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RESEARCH ARTICLE

Positive Parenting Matters in the Face of Early Adversity

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Introduction: A negative relationship between adverse childhood experiences and both physical and mental health in adulthood is well established, as is the positive impact of parenting on child development and future health. However, few studies have investigated unique influences of adverse childhood experiences and positive parenting together within a large, diverse early childhood sample.

Methods: The study used data on all children aged 0–5 years (n=29,997) from the National Survey of Children's Health 2011/2012 to examine effects of positive parenting practices and adverse childhood experiences on early childhood social–emotional skills and general development. All analyses were performed in 2017 and 2018.

Results: More than a third of the sample reported experiencing at least one adverse childhood experience. More than a fourth (26.7%) met study criteria for social–emotional deficits, and 26.2% met criteria for developmental delay risks. The number of adverse childhood experiences exhibited negative marginal associations with social–emotional deficits and developmental delay risks, whereas the number of positive parenting practices showed independent protective effects. Risks associated with an absence of positive parenting were often greater than those of four or more adverse childhood experiences, even among no/low adversity families. The population attributable fractions for social–emotional deficits and developmental delay risks were 17.3% and 13.9% (translating to prevalence reductions of 4.5% and 3.6%) when adopting all positive parenting practices and 4.5% and 7.2% (prevalence reductions of 1.2% and 1.9%) when eliminating adverse childhood experiences.

Conclusions: The number of adverse childhood experiences was associated with both social–emotional deficits and developmental delay risks in early childhood; however, positive parenting practices demonstrated robust protective effects independent of the number of adverse childhood experiences. This evidence further supports promotion of positive parenting practices at home, especially for children exposed to high levels of adversity.

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INTRODUCTION

Adverse childhood experiences (ACEs) continue to garner public attention for their cumulative negative health consequences in adulthood.[1–4] Many theorize the accumulation of adversities can lead to excessive or prolonged stress,[5] and in the absence of sensitive and responsive caregivers, this stress becomes toxic and can disrupt brain development, which in turn causes lifelong impairments. Negative ACE effects are documented for young adults, adolescents, and even children.[4,6–9] However, only a few studies[10,11] have examined, at a population level, the isolated effects of ACEs on health or health precursors occurring during critical early stages of childhood.

The prevailing view among early childhood professionals frames development as a synthesized product of

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negative outcomes from toxic stress and positive, adaptive outcomes from "protective factors."[11,12] Garner and Shonkoff[13] capture current thinking, explaining "the essence of toxic stress is the absence of buffers [i.e., protective factors] needed to return the physiologic stress response to baseline." This emphasis on adversity harms and protective buffers permeates most modern health promotion service systems and aligns with the mental health dual continuum movement.[14] The Centers for Diseases Control and Prevention, frontrunners of early child adversity research, widely promote creation of "safe, stable, and nurturing relationships and environments" as essential protective factors for all children.[15] Similarly, Strengthening Families™ is a broadly implemented program encouraging the protective factors approach with high-adversity families.[16]

One commonly cited, modifiable protective factor is parenting.[11,17] Key parenting practices not only protect children from adversity but also stimulate development that enhances resiliency. Recently, the National Academy of Sciences, Engineering, and Medicine released *Parenting Matters: Supporting Parents of Children Ages 0–8*,[18] which underscores the importance of quality parenting for child development. Despite popularity of this view,[18–20] limited information exists detailing the combined impact of childhood adversities and parenting practices on early development,[11] in part because selective samples from clinical trials usually restrict variability on parenting and/or adversity outcomes. As such, essential questions remain, and herein, special attention is drawn to one: Do protective effects of positive parenting practices (PPPs) persist even in the face of adversities? To explore this question further, this study considers two reasons why PPPs may not evidence protective effects in the presence of ACEs: (1) Because these are two sides of the same coin, and ACEs confound the relationship between PPPs and development; or (2) benefits of PPPs degrade under higher levels of adversity exposure. Equipped with a large, nationally representative survey sample, this study aims (1) to examine the relationship between ACEs and development during early childhood (0 to 5 years) and (2) to examine protective effects of PPPs, in the presence and absence of ACEs. To quantify public health benefits of prevention, the study also aims (3) to estimate population attributable fractions (PAFs)[21–23] for developmental risks among very young children when eliminating ACEs or universally adopting PPPs.

