Positive Childhood Experiences and Adult Health Outcomes

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abstract

OBJECTIVES: Adverse childhood experiences (ACEs) can drive poor adult mental and physical health, but the impact of early life protective factors should not be overlooked. Positive childhood experiences (PCEs) measures quantify protective factors, but evidence is lacking on their link to health conditions independent of ACEs in nationally representative studies. This study examines associations between composite PCE score and adult health, adjusting for ACEs.

METHODS: The most recent 2017 wave of the Panel Study of Income Dynamics, a nationally representative study and its 2014 Childhood Retrospective Circumstances supplement ($n = 7496$) collected adult health outcomes, PCEs, and ACEs. Multivariable logistic regression assessed associations between PCE score and adult self-rated health or condition diagnosis, with and without ACEs adjustment. Cox proportional hazards models examined relationships between PCEs, ACEs, and annual risk of diagnosis.

RESULTS: Adults with 5 to 6 PCEs had 75% (95% confidence interval [CI], 0.58–0.93) of the risk of fair/poor overall health and 74% of the risk of any psychiatric diagnosis (CI, 0.59–0.89) compared with those with 0 to 2 PCEs, independent of ACEs. In survival analysis models accounting for PCEs and ACEs, reporting 5 to 6 PCEs was associated with a 16% lower annual hazard of developing any adult psychiatric or physical condition (hazard ratio, 0.84; CI, 0.75–0.94); reporting 3+ ACEs was associated with a 42% higher annual hazard (CI, 1.27–1.59).

CONCLUSIONS: PCEs were independently associated with lower risks of fair or poor adult health, adult mental health problems, and developing any physical or mental health condition at any given age after adjusting for ACEs.

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WHAT'S KNOWN ON THIS SUBJECT: Adverse childhood experiences (ACEs) have been linked to worse adult health outcomes. Positive childhood experiences (PCEs) likely protect against adult health risks, but evidence is lacking on how ACEs and PCEs jointly influence adult health outcomes, especially in nationally representative studies.

WHAT THIS STUDY ADDS: Independent of ACEs, PCEs are associated with better self-reported adult health and lower risk of mental and physical conditions, especially among those with fewer ACEs. Higher PCE scores are also associated with lower annual risk of adult disease diagnosis.

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Adverse childhood experiences (ACEs) are stressful and potentially traumatic events and family challenges occurring before adulthood.[1] Ample evidence links ACEs to increased risk of common adult diseases, including heart disease, lung disease, and cancer.[2–8] Medical professional organizations, health systems, and a growing number of policymakers are recognizing that ACEs drive excess morbidity and mortality at a population level.[9–13] Yet the ACEs framework has been critiqued for focusing on risks without accounting for protective childhood experiences and resilience factors that may promote health and buffer long-term health effects of early adversity.[14–17]

Published evidence suggests positive childhood experiences (PCEs), characterized by the Centers for Disease Control and Prevention as "safe, stable, nurturing relationships and environments" before adulthood, are linked to better adult health.[18–29] Common PCE domains, including positive parent–child relationships, social engagement in school, and neighborhood social cohesion, have been linked to better adult self-reported well-being, mental health, and overall health.[22–27,30–34] However, these studies have been limited by analytic models omitting ACEs or other measures of early adversity, nonnationally representative samples, examination of single PCE domains rather than composite scores, and an underemphasis on physical health, focusing instead largely on mental health. Recent studies examining the association between PCEs and adult health outcomes after accounting for ACEs have found that PCEs are associated with lower risk of poor adolescent and adult mental health and greater adult flourishing.[33,35,36] However, whether PCE scores are associated with adult health conditions and annual risk of diagnosis independent of ACEs has not been explored in a national sample, and no large studies have provided evidence on whether ACEs and PCEs interact in their effects on adult health outcomes.

