Published in final edited form as:

Child Youth Serv Rev. 2014 November 1; 46: 55–63. doi:10.1016/j.chilgyouth.2014.08.006.

Is Participation in Head Start Associated with Less Maternal Spanking for Boys and Girls?

RaeHyuck Lee,

Post-doctoral Research Fellow, Columbia University School of Social Work, 1255 Amsterdam Avenue, New York, NY 10027, United States

Jeanne Brooks-Gunn,

Virginia and Leonard Marx Professor of Child Development and Education, Teachers College and College of Physicians and Surgeons, Columbia University, 525 West 120th Street, New York, NY 10027, United States

Wen-Jui Han [Professor],

Silver School of Social Work, New York University, 1 Washington Square North, New York, NY 10003, United States

Jane Waldfogel, and

Compton Foundation Centennial Professor for the Prevention of Children, and Youth Problems, Columbia University School of Social Work, 1255 Amsterdam Avenue, New York, NY 10027, United States

Fuhua Zhai [Associate Professor]

Fordham University Graduate School of Social Service, 113 West 60th Street, New York, NY 10023, United States, Phone: 212-636-6600

RaeHyuck Lee: rl2507@columbia.edu; Jeanne Brooks-Gunn: brooks-gunn@columbia.edu; Wen-Jui Han: wjh3@nyu.edu; Jane Waldfogel: jw205@columbia.edu; Fuhua Zhai: fzhai1@fordham.edu

Abstract

Head Start includes family-oriented services to enhance parent-child relationships, but little is known about the effect of Head Start on parenting practices. Using data from the Early Childhood Longitudinal Study-Birth Cohort ($n \approx 7,000$), we examined whether participation in Head Start was associated with maternal spanking, with particular attention to whether the association differed by child gender. We found that Head Start participation was associated with lower likelihood that mothers spanked their child in the past week at both preschool and kindergarten entry as well as lower likelihood that mothers would use spanking in a hypothetical situation,

© 2014 Elsevier Ltd. All rights reserved.

Corresponding author: RaeHyuck Lee, Post-doctoral Research Fellow, Columbia University School of Social Work, 1255 Amsterdam Avenue, New York, NY 10027, United States, rl2507@columbia.edu, Phone: 1-646-425-0573, Fax: 1-212-851-2206.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Disclosures

The content is solely the responsibility of the authors and does not necessarily represent the official views of NICHD or the National Institutes of Health.

among boys but not girls. These beneficial effects of Head Start participation on mothers' use of spanking among boys were not reduced by additionally including maternal depression and child behavior problems.

Keywords

Head Start; spanking; child gender; ECLS-B

1. Introduction

Since its establishment in 1965, Head Start (HS, hereafter) has been the federally funded early childhood education and care program providing preschool-age children and their low-income parents with early education as well as other services (e.g., nutrition services, health care, and services for parents) (Vinovskis, 2005). HS provides parenting education and emphasizes the skill-based dimensions of parenting practices, such as cognitive stimulation, child discipline, and child safety (U.S. Department of Health and Human Services, Administration for Children and Families [USDHHS, ACF], 2009, 2012; Zigler & Styfco, 2004). However, whereas modest short-term effects of HS participation for children's school readiness have been well documented (Currie & Thomas, 1995; Garces, Thomas, & Currie, 2002; Lee, Zhai, Brooks-Gunn, Han, & Waldfogel, 2014; USDHHS, ACF, 2012; Zhai, Brooks-Gunn, & Waldfogel, 2011), the effects of HS on family processes have been understudied.

The use of physical discipline by parents, including spanking, hitting or slapping, or other forms of physical contact, is prevalent in the United States (Gershoff, 2013; MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel, 2011; MacKenzie, Nicklas, Waldfogel, & Brooks-Gunn, 2013). Almost seven in ten American parents with two- to three-year-olds used spanking to discipline their young children (Regalado, Sareen, Inkelas, Wissow, & Halfon, 2004). It is not clear whether the use of spanking is harmful to children (Baumrind, 1996; Benjet & Kazdin, 2003; O'Callaghan, 2006), although many studies have found that parents' use of spanking is negatively associated with children's developmental outcomes (see reviews by Gershoff, 2002, 2010, 2013). In addition, available evidence suggests that boys are more likely than girls to be spanked by parents (Boutwell, Frankline, Barnes, & Beaver, 2011; U.S. Department of Education, Civil Rights Data Collection [USDE, CRDC], 2006).

In this paper, using a nationally representative sample and rigorous methodologies to address selection bias, as detailed below, we examined the association between HS participation and mothers' use of spanking. We extended the prior research by paying particular attention to gender differences in the associations between HS participation and mothers' use of spanking. We also conducted supplemental analyses to investigate whether the gender-differentiated associations, if any, are explained when including additional maternal or child characteristics related to harsh parenting, in particular, maternal depression and child behavior problems.

1.1. Prevalence of Parents' Use of Spanking

Spanking is a common disciplinary practice among American parents (Gershoff, 2013; MacKenzie et al., 2013; MacKenzie, Nicklas, Waldfogel, & Brooks-Gunn, 2012; Regalado et al., 2004; Socolar, Savage, & Evans, 2007; Wissow, 2001). For example, using a nationally representative sample of about 2,000 children from the 2000 National Survey of Early Childhood Health, Regalado and colleagues (2004) found that 29% of parents with children under two years old and 64% of parents with two- to three-year-olds used spanking as a disciplinary tactic. In addition, the prevalence of parents' use of spanking has also been reported among children of diverse backgrounds. Using a birth cohort of predominantly low-income children in 18 large U.S. cities from the Fragile Families and Child Wellbeing Study (FFCWS), MacKenzie and colleagues (2011) reported that almost 50% of parents of two- to five-year-olds spanked their children in the past month. Another study reported that 49% of mothers of 3-year-old Early Head Start participants spanked their child in the past week (Berlin et al., 2009). Similarly, a study using a small sample of African American families found 54% of parents of 2- to 3-year-old children reported using physical discipline (Westbrook, Harden, Holmes, Meisch, & Whittaker, 2013). Furthermore, many studies, including those using samples of low-income children, have shown that parents' use of spanking is often harmful to children. For example, spanking has been found associated with reduced cognitive ability, increased behavior and mental health problems, and worse child-parent relationships (Berlin et al., 2009; Boutwell et al., 2011; Gershoff, 2002, 2010, 2013; Straus, 1994; Straus, Sugarman, & Giles-Sims, 1997; Westbrook et al. 2013).

Given the prevalence of parents' use of spanking and its potential influence on a range of children's developmental outcomes, it is critical to understand whether and how early education programs might play a role in parents' use of spanking. Although little is known about the associations between early education and parents' use of spanking, early education has been prescribed as a family support service for families identified as at risk of child maltreatment as well as families with disabled children (Advisory Committee on Head Start Research and Evaluation, 2012; Howard & Brooks-Gunn, 2009). Among the early education programs available for such families, HS is particularly relevant in that it is the largest federally funded early education program targeting low-income children and children with disabilities.

1.2. Why Head Start Might Be Related to Parenting

Evaluation research suggests that model early childhood interventions are associated with less use of spanking by parents (Love et al., 2005; Love, Chazan-Cohen, Raikes, & Brooks-Gunn, 2013; Smith & Brooks-Gunn, 1997). Parenting is influenced by parental characteristics, child characteristics, and contextual sources of support and stress (Belsky, 1984). Based on this understanding, there would be several mechanisms which could explain the association between HS participation and spanking. First, providing support to parents, such as the provision of information and advice about child-rearing, may play a protective role in parenting. Such assistance positively affects parents' child-rearing practices in way that can improve parental discipline and attitudes toward child rearing (Brooks-Gunn, Berlin, & Fuligni, 2000; Howard & Brooks-Gunn, 2009). The involvement of parents is central to the mission of HS. Therefore, it is plausible to assume that HS

experiences might be associated with parenting practices. Second, providing support to parents, such as helping with child care, could also be associated with better parenting skills. HS provides child care services and such component of HS programs may help parents reduce their parenting stress. Finally, as discussed in prior empirical studies (e.g., Magnuson & Waldfogel, 2005; Zhai et al., 2013), another mechanism is that HS may also reduce parents' use of physical discipline by reducing HS participants' problem behaviors.

