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Spanking in Early Childhood and Later Behavior Problems: A Prospective Study of Infants and Young Toddlers

Eric P. Slade, PhD, and Lawrence S. Wissow, MD

ABSTRACT. *Objective.* To explore the relationship of spanking frequency before age 2 with behavior problems near time of entry into school.

Methods. Children who were younger than 2 years were followed up ~4 years later, after they had entered school. The likelihood of significant behavior problems at follow-up was estimated in multivariate analyses that controlled for baseline spanking frequency and other characteristics. Participants were mothers from a large-scale national study and their children. Statistical analysis included an ethnically diverse sample of 1966 children aged 0 to 23 months at baseline. Two dichotomous indicators of behavior problems were used. The first indicated that maternal rating of child behavior problems exceeded a threshold. The second indicated that a mother met with a school administrator to discuss her child's behavior problems.

Results. White non-Hispanic children who were spanked more frequently before age 2 were substantially more likely to have behavior problems after entry into school, controlling for other factors. For Hispanic and black children, associations between spanking frequency and behavior problems were not statistically significant and were not consistent across outcome measures.

Conclusion. Among white non-Hispanic children but not among black and Hispanic children, spanking frequency before age 2 is significantly and positively associated with child behavior problems at school age. These findings are consistent with those reported in studies of children older than 2 years but extend these findings to children who are spanked beginning at a relatively early age. *Pediatrics* 2004;113:1321-1330; *spanking, physical punishment, behavior problems, parenting.*

ABBREVIATIONS. NLSY-MC, National Longitudinal Survey of Youth Mother-Child Sample; BPI, Behavior Problems Index; ME, marginal effect.

In the United States, spanking is 1 of the most widely used practices for disciplining preschool-aged children. Approximately 94% of 3- and 4-year-old children have been spanked at least once during the past year.¹ Although not as common as among older children, a substantial minority of parents report spanking infants and toddlers. In a national survey conducted by the Commonwealth Fund, 11% of parents reported having spanked a

child 6 to 11 months of age, 36% reported having spanked a child 12 to 17 months of age, and 59% reported having spanked a child 18 to 23 months of age.² This raises the concern that spanking a child at these ages may not achieve the benefits claimed for its use with children aged 2 and older and could negatively affect developmental transitions that take place before age 2.

Although there have been numerous empirical studies of spanking's effects, almost all previous studies have been based on children aged 2 and older. In reviews of this research,^{3,4} Larzelere concluded that on balance, the evidence suggests that "nonabusive" and "customary" use of spanking for children 2 to 6 years has neutral effects on child emotional well-being and may have beneficial effects on child behavior, because it may increase child compliance and it may reduce the need for future punishments by deterring children's misbehavior. Also, citing research showing a positive association of spanking frequency with child behavior problems for white (ie, European American) children but not for children from African American backgrounds, Larzelere concluded that the effects of spanking probably depend on how spanking is used and on its "normative acceptance" within particular cultures. These conclusions have been endorsed by several observers,⁵⁻⁷ whereas opposing opinions have been expressed by others,⁸⁻¹¹ including many pediatricians.¹²

Even if one accepts these conclusions of earlier reviews, it may be invalid to extend conclusions that are based on evidence for children aged 2 and older to children younger than 2. Compared with older children, infants and young toddlers have relatively limited capacity to understand the intent of and rationale for punishment, they have limited capacity for verbal communication, and they have limited capacity to plan behaviors that comply with parents' verbal directives. These factors suggest that infants and young toddlers could be particularly vulnerable to emotional trauma and stress as a result of punishment, including spanking, because developmentally they are less equipped to understand punishment and to change their behavior to comply with their parents' expectations.

Moreover, introduction of physical punishment before age 2 could be riskier than at older ages, because before age 2, children undergo several fundamental transitions in emotional and cognitive development, including the initiation of relationships

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with adult caregivers and the development of a sense of reliance on adults for safety and security.^{13,14} If spanking is applied too frequently or too severely during these transitions or if its use is increased by other aversive circumstances within a household, such as acrimony, stress, or poverty, then it could inhibit a child's development of trust and feelings of security with parents. This possibility is a concern, because establishment of an emotionally secure and affectionate relationship with parents early in childhood is thought to influence the quality of their later interactions,¹⁴⁻¹⁷ and because children who do not develop a secure attachment to their parents before age 2 are at greater risk for adjustment problems at preschool ages and later, including persistent behavior problems and poorer competence with peers.¹⁸⁻²¹

These considerations suggest the need for empirical evidence on the association of spanking before age 2 with later child behavior problems. As far as we are aware, only 1 study of spanking and later child behavior problems has even included children younger than 2. Johannesson²² found no relationship between the extent of spanking ("never" to "constantly") at the study baseline, when children were 2 years of age or younger, and teacher ratings of child conflict with peers at ages 10 to 13 years. However, that study did not provide information that is relevant to children in the United States, because it was based on a small convenience sample of Swedish children ($N = 212$) who were born in the mid-1950s, and did not adjust for other possibly important influences such as child temperament and family socioeconomic status.