Thus, in this study, using a nationally representative population-based survey, we examine whether PCEs are associated with overall adult health status and risk of mental and/or physical health conditions cumulatively throughout adulthood, as well as annually in any given year of adulthood, with and without ACEs and ACE-by-PCE interactions.[37]

METHODS

Study Sample

We used data from the 2017 wave of the Panel Study of Income Dynamics' (PSID's, https://psidonline.isr.umich.edu/) main survey, the world's longest-running national longitudinal household panel survey begun in 1968, which interviewed adult participants and, if eligible, their spouse or partner for information on health status, health conditions, education, income, health insurance, family structure, and demographic characteristics.[37] Additionally, ACEs and PCEs were retrospectively assessed via the Childhood Retrospective Circumstances Study (CRCS) supplement, which collected data from eligible English-speaking adults who had participated in the previous 2013 main survey, well before the 2017 PSID health outcomes were collected.[38] Eight thousand and seventy-two individuals completed the CRCS via Web-based or mailed survey between May 2014 and January 2015, for an unweighted response rate of 62% (weighted response rate 67%), similar to Web-based supplements in other national panel studies.[38] Of those CRCS participants, 7496 (93%) had complete data.

Independent Variable

Positive Childhood Experiences (PCEs) Score

The PCEs composite score was constructed with CRCS survey items selected for their similarity to the previously published Benevolent Childhood Experiences Scale and the Children and Youth Resilience Measure scales created to measure childhood experiences associated with improved mental health outcomes (Supplemental Table 4).[33,39,40] The CRCS survey retrospectively assessed positive childhood experiences in domains including their (1) comfort confiding in at least 1 parent about things that were bothering them, (2) perception that at east 1 parent understood their problems, (3) rating of their relationship with their parents, (4) happiness at school, (5) comfort with friends, and (6) perception of their neighbors' helpfulness. Each item was first dichotomized, then summed and binned into categories (0–2, 3–4, or 5–6 PCEs) for an overall PCE score (Supplemental Table 10) with a similar distribution of scores similar to Bethell et al.[33]

Adverse Childhood Experiences

Our previously published ACE score[41,42] used CRCS data to construct binary indicators of each of the following before age 18 years: parent mental illness, parent substance use disorder, parent intimate partner violence, parental divorce or separation, deceased or absent parent, physical abuse, sexual abuse, emotional abuse, and neglect. These were summed and binned into 3 dose-related categories (0, 1–2, and 3 or more ACEs) similar to previous studies.[43,44]

Outcomes: Mental and Physical Health

Fair or Poor Self-Reported Health Status

Participants rated their or their spouse/partner's health as "excellent," "very good," "good," "fair," or "poor," which was dichotomized to fair/poor versus excellent/very good/good.[45]

Health Conditions

Mental health diagnoses were measured as self-report of a physician or other clinician telling the respondent they had a diagnosis of (1) any psychiatric problem, (2) depression, or (3) anxiety (Supplemental Table 5).

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Physical health diagnoses were similarly measured as report of a diagnosis of hypertension, diabetes, coronary heart disease or heart failure, heart attack, stroke, lung disease, asthma, cancer, and/or arthritis. These diagnoses were also combined into a composite indicator of any physical condition.

Age at Diagnosis

We used participants' report of their age at the time of diagnosis. We also constructed a composite age at first diagnosis of any physical health condition, using the earliest age at diagnosis for the following conditions: hypertension, diabetes, coronary heart disease, stroke, heart attack, lung disease, arthritis, cancer, and asthma (if diagnosed in adulthood). Similarly, we constructed a composite age at first diagnosis of any physical or psychiatric health condition, using the earliest age at diagnosis of any condition (Supplemental Table 6).

Statistical Analysis

Health Condition Diagnosis

We used doubly robust inverse probability-weighted regression-adjusted models with covariate adjustment to measure the association between PCE score and adult health outcomes.[46] The logistic regression model estimated the predicted risk of developing each condition for 0 to 2, 3 to 4, and 5 to 6 PCE groups, using propensity weights according to predicted probabilities of being in a particular PCE score category on the basis of age, sex, race/ethnicity, education, household income (as a percentage of federal poverty level), and health insurance (including uninsured, employer-sponsored, privately purchased, Medicare/Medigap/supplemental, Medicaid, and veterans and other government coverage). The nonlinear combinations of estimators command was used postestimation (Stata, nonlinear combinations of estimators) to convert odds ratios to relative risk ratios.[47] We added the 3-category ACE score to control for ACEs, along with the covariates used for propensity weights listed above.

All models were weighted to accommodate the complex survey design, achieve population representation, and adjust for nonresponse using the CRCS survey base weights in both the propensity score and outcome models.[48] All estimates employed survey-robust standard errors.