1.3. Prior Research on Head Start and Parents' Use of Spanking

The Head Start Impact Study (HSIS), which was the only nationally representative randomized experiment to examine the impacts of HS, provided evidence on the effects of HS on spanking. It followed a nationally representative sample of about 5,000 preschool-age children (age 3 to 4) from the year they attended HS to third grade year (USDHHS, ACF, 2012). The HSIS asked parents regarding the use of spanking in the past week, and found that parents of 3-year-old participants who were randomly assigned to the HS group were less likely to spank their children than those of children in the control group after one year of the random assignment as well as in kindergarten; however, such effects were not maintained to first grade or third grade. In addition, such effects were not found among parents of 4-year-old participants in any waves of data collected, and variation in the impact of HS by child gender was not examined in the HSIS (USDHHS, ACF, 2012). No other randomized experiments of HS or other preschool programs for 3 and 4 year olds have examined parenting outcomes (Camilli, Vargas, Ryan, & Barnett, 2010). It is surprising that so little information exists, given that family involvement has been perceived as central to these preschool programs (Brooks-Gunn et al., 2000; Zigler & Stifco, 2004).

In the absence of randomized experiments, another available design is to use prospective longitudinal data that provide information about child and parental characteristics prior to onset of HS. For example, using a sample of low-income families from the FFCWS and propensity score-weighted regression models, Zhai and colleagues (2013) found less spanking among parents of HS participants compared to those of all non-HS participants as well as those of children in other center-based care, relative/non-relative care, or parental care; nevertheless, they did not examine variation by child gender.

1.4. Gender Differences and Mothers' Use of Spanking

While associations between HS participation and parents' use of spanking have been documented, as reviewed above, no studies have examined gender differences in such associations, although child gender is an important factor related to parents' use of spanking (Boutwell et al., 2011; Gershoff, 2002; Straus & Stewart, 1999). According to a nationwide projection for 2006, boys were nearly 4 times more likely than girls to be spanked by parents (USDE, CRDC, 2006). This is in line with the fact that parents tend to consider the use of corporal punishment as a norm for rearing their sons (Mahoney, Donnelly, Lewis, & Maynard, 2000; Straus & Stewart, 1999). Generally, boys are more likely to misbehave or to be active than girls, and therefore parents are more likely to use physical discipline with their sons (Giles-Sims, Straus, & Sugarman, 1995). Furthermore, some parents believe that corporal punishment like spanking is needed to help their sons get ready for unexpected hardship in their future (Day, Peterson, & McCracken, 1998). Therefore, given that boys

were more likely to be spanked than girls and HS helps improve parenting skills, we expected that HS participation might have more pronounced effects on maternal spanking on boys than on girls.

1.5. Maternal and Child Characteristics Related to Parenting

We further examined some maternal and child characteristics (e.g., child temperament, child behavior problems, and maternal depression) that might explain the gender-differentiated associations between HS and mothers' use of spanking. Some evidence has shown that children's adjustment problems, such as temperament, are associated with adverse parenting characteristics and with stressors that may influence parenting qualities (Bates, Pettit, Dodge, & Ridge, 1998; Frankel & Bates, 1990). Also, studies have found that children's behavior problems were positively associated with negative parenting behaviors (Dumas & Wekerle, 1995; Ge et al., 1996). In addition, adverse associations between maternal depression and parenting have been well documented (Hoffman, Crnic, & Baker, 2006; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Therefore, given that early care and education programs might lead to lower levels of child behavior problems and might also lead to lower levels of depression among mothers (Chazan-Cohen et al., 2007; USDHHS, ACF, 2012), we expected that the beneficial associations between HS and mothers' use of spanking, if any, may be explained by lower levels of child behavior problems or maternal depression in the year of HS participation. Also, given that mothers who are depressed or have children with difficult temperaments might be more likely to spank their children, we might expect the benefits of HS to be more pronounced for these groups.

1.6. The Present Study

This study extended the literature by examining gender differences in the association between HS participation and mothers' use of spanking (i.e., whether the mother spanked the child in the past week at both preschool and kindergarten entry and whether the mother would use spanking in a hypothetical situation at kindergarten entry). We addressed four specific research questions. First, was HS participation associated with less maternal spanking? Based on theoretical and empirical evidence reviewed above, we expected that mothers of HS participants would be less likely to use spanking compared to those of non-participants. We created a binary indicator on whether the mother spanked the child in the past week at both the preschool and kindergarten surveys to examine concurrent and one year after associations between HS participation and mothers' use of spanking. Second, did associations between HS participation and mothers' use of spanking differ by child gender? Given that boys are more likely than girls to be spanked, we expected that to the extent that mothers of HS participants were less likely to spank their children than mothers of non-participants, this association would be stronger for boys than for girls. In addition to these two main questions, to understand why there were, if any, gender-differentiated associations and for whom these might be most important, we added two further questions. Third, were gender-differentiated associations explained by maternal or child characteristics? We examined whether the magnitude of gender-differentiated associations, if any, was reduced after further including maternal depression or child behavior problems. Finally, was the association between HS and maternal spanking more pronounced among certain groups of children? In separate analyses for boys and girls, we investigated whether the association

between HS and maternal spanking was more pronounced for children who had high initial temperament and more depressed mothers than for their counterparts.

To address these questions, this study used a large nationally representative birth cohort of children from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B). In addition, we employed two methodological strategies (i.e., regressions with an extensive set of covariates and propensity-score weighted regressions) to address selection bias, which is a perennial issue for research on HS. By definition, HS serves low-income children who may be more likely to be exposed to parental spanking than higher-income non-HS participants even before participating in HS. Therefore, potential effects of HS could be masked unless this selection bias is accounted for (Currie & Thomas, 1995).

2. Method

2.1. Data and Sample

We used data from the ECLS-B, a longitudinal study following a nationally representative birth cohort of about 10,700 children born in the U.S. in 2001 from birth to kindergarten entry (all sample sizes presented in this paper were rounded to the nearest 50 due to reporting rules of U.S. Department of Education; Nord et al., 2004). The ECLS-B collected data for parents and children when the children were approximately 9 months, 2 years, 4 years (the preschool survey), and 5 or 6 years old (the kindergarten survey).

We analyzed a sample of children who had valid information on HS participation at the preschool survey and whose mothers had valid information on at least one of the parental outcomes. We focused on mothers since they were primary respondents for the outcome variables as well as maternal and family covariates; but, in all analyses, we included indicators for father's presence at home in the 9-month and 2-year surveys. The kindergarten survey of the ECLS-B followed only about 7,700 cases due to financial constraints (Snow et al., 2009) and, of these cases, about 700 did not answer parent interviews and child assessments, leaving about 7,000 cases. Of these, excluding under 1% of children who had no information on HS participation, our final sample included about 7,000 children, which was 65% of the original sample and 91% of the kindergarten sample. In our analysis, we used sampling weights to adjust for the sampling structure designed by the ECLS-B (i.e., oversampling for twins, low birth weight infants, and several ethnic groups; and reducing the sample at the kindergarten survey) (Snow et al., 2009). No significant differences were found in demographic backgrounds between children included in the analysis and those who were excluded.

