms are measured using an 8-point scale drawn from the Composite International Diagnostic Interview-Short Form (CIDI-SF) (Nelson, Kessler, & Mroczek, 1998). The CIDI-SF depression measure has been widely used in prior research and can be coded either as a dichotomous measure of major depression "caseness" or as an index of depressive symptoms. We use the former approach, categorizing a respondent as potentially suffering from depression if she scores 3 or higher. Mothers' symptoms of anxiety were measured using the CIDI-SF for general anxiety disorder (GAD). The stem questions for GAD on the CIDI-SF considers whether the mother experienced a period lasting a month or more where she felt worried or anxious most of the time and, if so, what was the longest lasting period (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). The stem conditions coupled with affirmative responses on at least three physiological symptoms – result in the respondent being coded with potential GAD (Fragile Families, 2006a). We coded the mother as 1 if she was identified as potentially suffering from either depression or anxiety at any point-in-time.

Mother's impulsivity was based on two questions asked in the age 5 phone interview about whether she often says/does things without considering the consequences, and often gets in trouble for acting before thinking (Fragile Familes, 2006b). The response options use a 4-point scale where 1 means Strongly Agrees while 4 is Strongly Disagree.

Mother's cognitive level is based on items collected through the age 3 phone survey. Specifically, a modified version of the Similarities subtest of the Weschler Adult Intelligence Subscale - Revised (WAIS-R) test was administered to the mother to measure verbal concept formation and reasoning and abilities (Fragile Families, 2006). This subtest asks the respondent to identify how two objects or concepts are comparable. The values of the modified subscale for the mother range from 0 (lowest functioning) to 15 (highest functioning).

The final variable in this group is the measure of mother's frequency of cognitively stimulating activities with the child at age 1. These activities promote secure attachment and

have a direct effect on child's cognitive outcomes (Brooks-Gunn, & Markham, 2005; Hart & Risley, 2003). Specifically, the age 1 phone interview includes items asking the mother how many days a week did she play peek-a-boo with her child, sing songs or nursery rhymes, and read to her child. The positive parenting score reflects the average of the mother's responses to these items.

Normativeness—A proxy for the normativeness of spanking for each particular family was also included. This normativeness indicator is drawn from the age 1 data and is the rate of maternal spanking for the mother's particular racial/ethnic group in the city where that mother resided. We hypothesize that in communities where spanking is more widely endorsed, spanking has greater acceptance and the parent may be increasingly likely to spank.

Past child outcome measures—The final two variables are measures at age 3 of the child outcomes modeled at age 5. The child's Externalizing behavior score at age 3 was based on 24 items asked of the mother during the in-home interview. These items included the 19 item subscale for aggression from Achenbach and Rescorla (2000) plus five additional items from the Destructive subscale (alpha .89) (Achenbach, 1992; Fragile Families, 2005b). The PPVT (described above) was administered to the child during the age 3 In-Home visit.

Cumulative Risk Indicator—Finally, we developed a cumulative risk score to aid in the descriptive portion of this analysis. It combines a range of proxy variables that represent potential risks in the child's environment into one index. Variables included (all measured at 1 year-of-age, unless otherwise noted) were: mother not married, father ever incarcerated, any public assistance utilization, mother's health less than very good or excellent, any indication of maternal depression or anxiety, any maternal drug use, any reported economic hardship, 4 or more other children in the home, mother working full-time, any indication of violent or controlling behavior by the father, and household income less than $15,000 at baseline.

Results

As shown in Table 1, use of any spanking increases with child age from age 1 to age 3. At age 1, 24% of children (in the full study sample) were spanked by their mother. This rises to 55.2% by age 3, with 11.2% of mothers spanking two or more times a week and 44% less than twice a week. At age 3, 43.2% of fathers report spanking, with 8% in the more frequent group and 35.2% less than twice per week.

Analysis of spanking by race/ethnicity and cumulative risk suggest that rates and trends differ a good deal by these factors. At 1 year-of-age there were significant mean differences in use of spanking across the three racial groups ($F(2, 1109)=35.11$, $p<.001$). Using Bonferroni adjusted alpha levels of 0.017 for the 3 comparisons, we found that black families spanked significantly more than white families and Hispanic families, with no significant differences between the white and Hispanic families. At 1 year-of-age there were also significant mean differences in maternal use of spanking across the four (low risk = 0–1

factors; moderate risk = 2–3 factors; high risk = 4–5 factors; very high risk = 6 or more factors) cumulative risk groups ($F(3, 1109) = 7.01$, $p<.001$). Using Bonferroni adjusted alpha levels of 0.083 for the 6 comparisons between the 4 risk groups, we found that the very high risk group had higher spanking levels than both the low and moderate risk groups.

At 3 years-of-age, the significant differences in the use of spanking across the three racial groups found at age 1 remained ($F(2, 1109)=15.72$, $p<.001$). Using Bonferroni adjusted alpha levels of 0.017 for the 3 comparisons we once again found that black families spanked significantly more than white families and Hispanic families, with no significant differences between the white and Hispanic families. At three years-of-age there was no significant differences in maternal use of spanking across the four risk categories.