Interaction Between PCEs and ACEs

Multivariable logistic regression models with a PCE-by-ACE interaction term were used to examine how associations between PCEs and adult health outcomes varied according to an individual's ACE burden, while also controlling for sociodemographic covariates listed above. The probability of the outcome at each PCE-by-ACE combination was estimated using the delta method (Stata, margins program), followed by calculation of absolute risk increases compared with the 0 ACEs/5 to 6 PCEs reference group.

Survival Analysis: Annual Diagnosis Risk

Survival analyses with Cox proportional hazards regression models were used to examine the relationships between PCE score and annual risk of diagnosis at a given age for 3 outcomes: any condition, any psychiatric condition, and any physical condition. We dichotomized each outcome into whether an individual reported a diagnosis at the time of the survey, using their age at diagnosis as the "time to event." To focus on adult-onset conditions, we left-censored individuals who reported childhood diagnoses at 18 years old. Individuals who had not reported a diagnosis at the time of survey were censored using their age. We also controlled for age, sex, race/ethnicity, education, health insurance, income, and ACE count.

Sensitivity Analyses

Logistic regression models, without inverse probability-weighted regression-adjusted models, (generalized linear models [Stata, generalized linear models family (binomial) link (log)]) results matched the results from our primary approach, which was opted for because of greater ease of model convergence and estimating relative risks. ACEs were incorporated for models of outcomes with sufficient sample size to satisfy the treatment overlap assumption. Other models varied covariate specifications for parental education, marital status, and income. Another alternate model used adult health outcomes from the 2013 PSID wave. All these alternate models gave substantially similar results.

Analyses were carried out in 2019 to 2021 using Stata, version 15 (StataCorp). The University of California, Los Angeles, institutional review board approved this study.

RESULTS

The study sample included 7496 adults (Table 1), of which 3841 (51.5%), 2467 (32.3%), and 118 (16.3%) reported 5 to 6 PCEs, 3 to 4, and 0 to 2 PCEs, respectively. Those with more PCEs were more often older, non-Hispanic white, and married, and had employer-sponsored or Medicare insurance, higher income, and more years of education.

PCEs, ACEs, and Adult Health Outcomes

Compared with those who reported 0 to 2 PCEs (Table 2, Supplemental Table 11), adults with 5 to 6 PCEs had a 34.6% lower risk of fair/poor self-rated health (adjusted risk ratio [aRR], 0.65; confidence interval [CI], 0.54–0.76), which was dampened to 24.6% (aRR, 0.75; CI, 0.58–0.93) after adjusting for ACEs.

Higher PCE count was associated with a lower risk of having of any psychiatric or physical condition (Table 2) after adjusting for sociodemographic characteristics.

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TABLE 1 Survey-Weighted Study Population Characteristics, Overall and by Number of PCEs

	Total	PCEs			P
		5–6 PCEs	3–4 PCEs	0–2 PCEs	
Sample size, *n* (%)	7496	3841 (51.5)	2467 (32.3)	1188 (16.3)	—
Age, mean (SE)	53.2 (0.23)	55.0 (0.33)	51.4 (0.40)	51.1 (0.57)	<.0001
Sex, female, %	52.9	53.1	48.2	61.6	<.0001
Race, %					.0003
White	79.6	80.9	78.7	77.2	
Hispanic	6.1	4.5	7.6	8.5	
Black	11.3	11.6	11.2	10.7	
Asian American/Pacific Islander	1.9	1.8	1.5	2.6	
Other	1.1	1.2	1.0	1.0	
Education, %					.0001
Less than high school	9.2	7.6	9.9	12.6	
High school	24.9	24.0	26.2	25.0	
Any college/vocational school	66.0	68.4	63.9	62.4	
Income, FPL, %					<.0001
<100%	6.8	5.0	7.7	10.5	
100%–199%	12.5	11.3	13.7	13.6	
200%–299%	14.6	14.1	15.1	15.3	
300%–399%	13.9	14.3	14.5	11.6	
>400%	52.3	55.3	49.1	49.1	
Health insurance, %					<.0001
Employer-sponsored	53.6	53.7	54.4	51.6	
Privately purchased	7.6	7.7	7.2	8.0	
Medicare	23.5	26.3	20.6	20.2	
Medicaid	6.2	4.6	7.1	9.6	
VA/Tricare	2.8	2.7	2.9	3.0	
Other insurance	0.2	0.1	0.3	0.0	
Uninsured	6.2	4.9	7.6	7.5	
No. of ACEs, %					<.0001
0	33.4	44.7	25.6	11.1	
1–2	45.6	44.1	49.5	42.5	
3+	21.0	11.2	24.9	46.4	

FPL, federal poverty level; VA, US Department of Veterans Affairs. —, not applicable.