METHODS

Study Sample

Study data came from the National Survey of Children's Health (NSCH) 2011/2012—a U.S. representative, cross-sectional, list-assisted random-digit-dial telephone survey. This survey was initiated, designed, led and sponsored by the Health Resources and Services Administration/Maternal and Child Health Bureau and administered by the National Center for Health Statistics under contract by Health Resources and Services Administration/Maternal and Child Health Bureau.[24] The authors obtained the dataset and codebook for the 2011–2012 NSCH from the Child and Adolescent Health Measurement Initiative Data Resource Center for Child and Adolescent Health (www.childhealthdata.org; also sponsored by Health Resources and Services Administration/Maternal and Child Health Bureau). Participating parents responded to questions about a single randomly selected child. The current study included children aged 0–5 years to evaluate social–emotional skills, development, ACEs, and parenting practices (n=29,997; 31.4% of total NSCH sample). NSCH item wording for study variables appears in Appendix Table 1. The response rate for this survey was 23.0%.[24] Additional methodology details are available elsewhere.[25]

Measures

Parent-reported developmental concerns for children aged 4 months–5 years were elicited using an NSCH-version of the Parents' Evaluation of Developmental Status (PEDS). The clinical PEDS is a standardized, screening instrument assessing parental concerns about developmental delay of children aged <8 years.[26] The NSCH-version includes nine questions from the clinical PEDS but omits all open-ended comments. Comparable with past work,[19,20,27,28] this study uses the NSCH codebook criteria for PEDS scoring to create a binary indicator for developmental delay risk (DDR) that differentiates low or no risk from moderate or high risk.

The NSCH 2011/2012 included flourishing items developed by a subgroup of the Child and Adolescent Health Measurement Initiative–led, Technical Expert Panel that set forth a framework, domains, and candidate items from which a condensed set was later selected after vetting combined input from public commentary and subject matter experts.[27,29,30] Although the construct is multifaceted,[31,32] the authors of this article contend the NSCH flourishing items for young children (aged 6 months–5 years) primarily assess expected positive health outcomes linked to essential social–emotional skills. Three items address content areas that strongly overlap with other social–emotional assessments for this age group (e.g., Ages and Stages Questionnaire–Social-Emotional[33]) and are conceptually linked to (1) caregiver-child attachment ("tender/affectionate"), (2) self-regulation and resiliency ("bounces back"), and (3) positive affect ("laughs a lot").[34] The fourth item assesses child's aspiration level ("interest/curiosity in learning new things") and closely maps to social–emotional learning skills which are conceptually linked to the Openness to Experiences personality factor.[35] Following similar scoring routines for the older-child flourishing items,[36–39] responses to questions are dichotomized into 1 for sometimes/rarely/never and 0 for always/usually. Summed scores are collapsed into a binary, social–emotional deficit (SED) outcome which differentiates scores above zero (i.e., any sometimes/rarely/never response) and at zero (i.e., all rated always/usually). Because few have used younger-age flourishing items, the Appendix describes psychometric analyses that demonstrate a single factor captures inter-item correlations reasonably well at an adequate level of internal reliability and that sensitivities and specificities for SED are, to varying degrees, comparable to those of the clinical PEDS.[40,41]

The NSCH 2011/2012 includes nine items addressing a child's lifetime experience with the following adversities: (1) hard to get by on current income, (2) divorce/separation of parent, (3) lived with someone with alcohol or drug problem, (4) victim or witnessed neighborhood violence, (5) lived with someone who was mentally ill or suicidal family member, (6) witnessed domestic violence, (7) parent served time in jail, (8) treated or judged unfairly because of race/ethnicity, and (9) death of parent. Item 1 is recoded as binary (collapsing *very* and *somewhat often* categories) to match the other item scales, and ACE counts are categorized into four levels: 0, 1, 2-3, and ≥4. The NSCH-ACE items have been studied extensively, and support exists for cumulative score usage.[42]

Respondents reported the number of days in the past week when caregivers engage the child in reading stories, storytelling/singing, eating meals together, playing with similar-age children (playing with peer), and family outings. Caregivers also provide the number of hours or minutes the child spends watching TV. Adapting previous scoring procedures,[19,20] a PPP binary indicator is constructed for each activity and operationalized as positive whenever the frequency of the first five activities is >3 days (more than half a week) and whenever TV watching is ≤2 hours. All indicators were summed to produce a PPP count variable that mimicked ACEs score construction. Items selected represent behaviors all parents of young children could practice daily. This set partially overlaps a 2007 NSCH home environment measure that excluded peer play and family outings and included items not assessing daily participation (smoking status; breastfeeding history).[43]