This examination of mean differences for race/ethnicity and cumulative risk level were then expanded upon with a two-way analysis of spanking rates across both race/ethnicity and cumulative risk group (See Figure 1). Two-way ANOVA analysis at age 1 reveals significant main effects for both race/ethnicity ($F(2, 1109)=22.62$, $p<.001$) and cumulative risk group ($F(3, 1109)=3.03$, $p<.05$) for spanking rates in Figure 1A. At age 1 the interaction term for race/ethnicity by cumulative risk group was also significant ($F(6, 1109)=2.12$, $p<.05$) indicating that as you move across the risk spectrum from low to very high risk the mean differences in spanking between black families and the other two groups get smaller. At age 3 (Figure 1B) the main effect for race/ethnicity in the two-way analysis remains significant ($F(2, 1109)=9.15$, $p<.001$), but the main effect for risk category and the interaction between race/ethnicity and risk category are no longer significant.

With these broad variations in spanking rates across racial/ethnic groups and risk level in these comparisons, it becomes important to examine the predictors of spanking at age 3 in a multivariate approach to better address the question of whether these differences represent broad racial/ethnic cultural differences in child-rearing practices, or if these socially-constructed racial groupings are simply serving as a proxy for unmeasured socioeconomic markers in our stratified society as the significant interaction between risk and race/ethnicity would seem to indicate.

Predictors of Spanking at age 3

As discussed earlier, we estimate two logistic regression models for the prediction of maternal and paternal spanking at 3 years-of-age (Table 2). Table 2 shows odds ratios (with standard errors of the estimates in parentheses, and asterisks indicating significance levels as noted in the tables), with significant odds ratios greater than 1 indicate that a factor is associated with increased odds of spanking, whereas odds ratios less than 1 indicate that a factor is associated with reduced odds of spanking.

We see in Table 2 that the child characteristics do not have strong effects in predicting maternal or paternal spanking at age 3, although fathers are significantly less likely to spank girls and children who are younger at the time of the age 1 interview. Spanking endorsement at age 1 emerges as the strongest predictor of maternal spanking at age 3 and a significant predictor of paternal spanking, indicating continuity in parenting practices over time and consistency across parent. With regard to family status, families where the mother and father

were living together or married at either or both of baseline and age 3 were more likely to endorse spanking at age 3 than those families where the parents were not living together at baseline or at age 3. Foreign-born mothers and their partners were much less likely to spank, but with the wide array of measures of socio-economic status (models 2–4), race/ethnicity did not predict spanking rates at age 3. Mother's report of father supportiveness during pregnancy and lower parental stress was associated with lower levels of maternal spanking. Finally, parents from communities where spanking was more normative were more likely to use spanking themselves.

To ensure that our results were not being driven by regional or local variation, we repeated the models adding controls for city fixed effects. Results from these models (not shown but available on request) were overall quite similar to those reported here.

Association between Spanking and Subsequent Child Externalizing Problems

Table 3 displays the results of multivariate regressions predicting child externalizing behavior problems at age 5. As discussed, we present results from a series of models layering in progressively more complex predictors and controls from across the child's ecology. In Model 1, we see that both low frequency maternal and paternal spanking (less than twice a week) and more frequent maternal and paternal spanking (two or more times a week) at age 3 are associated with significantly higher levels of externalizing behavior at age 5.

In Model 2 we add child characteristics including child gender, age at age 5 assessment, if the child was low birth weight, birth order, and child temperament at age 1 as well as indicators of family socio-demographics and risk behaviors. While the four spanking variables continue to be significant predictors of later externalizing behavior, we can begin to see the predictive power being somewhat diminished by the addition of controls, such as early child temperament, which is a significant predictor of age 5 externalizing across all models. We also see family structure emerging as an important predictor with children in families in stable cohabitating relationships or moving toward cohabitation over time having lower levels of externalizing problems than families who were living apart at baseline and at age 5. Maternal substance use is a significant predictor of greater externalizing difficulty in this model, although it does not remain significant in the fully defined models. Birth father supportiveness during pregnancy, however, significantly predicts lower levels of externalizing problems at age 5 and remains a significant predictor through the fully explicated models when additional controls are added.

Model 3 sees the addition of measures of maternal functioning and well-being, including measures of parental stress, indication of depression or anxiety over the past 5 years, mother's impulsivity, and mother's cognitive capacity. In Model 3, maternal high-frequency spanking and father spanking of both low and high frequency remain as significant predictors of later externalizing behavior, but maternal low-frequency spanking at age 3 no longer significantly predicts externalizing behavior at age 5. Lower maternal stress and impulsivity are also both found to be associated with lower levels of externalizing behavior at age 5.

Finally, model 4 adds in the important control of earlier child externalizing behavior at age 3, which is, as expected, a significant predictor of later externalizing behavior at age 5 indicating continuity in child behavior. In Model 4 the two paternal spanking variables at age 3 are no longer predictive of age 5 externalizing behavior. Despite the addition of the earlier behavior control to the existing broad battery of variables from across the family ecology, however, we still find that high frequency maternal spanking at age 3 remains a significant predictor of greater externalizing problems at age 5.

Association between Spanking and Subsequent Child Receptive Verbal Capacity

Table 4 displays the results of multivariate regressions predicting child receptive verbal capacity as assessed by the PPVT at age 5. We present a series of progressively more complex models using the same strategy outlined for the externalizing behavior outcome above. In Model 1, we see that only high-frequency maternal spanking at age 3 is associated with significantly lower PPVT scores at age 5. In Model 2 we layer in the child characteristics and family socio-demographic variables, and see effects for child gender and temperament as well as maternal race/ethnicity, education, income, nativity, maternal family of origin structure, and size of family are all associated with receptive verbal capacity at age 5. Despite all of these significant predictors coming into the model, we still see high-frequency maternal spanking staying fairly stable in its association with later reduced PPVT scores.