Compared with 0 to 2 PCEs, those reporting 5 to 6 PCEs had a 9.8% lower risk of reporting any condition (aRR, 0.90; CI, 0.86–0.95) and a 7.7% lower risk after adjusting for ACEs (aRR, 0.92; CI, 0.86–0.99).

When examined separately, those reporting 3 to 4 and 5 to 6 PCEs had 21.8% and 43.2% lower risk of any psychiatric diagnosis, respectively, compared with 0 to 2 PCEs. In adjusted models including both PCEs and ACEs, adults with 5 to 6 PCEs had a 26.2% reduction in risk of any psychiatric condition (aRR, 0.74; CI, 0.59–0.89), and a 37.3% reduction in depression risk (aRR, 0.63; CI, 0.44–0.81).

A higher PCE score (Table 2) was associated with a small reduction in the risk of any physical condition (5–6 PCEs: aRR, 0.94; CI, 0.88–0.99), which was not significant after controlling for ACEs (aRR, 0.93; CI, 0.87–1.00). When examined individually, higher PCE scores were associated with lower risks of developing asthma (5–6 PCEs: aRR, 0.75, CI, 0.61–0.88) which remained significant after controlling for ACEs (aRR, 0.76, CI: 0.59–0.94). There were otherwise no statistically significant associations between PCE score and the risk of other individual conditions examined (Supplemental Table 9).

Interaction Between PCEs and ACEs Measures and Adult Health Outcomes

In our interaction analyses, the PCE–ACE interaction term was statistically significant for both having any physical or psychiatric condition and having any physical condition (Fig 1, Supplemental Table 7), indicating that the strength of association between PCEs and these outcomes varied according to ACE count. Specifically, among those who reported 0 ACEs, reporting 3 to 4 PCEs and 0 to 2 PCEs were associated with an absolute increase of 5.2 (CI, 1.9–13.8) and 15.2 percentage points (95% CI, 8.3–27.7), respectively, of reporting any physical or psychiatric diagnosis, compared with the risk among those reporting 5 to 6 PCEs. In contrast, among those with 3+ ACEs, the

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TABLE 2 Association Between PCE Score and Adult Self-Reported Health and Physical and Psychiatric Condition, Relative Risk (95% Confidence Interval)

Outcome	Model Specification for Childhood Experiences	PCEs, aRR (95% CI)			ACEs, aRR (95% CI)			Model Specification for Childhood Experiences
		5–6 PCEs	3–4 PCEs	0–2 PCEs (Ref)	0 ACEs (Ref)	1–2 ACEs	3+ ACEs	
Fair or poor health	PCEs only	0.65***	0.87	1.00	1.00	1.40***	1.74***	ACEs only
		(0.55–0.76)	(0.72–1.02)			(1.14–1.67)	(1.39–2.09)	
	ACEs + PCEs	0.75*	0.94	1.00	1.00	1.34***	1.69***	ACEs + PCEs
		(0.58–0.93)	(0.71–1.16)			(1.06–1.61)	(1.29–2.08)	
Any psychiatric or physical condition	PCEs only	0.90***	0.96	1.00	1.00	1.12***	1.25***	ACEs only
		(0.86–0.95)	(0.90–1.01)			(1.06–1.17)	(1.18–1.32)	
	ACEs + PCEs	0.92*	0.93	1.00	1.00	1.08***	1.21***	ACEs + PCEs
		(0.86–0.99)	(0.87–1.00)			(1.03–1.14)	(1.14–1.29)	
Any psychiatric condition	PCEs only	0.57***	0.78**	1.00	—	1.63***	2.38***	ACEs only
		(0.47–0.66)	(0.65–0.91)			(1.33–1.94)	(1.91–2.85)	
	ACEs + PCEs	0.74**	0.90	1.00	1.00	1.50***	1.90***	ACEs + PCEs
		(0.59–0.89)	(0.71–1.08)			(1.12–1.81)	(1.48–2.31)	
Any physical condition	PCEs only	0.94*	0.99	1.00	—	1.10***	1.22***	ACEs only
		(0.88–0.99)	(0.9–1.05)			(1.04–1.16)	(1.15–1.29)	
	ACEs + PCEs	0.93	0.96	1.00	1.00	1.07*	1.21***	ACEs + PCEs
		(0.87–1.00)	(0.89–1.03)			(1.00–1.13)	(1.13–1.29)	