In this article, we explore the hypothesis that spanking frequency before age 2 is positively associated with the probability of having significant behavior problems 4 years later, after entry into school. Behavior problems after the transition into school is of interest because the presence of significant behavior problems early in one's school career is a risk factor for several adverse outcomes, including school failure, need for special educational services, and mental health problems.²³⁻²⁷ In multivariate analyses, we controlled for several factors that could confound the importance of spanking as a risk factor for child behavior problems. Nevertheless, it is important to state at the outset that the evidence presented here is correlational and therefore can neither confirm nor rule out a causal effect of spanking on later child behavior.

METHODS

Study Sample

The data used in this study are from the 1979-1998 National Longitudinal Survey of Youth Mother-Child Sample (NLSY-MC).²⁸ The NLSY began in 1979 with a nationally representative sample of noninstitutionalized civilian youths aged 14 to 21. Respondents were selected using a multistage stratified area probability sample of dwellings and group quarters. Initial screening interviews were conducted in ~75 000 dwellings, with oversampling of black, Hispanic, and economically disadvantaged white households. Beginning in 1986 and continuing every 2 years, the NLSY has administered supplementary interviews to all female respondents who have children. These supplements include all children younger than 21. The interviews focus on the home environment and on child development. Data collected during

these interviews compose the NLSY-MC. Our analysis included children younger than 24 months at the time of interview in 1986, 1988, 1990, 1992, or 1994. This interview was chosen as this study's baseline. Interviews that occurred ~4 years later, ie, the second biennial interview after baseline in 1990, 1992, 1994, 1996, or 1998, became this study's follow-up.

The NLSY-MC has 4845 children younger than 24 months at baseline. From these children, 2879 were excluded from the analysis (Table 1). Follow-up interviews were not completed for 1010 children. Also, we excluded from our analysis 1104 children who had not yet attended preschool or elementary school at the time of the follow-up interview so that we could examine a school-based measure of behavior problems. Other substantial exclusions were attributed to missing values for child behavior problems (477 children), use of spanking (101 children), and temperament score (100).

Differences between the children in the analysis and those who were excluded were modest in magnitude and were influenced by the exclusion of >500 children in the "economically disadvantaged white" supplemental sample, which was discontinued by the NLSY after the 1990 interview. In particular, the included children were significantly more likely to be black (28.2% vs 23.0%; $P < .001$) or Hispanic (20.0% vs 17.1%; $P < .027$) and were older (13.4 months vs 10.2 months; $P < .001$), their mothers were significantly more likely to have completed at least 13 years of education (41.4% vs 35.7%; $P = .001$), they had slightly greater average family income (\$38 400 vs \$38 000; $P < .001$), and they were spanked more frequently in the week preceding baseline (1.63 vs 1.31 times per week; $P = .001$). Differences in mother's age and mother's marital status were not statistically significant.

Measures

Behavioral Outcomes

We used 2 different measures of significant child behavior problems at follow-up. First, we created a dichotomous indicator for scores exceeding a threshold score on the Behavior Problems Index (BPI).²⁹ The BPI was adapted from the Child Behavior Checklist³⁰ and other scales.²⁸ It aggregates mother ratings of the frequency of 27 child behavior problems during a 1-year reference period for children at least 4 years of age. Bradley et al³¹ reported a test-retest correlation for the total BPI of .92 and a Cronbach α of .89 among young children in the NLSY-MC. The BPI was validated against data from the 1981 National Health Interview Survey.²⁸ Using standardized BPI scores, we created an indicator equal to 1 for children with BPI standardized scores >119, which represents approximately the top 10% of children in the United States ranked by ratings of behavior problems. Thus, children with BPI scores >119 have more frequent and/or more severe behavior problems than 90% of children in the United States.

TABLE 1. Summary of Sample Selection Criteria

	No. of Children Excluded	No. of Children Remaining
All children aged 0 to 23 months at time of NLSY interview in 1986, 1988, 1990, 1992, 1994		4845
Exclusions		
Not followed up 4 years later in 1990, 1992, 1994, 1996, or 1998	1010	3835
Not yet attending school by time of follow-up	1104	2731
Missing a follow-up BPI rating for children aged 4 years and older	477	2254
Missing maternal report of spanking frequency for the week before the baseline interview	101	2153
Missing baseline rating of child temperament	100	2053
Missing other information on household characteristics, family background, or personal characteristics	87	1966

The second measure of behavior problems was a dichotomous indicator equal to 1 when a mother reported that she had ever been asked to come to her child's school to discuss her child's behavior problems. The precise wording of the interview question is, "Has your child ever had any behavior problems at school resulting in your receiving a note or being asked to come in and talk to the teacher or principal?" This measure was included in the analysis because of concern that BPI ratings may be subjective and therefore unreliable as a measure of actual child behavior. Compared with the BPI, the school problems measure presumably leaves less room for a subjective response.

Spanking Frequency

Spanking frequency in the previous week was reported by mothers. The questionnaire asks mothers whether they spanked their child in the past week, and a follow-up question asks mothers to report how many times they spanked their child. The NLSY does not request information on spankings delivered by fathers, father figures, or other adults in the household and does not ask about the severity or type of spanking used by parents.