Model 3 sees the addition of maternal functioning and well-being measures that now include mother's use of pro-cognitive activities at age 1. In Model 3 we see that the addition of a significant control for maternal cognitive capacity (WAIS-R similarities score) is accompanied by a drop in the predictive power of high-frequency maternal spanking, but frequent spanking continues to be a more powerful predictor of PPVT scores than it is of externalizing behavior with a comparable level of controls. Model 4 adds in the final controls of earlier child externalizing behavior at age 3 as well as the child's earlier PPVT score at age 3, which as expected is a significant predictor of age 5 PPVT performance. In Model 4 we see a decrease in the predictive capacity of high-frequency maternal spanking, although it continues to be marginally significant (at $p<.10$).

Interaction Results

In data not shown, but available upon request, we also tested a series of interactions, including spanking by normativeness, by maternal warmth, by gender, and importantly, by race/ethnicity. We did not find that any of these were significant moderators of the relationship between spanking and later externalizing behavior nor receptive verbal ability.

Discussion

Our results provide new evidence as to the prevalence of spanking of preschool aged children among families in U.S. cities and also shed some light on the factors that are predictive of spanking and its associated downstream sequelae. Our analysis is distinctive in the inclusion of both mothers and fathers and also in the breadth of control variables available for analysis. We take a transactional perspective (Sameroff & MacKenzie, 2003)

in conceptualizing how stressors from across the ecology affect more proximal family relationship processes and flavor adult perceptions of, and attributions about, child behavior in ways that increase the risk for spanking and poor child outcomes (MacKenzie & McDonough, 2009). This underscores the importance of the nuanced layering of control variables that we entered into our models, to minimize the likelihood that the association between spanking and child outcomes is a spurious artifact of upstream socioeconomic and ecological risks.

Rates of spanking at 3 years-of-age were nearly 55% for mothers and 43% for fathers, suggesting that this is a typical experience for U.S. children in urban settings. Confirming prior research on mostly older samples of children, we find striking racial/ethnic differences in spanking in the raw data (e.g. Figure 1), with African-American children more likely to be spanked and at younger ages. In our logistic regression models, however, we do not find that African American families are more likely to spank, once the ecological control variables are entered into the model. This may suggest a risk of assuming differences in spanking across race/ethnicity without accounting for a full battery of risks.

An innovation in our analysis was the inclusion of our proxy for normativeness of spanking. In the toddler-preschool period it is more difficult to measure a child's perception of spanking and the meaning-making that children are applying to the experience as has been done with older children (Gershoff et al., 2010; Lansford et al., 2005). Normativeness may be operating in at least a couple of different ways – in the meaning that children are making of the experience, and in the motivation behind what it actually does mean for a caregiver to be spanking. In the current study, we took advantage of the highly racially segregated nature of American cities to calculate a normativeness score for each family that was the rate of spanking in their city for their racial/ethnic group. This provides us at least a rough proxy for the rates of spanking that are likely to surround an individual family in their community, taking into account city fixed-effects and racial communities. It was a significant predictor of spanking in our logistic regression models, indicating that families may make decisions about spanking rooted in their perception of spanking in their community and/or their own likelihood of having experienced spanking in their own family of origin. We did not find, however, that normativeness moderated the link between spanking and behavioral or cognitive outcomes.

One cultural variable that remained a significant predictor in the models of spanking was maternal nativity, with the largely Hispanic mothers who were not U.S. born exhibiting significantly lower levels of spanking. This finding builds on earlier work by Gibson-Davis and Brooks-Gunn (2006), who found differences in child rearing practices around breastfeeding for those who were foreign born. One question we cannot address in the current dataset is whether spanking rates were lower in the countries of origin for these non-native born participants. Are immigrants in our sample representative of lower spanking rates in their country of origin, or do they spank less than native born U.S. citizens and those families back in their own country of origin because they represent a special group of resourced families who are able to migrate? Or, alternatively, are immigrants spanking less in our sample because they choose to stop or reduce spanking once they move to the U.S. –

out of their beliefs of what is acceptable in their new country, particularly for families of color in a dominant white context?

We also see that having the birth father play a supportive role during pregnancy reduces the odds of spanking at 3 years-of-age. It is not clear what mechanism is at work here – perhaps the support leads the mother to view the child more positively, or perhaps it reduces stress during pregnancy and leads to better birth outcomes. This issue is worth pursuing in future research, because if father supportiveness during pregnancy really does play a protective role, this could have implications for programs to engage fathers and boost their supportiveness prenatally. The parental relationship issue is a complex one, however, as rates of both maternal and paternal use of spanking at 3 years-of-age are actually higher in intact and cohabitating couples. We speculate that part of the reason for this finding is that we are controlling for a wide array of the variables that we typically think of as advantages derived from married or cohabiting couples, including supportive partner and socio-economic variables. We are thus looking at married or cohabitating families, but they are in the same neighborhoods, income levels, education, etc. as other families. This finding is in keeping with recent work demonstrating that in bivariate models married families show lower risk of physical maltreatment, but in multivariate controlled models marriage was not protective and in some instances greater levels of maltreatment were found (Guterman, Lee, Lee, Waldfogel, & Rathouz, 2009).