2.2. Measures

2.2.1. Head Start participation—In the preschool survey, the ECLS-B provides a set of questions about child care arrangements— HS, center-based care (e.g., state-funded prekindergarten programs, day care centers, nursery schools, or preschool programs), relative care (e.g., care from grandparents, brothers or sisters, or any other relatives), and non-relative care (e.g., care from someone not related to the child, such as home child care providers, baby sitters, or neighbors). Using this information, HS participation was

measured as a binary indicator with a value of 1 if a child attended HS on a regular basis when the child was approximately 4 years old and 0 otherwise. In our analytic sample, about 16% of children were in HS at the preschool survey.

Since we focused on the effects of participation in HS, we coded children as non-HS participants if they did not attend HS on a regular basis, regardless of whether they spent some time in other types of care arrangements. For such a reason, we also coded children as HS participants if they attended HS on a regular basis, regardless of whether they spent some time in other care arrangements (about 40% of the HS participants attended HS in combination with other types of care arrangements). Therefore, as robustness checks, we defined three alternative indicators for HS participation: 1) dividing the non-HS participants into four comparison groups (i.e., prekindergarten, other center-based care, relative or non-relative care, and exclusive parental care), 2) dividing the HS participants into two groups according to whether they attended HS only or in combination with other types of care arrangements, and 3) dividing the HS participants into part- and full-time groups based on time spent in HS (i.e., more than 20 hours per week for full-time vs. 20 hours or fewer per week for part-time; about 47% of the HS participants attended HS full-time).

2.2.2. Mothers' use of spanking—Mothers were asked how many times they had spanked their child in the prior week. Using this information, we created the first two outcome variables as binary indicators on whether a mother spanked her child in the prior week at the preschool and kindergarten surveys, respectively. Mothers were also asked whether they would use spanking as punishment if their child got angry and hit them. Using this information, the third outcome variable was created as a binary variable with a value of 1 if mothers reported that they would use spanking in a hypothetical situation at the kindergarten survey and 0 otherwise. In our sample, about 34% and 24% of mothers reported that they spanked their child in the prior week the preschool and kindergarten surveys, respectively; and about 45% reported that they would use spanking in a hypothetical situation at the kindergarten survey.

2.2.3. Other covariates—In all analyses, we controlled for an extensive set of child, maternal, and family covariates that may be correlated with children's HS participation as well as mothers' use of spanking. Child characteristics at the 9-month survey included gender, age in months, race/ethnicity, low birth weight, prematurity, multiple births, duration of breast-feeding, and number of siblings. Two more child covariates in the 2-year survey, health status reported by parents and child care arrangements, were included. Maternal characteristics in the 9-month survey included age in years, whether mother lived with bio-mother and bio-father until 16 years old, marital status at birth, and immigration status. Also, included were three maternal covariates in the 2-year survey, which are employment status, primary home language, and self-rated health status. Family characteristics in the 9-month survey included parental education (whichever parent held the highest education degree), parental occupational prestige scores (whichever parent held the highest score), and family income; family characteristics in the 2-year survey included family income, urbanicity, and region of country. Two indicators for father's presence at home in both the 9-month and 2-year surveys were also controlled for in all analyses.

In supplemental analyses, we further included maternal depression and child behavior problems at the preschool survey. Mothers' depression was measured using the total score of 12 items ($\alpha = .89$, range from 0 to 36) from the Center for Epidemiological Studies – Depression Scale (CES-D; Radloff, 1977). Next, following Bradbury, Corak, Waldfogel, and Washbrook (2011), children's conduct problems were measured using total scores of five parent-reported items ($\alpha = .76$) that asked about children's temper tantrums, aggressiveness, annoying, destructive behavior, and anger with a 5-point Likert scale (1 = "never" to 5 = "very often"), and children's attention problems were measured using total scores of five parent-reported items ($\alpha = .70$) that asked about children's hyperactivity and inattention problems with a 5-point Likert scale (1 = "never" to 5 = "very often"). Additionally, we measured a child's early temperament at 2-years by using the total score of the subset of the Infant/Toddler Symptom Checklist (ITSC) that includes seven questions ($\alpha = .66$) about self-regulatory behavior problems (Nord et al., 2004). For maternal depression and child behavior problems and temperament measures, the total scores were standardized to have a mean of 0 and a standard deviation of 1, with higher scores indicating higher levels of maternal depression, behavior problems, or problematic temperament (Appendix Table A).

2.2.4. Missing information on covariates—In our sample, rates of missing data for most covariates were below 2% but two covariates, child age and mother's depression, had slightly higher rates—4% and 10%, respectively. To address the issue of missing data for covariates, we conducted multiple imputation using all covariates, mediators, and outcome measures. Using Stata, we first created five imputed data sets (Royston, 2005). In this step, we included all outcome measures to enhance the accuracy of imputation (Moons, Donders, Stijnen, & Harrell, 2006). Using the MICOMBINE command in Stata, we then estimated average regression coefficients of the five imputed data sets and standard errors adjusted across the five imputed data sets (Royston, 2005) using the original outcome measures, not the imputed ones. We used the expected relative efficiency to gauge how much generating five data sets recovers missing data (Rubin, 1987). In our analysis, the expected relative efficiency ranged from 98.1% to 99.9%.

2.3. Analytic Strategies

To address selection bias, as discussed above, we applied two analytic methods. First, we estimated a series of logistic regression models with a rich set of covariates (Model 1) to predict the association between HS participation at the preschool survey and mothers' use of spanking at both the preschool and kindergarten surveys, controlling for child, maternal, and family characteristics. Although these models are not totally free from selection bias, they reduce the bias on observable characteristics (Gibson-Davis & Foster, 2006).

Second, to further reduce selection bias, we specified Model 2, which included the same set of controls in Model 1 but used a propensity score matching method. As presented in Table 1 below, in our sample, HS participants differed from non-participants in most covariates included. Therefore, we used a propensity score matching method to allow HS participants and non-participants to be as similar as possible on a rich set of observed characteristics (Dehejia & Wahba, 2002; Rosenbaum & Rubin, 1983, 1985). Specifically, we estimated

probit regressions to predict the probability of being in HS for each child using the same set of covariates employed in Model 1 and adjusting for the sample with the ECLS-B sampling weight ('W31R0'). We then used a radius matching method with a caliper to match each HS participant with all possible non-participants within a specified caliper width, which allows the comparison group to have a larger sample size and thus produces more precise estimates (Dehejia & Wahba, 2002; Somers, Zhu, Jacob, & Bloom, 2013). Following Rosenbaum and Rubin (1985), we used 0.01 as our caliper, which was smaller than one fourth of a standard deviation of the predicted propensity scores. A common support option was also used to exclude observations with propensity scores out of the common support region (Gibson-Davis & Foster, 2006; Leuven & Sianesi, 2003). Lastly, we estimated regression-adjusted differences by conducting multivariate regression models, which controlled for the same set of covariates included in Model 1 and used the weights obtained from the matching procedure. Whether the matching procedure was successful can be tested by identifying the extent of overlapping and balancing of the predicted propensity scores between HS participants and non-participants (Dehejia & Wahba, 2002; Gibson-Davis & Foster, 2006). We confirmed that predicted propensity scores were well balanced on all observed characteristics between the two groups (see Table 1).

Using Models 1 and 2, we first estimated the association between HS participation and mothers' use of spanking and then investigated whether the association differs by child gender by adding an interaction term of HS participation with child gender to Model 2. To see whether gender-differentiated associations, if any, are explained when further including maternal depression or child behavior problems, we then conducted three supplemental analyses, adding maternal depression, child conduct problems, or child attention problems to the interaction model. In addition, to examine whether the association between HS participation and maternal spanking was more pronounced for certain groups of children, we conducted two more supplemental analyses, separately for boys and girls, by adding interaction terms of HS participation with child temperament scores and with maternal depression scores to Model 2; no moderation results were found (results available upon request). Finally, we conducted robustness checks using three alternative measures for HS participation.