Characteristics of children (sex, age, race/ethnicity) and household (highest education level, income) appear in statistical models as control variables. Race/ethnicity is categorized as non-Hispanic white, non-Hispanic black, Hispanic, or other race/multi-race. Education is coded as more than high school, high school graduate, and less than high school, and household income is categorized as below federal poverty level (FPL), 100%−199% FPL, 200%−399% FPL, or ≥400% FPL. Unfortunately, sex of surveyed caregiver is not available; however, NSCH documentation states 69% of respondents are female guardians, 24% male guardians, and 5% grandparents.

Statistical Analysis

Population proportions for all variables are estimated for the full sample as are prevalences of individual ACEs and PPPs among children aged 0−2 and 3−5 years. Hierarchical regression analysis (not to be confused with Hierarchical Models[44,45]) is used to quantify effects of ACEs and PPPs on social−emotional deficits (SEDs) and developmental delay risks (DDRs) and evaluate potential confounding. This multiple logistic regression procedure sequentially introduced variable sets starting with an unadjusted ACEs model (Model 1), then adding demographic controls (Model 2), and finally adding PPPs (Model 3). An alternate second model (Model 2b), which replaced ACEs with PPPs, was also run to compare PPP effects with (Model 3) and without (Model 2b) ACEs adjustments. PAFs[21] represent the predicted proportional reduction in cases (e.g., children with DDR) when either risk factor is eliminated (e.g., reducing ACEs) or protective factors are elevated (e.g., increasing PPPs). Confounder-adjusted PAF results are presented for ideal alternatives where either all six PPPs are adopted or all ACEs are eliminated. (The PAF formula is in Appendix Table 4.) Analyses adjust for complex survey design variables (sampling weights, clusters, strata) using SVY procedures of Stata, version 14.1.[46] R, version 3.5.0 is used to produce figures.[47] Analyses were performed in 2017 and 2018. The University of Oklahoma Health Sciences Center IRB reviewed and approved this study.

RESULTS

Table 1 provides variable proportions for all children and indicates more than one third (36.7%) experience at least 1 ACE, most (89.2%) experience ≥3 PPPs, and roughly one quarter meet study criteria for SED (26.7%) and DDR (26.2%). Income hardship is the most frequent ACE reported (Table 2) with comparable prevalence (24.5% and 26.1%, respectively) in strata of children aged 0−2 and 3−5 years. All other ACEs affect <15% of the sample but are 2−3 times more frequent in the older age group. For younger children, the most frequently endorsed PPPs are limited TV watching (87.9%), family meal (84.4%), and storytelling/singing (83.9%). Family meals were the most popular practice among older children (83.8%), and except for family outings (51.7%), the other PPPs were also highly prevalent (≅ ≥75%).

The correlation between ACEs and PPPs was significant but small ($r = -0.07$, $p<0.001$) and would not typically signal severe confounding. The smallest raw frequency for any ACE by PPP combination was 72; 85% of combinations involve ≥200 children. The joint distribution is characterized in Appendix Figure 1 and Appendix Table 2. Table 3 shows the effects of ACEs and PPPs on SED and DDR. ACEs OR, comparing 1+ ACE categories to zero ACEs, displays a significant positive gradient with SED and DDR (Model 1). All but two ORs, the 2−3 ACEs effect for SED (p=0.39) and the 1 ACE effect for DDR (p=0.051), remain significant after adjusting for demographic covariates and PPPs in Model 3. The ORs of Model 3 increase from 1.10 to 1.36 for SED and from 1.17 to 2.04 for DDR. PPPs show significant protective effects for both outcomes after controlling for ACEs. Relative to the lowest PPP category (count <3), those providing all PPPs were attributed half the odds of meeting criteria for SED (OR=0.49) or DDR (OR=0.53). Finally, inclusion of interaction terms between ACEs X PPPs results in, at best, weak evidence for effect modification. None of the simple effects for ACE group differences in PPP trend reach statistical significance (all p>0.10), but there is a visible difference in the DDR prediction curve for the 4+ ACEs group. This difference suggested little or no protective PPP advantage for this outcome and may be underpowered because of low numbers of 4+ ACEs participants (Appendix Figures 2 and 3). Per recommendations of recent NSCH work,[42] analyses