Infant Temperament

Child temperament at baseline was rated by mothers using the How My Infant Usually Acts–Difficult Temperament scale, which was developed specifically for the NLSY on the basis of Rothbart's Infant Behavior Questionnaire³² and other temperament scales.³³ A higher score indicates a more difficult temperament (or perception thereof). Although little information is available on the validity and the reliability of this measure, it has been demonstrated that the NLSY's infant temperament scales are significantly correlated with parent ratings of behavior problems among school-aged children.³³

Parent-Child Interaction

The frequency of parent-to-child reading and interviewer observations of positive mother-child interactions served as proxy measures of cognitive stimulation and emotional support, respectively. Mothers reported whether they read books to their child "never," "several times a year," "several times a month," "once a week," "about 3 times a week," or "every day." Greater reading frequency presumably indicates greater stimulation and may also be indicative of more frequent positive parent-child interaction. A dichotomous indicator for frequent reading—ie, "about 3 times a week" or "every day"—was created. Approximately 54% of mothers met this condition. The frequency of positive parent-child interactions was also recorded by NLSY interviewers. Specifically, interviewers recorded whether during the baseline interview mothers "spontaneously spoke to child twice or more (excluding scolding)"; "responded verbally to child's speech"; and/or "caressed, kissed, or hugged child at least once." On the basis of these interviewer observations, a dichotomous indicator for mothers who exhibited all 3 of these behaviors was created. Approximately 60% of mothers met this condition.

Other Parent, Child, and Household Characteristics

Maternal age and marital status, child age and gender, household income, and indicators for year of interview were also included as explanatory variables. Low maternal age at birth has been associated with several risk factors for poor child outcomes, including authoritarian child-rearing practices³⁴ and greater abruptness in parent-child interactions.³⁵ Household income and mother's educational attainment are proxies for a variety of differences between households, including family stress level, quality of the home environment, and child behavior.^{36–38} Marital status, especially father absence from the household and previous divorce, has been associated with behavior problems in young children and with parent stress level.^{39–41}

Analyses

Probit models⁴² were estimated for each dependent variable using both the full sample and 3 racial/ethnic subsamples: white non-Hispanics, black non-Hispanics (henceforth African Americans), and Hispanics. The importance of separate analyses by race/ethnicity was indicated by previous research showing racial/ethnic differences in the association of physical discipline

with child behavior problems, with associations tending to be positive for European Americans but not for African Americans.^{43–46} Likelihood ratio statistics⁴⁷ were used to test the null hypothesis that probit model coefficient estimates were the same across the 3 racial/ethnic subsamples. Rejection of (or failure to reject) this hypothesis was used to determine whether separate analyses by race/ethnicity provided a better fit to the data.

Spanking frequency, ie, the reported number of spankings in the past week, was entered in the probit models as a quadratic term by including both spanking frequency and the square of spanking frequency. This specification was suggested by past research showing that the relationship between spanking frequency and child behavior problems is nonlinear, with larger marginal effects observed at greater spanking frequencies, ie, a convex relationship between frequency and behavior problems.⁴⁴ We were also concerned that spanking frequency could be related to qualitative differences in the type of spanking that occurred. For example, research suggests that slaps that are light to moderate in severity have a qualitatively different and perhaps less adverse effect on children than more severe slaps.⁴ In the NLSY-MC data, mothers who reported very high spanking frequencies (eg, 20 in the previous week) could have been more likely to have been using frequent but relatively light slaps than mothers who reported only 1 or 2 spankings. If this is the case, then we would expect to observe a concave relationship (ie, a positive but decreasing association) between spanking frequency and child behavior problems.

For ease of interpretation, probit regression coefficient estimates were converted to "marginal effects": the estimated change in proportion of children who exhibited the outcome of interest given a change in the value of an explanatory variable.⁴⁸ For continuous explanatory variables (eg, spanking frequency, age, income, temperament ratings), the marginal effect (ME) represents the estimated effect of a 1-unit increase in value of a predictor on the expected proportion of children who had BPI scores >119 and/or who had behavior problems in school that required a parent-teacher meeting; for dichotomous indicator variables, the ME represents the estimated effect of a change in value of an indicator from 0 to 1 on the proportion of children with those outcomes.

Finally, probit model variances were estimated using the Huber-White, or sandwich, variance estimator^{49–51} to adjust for clustering effects. Some measures could have been correlated across observations, because the sample included >1 child per mother on average. Specifically, of the 1540 mothers represented in the sample used here, 1165 (75.7%) mothers had 1, 330 (21.4%) mothers had 2, 39 (2.5%) mothers had 3, and 6 (0.4%) mothers had 4 children in the sample. The adjusted variances adjust for intracorrelation by applying unequal weights to observations in different clusters and equal weights within each cluster.