3. Results

3.1. Descriptive Statistics

Table 1 shows the descriptive statistics of all covariates by HS participation. To compare mean differences between HS participants and non-participants before and after propensity score matching, descriptive statistics for non-participants before and after matching along with the results of two-tailed t-tests are presented in Columns 2 and 4, respectively. As shown in Table 1, HS participants (Column 3) and non-participants before matching (Column 2) were quite different on most covariates. For example, compared to non-participants, HS participants were more likely to be non-Hispanic Black or Hispanic; they were less likely to be breastfed and more likely to have poor health status. Mothers of HS participants were more likely than those of non-participants to be younger, unmarried at the

time of birth, unemployed, reporting worse health status, less-educated, having a job of lower occupational prestige, and poor.

Taken together, the results in Table 1 clearly indicate that HS participants tended to possess more disadvantaged backgrounds than non-participants. As discussed above, this selection into HS could produce biased estimates in that those disadvantaged characteristics of HS participants and their mothers might have already increased mothers' use of spanking even before attending HS. Notably, after matching (Column 4), HS participants and non-participants were almost identical on all covariates, indicating our propensity score matching procedure successfully reduced selection bias on an extensive set of observed characteristics.

3.2. Head Start Participation and Mothers' Use of Spanking, and Differences by Gender

Panel A of Table 2 presents the associations between HS participation and mothers' use of spanking at the preschool and kindergarten surveys. To address selection bias, as discussed above, we used two empirical strategies—logistic regressions with rich covariates (Model 1) and propensity-score weighted regressions (Model 2). Overall, the results in Table 2 suggest that HS was not significantly associated with whether mothers spanked their children in the past week at both preschool and kindergarten entry or whether mothers would use spanking in a hypothetical situation at kindergarten entry. Although associations in the first two outcomes tended to be smaller in magnitude in Model 2 than in Model 1 (indicating that selection bias was reduced by using propensity score matching), they did not achieve conventional levels of statistical significance.

We next turned to the question of whether the association between HS participation and mothers' use of spanking differed by child gender (Panel B of Table 2). The analyses were based on the interaction models that added the HS participation and child gender interaction term to a propensity-score weighted regression (i.e., Model 2). We found that HS participation was associated with lower likelihood that mothers spanked their child in the past week both at preschool and kindergarten among boys compared to girls. Similarly, compared to girls, HS participation was associated with lower likelihood of mothers using spanking on boys in a hypothetical situation at kindergarten entry. In summary, the results in Table 2 suggest protective associations between HS participation and mothers' use of spanking among boys at both the preschool and kindergarten surveys.

3.3. Results of Supplemental Analyses

Table 3 shows the results of supplemental analyses to examine whether gender-differentiated associations are explained by additionally including maternal depression or child behavior problems at the preschool survey. As shown in Table 3, after further including maternal depression (Panel A), children's conduct problems (Panel B), or children's attention problems (Panel C), significant interaction terms between HS and child gender (i.e., more beneficial effects for boys compared to girls) were not eliminated; results for the second outcome (i.e., whether a mother spanked her child in the past week at kindergarten entry) after adding maternal depression became marginally significant due to slight increase in standard errors. In separate analyses for boys and girls, we also found that

including these variables did not reduce the magnitude of the HS coefficients (Panel A of Appendix Table B). We next, using three alternative measures for HS participation, conducted robustness checks on our main estimates (results available upon request). First, to see whether the results differ by comparison group, we examined mothers' use of spanking, comparing HS participants and children in each of the four comparison groups (i.e., prekindergarten, other center-based care, relative or non-relative care, and parental care). We found that, in the comparisons of HS with prekindergarten or other center-based care, HS was associated with lower likelihood of mothers spanking their child in the past week at preschool among boys compared to girls (Panel B of Appendix Table B). No significant differences in spanking were found by whether the child attended HS only or in combination with other arrangements and whether the child attended HS full-time or part-time, respectively (results available upon request).

4. Discussion

Using a nationally representative birth cohort and a propensity score matching method to address selection bias, we examined gender differences in the associations between HS participation and mothers' use of spanking. We found that HS participation was not associated with maternal spanking. This result is consistent with a study showing no associations (Magnuson & Waldfogel, 2005), but inconsistent with another study showing less maternal spanking among HS participants (USDHHS, ACF, 2012; Zhai et al., 2013). One possible explanation for this inconsistency is that, our and Magnuson and Waldfogel (2005)'s studies used nationally representative samples (i.e., urban, suburban, and rural ones), whereas Zhai et al. (2013)'s study employed an urban sample with predominantly low-income families from 20 large U.S. cities, and the HSIS included HS eligible children (USDHHS, ACF, 2012). Another possible explanation is that, while our and Magnuson and Waldfogel (2005)'s studies defined the spanking measure as the frequency of spanking in the past week, Zhai et al. (2013)'s study defined it as the frequency of spanking in the past year.

We also found that HS participation was associated with less maternal spanking among boys compared to girls. This finding suggests that HS settings might be a venue providing parents with support that positively affects parenting (e.g., family support and parent involvement services). This is also supported by the HSIS's findings showing less spanking among parents of HS participants (USDHHS, ACF, 2012). Therefore, our results suggest that early care and education could be a protective factor for children's wellbeing, particularly for boys (Barbarin, 2013; Watamura, Phillips, Morrissey, McCartney, & Bub, 2011). Given that parents, particularly mothers, are more likely to use spanking with sons than with daughters (Mahoney et al., 2000; Straus & Stewart, 1999), HS services for parents (e.g., education on parenting skills) may be closely related to the improvement of parenting among mothers of male participants (USDHHS, ACF, 2009). For instance, HS parents may have opportunities through parental involvement services to change their norms about acceptable discipline of boys or to learn alternative parenting skills of coping with boys' misbehavior. This explanation may also shed some light on why less maternal spanking among boys was still found when additionally including maternal depression or child behavior problems and why the association between HS participation and maternal spanking was not more pronounced

among children who had high initial temperament or more depressed mothers—that is to say, beneficial effects of HS participation on mothers' use of spanking may be due to the improvement of parenting, rather than to reduced child behavior problems or improved maternal wellbeing.

As a two-generational early care and education program, HS provides many opportunities for parents to be involved in on-site programs, such as volunteering in the classroom and participating in activities and workshops (Henrich & Gadaire, 2008; USDHHS, ACF, 2009). Such parental involvement in HS may lead to changes in parenting at home (e.g., increased activities with children at home and better parenting styles) (Henrich & Gadaire, 2008; O'Brien et al., 2002). Home visiting is also a component of HS programs, which includes services for parents (e.g., parenting education) (Howard & Brooks-Gunn, 2009). Therefore, given that HS provides diverse programs to help parents to improve their parenting skills (i.e., on-site activities and home visiting services), our finding suggests that providing low-income families with early intervention programs that include parent involvement components may be beneficial to both children and parents as well as the parent-child relationship (Brooks-Gunn et al., 2000; Henrich & Gadaire, 2008; Howard & Brooks-Gunn, 2009).