Table 1. Description of Child and Household

Characteristics	Unweighted,[a] *n* (%)	Weighted, % (95% CI)
Child's characteristics		
Age, years, mean (SD/SE)	2.55 (1.7)	2.53 (0.02) / (2.48, 2.57)
Sex		
Male	15,233 (50.8)	51.0 (49.8, 52.3)
Female	14,742 (49.1)	49.0 (47.7, 50.2)
Race		
White, non-Hispanic	18,228 (62.3)	50.1 (48.8, 51.3)
Hispanic	4,609 (15.8)	26.4 (25.2, 27.7)
Black, non-Hispanic	2,698 (9.2)	12.2 (11.4, 13.0)
Other, multirace	3,734 (12.8)	11.4 (10.6, 12.2)
Household characteristics		
Highest education in household		
> High school	22,995 (78.1)	67.7 (66.4, 68.9)
High school graduate	4,584 (15.6)	20.5 (19.4, 21.6)
< High school	1,863 (6.3)	11.8 (10.9, 12.9)
Household income		
≥400% FPL	9,875 (32.9)	25.3 (24.3, 26.3)
200%–399% FPL	8,595 (28.7)	26.8 (25.7, 27.9)
100%–199% FPL	5,734 (19.1)	21.8 (20.7, 22.8)
0–99% FPL	5,793 (19.3)	26.1 (25.0, 27.3)
PPPs		
PPP counts		
0–2	2,420 (8.1)	10.8 (9.9, 11.6)
3	3,983 (13.3)	15.3 (14.4, 16.3)
4	7,553 (25.2)	25.2 (24.2, 26.3)
5	10,134 (33.8)	31.4 (30.3, 32.6)
6	5,907 (19.7)	17.2 (16.4, 18.1)
ACEs		
ACE score		
0	19,810 (66.8)	63.3 (62.1, 64.6)
1	6,351 (21.4)	24.1 (23.0, 25.3)
2–3	2,676 (9.0)	9.9 (9.2, 10.7)
≥4	804 (2.7)	2.6 (2.3, 3.0)
Social–emotional skill and general development		
Social–emotional deficit		
No	21,413 (77.6)	73.3 (72.1, 74.5)
Yes	6,199 (22.5)	26.7 (25.5, 27.9)
Developmental delay risk		
No/Low risk	21,722 (76.1)	73.8 (72.7, 75.0)
Moderate/High risk	6,818 (23.9)	26.2 (25.0, 27.3)

Note: Weighted % was calculated using design variables (sampling weights and strata indicators).
[a]*n*=29,997.
ACE, adverse childhood experience; FPL, federal poverty level; PPP, protective parenting practice.

were repeated using a new ACE measure that dropped the income hardship item. As shown in Appendix Table 3, this change does not affect overall model conclusions (and ACE X PPP interactions remain nonsignificant, $p>0.08$) but does result in lower ACEs effects.

It is worth comparing ACEs effects of Model 2 (ACEs and covariates) and Model 3 (ACEs, PPPs, and covariates) to evaluate the impact of a parenting confounder. Conversely, comparing PPP main effects in Model 2b (PPPs and covariates) and Model 3 (ACEs, PPPs, and

Table 2. Proportions of Adverse Childhood Experiences (ACEs) and Positive Parenting Practices (PPPs) Among Young Children