RESULTS

Sample Characteristics

Characteristics of the full sample and the 3 racial/ethnic subsamples are shown in Table 2. Several significant differences ($P < .05$) across the 3 subsamples indicated that white non-Hispanic respondents were from a higher socioeconomic background, on average, compared with African American and Hispanic respondents. Mean income (expressed in 1996 dollars) was greatest among white families (\$46 400), followed by Hispanic (\$35 200) and African American families (\$26 300), respectively. Compared with African American and Hispanic mothers, respectively, white mothers were more likely to be married (87.8% vs 45.5% and 75.0%), were more likely to have completed >12 years of education (46.7% vs 38.2% and 31.7%), were older (28.4 years vs 27.5 years and 27.8 years), gave lower difficulty ratings for their children's temperament, and were more likely to read to their children every day (68.2% vs 39.1% and 40.1%). In addition,

TABLE 2. Sample Characteristics at Ages <24 Months and Behavior Problems at Follow-up, by Race/Ethnicity

	Full Sample (N = 1966; Mean [SD])	White (N = 1023; Mean [SD])	African American (N = 548; Mean [SD])	Hispanic (N = 395; Mean [SD])
Child is female (1 = yes, 0 = no)	0.497 (0.500)	0.481 (0.500)	0.512 (0.500)	0.515 (0.500)
Child's age, mo*	13.644 (4.475)	13.548 (4.442)	13.896 (4.526)	13.544 (4.493)
Family income (in 1996 dollars)†	\$39 494 (\$22 547)	\$46 381 (\$22 058)	\$26 350‡ (\$17 234)	\$35 252‡§ (\$22 045)
Child's parents are married (1 = yes, 0 = no)	0.736 (0.443)	0.878 (0.328)	0.455‡ (0.499)	0.750‡§ (0.434)
Child's mother completed >12 y of school (1 = yes, 0 = no)	0.429 (0.493)	0.467 (0.499)	0.382‡ (0.487)	0.317‡ (0.466)
Mother's age, y	28.055 (3.404)	28.442 (3.311)	27.549‡ (3.480)	27.768‡ (3.420)
Mother rating of child temperament difficulty	26.541 (6.798)	25.548 (6.770)	27.714‡ (6.702)	27.448‡ (6.632)
Spanked child in past week (1 = yes, 0 = no)	0.387 (0.500)	0.356 (0.497)	0.493‡ (0.492)	0.318§ (0.489)
No. of times spanked child in past week (excludes 0s)	3.422 (3.539)	3.247 (3.280)	3.993‡ (4.169)	2.724§ (2.512)
Mother reads to child every day (1 = yes, 0 = no)	0.544 (0.498)	0.682 (0.466)	0.391‡ (0.489)	0.401‡ (0.491)
Positive interactions observed during interview (1 = yes, 0 = no)	0.603 (0.490)	0.632 (0.483)	0.552‡ (0.498)	0.599 (0.491)
Child behavior problems required a parent-teacher meeting (1 = yes, 0 = no)	0.086 (0.280)	0.076 (0.264)	0.110‡ (0.313)	0.077 (0.267)
BPI >119 (1 = yes, 0 = no)	0.125 (0.331)	0.100 (0.300)	0.165‡ (0.371)	0.136 (0.343)

* At follow-up, children were aged 4–6 years.

† Adjusted using the 1996 Consumer Price Index.

‡ Statistically different from average for whites at $P < .05$.

§ Statistically different from average for African Americans at $P < .05$.

compared with African American (but not Hispanic) mothers, white mothers were less likely to have spanked their child in the previous week (35.6% vs 49.3%), spanked their child fewer times on average (3.2 times vs 4.0 times), were more likely to be observed interacting positively with their children (63.2% vs 55.2%), were less likely to have met with their child's teacher to discuss their child's behavior problems (7.6% vs 11.0%), and were less likely to report BPI scores >119 (10.0% vs 16.5%). Finally, compared with African American mothers, Hispanic mothers were more likely to be married (75.0% vs 45.5%), were less likely to have spanked their child in the past week (31.8% vs 49.3%), and spanked their child fewer times on average (2.7 times vs 4.0 times).

Bivariate Associations

Table 3 shows unadjusted associations of spanking frequency with child behavior problems. In the full sample, spanking frequency was positively and significantly associated with the proportion of children who required a parent-teacher meeting ($\chi^2 = 9.807$, $P = .007$) and with the proportion of children with BPI scores >119 ($\chi^2 = 8.901$, $P = .012$). However, associations differed across the 3 racial/ethnic subgroups. In white families, spanking frequency was significantly and positively related to the proportion of children with behavior problems that required a parent-teacher meeting ($\chi^2 = 17.768$, $P < .001$); in African American families, the association was slightly positive and not statistically significant ($\chi^2 = .666$, $P = .717$); and in Hispanic families, the association was slightly negative and not statistically significant ($\chi^2 = .010$, $P = .995$). Also, in white families, spanking frequency was positively and significantly associated with the proportion of children with BPI scores >119 ($\chi^2 = 6.662$, $P = .036$); in African American families, there was no apparent association of spanking fre-

quency with BPI scores >119 ($\chi^2 = .544$, $P = .762$); and in Hispanic families, the association was positive but not statistically significant ($\chi^2 = 1.074$, $P = .584$).

Multivariate Results

Multivariate estimates of the relationship of spanking frequency with the risk that a child's behavior at school required a parent-teacher meeting and with the risk that a child's BPI rating was >119 are shown in Tables 4 and 5, respectively. Coefficient estimates for the full sample were not included in the tables because the assumption that probit coefficients were the same across the 3 racial/ethnic subgroups was rejected in both models ($\chi^2[16] = 40.398$, $P = .0007$ in the model for behavior problems requiring a parent-teacher meeting, and $\chi^2[16] = 30.981$, $P = .0135$ in the model for BPI scores >119), indicating that separate models for each racial/ethnic subgroup provided a better fit to the data.