Several limitations should be noted. First, as in any non-experimental study, we were not able to establish causality with certainty. Although we used propensity-score weighted regression models to address the issue of selection bias, our estimated effects of HS participation could be biased if any important observed or unobserved covariates were omitted from the models. For example, our models may not fully control for families' selection of HS in particular relative to other care options. Second, our information about HS participation was reported by parents and thus may have measurement error. If children whose parents reported their children attended HS did not actually attend, HS participation in our sample could be over-reported, which would yield underestimated effects of HS participation (Garces et al., 2002; Ludwig & Miller, 2007). Third, our information about the use of spanking was also reported by mothers and thus may be inaccurate. If HS mothers felt uncomfortable reporting their use of spanking and thus underreported spanking their children, our results could be biased.

Despite these limitations, this study contributes to previous research in that this is the first study to show gender differences in the associations between HS participation and mothers' use of spanking. In contrast to previous studies that have found main effects of HS participation on parents' use of spanking (e.g., USDHHS, ACF, 2012; Zhai et al., 2013), our study found that HS participation was only protective for boys in terms of its associations with mothers' use of spanking. This is a notable result in that it shows the importance of considering child characteristics (e.g., child gender) in estimating the influence of contextual environments (e.g., HS participation) with which children interact. We also found that the beneficial associations between HS participation and mothers' use of spanking among boys were not eliminated when we considered maternal depression or child behavior problems at the preschool survey. Since mothers reported all three outcomes (spanking, depression, and child behavior), these results suggest that the association between HS and less maternal

spanking is not simply due to mothers whose children attended HS simply reporting better outcomes across the board.

In sum, this study adds further evidence to the growing empirical research examining the associations between HS participation and child and family wellbeing. Furthermore, our results may speak to some implications related to practices. First, our results suggest that strengthening family-oriented services in HS programs might help improve parenting and child wellbeing among HS families (Henrich & Gadaire, 2008; Weiss, Caspe, & Lopez, 2006). Second, this study also suggests that in future research, in addition to exploring main associations of HS, examining moderated associations by child characteristics, in particular gender, would allow us to have a deeper understanding of the effects of HS programs.

Acknowledgments

We gratefully acknowledge support from award number R01HD047215-05 and R24HD058486 from the Eunice Kennedy Shriver National Institute of Child Health & Human Development (NICHD).

References

- Advisory Committee on Head Start Research and Evaluation. Advisory Committee on Head Start Research and Evaluation: Final Report. Washington, DC: Administration for Children and Families; 2012.
- Barbarin O. A longitudinal examination of socioemotional learning in African American and Latino boys across the transition from pre-k to kindergarten. *American Journal of Orthopsychiatry*. 2013; 83(2–3):156–164. [PubMed: 23889008]
- Bates JE, Pettit GS, Dodge KA, Ridge B. The interaction of temperamental resistance to control and restrictive parenting in the development of externalizing behavior. *Developmental Psychology*. 1998; 34(5):982–995. [PubMed: 9779744]
- Baumrind D. The discipline controversy revisited. *Family Relations*. 1996; 45(4):405–414.
- Belsky J. The determinants of parenting: A process model. *Child Development*. 1984; 55(1):83–96. [PubMed: 6705636]
- Benjet C, Kazdin AE. Spanking children: The controversies, findings, and new directions. *Clinical Psychology Review*. 2003; 23(2):197–224. [PubMed: 12573670]
- Berlin LJ, Ispa JM, Fine MA, Malone PS, Brooks-Gunn J, Brady-Smith C, Bai Y. Correlates and consequences of spanking and verbal punishment for low-income White, African American, and Mexican American toddlers. *Child Development*. 2009; 80(5):1403–1420. [PubMed: 19765008]
- Boutwell BB, Frankline CA, Barnes JC, Beaver KM. Physical punishment and childhood aggression: The role of gender and gene-environment interplay. *Aggressive Behavior*. 2011; 37(6):559–568. [PubMed: 21898451]
- Bradbury, B.; Corak, M.; Waldfogel, J.; Washbrook, E. Inequality during the early years: Child outcomes and readiness to learn in Australia, Canada, United Kingdom, and United States. Bonn, Germany: Institute for the Study of Labor; 2011. [IZA Discussion Paper Series No. 6120]
- Brooks-Gunn, J.; Berlin, LJ.; Fuligni, A. Early childhood intervention programs: What about the family?. In: Meisels, S.; Shonkoff, J., editors. *The handbook of early intervention*. New York, NY: Cambridge University Press; 2000. p. 549–588.
- Camilli G, Vargas S, Ryan S, Barnett WS. Meta-analysis of the effects of early education interventions on cognitive and social development. *Teachers College Record*. 2010; 111(3):579–620.
- Chazan-Cohen R, Ayoub C, Pan BA, Roggman L, Raikes H, McKelvey L, Hart A. It takes time: Impacts of Early Head Start that lead to reductions in maternal depression two years later. *Infant Mental Health Journal*. 2007; 28(2):151–170.
- Currie J, Thomas D. Does Head Start make a difference? *American Economic Review*. 1995; 85(3):341–364.

- Day RD, Peterson GW, McCracken C. Predicting spanking of younger and older children by mothers and fathers. *Journal of Marriage and Family*. 1998; 60(1):79–94.
- Dehejia RH, Wahba S. Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and Statistics*. 2002; 84(1):151–161.
- Dumas JE, Wekerle C. Maternal reports of child behavior problems and personal distress as predictors of dysfunctional parenting. *Development and Psychopathology*. 1995; 7(3):465–479.
- Frankel KA, Bates JE. Mother-toddler problem-solving: Antecedents in attachment, home behavior, and temperament. *Child Development*. 1990; 61(3):810–819. [PubMed: 2364755]
- Garces E, Thomas D, Currie J. Long-term effects of Head Start. *American Economic Review*. 2002; 92(4):999–1012.
- Ge X, Conger R, Cadoret R, Neiderhiser J, Yates W, Troughton E, Stewart MA. The developmental interface between nature and nurture: A mutual influence model of child antisocial behavior and parent behavior. *Developmental Psychology*. 1996; 32(4):574–589.
- Gershoff ET. Corporal punishment by parents and associated child behaviors and experiences: A meta-analytic and theoretical review. *Psychological Bulletin*. 2002; 128(4):530–579.
- Gershoff ET. More harm than good: A summary of scientific research on the intended and unintended effects of corporal punishment on children. *Law and Contemporary Problems*. 2010; 73(2):31–56.
- Gershoff ET. Spanking and child development: We know enough now to stop hitting our children. *Child Development Perspectives*. 2013; 7(3):133–137. [PubMed: 24039629]
- Gibson-Davis C, Foster E. A cautionary tale: Using propensity scores to estimate the effect of Food Stamps on food insecurity. *Social Service Review*. 2006; 80(1):93–126.
- Giles-Sims J, Straus MA, Sugarman DB. Child, maternal, and family characteristics associated with spanking. *Family Relations*. 1995; 44(2):170–176.
- Henrich CC, Gadaire DM. Head Start and parent involvement. *Infant & Young Children*. 2008; 21(1):56–69.
- Hoffman C, Crnic KA, Baker JK. Maternal depression and parenting: Implications for children's emergent emotion regulation and behavioral functioning. *Parenting: Science and Practice*. 2006; 6(4):271–295.
- Howard KS, Brooks-Gunn J. The role of home-visiting programs in preventing child abuse and neglect. *The Future of Children*. 2009; 19(2):119–146. [PubMed: 19719025]
- Lee R, Zhai F, Brooks-Gunn J, Han W-J, Wladfogel J. Head Start participation and school readiness: Evidence from the Early Childhood Longitudinal Study-Birth Cohort. *Developmental Psychology*. 2014; 50(1):200–215.
- Leuven, E.; Sianesi, B. PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. 2003. Retrieved from <http://ideas.repec.org/c/boc/bocode/s432001.html>
- Love JM, Chazan-Cohen R, Raikes H, Brooks-Gunn J. What makes a difference: Early Head Start evaluation in a developmental context. *Monographs of the Society for Research in Child Development (SRCD)*. 2013; 78:1–173.
- Love JM, Kisker EE, Ross C, Raikes H, Constantine J, Boller K, Vogel C. The effectiveness of Early Head Start for 3-year-old children and their parents: Lessons for policy and programs. *Developmental Psychology*. 2005; 41(6):885–901. [PubMed: 16351335]
- Lovejoy MC, Graczyk PA, O'Hare E, Neuman G. Maternal depression and parenting behavior: A meta-analytic review. *Clinical Psychology Review*. 2000; 20(5):561–592. [PubMed: 10860167]
- Ludwig J, Miller DL. Does Head Start improve children's life chances? Evidence from a regression discontinuity design. *Quarterly Journal of Economics*. 2007; 122(1):159–208.
- MacKenzie MJ, Nicklas E, Brooks-Gunn J, Waldfogel J. Who spans infants and toddlers? Evidence from the Fragile Families and Child Well-being Study. *Children and Youth Services Review*. 2011; 33(8):1364–1373. [PubMed: 21686081]
- MacKenzie MJ, Nicklas E, Waldfogel J, Brooks-Gunn J. Spanking and child development across the first decade of life. *Pediatrics*. 2013; 132:e1118–e1125. [PubMed: 24144718]