Variable	Aged 0–2 years, Weighted % (95% CI)	Aged 3–5 years, Weighted % (95% CI)
Childhood adversity experiences		
Hard to get by on current income	24.5 (22.9, 26.1)	26.1 (24.6, 27.8)
Parent divorced or separated	5.4 (4.6, 6.2)	14.0 (12.8, 15.4)
Lived with someone with drug or alcohol problem	3.5 (3.0, 4.2)	7.4 (6.5, 8.4)
Witnessed or was victim of neighborhood violence	1.4 (1.1, 1.9)	4.0 (3.4, 4.6)
Lived with someone who was mentally ill or suicidal	3.9 (3.2, 4.6)	7.1 (6.3, 8.0)
Witnessed domestic violence	2.2 (1.8, 2.7)	5.8 (5.0, 6.8)
Parent served time in jail	2.9 (2.4, 3.6)	5.9 (5.2, 6.7)
Targeted or judged unfairly due to race/ethnicity	0.6 (0.3, 1.2)	1.2 (0.9, 1.6)
Death of parent	0.6 (0.3, 1.2)	1.1 (0.9, 1.5)
Positive parenting practices (≥4 days/week)		
Reading a book	65.7 (63.9, 67.5)	77.5 (75.9, 79.0)
Storytelling/Singing	83.9 (82.3, 85.3)	74.9 (73.3, 76.4)
Playing with peer	39.4 (37.6, 41.2)	75.1 (73.5, 76.5)
Family outing	52.9 (51.0, 54.7)	51.7 (49.9, 53.4)
Family meal	84.4 (83.0, 85.7)	83.8 (82.4, 85.1)
TV watching (≤2 hours/day)	87.9 (86.7, 89.0)	76.9 (75.4, 78.3)

Note: Weighted % was calculated using design variables (sampling weights and strata indicators).

covariates) allows for evaluation of ACEs confounding. Figure 1 provides a plot of predicted probabilities from Models 2, 2b, and 3 for this purpose. The ACE and PPP absolute risk differences do not change much in Model 3 compared with Models 2 and 2b, which suggests little confounding of either effect. Notably, when comparing 0-2 PPP and 6 PPP families who also report zero ACEs, models predicted an 11.6% and 10.6% reduction in SED and DDR (fixing control covariates at their mean or mode). This same comparison among families with 4+ ACEs reveals risk reductions of 13.6% and 14.4%, respectively. Flipping the scenario and comparing zero ACE and 4+ ACE families with 6 reported PPPs, risk reductions of 4.4% (SED) and 12.4% (DDR) were predicted. This same ACE comparison among 0-2 PPP families results in 6.4% and 16.1% risk reductions. When contrasting these simple effects across models, absolute risk reductions for PPP were similar for both outcomes, whereas extreme ACE differences produced greater risk reduction for the DDR outcome.

Under the condition that all families provide all 6 PPPs, the estimated PAFs for SED and DDR are 17.3% and 13.9%, which represent reductions of 4.5% and 3.6% in risk prevalence. This translates to an outcome reversal/benefit (i.e., moving from at risk to not at risk) for roughly 1.1 million children aged <6 years at risk for SED and 0.9 million children at risk for DDR nationwide (Appendix Table 4). Under the condition that all families have zero ACEs, PAFs for SED and DDR are 4.5% and 7.2%, which infer prevalence reductions of 1.2% and 1.9%. Among U.S. children aged <6 years, this equates to an SED reversal/benefit for ≥282,000 children and a DDR reversal/benefit for ≥454,000 children.

Surprisingly, the full SED model predicted higher probability of risk for families reporting low PPPs (0-2) and zero ACEs than for families reporting all 6 PPPs and 4+ ACEs (27.1% vs 19.9%). Similarly, Model 3 for DDR predicted comparable risks for these types of families (27.4% vs 29.2%). Ergo, in some instances, absence of positive parenting among the lowest ACE families can be viewed as roughly equivalent to the impact of 4+ ACEs.

DISCUSSION

This study finds that, before the age of 6 years and as early as 4 months, accumulated ACEs already manifest signs of negative impact on social–emotional skills and general development. More than one third of children aged less than 6 years had already experienced at least one of nine NSCH adversities. Given ACEs prevalence and associated long-term societal costs,[48] the increased attention and importance placed on childhood adversities seems well justified.

Fortunately, PPPs appear to mitigate negative effects of adversities on these same outcomes and over this same period of early development. The evidence presented suggests the absence of PPPs can be viewed, itself, as another adversity that at the extremes is equivalent to the addition of four or more ACE score units. This finding, coupled with the lack of evidence for effect modification, seems

Table 3. Effects of Adverse Childhood Experiences (ACEs) and Positive Parenting Practices (PPPs) on Social–Emotional Deficits and Developmental Delay Risks