Probability of Behavior Problems in School

In Table 4, among white non-Hispanic children, the estimated coefficient of spanking frequency at baseline with the probability that behavior problems required a parent-teacher meeting before follow-up was positive and statistically significant (ME: 0.038; $P < .001$), but the coefficient estimate for the square of spanking frequency was negative and statistically significant (ME: -0.004; $P = .010$), indicating a positive and concave relationship overall. Among African American children, the coefficient estimate for spanking frequency (ME: -0.001; $P = .568$) and the coefficient estimate for the square of spanking frequency (ME: -0.000; $P = .871$) were essentially 0. Among Hispanic children, the coefficient estimate for spanking frequency (ME: 0.000; $P = .838$) and the coefficient estimate for the square of spanking frequency (ME: -0.001, $P = .775$) were essentially 0,

TABLE 3. Behavioral Problems in Preschool/Kindergarten by Spanking Frequency at Ages <24 Months

Spanking Frequency in the Week Preceding Baseline	% at Follow-up With Behavior Problems in School That Required Parent-Teacher Meeting (n)						% at Follow-up With BPI >119 (n)					
	Full Sample	White	African American	Hispanic	Full Sample	White	African American	Hispanic	Full Sample	White	African American	Hispanic
Never	6.6% (79/1208)	5.3% (35/660)	9.4% (26/278)	6.7% (18/270)	11.9% (144/1208)	9.7% (64/660)	17.3% (48/278)	11.9% (32/270)	13.0 (53/409)	10.5 (22/209)	16.4 (20/122)	14.1 (11/78)
Once or twice	9.6 (39/409)	9.6 (20/209)	11.5 (14/122)	6.4 (5/78)	18.0 (63/349)	16.9 (26/154)	19.6 (29/148)	17.0 (8/47)	10.9 (38/349)	11.7 (18/154)	19.6 (29/148)	17.0 (8/47)
More than twice	11.7 (18/148)	17.768	11.5 (17/148)	6.4 (3/47)	8.901	6.662	0.544	1.074	9.807	17.768	0.544	1.074
χ^2 (2)				0.010								
P value	.007	.000	.717	.995	.012	.036	.762	.584				

TABLE 4. Probit Probability Estimates for School Behavior Problems at Follow-up That Required Parent-Teacher Meeting

Independent Variable	White Non-Hispanic			African American			Hispanic		
	ME*	P Value	CI	ME*	P Value	CI	ME*	P Value	CI
No. of times spanked in the week preceding baseline	0.038†	<.001	(0.021 to 0.060)	-0.001	.586	(-0.038 to 0.022)	0.000	.979	(-0.032 to 0.040)
Square of no. of times spanked	-0.004†	.010	(-0.006 to -0.001)	0.000	.871	(-0.004 to 0.004)	-0.000	.874	(-0.007 to 0.005)
Child is female	-0.062†	<.001	(-0.094 to -0.030)	-0.097†	.001	(-0.151 to -0.043)	-0.088†	.003	(-0.145 to -0.031)
Age of child	-0.004‡	.014	(-0.009 to -0.001)	0.000	.853	(-0.004 to 0.005)	-0.001	.864	(-0.007 to 0.006)
Age of mother	-0.001	.683	(-0.009 to 0.006)	0.001	.878	(-0.011 to 0.013)	0.001	.822	(-0.010 to 0.012)
Mother married	-0.028	.303	(-0.089 to 0.033)	-0.039	.149	(-0.091 to 0.013)	-0.005	.886	(-0.068 to 0.059)
Family income ÷ 10 000	0.000	.879	(-0.011 to 0.013)	0.014	.310	(-0.013 to 0.041)	-0.002	.840	(-0.023 to 0.019)
Mother completed >12 y of school	-0.028§	.077	(-0.049 to 0.022)	-0.053§	.059	(-0.105 to 0.001)	0.004	.888	(-0.057 to 0.064)
Mother reads to child every day	0.020	.428	(-0.022 to 0.043)	0.013	.616	(-0.039 to 0.065)	0.007	.806	(-0.049 to 0.062)
Difficult temperament index	0.002	.320	(-0.002 to 0.004)	-0.003	.147	(-0.008 to 0.001)	0.002	.484	(-0.003 to 0.007)
Positive mother-child interactions	-0.012	.273	(-0.048 to 0.018)	-0.022	.401	(-0.074 to 0.030)	-0.032	.246	(-0.086 to 0.025)
Predicted probability at means	0.056			0.079			0.058		

CI indicates confidence interval.

* Represents the estimated change in proportion resulting from a 1-unit increase in an explanatory variable. For dichotomous indicators, ME estimate is for a change from 0 to 1.

† $P < .01$.

‡ $P < .05$.

§ $P < .10$.