- MacKenzie MJ, Nicklas E, Waldfogel J, Brooks-Gunn J. Corporal punishment and child behavioral and cognitive outcomes through 5 years-of-age: Evidence from a contemporary urban birth cohort study. *Infant and Child Development*. 2012; 21(1):3–33. [PubMed: 24839402]
- Magnuson KA, Waldfogel J. Preschool child care and parents' use of physical discipline. *Infant and Child Development*. 2005; 14(2):177–198.
- Mahoney A, Donnelly WO, Lewis T, Maynard C. Mother and father self-reports of corporal punishment and severe physical aggression toward clinic-referred youth. *Journal of Clinical Child Psychology*. 2000; 29(2):266–281. [PubMed: 10802835]
- Moons K, Donders R, Stijnen T, Harrell FE. Using the outcome for imputation of missing predictor values was preferred. *Journal of Clinical Epidemiology*. 2006; 59(10):1092–1101. [PubMed: 16980150]
- Nord, C.; Edward, B.; Hilpert, R.; Branden, L.; Andreassen, C.; Elmore, A.; West, J. Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), User's manual for the ECLS-B nine-month restricted-use data file and electronic code book. Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education; 2004.
- O'Brien, RW.; D'Elio, MA.; Vaden-Kiernan, M.; Magee, C.; Younoszai, T.; Keane, MJ.; Hailey, L. A descriptive study of Head Start families: FACES technical report. Washington, D.C: Administration for Children, Youth and Families, U.S. Department of Health and Human Services; 2002.
- O'Callaghan K. Is it okay to spank? *Parenting*. 2006; 20(7):142–148.
- Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Journal of Applied Psychological Measurement*. 1977; 1(3):385–401.
- Regalado M, Sareen H, Inkelas M, Wissow LS, Halfon N. Parents' discipline of young children: Results from the National Survey of Early Childhood Health. *Pediatrics*. 2004; 113(6):1952–1958. [PubMed: 15173466]
- Rosenbaum PR, Rubin DB. The central role of the propensity score in observational studies for causal effects. *Biometrika*. 1983; 70(1):41–55.
- Rosenbaum PR, Rubin DB. Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *American Statistician*. 1985; 39(1):33–38.
- Royston P. Multiple imputation of missing values: Update of ICE. *The Stata Journal*. 2005; 5(4):527–536.
- Rubin, D. Multiple imputation for nonresponse in surveys. New York, NY: John Wiley & Sons; 1987.
- Smith JR, Brooks-Gunn J. Correlates and consequences of mothers' harsh discipline with young children. *Archives of Pediatric and Adolescent Medicine*. 1997; 151(8):777–786.
- Snow, K.; Derecho, A.; Wheelless, S.; Lennon, J.; Rosen, J.; Rogers, J.; Mulligan, GM. Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), Kindergarten 2006 and 2007 data file user's manual (2010-010). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education; 2009.
- Socolar RRS, Savage E, Evans H. A longitudinal study of parental discipline of young children. *Southern Medical Journal*. 2007; 100(5):472–477. [PubMed: 17534082]
- Somers, MA.; Zhu, P.; Jacob, R.; Bloom, H. The validity and precision of the comparative interrupted time series design and the difference-in-difference design in educational evaluation. New York, NY: MDRC; 2013.
- Straus, MA. Beating the devil out of the them: Corporal punishment by parents and its effects on children. Boston, MA: Lexington/Macmillian; 1994.
- Straus MA, Stewart JH. Corporal punishment by American parents: National data on prevalence, chronicity, severity, and duration, in relation to child and family characteristics. *Clinical Child and Family Psychology Review*. 1999; 2(2):55–70. [PubMed: 11225932]
- Straus MA, Sugarman DB, Giles-Sims J. Spanking by parents and subsequent antisocial behavior of children. *Archives of Pediatrics and Adolescent Medicine*. 1997; 151(8):761–767. [PubMed: 9265876]
- U.S. Department of Education, Civil Rights Data Collection. Projected values for the nation. Washington, DC: Author; 2006. Retrieved from <http://ocrdata.ed.gov/downloads/projections/2006/2006-nation-projection.xls>

- U.S. Department of Health and Human Services, Administration for Children and Families. Head Start program performance standards. Washington, DC: Author; 2009.
- U.S. Department of Health and Human Services, Administration for Children and Families. Third grade follow-up to the Head Start Impact Study: Final report. Washington, DC: Author; 2012.
- Vinovskis, MA. The birth of Head Start: Preschool education policies in the Kennedy and Johnson administrations. Chicago, IL: University of Chicago Press; 2005.
- Watamura SE, Phillips DA, Morrissey TW, McCartney K, Bub K. Double jeopardy: Poorer social-emotional outcomes for children in the NICHD SECCYD experiencing home and child-care environments that confer risk. *Child Development*. 2011; 81(1):48–65. [PubMed: 21291428]
- Weiss, HB.; Caspe, M.; Lopez, ME. Family involvement in early childhood education. Cambridge, MA: Harvard Family Research Project; 2006.
- Westbrook TR, Harden BJ, Holmes AK, Meisch AD, Whittaker JV. Physical discipline use and child behavior problems in low-income, high-risk African American families. *Early Education and Development*. 2013; 24(6):923–945.
- Wissow LS. Ethnicity, income, and parenting contexts of physical punishment in a national sample of families with young children. *Child Maltreatment*. 2001; 6(2):118–129. [PubMed: 16705787]
- Zhai F, Brooks-Gunn J, Waldfogel J. Head Start and urban children's school readiness: A birth cohort study in 18 cities. *Developmental Psychology*. 2011; 47(1):134–152. [PubMed: 21244155]
- Zhai F, Waldfogel J, Brooks-Gunn J. Estimating the effects of Head Start on parenting and child maltreatment. *Children and Youth Services Review*. 2013; 35(7):1119–1129. [PubMed: 23788823]
- Zigler, E.; Styfco, SJ., editors. The Head Start debates. Baltimore, MD: Paul H. Brookes Publishing, Co.; 2004.