Variable	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 2b, OR (95% CI)	Model 3, OR (95% CI)
Social–emotional deficits				
ACE score				
ref: 0				
1	**1.52 (1.31, 1.77)**	**1.19 (1.01, 1.40)**	—	**1.18 (1.00, 1.39)**
2–3	**1.60 (1.32, 1.94)**	1.11 (0.90, 1.38)	—	1.10 (0.89, 1.36)
≥4	**1.82 (1.37, 2.42)**	**1.35 (1.01, 1.80)**	—	**1.36 (1.02, 1.81)**
Covariates				
Age, years	—	**1.08 (1.04, 1.12)**	**1.09 (1.05, 1.13)**	**1.09 (1.05, 1.13)**
Sex (ref: female)				
Male	—	**1.25 (1.10, 1.42)**	**1.25 (1.10, 1.42)**	**1.24 (1.09, 1.42)**
Race (ref: white, non-Hispanic)				
Hispanic	—	1.07 (0.89, 1.29)	0.98 (0.81, 1.19)	0.99 (0.82, 1.20)
Black, non-Hispanic	—	**1.77 (1.48, 2.11)**	**1.65 (1.38, 1.97)**	**1.66 (1.38, 1.98)**
Other, multiracial	—	**1.60 (1.31, 1.96)**	**1.50 (1.23, 1.84)**	**1.51 (1.24, 1.85)**
Parental education (ref: >high school)				
High school graduate	—	**1.34 (1.13, 1.59)**	**1.27 (1.07, 1.51)**	**1.27 (1.07, 1.50)**
< High school	—	**1.70 (1.33, 2.18)**	**1.53 (1.18, 1.98)**	**1.54 (1.19, 1.99)**
Poverty status (ref: >400% FPL)				
200%–399% FPL	—	1.17 (0.97, 1.40)	1.14 (0.95, 1.37)	1.12 (0.93, 1.34)
100%–199% FPL	—	**1.46 (1.19, 1.79)**	**1.45 (1.20, 1.77)**	**1.39 (1.13, 1.70)**
0–99% FPL	—	**2.13 (1.71, 2.64)**	**2.11 (1.73, 2.59)**	**1.98 (1.60, 2.45)**
No. of parenting practices (ref: 0–2)				
3	—	—	**0.74 (0.57, 0.97)**	**0.74 (0.57, 0.97)**
4	—	—	**0.70 (0.55, 0.90)**	**0.70 (0.55, 0.90)**
5	—	—	**0.52 (0.41, 0.67)**	**0.53 (0.41, 0.67)**
6	—	—	**0.49 (0.37, 0.64)**	**0.49 (0.37, 0.65)**
Developmental delay risks				
ACE score (ref: 0)				
1	**1.41 (1.22, 1.63)**	**1.18 (1.01, 1.37)**	—	1.17 (0.99, 1.36)
2–3	**1.92 (1.58, 2.33)**	**1.44 (1.16, 1.78)**	—	**1.42 (1.15, 1.76)**
≥4	**2.64 (1.99, 3.51)**	**2.01 (1.48, 2.73)**	—	**2.04 (1.49, 2.80)**
Covariates				
Age, years	—	**1.20 (1.16, 1.25)**	**1.23 (1.19, 1.28)**	**1.22 (1.17, 1.26)**
Sex (ref: female)				
Male	—	**1.43 (1.26, 1.62)**	**1.43 (1.26, 1.62)**	**1.43 (1.26, 1.62)**
Race (ref: white, non-Hispanic)				
Hispanic	—	**1.40 (1.18, 1.67)**	**1.27 (1.07, 1.51)**	**1.30 (1.09, 1.54)**
Black, non-Hispanic	—	**1.31 (1.09, 1.58)**	**1.23 (1.02, 1.48)**	**1.23 (1.02, 1.48)**
Other, multiracial	—	**1.54 (1.27, 1.87)**	**1.45 (1.19, 1.76)**	**1.45 (1.19, 1.77)**
Parental education (ref: > High school)				
High school graduate	—	1.12 (0.94, 1.33)	1.06 (0.89, 1.26)	1.06 (0.89, 1.26)
< High school	—	1.48 (1.17, 1.87)	**1.30 (1.03, 1.65)**	**1.33 (1.05, 1.69)**
Poverty status (ref: >400% FPL)				
200%–399% FPL	—	0.91 (0.77, 1.09)	0.92 (0.77, 1.10)	0.88 (0.73, 1.05)
100%–199% FPL	—	1.06 (0.87, 1.28)	1.10 (0.91, 1.33)	1.00 (0.82, 1.22)
0–99% FPL	—	**1.39 (1.12, 1.73)**	**1.49 (1.21, 1.83)**	**1.30 (1.04, 1.61)**
No. of parenting practices (ref: 0–2)				
3	—	—	0.87 (0.67, 1.14)	0.87 (0.67, 1.13)
4	—	—	**0.65 (0.51, 0.83)**	**0.65 (0.51, 0.82)**