TABLE 5. Probit Probability Estimates for BPI >119 at Follow-up

Independent Variable	White Non-Hispanic			African American			Hispanic		
	ME*	P Value	CI	ME*	P Value	CI	ME*	P Value	CI
No. of times spanked in week preceding baseline	0.044†	.003	(0.015 to 0.066)	0.023	.251	(-0.016 to 0.061)	0.027	.253	(-0.021 to 0.084)
Square of no. of times spanked	-0.005†	.022	(-0.009 to -0.001)	-0.002	.390	(-0.007 to 0.003)	-0.006	.234	(-0.017 to 0.004)
Child is female	0.011	.569	(-0.027 to 0.048)	-0.018	.505	(-0.089 to 0.044)	-0.050	.146	(-0.119 to 0.018)
Age of child	-0.006†	.018	(-0.010 to -0.001)	-0.003	.544	(-0.011 to 0.006)	-0.004	.377	(-0.012 to 0.005)
Age of mother	-0.002	.659	(-0.011 to 0.007)	0.000	.984	(-0.015 to 0.015)	0.013§	.096	(-0.002 to 0.028)
Mother married	-0.033	.280	(-0.100 to 0.033)	-0.046	.230	(-0.120 to 0.028)	0.035	.353	(-0.035 to 0.106)
Family income ÷ 10,000	-0.012	.169	(-0.030 to 0.005)	0.014	.409	(-0.009 to 0.062)	-0.050†	.007	(-0.085 to -0.016)
Mother completed >12 y of school	-0.029	.190	(-0.073 to 0.014)	-0.018	.637	(-0.093 to 0.056)	-0.035	.394	(-0.112 to 0.041)
Mother reads to child every day	-0.011	.604	(-0.059 to 0.026)	-0.003	.941	(-0.072 to 0.066)	0.019	.613	(-0.056 to 0.095)
Difficult temperament index	0.002	.201	(-0.002 to 0.006)	0.007†	.031	(0.001 to 0.012)	0.002	.533	(-0.004 to 0.009)
Positive mother-child interactions	-0.003	.885	(-0.039 to 0.040)	0.012	.733	(-0.055 to 0.079)	0.016	.647	(-0.054 to 0.085)
Predicted probability at means	0.079			0.141			0.105		

* Represents the estimated change in proportion resulting from a 1-unit increase in an explanatory variable. For dichotomous indicators, ME estimate is for a change from 0 to 1.

† $P < .01$.

‡ $P < .05$.

§ $P < .10$.

indicating no association of spanking frequency with the risk of behavior problems that required a parent-teacher meeting.

Probability of BPI >119

In Table 5, among white non-Hispanic children, the coefficient estimate for spanking frequency at baseline was positive and statistically significant (ME: 0.044; $P = .003$), and the coefficient estimate for the square of spanking frequency was negative and statistically significant (ME: -0.005; $P = .022$), indicating a positive and concave relationship of spanking frequency with the probability of a BPI rating >119 at follow-up. Among African American children, spanking frequency was positively associated with risk for a BPI rating >119, but the coefficient estimate was not statistically significant (ME: 0.023; $P = .251$). The coefficient estimate for the square of spanking frequency (ME: -0.002; $P = .871$) also was not significant. Among Hispanic children, spanking frequency was positively associated with risk for a BPI rating >119, but the coefficient estimate was not statistically significant (ME: 0.027; $P = .253$). The coefficient estimate for the square of spanking frequency (ME: -0.006; $P = .234$) also was not significant.

Predictions From Multivariate Estimates

Figures 1 and 2 summarize the multivariate estimates (from Tables 4 and 5) of the relationship of spanking frequency with the proportion of children whose behavior problems required a parent-teacher meeting and with the proportion of children with a BPI rating greater than the 90th percentile of the US child population (BPI >119), respectively. Spanking frequencies ranging from 0 to 5 times in the past week were used in predictions; this range represents the central 95% of the spanking frequency distribution reported in our NLSY-MC sample.

As shown in Fig 1, only among white non-Hispanic children was there a positive association of spanking frequency with the probability of child behavior problems in school requiring a parent-teacher meeting. Among African American children, the as-

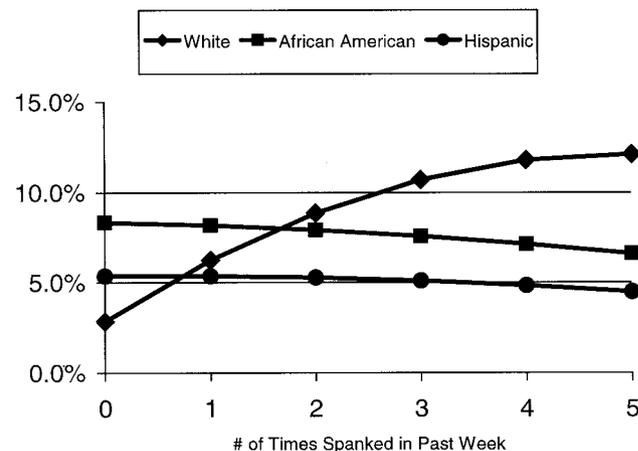


Fig 1. Predicted percentage of children whose behavior problems required a parent-teacher meeting.