Our results also strongly indicate that spanking is affected by maternal stress. Although the specific indicators of stress vary, mothers who find parenting more stressful are more likely to resort to spanking. Further elucidating the parenting behavior and relationship mechanism(s) by which the experience of accumulating risk and stress in the parenting role leads to child adjustment issues (Deater-Deckard, 1998) will be an important priority moving forward. Certainly evidence on disrupted relationship processes would indicate that one potential mechanism involves the extent to which the experience of stress impacts caregiver perceptions of child behavior, and the potential for those negative perceptions and attributions surrounding child behavior to reduce capacity for sensitivity (MacKenzie & McDonough, 2009). This constellation of predictors is similar to those that predict maltreatment (MacKenzie, et al., 2011a), suggesting that at least in some families, spanking is a marker for elevated risk of maltreatment. If so, families who are reporting such stresses are good candidates for preventive support programs aimed at reducing stressors, or at reframing negative caregiver perceptions of child behavior in the face of such burden (Sameroff & Fiese, 2000).

Overall, our regression model results predicting externalizing problems at 5 years-of-age from spanking at 3 years-of-age are consistent with the literature (Gershoff, 2002), even though we were able to put in place a series of increasingly nuanced models taking into account a host of risk factors from the level of the child to more distal stressors. We see that in the less complex models both maternal and paternal spanking at both high and low frequency are predictive of later externalizing difficulty, but with the addition of further controls father's spanking drops from significance as does low-level maternal spanking. High frequency maternal spanking remains a significant predictor of downstream externalizing behavior in the fully articulated model, even after controlling for age 3

externalizing problems. One limitation in the current study is that parents were left to apply their own definition to the question of whether they "spank," which creates the potential for some parents to include more severe behaviors such as hitting with a belt for example under their definition of "spanking" while others might be reporting less severe behaviors. Having a measure of frequency strengthens our examination, but more clear definitions for spanking would have limited this potential for noise in the data.

That we see higher rates of spanking in African American families across gradients of cumulative risk highlights the importance of a full set of controls in any analysis of behavioral outcomes associated with spanking. This difference in spanking across risk gradients creates a situation where without careful controls the higher rates of spanking in lower risk black families could be masking the effects of spanking and accounting for some of the early findings of a moderating role for race in the literature. In the current analysis we tested several potential moderating interactions and did not find a significant moderating role for race/ethnicity, gender, caregiver warmth or spanking normativeness. This builds on some recent work, such as that by Berlin and colleagues (2009), on larger national datasets that has not replicated the moderating role for race or warmth for externalizing outcomes.

We also find evidence that is suggestive of an effect of spanking on the development of child verbal capacity as measured by the PPVT. When it comes to this important cognitive outcome it may be that we are late in the game. By controlling for age 3 PPVT score in our final model, we are in fact only examining the extent to which variation in spanking at age 3 is leading to changes in PPVT from age 3 to 5. It is possible that the effects on developing receptive verbal capacity are present already by age 3 in early development and by controlling for age 3 PPVT we are washing out some of the effect. Gershoff (2010) in her recent review highlights the importance of expanding our focus to examine cognitive outcomes. This association with receptive verbal capacity awaits replication in other datasets and future work will benefit from a focus on whether spanking is having a direct effect on cognitive development through stress, trauma and other physiological/neural processes, or if spanking is simply an indirect proxy for other unmeasured parenting practices that are impacting cognitive development. However, our inclusion of controls such as maternal depression, maternal intelligence, and observations of a cognitively stimulating home environment during early home visits gives us some confidence that these are direct effects and not simply that families that spank are also less likely to speak to or engage their child in ways important for cognitive development.

Conclusions

This set of analyses represents one more brick in a growing foundation of research highlighting the risks for later amplified aggression associated with the use of spanking, even in prospective longitudinal models taking into account a broader array of ecological risk factors than has been found in much of the literature to date (Benjet & Kazdin, 2003). We also add novel information about the role of fathers' spanking as well as add to an emerging literature on the impact of spanking on cognitive outcomes. As Gershoff (2010) highlights, we should not be surprised that the use of low levels of spanking as a back-up to more positive discipline practices may compare favorably to families using no back-up

discipline or taking a more authoritarian or permissive approach. But proponents of spanking must begin to recognize that the literature does not support the supposition that spanking is better than alternative means of non-physical discipline. Even Larzelere and Kuhn (2005) in their analysis did not find that corporal punishment was better at promoting positive behavior than other discipline methods.

We can continue to couch religious, social and political debates under the cover of scientific arguments around “non-experimental designs” etc., but the fact that some studies in Gershoff’s (2002) review did not find significant associations between spanking and behavioral problems does not provide a line of support for continued use of spanking. Beyond the outcome of immediate compliance, no studies included in Gershoff’s meta-analysis found that spanking decreased undesirable behaviors over time, which is most certainly an important rationale behind parents’ attempts to regulate their children with spanking. It is not enough that it isn’t negative in some studies, particularly for a method of discipline that increases the risks of maltreatment.

Alternatively, our data and the existing literature also do not support the views of some who paint an extreme view of the negative effects of spanking, although our results for frequent maternal spanking are certainly cause for concern. Our data suggest that other factors including family stress and socioeconomic risk factors have larger effects. The framing of the public policy argument to date clearly is not reaching people in a way that they can hear (Shonkoff & Bales, 2011), particularly since people’s experiences of spanking are often interpreted as an important part of their own rearing experience. The data is clear that spanking is not effective at achieving its goals, and providing families evidence for other tools that can be effectively applied without overstating the case of the negative effects of spanking may be a more effective way to reach families and change minds in our society. And we must not lose sight of the burden faced by so many of our families, particularly since the tools we hope to see replace spanking sometimes require more up front effort and consistency in implementation, which are difficult to maintain in the face of stress and its effects on perceptions of, and frustration with, child behavior. The cumulative risk literature has demonstrated that under high levels of burden the addition of an additional child rearing risk may not have the same added impact as that risk might have at low levels of risk (MacKenzie et al., 2011a). This is not unlike turning on an 8th light bulb in a room already lit by 7 other lights, the effect of the additional light will be less noticeable, than if one light bulb was turned on in a dark room. It is also important to point out that while within any one risk group it is always better to have low levels of spanking than high, and no spanking rather than low spanking, those non-spanked children at very high risk are doing worse at 5 years-of-age than the spanked children at the lowest end of the risk spectrum.