(*continued on next page*)

Table 3. Effects of Adverse Childhood Experiences (ACEs) and Positive Parenting Practices (PPPs) on Social–Emotional Deficits and Developmental Delay Risks (*continued*)

Variable	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 2b, OR (95% CI)	Model 3, OR (95% CI)
5	—	—	**0.55 (0.43, 0.70)**	**0.55 (0.43, 0.69)**
6	—	—	**0.54 (0.41, 0.69)**	**0.53 (0.41, 0.69)**

Note: Boldface indicates statistical significance ($p<0.05$); Model 1: ACEs, Model 2: ACEs + covariates, Model 2b: PPPs + covariates, Model 3: ACEs + PPPs + covariates; Ref = referent value for OR calculations.
ACE, Adverse childhood experience; FPL, federal poverty level; PPP, positive parenting practices.

promising for prevention professionals. As the recent National Academy of Sciences, Engineering, and Medicine report *Parenting Matters: Supporting Parents of Children Ages 0–8*[18] noted, "High-quality 'serve and return' parenting skills do not always develop spontaneously," especially among families living with adversities. So to promote PPPs, policies that strengthen and fund evidence-based parent training (e.g., home visiting) and parent resource (e.g., Reach Out and Read) programs ought to remain at the forefront of early childhood prevention efforts.