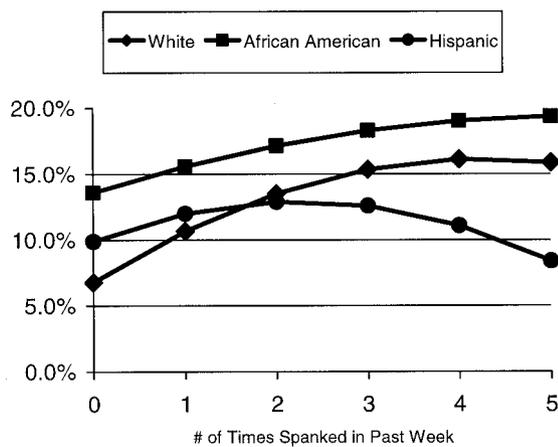


Fig 2. Predicted percentage of children with a BPI rating >119.

sociation was negative but not statistically significant, and among Hispanic children, the association was slightly positive. As shown in Fig 2, among white and African American children, spanking frequency was positively associated with the probability of having a BPI rating >119. Among Hispanic children, the association was positive from 0 to ~2 spankings in the previous week; at greater spanking frequencies, the relationship was negative.

One other characteristic of the associations represented in Figs 1 and 2 is notable. The probit models predicted that, compared with African American and Hispanic children, white children were relatively unlikely to meet either of the 2 criteria for behavior problems when they were not spanked. However, when spanking was relatively frequent, the proportion of white children who were predicted to have behavior problems that required a parent-teacher meeting was greater than the proportion of African American and the proportion of Hispanic children who were predicted to meet that criterion; also, when spanking was relatively frequent, the proportion of white children who were predicted to have BPI ratings >119 was greater than the proportion of Hispanic children and was similar to the proportion of African American children who were predicted to exceed that threshold.

DISCUSSION

Previous empirical studies of the relationship of spanking with child behavior problems have in general not included children younger than 2. In this study, we explored the association of spanking frequency before age 2 with children's risk for significant behavior problems ~4 years later, after they had entered school. Among children in this sample, spanking frequency before age 2 was a substantial predictor of a child's risk for behavior problems at school age for white non-Hispanic children only. For example, marginal effects estimates suggested that compared with the white non-Hispanic children who were not spanked in a week-long period before age 2, white non-Hispanic children who were spanked 5 times in a week had an ~4.2-times greater risk of behavior problems that required a parent-teacher meeting 4 years later (0.121 vs 0.029) and had an

~2.3-times greater risk of maternal ratings of behavior problems exceeding the 90th percentile 4 years later (0.159 vs 0.068). Among Hispanic and African American children, spanking frequency before age 2 was not consistently associated with child behavior 3 years later, although some results (shown in Fig 2) were suggestive of a positive association in these families.

These associations are consistent with those reported in previous studies of European American and African American children older than 2. Deater-Deckard et al⁴³ reported that spanking was positively correlated with child externalizing behaviors in subsequent years among European American children but was not significantly correlated with behavior problems among African American children. Gunnoe and Mariner⁴⁵ reported that spanking frequency at ages 5 to 11 was significantly associated with an increase in fighting 5 years later among European American children but was also significantly related to a decrease in fighting among African American children. Finally, McLeod et al,⁴⁶ who also used data from the NLSY-MC, reported that spanking frequency at ages 4 and above predicted significantly greater antisocial behavior among European Americans 2 years later, but the association was not statistically significant among African Americans.

Several possible explanations for these differences in association have been proposed.^{4,44} Spanking is thought to have greater "normative acceptance" in African American families,^{7,52,53} which could mean that African American children and parents are relatively less likely to perceive spanking as harsh or unfair. Alternatively, in white non-Hispanic communities—where spanking is used less frequently and where its use is thought to be more stigmatizing—frequent spanking before age 2 could be associated with other factors that indicate relatively greater developmental risk, such as high parent stress. Both interpretations are consistent with our finding (shown in Fig 1) that compared with African American and Hispanic families, child behavior problems that require a parent-teacher meeting were predicted to be relatively less common in white non-Hispanic families when spanking before age 2 was infrequent, whereas the relative ordering was the reverse in families in which spanking was relatively frequent. However, in predictions of risk for behavior problem ratings above the 90th percentile (Fig 2), African American children were predicted to be at greater risk at all spanking frequencies, suggesting that in both groups, more frequent spanking was associated with greater behavioral risk.

With respect to the proposition that spanking children younger than 2 is potentially detrimental to their development, our findings should be viewed cautiously. First, although greater spanking frequency was a substantial risk factor for behavior problems in white non-Hispanic families, even relatively frequent spanking before age 2 did not represent an overwhelming risk for significant behavior problems 4 years later. More than 87% of white non-Hispanic children in this sample who were spanked

5 times in a week-long period before age 2 were not expected to have behavior problems that require a parent-teacher meeting, and >84% of these children were not expected to have behavior problem ratings exceeding the 90th percentile of the US population.