Appendices

Appendix Table A

Descriptive Statistics of Child Temperament and Behavior Problems and Maternal Depression

	Full sample	Head Start participants			Non-participants		
		All	Boys	Girls	All	Boys	Girls
ITSC	0.00 (1.00)	0.18 (1.02) ^a	0.26 (1.01) ^b	0.10 (1.01) ^b	−0.03 (0.99) ^a	0.02 (1.01) ^c	−0.08 (0.97) ^c
Conduct problems	0.00 (1.00)	0.10 (1.16) ^a	0.20 (1.18) ^b	−0.00 (1.13) ^b	−0.02 (0.96) ^a	0.14 (0.99) ^c	−0.18 (0.91) ^c
Attention problems	0.00 (1.00)	0.07 (1.07) ^a	0.23 (1.09) ^b	−0.10 (1.03) ^b	−0.01 (0.98) ^a	0.16 (1.00) ^c	−0.19 (0.94) ^c
Maternal depression	0.00 (1.00)	0.16 (1.09) ^a	0.15 (1.09)	0.16 (1.09)	−0.03 (0.98) ^a	−0.03 (0.99)	−0.03 (0.97)

Note. Means with standard deviations in parentheses. ITSC scores were measured at 2-years and the others at preschool. All measures were standardized to have a mean of 1 and a standard deviation of 1. All numbers were adjusted using the preschool sampling weights. All reported sample sizes were rounded to the nearest 50, due to IES reporting rules. Sample sizes were 6950 for ITSC, 6600 for maternal depression and 7000 for child conduct and attention problems. Sharing the same superscript letters indicates significant differences at least at the $p < .05$ level. ITSC = Infant/Toddler Symptom Checklist.

Appendix Table B

Results of Supplemental Analyses

	Did you spank your child in past week at preschool?			Did you spank your child in past week at kindergarten?			If child hit, would you use spanking as punishment?		
	<i>Odds</i>	<i>Coef</i>	<i>SE</i>	<i>Odds</i>	<i>Coef</i>	<i>SE</i>	<i>Odds</i>	<i>Coef</i>	<i>SE</i>
Panel A. Models additionally including maternal depression or child behavior problems among boys									
HS participation	0.84	-0.17	0.04	0.88	-0.13	0.12	0.80*	-0.22	0.11
A1. Adding mom's depression									
HS participation	0.83	-0.19	0.12	0.79	-0.23	0.12	0.77*	-0.26	0.12
Depression at preschool	1.05	0.05	0.14	1.09	0.09	0.14	0.90	-0.11	0.13
A2. Adding conduct problems									
HS participation	0.76*	-0.28	0.11	0.76*	-0.28	0.12	0.78*	-0.25	0.11
Conduct problems at preschool	1.79***	0.58	0.12	1.79***	0.58	0.13	1.21	0.19	0.12
A3. Adding attention problems									
HS participation	0.76*	-0.27	0.11	0.78*	-0.25	0.12	0.78*	-0.25	0.11
Attention problems at preschool	1.75***	0.56	0.14	1.65***	0.50	0.14	1.23	0.21	0.13
Panel B. Models estimating HS effects on maternal spanking by comparison group									
HS participation * boys	0.69*	-0.37	0.15	0.73*	-0.32	0.16	0.73*	-0.32	0.15
B1. HS vs. prekindergarten									
HS participation * boys	0.61*	-0.50	0.26	0.63	-0.46	0.27	0.66	-0.41	0.26
B2. HS vs. other center-based care									
HS participation * boys	0.64*	-0.44	0.21	0.65	-0.43	0.23	0.87	-0.14	0.22
B3. HS vs. relative/non-relative care									
HS participation * boys	0.89	-0.12	0.27	0.93	-0.07	0.28	0.70	-0.36	0.28
B4. HS vs. parental care									
HS participation * boys	0.79	-0.23	0.21	0.93	-0.07	0.22	0.85	-0.16	0.21

Note. All reported sample sizes were rounded to the nearest 50, due to IES reporting rules. Sample sizes of three outcome measures were 3200 in Panel A1 and 3550 in Panels A2 and A3, and those were 2,200 in Panel B1, 3,900 in Panel B2, 1,800 in Panel B3, and 2,500 in Panel B4. All analyses were conducted using Model 2, which included the same set of covariates as Model 1 but adjusted by the weights generated from propensity score matching. HS = Head Start; *Coef* = coefficient; *SE* = standard error of the coefficient.

 $p < .001$.

*
 $p < .05$.

Highlights

- ▶ We found no main effect of Head Start on maternal spanking for the full sample.
- ▶ Head Start participation predicted less maternal spanking among boys than girls.
- ▶ The effects for boys were not reduced by controlling for maternal depression.
- ▶ The effects for boys were not reduced by controlling for child behavior problems.

Table 1

Descriptive Statistics Before and After Matching, by Head Start Participation

Variable	Full sample (<i>n</i> ≈ 7000)	Non-Head Start before matching (<i>n</i> ≈ 5800)	Head Start (<i>n</i> ≈ 1200)	Non-Head Start after matching (<i>n</i> ≈ 5800)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Child care arrangements at 2-year				
Parental care	0.51(0.50)	0.50 (0.50)	0.52(0.50)	0.52(0.50)
Relative care	0.20(0.40)	0.19(0.39)***	0.24(0.42)	0.24(0.43)
Non-relative care	0.15(0.36)	0.16(0.36)***	0.10(0.31)	0.11(0.31)
Center-based care	0.15(0.36)	0.15 (0.36)	0.14(0.35)	0.14(0.34)
Child characteristics				
Boys	0.51(0.50)	0.51 (0.50)	0.50(0.50)	0.50(0.50)
Age in months at 9-month	10.48(1.87)	10.47 (1.86)	10.53(1.92)	10.54(1.97)
Race/ethnicity at 9-month				
Non-Hispanic White	0.41(0.49)	0.45(0.50)***	0.21(0.40)	0.21(0.41)
Non-Hispanic Black	0.16(0.36)	0.13(0.33)***	0.29(0.46)	0.28(0.45)
Hispanic	0.20(0.40)	0.18(0.39)***	0.28(0.45)	0.29(0.46)
Non-Hispanic Asian	0.11(0.32)	0.13(0.33)***	0.04(0.20)	0.04(0.20)
Other	0.12(0.33)	0.11(0.32)***	0.18(0.38)	0.17(0.38)
Low birth weight at birth	0.25(0.43)	0.25 (0.43)	0.25(0.43)	0.26(0.44)
Prematurity at birth	0.27(0.44)	0.27 (0.44)	0.28(0.45)	0.28(0.45)
Multiple birth at birth	0.18(0.39)	0.19 (0.39)*	0.16(0.37)	0.16(0.36)
Breast-feeding at 9-month				
None	0.31(0.46)	0.28(0.45)***	0.45(0.50)	0.44(0.50)
<3 months	0.23(0.42)	0.23 (0.42)	0.24(0.43)	0.24(0.43)
3~6 months	0.21(0.41)	0.22(0.41)***	0.17(0.37)	0.17(0.38)
7 months	0.25(0.43)	0.27(0.44)***	0.14(0.35)	0.14(0.35)
Number of siblings at 9-month				
No sibling	0.36(0.48)	0.35 (0.48)*	0.38(0.49)	0.38(0.49)
One	0.34(0.47)	0.35(0.48)***	0.29(0.46)	0.29(0.45)
Two or more	0.30(0.46)	0.30 (0.46)	0.33(0.47)	0.33(0.47)
Health status at 2-year				
Poor/fair	0.03(0.16)	0.03 (0.16)*	0.04(0.19)	0.04(0.19)
Good	0.11(0.32)	0.11 (0.31)**	0.14(0.35)	0.14(0.35)
Very good	0.27(0.45)	0.27 (0.44)	0.29(0.45)	0.29(0.45)
Excellent	0.59(0.49)	0.60(0.49)***	0.54(0.50)	0.54(0.50)
Maternal characteristics				
Age at birth	27.80(6.36)	28.32(6.29)***	25.20(6.09)	25.13(6.13)