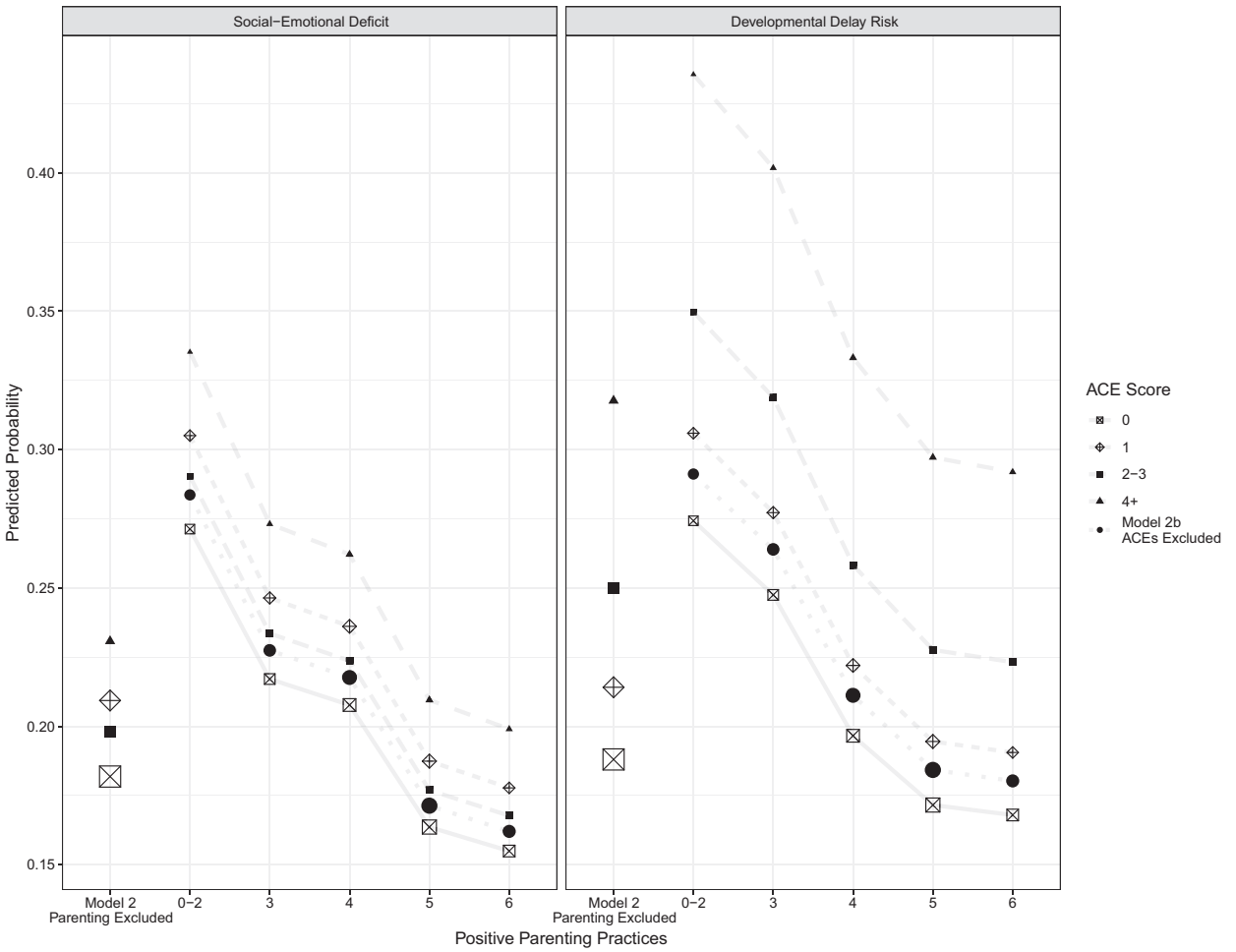

Figure 1. Predicted probability comparisons across models.
Note: Symbols are proportional to population size. Solid circles reflect (Model 2b) predicted probabilities WITHOUT adjustment for ACEs. Disconnected dots reflect (Model 2) predicted probabilities WITHOUT adjustment for positive parenting. Predictions were produced with covariates fixed to modal (male, white not Hispanic, household educated beyond high school) or mean (2.53 years) values.
ACE, adverse childhood experience.

The population impacts of PPPs are particularly worth emphasizing because promotion of PPPs can be a simple, feasible, and universal intervention. If studied relationships are (directly or indirectly) causal, adoption of all PPPs could reduce developmental risks for nearly 1 million children aged less than 6 years nationwide. Practitioners and policy makers would be wise to pay equitable attention to both ACEs and the absence of positive parenting during early childhood. Promotion of PPPs, not only as a buffer to adversity but also as a generally effective intervention for lowering risks of social–emotional and developmental disabilities, seems to be a worthy public health message that could be spread in all early childhood service settings.

Limitations

Given the cross-sectional nature of the NSCH, reverse or reciprocal causation (where development induces ACEs or PPPs) cannot be ruled out, and follow-up longitudinal research examining mechanisms of change over time is warranted. For the sake of interpretive clarity, simple summed scores of dichotomized items were constructed for key variables, and these changes could distort variable relationships. To address this concern, sensitivity analyses without these coarsened scoring approaches were performed, and the results largely replicated the general pattern of findings presented. Sensitivity analyses also explored including individual PPP items (instead of an aggregate score) and found no statistically significant difference in AORs, which supports a common summative PPP effect for these outcomes. (Results available by contacting corresponding author.) All key measures suffered from limited scope, minimal psychometric support, or both. Although PEDS is a clinically validated instrument,[40] the NSCH excluded direct assessment and open-ended questions about concerns, and these differences likely affect accuracy (i.e., lower sensitivity/specificity). Similarly, the PPP measure only addressed frequency of activities reported by a single caregiver (whose sex and relationship to child were unavailable), and thus excluded important aspects of interaction quality (e.g., caregiver warmth and responsiveness)[12] and details of multi-caregiver involvement (e.g., value of father engagement).[49] Although NSCH ACEs were expanded to include life-course stressors[50] and measurement validity support exists,[42] this measure likely underestimates adversity exposure as a result of social desirability bias and omission of other important adversities (e.g., child maltreatment).[51] Thus, for all measures used, further research should examine broader construct coverage and differential impact of construct facets (e.g., PPP quality versus quantity, deprivation versus threat[52] adversities). Finally, there was weak evidence of ACEs moderation of the PPP effect on DDR, which deserves closer inspection among a larger sample of high ACEs children.

CONCLUSIONS

ACEs evidence noteworthy negative effects on social–emotional skill and general development in early childhood; however, PPPs exhibit independent and in some situations (social–emotional skills) larger protective effects. These data support and champion sustaining and furthering interventions that promote PPPs at home for all children, but especially for families experiencing high levels of adversity.

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SUPPLEMENTAL MATERIAL

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