In future research it will be important to examine the cross-diagonal transactions over time between ecological-stressors, parent perceptions of child behavior, parent disciplinary behavior and child behavior and meaning-making. It is certainly not just parents who spank who find themselves frustrated by their child’s behavior, but for those who choose not to spank the child has the experience of seeing a model of an adult in a moment of frustration/anger use self-regulation tools to gather themselves to apply alternative models of discipline. The child who is spanked, on the other hand, experiences a model where physical force gets

people to comply with you, and thus may have reduced opportunity for internalizing a self-regulatory framework (Sameroff & Fiese, 2000) that does not itself involve aggressive responses.

Parents need to see that while infrequent spanking may not be having significant negative effects, we see a paucity of examples in the literature of significant positive effects. So, if a key parental goal is to do more than achieve immediate compliance, to have the child actually internalize an external regulatory framework into an internalized strategy over time, it is clear that spanking is not having its intended effects. Future work should focus on providing families a clearer picture of what discipline practices may actually have the desired effect in improving family processes, and move beyond punishment practices to the incorporation of positive parenting behaviors with the potential to encourage healthy child trajectories.

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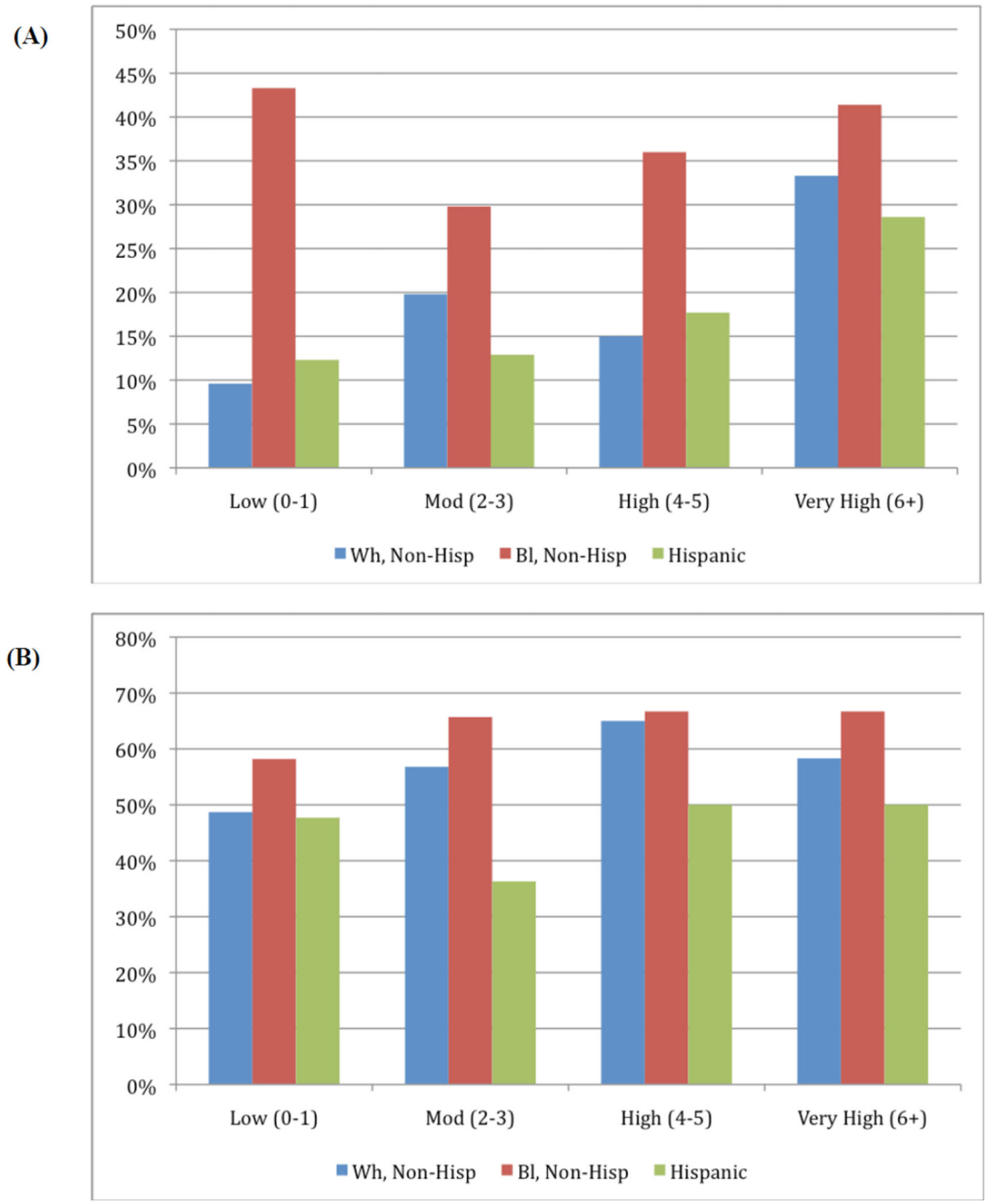

Figure 1.