In addition, the significant associations found for white non-Hispanic children could be partially or completely attributable to correlation of spanking frequency with other problems in family functioning and home environment that adversely affect child outcomes. Although we adjusted for several observable factors that may be confounded with a causal effect of spanking—including mother's educational attainment and marital status, child temperament, family income, independent observation of parent-child interaction, and frequency of parent-child reading—many other aspects of parent-child interaction—eg, the emotional tone of the household, other aspects of parenting, the category of child-parent attachment—were not captured in our study. For example, Larzelere⁴ emphasized the importance of measuring all forms of punishment, not just spanking, although other forms of punishment, such as time-outs, may be far less common among children younger than 2. For these reasons, there is no way to tell whether the significant association of spanking frequency before age 2 and behavior problems in white non-Hispanic children was indicative of a causal relationship between spanking and child outcome.

Nevertheless, it is worth pointing out that spanking is 1 concrete experience that mediates interactions between parents and children and therefore is both a proxy for characteristics within a family that promote its use and a modifier—for better or worse—of subsequent developmental risks. Moreover, because the specific context within which spanking (and other forms of punishment) is used often involves parent feelings of irritation, anger, or frustration, which can be mild or more severe, children and parents could associate spanking with underlying sources of intrafamily conflict that promote its use, eg, negative parent-child attitudes, parent level of distress, marital discord.^{54–59} These factors might also influence how spanking is ultimately perceived by both parties and therefore its subsequent effects on children.

Finally, our results suggest that studies of children older than 2 need take into account the possible effects of spanking and other punishments that began at earlier ages, although most have not. We found that ~40% of families reported spanking their infant or toddler at least once in the previous week, and spanking frequency at this age was associated with child behavior problems at an older age. Thus, in studies of children older than 2, failure to account for effects of punishments from earlier ages could result in incorrect inferences about the effects of punishments received at ages beyond 2. In fairness, although previous evidence suggests that spanking is more normative and not detrimental at ages 2 to 6 years,⁴ the converse argument can be applied to this study in that we do not account for the possible effects of spanking received after age 2. However,

that actions that take place during parent-child interactions are often recurrent indicates a need for research on this topic that models the dynamics of child behavior and parent response, starting at a relatively early point in childhood.

Limitations

Several limitations of the data and of the analysis may affect interpretation of these results. First, fathers' and other adults' participation in spanking children was not measured, so it is not known whether children's behavioral outcomes were associated with spanking by mothers, fathers, or both. This limitation of the data also may have influenced direction and magnitude of the estimated associations between spanking frequency and behavior problems; for example, compared with other children, children who were not spanked in the previous week might have been more likely to be spanked by fathers, and these unreported spankings may have influenced these children's later behavioral outcomes relative to children who are spanked more frequently. Second, no information was available on other punishments used by parents, although among children younger than 2, other forms of punishment are unlikely to have been common. Other forms of punishment may also have been associated with subsequent child behavior problems, but it was not possible to explore those associations using these data. Third, ratings of behavior problems were reported by mothers and were not confirmed by independent observation. However, subjective factors that may have affected parent ratings of child behavior may have had less influence on parent report of factual events, such as the occurrence of a parent-teacher meeting to discuss child behavior. Fourth, it is notable that fewer than half of the 1966 children were in the Hispanic and African American subsamples, suggesting that in these subsamples there was limited power to detect associations of spanking frequency with behaviors that applied only to 8% to 13% of the overall sample.

Fifth, many age-eligible children in the NLSY-MC data were excluded from this analysis because of missing information, representing 59.5% of age-eligible children. Most of these exclusions resulted from the absence of a follow-up interview, discontinuation of the "economically disadvantaged white" subsample after 1990, and the restriction that children had to have attended school before the age of follow-up. These factors tended to bias the sample toward greater African American and Hispanic composition, toward slightly greater average socioeconomic status, and toward greater average child age. These biases might have reduced the magnitude of the association of spanking frequency with child behavior problems, because spanking frequency and behavior problems are likely to have been relatively more common among low-income whites whose children were excluded from the sample.

CONCLUSION

In this study, we found evidence suggesting that spanking frequency before age 2 is a risk factor for

significant child behavior problems among white non-Hispanic school-aged children. No evidence was found that spanking frequency before age 2 predicts either greater or lesser risk of behavior problems at school age among children from Hispanic and African American backgrounds. These findings indicate that positive associations of spanking frequency with child behavior problems, which have previously been identified in older children, are also found in children who are spanked at a relatively early age.

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“A 10-kiloton nuclear bomb (a pip-squeak in weapons terms) is smuggled into Manhattan and explodes at Grand Central. Some 500 000 people are killed, and the U.S. suffers \$1 trillion in direct economic damage.

That scenario, cited in a report last year from the John F. Kennedy School of Government at Harvard, could be a glimpse of our future. We urgently need to control nuclear materials to forestall that threat, but in this war on proliferation, we're now slipping backwards. . . . To clarify the stakes, here's a scenario from the Federation of American Scientists for a modest terrorist incident:

A stick of cobalt, an inch thick and a foot long, is taken from among hundreds of such sticks at a food irradiation plant. It is blown up with just 10 pounds of explosives in a 'dirty bomb' at the lower tip of Manhattan, with a one-mile-per-hour breeze blowing. Some 1000 square kilometers in three states is contaminated, and some areas of New York City become uninhabitable for decades.”

Kristof ND. *New York Times*. March 10, 2004

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Spanking in Early Childhood and Later Behavior Problems: A Prospective Study of Infants and Young Toddlers

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