Variable	Full sample (<i>n</i> ≈ 7000)	Non-Head Start before matching (<i>n</i> ≈ 5800)	Head Start (<i>n</i> ≈ 1200)	Non-Head Start after matching (<i>n</i> ≈ 5800)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Mom lived with bio-mother until 16	0.85(0.35)	0.87(0.34)***	0.79(0.41)	0.80(0.40)
Mom lived with bio-father until 16	0.62(0.48)	0.65(0.48)***	0.50(0.50)	0.51(0.50)
Married at birth	0.68(0.47)	0.73(0.45)***	0.44(0.50)	0.44(0.50)
Employment status at 2-year				
Not working	0.46(0.50)	0.44(0.50)***	0.52(0.50)	0.50(0.50)
Full-time	0.36(0.48)	0.37 (0.48)*	0.33(0.47)	0.34(0.47)
Part-time	0.19(0.39)	0.19(0.39)***	0.15(0.36)	0.15(0.36)
Foreign-born	0.26(0.44)	0.26 (0.44)	0.25(0.43)	0.26(0.44)
English is primary home language at 2-year	0.79(0.41)	0.79 (0.41)	0.77(0.42)	0.77(0.42)
Health status at 2-year				
Poor/fair	0.08(0.28)	0.07(0.26)***	0.13(0.34)	0.13(0.34)
Good	0.25(0.43)	0.24(0.43)***	0.30(0.46)	0.30(0.46)
Very good	0.34(0.47)	0.35 (0.48)**	0.31(0.46)	0.31(0.46)
Excellent	0.32(0.47)	0.34(0.47)***	0.26(0.44)	0.26(0.44)
Family characteristics				
Parent's education at birth				
Below high school(0–11)	0.12(0.33)	0.10(0.30)***	0.22(0.42)	0.23(0.42)
High school(12)	0.23(0.42)	0.20(0.40)***	0.38(0.49)	0.38(0.49)
Some college(13–15)	0.29(0.45)	0.29 (0.45)	0.31(0.46)	0.32(0.47)
Above college(16+)	0.36(0.48)	0.41(0.49)***	0.08(0.27)	0.07(0.26)
Parental occupational prestige at 9-month	2.22(2.46)	2.34(2.52)***	1.66(2.07)	1.64(2.06)
Family income at 9-month				
\$0 – \$20000	0.25(0.43)	0.21(0.40)***	0.49(0.50)	0.48(0.50)
\$20001 – \$35000	0.23(0.42)	0.21(0.41)***	0.30(0.46)	0.31(0.46)
\$35001 – \$50000	0.30(0.46)	0.33(0.47)***	0.17(0.37)	0.16(0.37)
\$50001+	0.21(0.41)	0.25(0.43)***	0.04(0.20)	0.04(0.20)
Family income at 2-year				
\$0 – \$20000	0.24(0.43)	0.19(0.40)***	0.47(0.50)	0.46(0.50)
\$20001 – \$35000	0.21(0.40)	0.19(0.39)***	0.30(0.46)	0.31(0.46)
\$35001 – \$50000	0.32(0.46)	0.34(0.47)***	0.19(0.39)	0.19(0.39)
\$50001+	0.24(0.43)	0.28(0.45)***	0.05(0.22)	0.05(0.21)
Lived in urban area at 2-year	0.84(0.37)	0.86(0.35)***	0.76(0.43)	0.76(0.42)
Region of country at 2-year				
Northeast	0.15(0.35)	0.15 (0.36)	0.13(0.34)	0.12(0.33)
Midwest	0.24(0.42)	0.24 (0.43)	0.23(0.42)	0.22(0.41)

		Non-Head Start before matching	Head Start	Non-Head Start after matching
	Full sample (<i>n</i> ≈ 7000)	(<i>n</i> ≈ 5800)	(<i>n</i> ≈ 1200)	(<i>n</i> ≈ 5800)
Variable	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
South	0.35(0.48)	0.34 (0.47) **	0.39(0.49)	0.40(0.49)
West	0.27(0.44)	0.27 (0.44)	0.25(0.43)	0.26(0.44)

Note. Standard deviations (SD) are in parentheses. Descriptive statistics of non-HS participants after matching in the last column were reported from the first imputed data set (other four imputed data sets also yielded almost the same descriptive results). Sample sizes were rounded to the nearest 50, due to IES reporting rules. Two-tailed *t* tests were conducted to test mean differences between HS participants and non-participants before and after matching.

 $p < .001$.

**
 $p < .01$.

*
 $p < .05$.

Table 2

Head Start Participation and Mothers' Use of Spanking, by Child Gender

	Did you spank your child in past week at preschool?		Did you spank your child in past week at kindergarten?		If child hit, would you use spanking as punishment?	
	Odds	Coef SE	Odds	Coef SE	Odds	Coef SE
Panel A. Full sample						
Model 1	1.11	0.10 0.10	1.19	0.17 0.11	0.96	-0.04 0.11
Model 2	1.02	0.02 0.08	1.02	0.02 0.08	0.96	-0.04 0.08
Panel B. Interaction by gender						
HS participation *	0.69 *	-0.37 0.15	0.73 *	-0.32 0.16	0.73 *	-0.32 0.15
boys						
HS participation	1.22	0.20 0.11	1.21	0.19 0.12	1.13	0.12 0.11
Boys	1.52 ***	0.42 0.09	1.60 ***	0.47 0.09	1.20 *	0.18 0.09

Note. All reported sample sizes were rounded to the nearest 50, due to IIES reporting rules. The sample sizes were 7000 in all models. In Panel A, Model 1 was estimated with multivariate regressions including all covariates and employing the kindergarten sampling weights 'W41R0,' and Model 2 included the same set of covariates as Model 1 but adjusted by the weights generated from propensity score matching. In Panel B, all analyses were conducted based on Model 2. HS = Head Start; Coef = coefficient; SE = standard error of the coefficient.

p < .001.

*
p < .05.

Table 3
Results of Supplemental Analyses Additionally Including Maternal Depression or Child Behavior Problems

	Did you spank your child in past week at preschool?			Did you spank your child in past week at kindergarten?			If child hit, would you use spanking as punishment?		
	Odds	Coef	SE	Odds	Coef	SE	Odds	Coef	SE
HS participation * boys	0.69 *	-0.37	0.15	0.73 *	-0.32	0.16	0.73 *	-0.32	0.15
Panel A. Adding mom's depression									
HS participation * boys	0.67 *	-0.40	0.16	0.73	-0.31	0.17	0.71 *	-0.34	0.17
Depression at preschool	1.01	0.01	0.09	1.11	0.10	0.09	0.99	-0.01	0.09
Panel B. Adding conduct problems									
HS participation * boys	0.61 **	-0.49	0.16	0.66 *	-0.42	0.16	0.70 *	-0.36	0.16
Conduct problems at preschool	1.97 ***	0.68	0.09	1.70 ***	0.53	0.09	1.28	0.25	0.08
Panel C. Adding attention problems									
HS participation * boys	0.62 **	-0.48	0.16	0.66 *	-0.42	0.16	0.70 *	-0.36	0.16
Attention problems at preschool	1.80 ***	0.59	0.10	1.63 ***	0.49	0.09	1.28	0.25	0.09

Note. All reported sample sizes were rounded to the nearest 50, due to IIES reporting rules. The sample sizes of three outcome measures were 6250 in Panel A and 6950 in Panels B and C. All analyses were conducted using Model 2, which included the same set of covariates as Model 1 but adjusted by the weights generated from propensity score matching. HS = Head Start; *Coef* = coefficient; *SE* = standard error of the coefficient.

 $p < .001$.

**
 $p < .01$.

*
 $p < .05$.