Rates of maternal use of any spanking by cumulative risk score category (Low=0–1 risks; Moderate=2–3 risks; High=4–5 risks; Very high=6 or more risks) and race/ethnicity at (A) age 1 and (B) age 3.

Table 1

Descriptive statistics for analytic samples.

	Full Sample (N=1,110)	PPVT Sample (N=779)
Average CBCL Externalizing behavior score for child at Age 5	12.2	12.7
Average PPVT score for Child at Age 5 **	95.7	96.4
% Mothers report spanking child at Age 1	24.0%	25.3%
% Mothers report spanking child 2× a week or more at Age 3	11.2%	11.6%
% Mothers report spanking child less than 2× a week at Age 3	44.0%	46.5%
% Mothers report not spanking child at Age 3	44.8%	41.9%
% Fathers report spanking child 2× a week or more at Age 3	8.0%	9.1%
% Fathers report spanking child less than 2× a week at Age 3	35.2%	36.7%
% Fathers report not spanking child at Age 3	56.8%	54.2%
% Girls	48.9%	49.6%
Average age of child at Age 5 assessment (months)	60.7	60.6
% Born low birth weight	8.7%	8.9%
% First born	34.8%	35.9%
Average emotional temperament score at age 1 for focal child	8.2	8.3
Average age of mother at birth (years)	26.1	25.7
% Married at baseline and Age 5	33.9%	30.4%
% Cohabiting at baseline & married or cohabiting at Age 5	27.5%	27.7%
% Not living together at baseline or Age 5	10.9%	12.6%
% Living together at baseline, not at Age 5	17.6%	18.8%
% Living separate at baseline, together at Age 5	10.1%	10.5%
% White, non-Hispanic	32.6%	31.5%
% Black, non-Hispanic	41.7%	47.1%
% Hispanic	25.7%	21.4%
% Not completed high school	30.8%	30.3%
% Completed high school or GED only	24.3%	26.4%
% Attended some college or trade school	28.6%	28.8%
% With BA/BS degree or more	16.3%	14.5%
Household income/needs ratio at baseline	2.8	2.8
% Mothers not US born	12.3%	6.5%
% Mothers lived w/ both parents at age 15	45.8%	41.5%
% Mothers reported working in past week at Age 5	61.4%	64.1%
Average number of other adults in household at Age 5	2.1	2.0
Average number of other children in household at Age 5	2.6	2.6
% Drug, moderate/heavy alcohol or smoking during pregnancy	20.0%	21.3%
% Mothers reported IPV before child's birth	4.4%	4.5%

	Full Sample (N=1,110)	PPVT Sample (N=779)
Mothers' rating of father's supportiveness during pregnancy	10.8	10.8
% Late starting or no prenatal care	14.0%	14.6%
Average mothers' parental stress score at Age 5	11.4	11.4
% Maternal depression or general anxiety disorder by age 5	32.9%	34.1%
Average impulsivity score for mothers at Age 5	6.7	6.7
Average WAIS-R Similarities Subtest score at Age 3 for mother	7.2	7.2
Average CBCL Externalizing behavior score for child at Age 3	14.4	14.8
Normativeness (rate of spanking at age 1 by race and city)	26.0%	26.8%
Average Maternal Pro-Cognition Activities Score at Age 1	5.4	5.5
Average PPVT score for Child at Age 3 ^	87.7	88.0

** Only 905 of the children observed from the full study sample for this variable.

^ Only 850 of the children observed from the full study sample for this variable.

Table 2

Predictors of maternal and paternal spanking at age 3.

VARIABLES	Maternal Spanking Odds Ratio	Paternal Spanking Odds Ratio
Child is a girl	0.860 (0.115)	0.659*** (0.085)
Child's age (months)	0.917** (0.038)	.909** (.037)
Child is low birth weight	1.066 (0.261)	1.076 (.248)
Child is first born	1.298 (0.230)	0.787 (0.136)
Maternal spanking endorsement at age 1	4.807*** (0.942)	1.328* (0.216)
Mother's age at birth (years)	0.983 (0.014)	0.961** (0.014)
Married at baseline and Age 3 ^	2.878*** (0.868)	3.472*** (1.027)
Cohabiting at baseline & married or cohabiting at age 3 ^	2.284*** (0.621)	2.175*** (0.578)
Living together at baseline, not at age 3 ^	2.147** (0.721)	1.234 (0.402)
Living separate at baseline, together at age 3 ^	2.687*** (0.829)	1.910** (0.560)
Mother completed HS/GED only ^^	1.246 (0.237)	1.091 (0.560)
Mother has some college/trade school ^^	1.372 (0.272)	1.117 (0.213)
Mother has BA/BS or more ^^	0.855 (0.250)	0.803 (0.229)
Household income to need ratio	1.016 (0.034)	0.977 (0.032)
Mother is black, non-Hispanic ^^^	0.955 (0.208)	0.930 (0.195)
Mother is Hispanic ^^^	0.746 (0.160)	1.010 (0.210)
Mother is not US born	0.638* (0.152)	0.339*** (0.087)
Mother reported living with both parents at age 15	1.076 (0.160)	1.047 (0.150)
Mother worked in past 2 weeks	1.154 (0.164)	1.155 (0.158)
Number of other children in household at age 3	1.072 (0.065)	0.914 (0.055)
Number of other adults in household at age 3	1.052 (0.097)	0.903 (0.084)
Mother reported drugs, moderate/heavy alcohol or cigarettes during pregnancy	1.087 (0.200)	1.186 (0.208)
Mother reported at least some IPV before child's birth	1.029 (0.357)	1.489 (0.474)
Birth father supportive during pregnancy	0.841*** (0.047)	1.061 (0.055)
Late starting or no prenatal care	1.190 (0.243)	1.346 (0.259)
Maternal stress reported at age 3	0.914*** (0.026)	1.014 (0.028)
Mother report of emotional child temperament at age 1	0.988 (0.023)	1.035 (0.023)
Some indication of maternal depression or general anxiety disorder over past 3 years	1.022 (0.166)	1.225 (0.188)
Mother's impulsivity at age 3	0.974 (0.020)	0.993 (0.020)
Spanking normativeness at age 1	1.015** (0.006)	1.015** (0.006)
Constant	170.187*** (287.081)	12.381 (20.249)
Pseudo r^2	.133	0.074
Observations	1,110	1,110

*** p<0.01,

** p<0.05,

* p<0.1 (seEform in parentheses)

^ Omitted category is Not living with father at baseline or at Age 3

^^ Omitted category is Mother did not finish high school

^^^ Omitted category is Mother is white, non-Hispanic

Table 3

Predictors of Child's Externalizing Child Behavior Checklist (CBCL) Scores at age 5.

VARIABLES	(1) Externalizing	(2) Externalizing	(3) Externalizing	(4) Externalizing
Mother's more frequent spanking age 3	3.120*** (0.744)	2.684*** (0.719)	2.421*** (0.704)	1.235** (0.616)
Mother's less frequent spanking age 3	1.247*** (0.464)	0.927** (0.446)	0.685 (0.437)	0.217 (0.381)
Father's more frequent spanking age 3	1.729** (0.836)	1.357* (0.799)	1.295* (0.781)	0.711 (0.681)
Fathers less frequent spanking age 3	1.123** (0.470)	1.007** (0.452)	1.140** (0.444)	0.509 (0.388)
Child is a girl		−0.646 (0.410)	−0.579 (0.401)	−0.205 (0.350)
Child's age (months)		−0.146 (0.094)	−0.143 (0.092)	−0.132* (0.080)
Child is low birth weight		−0.981 (0.731)	−0.702 (0.719)	−0.879 (0.626)
Child is first born		−0.740 (0.537)	−0.754 (0.525)	−0.415 (0.458)
Mother report of emotional child temperament at age 1		0.494*** (0.069)	0.431*** (0.068)	0.162*** (0.061)
Mother's age at birth (years)		−0.091** (0.045)	−0.088** (0.044)	−0.047 (0.038)
Married at baseline and age 5 ^		−2.149** (0.865)	−1.997** (0.847)	−1.326* (0.738)
Cohabiting at baseline & married or cohabiting at age 5 ^		−1.325* (0.777)	−1.054 (0.761)	−0.844 (0.663)
Living together at baseline, not at age 5 ^		0.105 (0.800)	0.112 (0.782)	−0.170 (0.680)
Living separate at baseline, together at age 5 ^		−1.904** (0.907)	−1.680* (0.887)	−1.693** (0.771)
Mother is black, non-Hispanic ^^		−1.247** (0.567)	−1.126** (0.559)	−0.565 (0.487)
Mother is Hispanic ^^		−0.365 (0.667)	−0.210 (0.656)	−0.364 (0.571)
Mother completed HS/GED ^^^		−0.041 (0.568)	0.188 (0.557)	0.052 (0.484)
Mother has some college/trade school ^^^		−0.345 (0.594)	−0.173 (0.593)	−0.408 (0.516)
Mother has BA or more ^^^		−0.468 (0.886)	−0.410 (0.888)	−0.605 (0.773)
Household income to need ratio		−0.072 (0.103)	−0.071 (0.101)	−0.076 (0.088)
Mother is not US born		1.324* (0.740)	1.163 (0.736)	1.534** (0.641)
Mother reported living with both parents at age 15		−0.066 (0.449)	−0.101 (0.439)	0.128 (0.382)
Mother worked in past 2 weeks		0.539 (0.431)	0.733* (0.423)	0.525 (0.368)
Number of other adults in household at age 5		0.074 (0.273)	0.116 (0.267)	−0.070 (0.233)
Number of other children in household at age 5		0.145 (0.181)	0.078 (0.178)	0.027 (0.155)
Mother reported drugs, moderate/heavy alcohol or cigarettes during pregnancy		1.870*** (0.555)	1.614*** (0.544)	0.750 (0.476)
Mother reported some IPV before child's birth		0.083 (1.006)	−0.057 (0.989)	0.073 (0.860)
Birth father supportive during pregnancy		−0.709*** (0.162)	−0.583*** (0.160)	−0.410*** (0.140)
Late starting or no prenatal care		−0.071 (0.614)	−0.302 (0.601)	−0.063 (0.523)
Parental stress at age 5			−0.496*** (0.080)	−0.297*** (0.071)
Some indication of maternal depression or general anxiety disorder over past 5 years			0.239 (0.449)	−0.106 (0.391)
Mother's impulsivity age 5			−0.387** (0.164)	−0.248* (0.143)
Mother's WAIS-R similarities score age 3			0.057 (0.088)	0.060 (0.076)

VARIABLES	(1) Externalizing	(2) Externalizing	(3) Externalizing	(4) Externalizing
Child's externalizing CBCL at age 3				0.465*** (0.025)
Constant	10.731*** (0.348)	27.426*** (6.249)	33.831*** (6.221)	23.315*** (5.443)
Observations	1,110	1,110	1,110	1,110
R-squared	0.032	0.169	0.210	0.402

*** p<0.01,

** p<0.05,

* p<0.1 (Standard errors in parentheses)

^ Omitted category is Not living with father at baseline or at Age 5

^^ Omitted category is Mother is white, non-Hispanic

^^^ Omitted category is Mother did not finish high school

Table 4

Predictors of Child's Standardized Peabody Picture Vocabulary Test (PPVT) Score at age 5.

VARIABLES	(1) PPVT	(2) PPVT	(3) PPVT	(4) PPVT
Mother's more frequent spanking age 3	−4.316** (1.916)	−3.882** (1.644)	−3.440** (1.636)	−2.558* (1.521)
Mother's less frequent spanking Age 3	0.050 (1.203)	0.745 (1.031)	0.669 (1.022)	0.321 (0.947)
Father's more frequent spanking Age 3	1.769 (2.059)	2.439 (1.760)	2.034 (1.744)	1.569 (1.614)
Fathers less frequent spanking Age 3	1.417 (1.208)	1.104 (1.036)	1.077 (1.028)	0.932 (0.953)
Child is a girl		2.862*** (0.946)	2.776*** (0.937)	1.222 (0.878)
Child's age (months)		−0.077 (0.225)	−0.089 (0.224)	−0.086 (0.207)
Child is low birth weight		−2.599 (1.686)	−2.293 (1.681)	−1.484 (1.557)
Child is first born		−1.431 (1.250)	−1.663 (1.240)	−1.945* (1.148)
Mother report of emotional child temperament at Age 1		−0.289* (0.158)	−0.242 (0.158)	−0.111 (0.152)
Mother's age at birth (years)		−0.102 (0.107)	−0.091 (0.107)	−0.077 (0.099)
Married at baseline and Age 5 ^		2.496 (1.960)	1.744 (1.946)	0.866 (1.803)
Cohabiting at baseline & married or cohabiting at age 5 ^		1.372 (1.699)	1.066 (1.682)	0.636 (1.557)
Living together at baseline, not at age 5 ^		−1.955 (1.746)	−1.858 (1.728)	−2.477 (1.599)
Living separate at baseline, together at age 5 ^		2.648 (2.004)	2.235 (1.985)	1.900 (1.836)
Mother is black, non-Hispanic ^^		−7.182*** (1.309)	−6.560*** (1.304)	−4.554*** (1.226)
Mother is Hispanic ^^		−8.294*** (1.517)	−7.920*** (1.509)	−5.755*** (1.409)
Mother completed HS/GED ^^^		0.040 (1.282)	−0.109 (1.270)	1.092 (1.179)
Mother has some college/trade school ^^^		7.399*** (1.373)	6.246*** (1.400)	5.608*** (1.295)
Mother has BA or more ^^^		9.131*** (2.098)	6.984*** (2.127)	3.935** (1.985)
Household income to need ratio		0.741*** (0.243)	0.696*** (0.241)	0.536** (0.223)
Mother is not US born		−4.608** (2.050)	−3.281 (2.047)	−1.751 (1.898)
Mother reported living with both parents at age 15		−2.239** (1.051)	−2.121** (1.042)	−2.087** (0.964)
Mother worked in past 2 weeks		1.030 (1.008)	0.801 (1.000)	0.172 (0.928)
Number of other adults in household at Age 5		−0.432 (0.648)	−0.480 (.643)	−0.842 (0.596)
Number of other children in household at Age 5		−1.425*** (0.416)	−1.473*** (0.413)	−1.281*** (0.382)
Mother reported drugs, moderate/heavy alcohol or cigarettes during pregnancy		−0.547 (1.265)	−0.418 (1.261)	0.621 (1.176)
Mother reported some IPV before child's birth		0.402 (2.297)	0.887 (2.286)	−1.917 (2.129)
Birth father supportive during pregnancy		−0.303 (0.368)	−0.422 (0.371)	−0.523 (0.344)
Late starting or no prenatal care		−1.865 (1.411)	−1.397 (1.415)	−1.370 (1.313)
Parental stress at Age 5			−0.017 (0.192)	−0.066 (0.180)
Some indication of maternal depression or general anxiety disorder over past 5 years			−1.503 (1.051)	−1.755* (0.973)
Mother's impulsivity Age 5			0.582 (0.381)	0.460 (0.353)
Mother's WAIS-R similarities score Age 3			0.808*** (0.208)	0.803*** (0.192)

VARIABLES	(1) PPVT	(2) PPVT	(3) PPVT	(4) PPVT
Mother's pro-cognition activities score at Age 1			0.361 (0.364)	−0.181 (0.341)
Child's externalizing CBCL at Age 3				−0.146** (0.063)
Child's standardized PPVT at Age 3				0.324*** (0.029)
Constant	96.222*** (0.930)	112.365*** (15.050)	103.743*** (15.573)	82.536*** (14.727)
Observations	779	779	779	779
R-squared	0.009	0.330	0.350	0.446

*** p<0.01,

** p<0.05,

* p<0.1 Standard errors in parentheses

^ Omitted category is Not living with father at baseline or at Age 5

^^ Omitted category is Mother is white, non-Hispanic

^^^ Omitted category is Mother did not finish high school