Results from main analytic model shown are relative risks, with 95% confidence intervals, from postestimation using inverse probability weighting with regression adjustment (Stata tefffects inverse probability-weighted regression-adjusted models, pomean; postestimation using nonlinear combinations of estimators). Covariates in the treatment model included continuous age, sex, a 5-category race/ethnicity measure, educational attainment, health insurance, and income as measured by percentage of federal poverty level. Survey weights were included in both the treatment and outcome model to accommodate the PSID's complex survey design. Statistical significance at the 5% level is indicated: * $P < .05$; ** $P < .01$; *** $P < .001$. Ref, reference group.

change in absolute risk of reporting any physical or psychiatric condition did not differ significantly as PCE count increased (11.7% [CI 7.0–19.6] among those with 5–6 PCEs versus 18.0% [CI 13.5–24.0] for those with 3–4 PCEs or 15.7% [CI 11.2–22.1] for those with 0–2 PCEs). Similarly, the strength of association between PCEs and

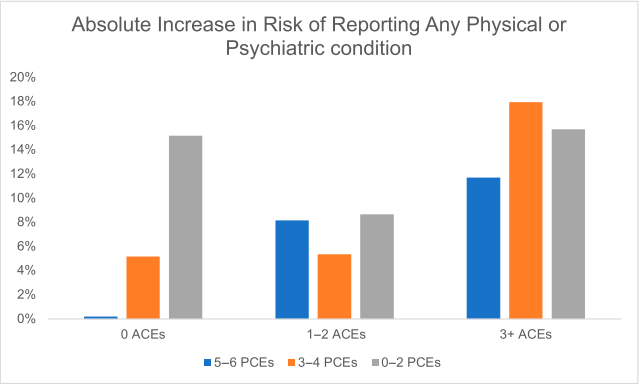

FIGURE 1
Absolute increase in risk of reporting any physical or psychiatric condition across ACEs and PCEs score (reference group: 5–6 PCEs/0 ACEs). Results from main analytic model shown are absolute risk increases from models with PCEs and ACEs scores interacted. Covariates in the treatment model included continuous age, sex, a 5-category race/ethnicity measure, educational attainment, health insurance, and income as measured by percentage of federal poverty level. Survey weights were included in both the treatment and outcome model to accommodate the PSID's complex survey design.

having any psychiatric condition did not vary by ACE burden (Supplemental Table 7).

Survival Analysis Using Age at Diagnosis: PCEs and ACEs

In unadjusted analyses, higher PCE scores were associated with lower likelihoods of being diagnosed with each of the following during a given year of adulthood: any psychiatric condition, any physical condition, and any psychiatric or physical condition (Table 3, Supplemental Table 8).

After adjusting for sociodemographic characteristics, reporting 5 to 6 PCEs remained associated with lower annual hazard of being diagnosed with any physical condition (hazard ratio [HR], 0.84; CI, 0.75–0.94) and any psychiatric or physical condition (HR, 0.78; CI, 0.70–0.87). The association between PCEs and age at diagnosis of any psychiatric condition was not statistically significant.

Upon controlling for ACEs, the hazard for reporting being diagnosed with any psychiatric or physical condition was lower (HR, 0.85; CI, 0.75–0.95) among those reporting 5 to 6 PCEs, but upon condition of subtype disaggregation, the associations between PCE score and the risk of developing any psychiatric condition or any physical condition were no longer statistically significant.

In contrast, reporting 3 or more ACEs was associated with a 35.1% greater hazard of reporting developing any physical condition (CI 1.200–1.521), 47.2% greater hazard of developing any psychiatric condition (CI 1.139–1.903),

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TABLE 3 Hazard Ratios of Reporting Any Psychiatric Condition, Any Physical Condition, or Either during Adulthood by PCE Score and ACE Score

	PCEs Score, HR (95% CI)			ACEs Score, HR (95% CI)		
	5–6 PCEs	3–4 PCEs	0–2 PCEs	0 ACEs	1–2 ACEs	3+ ACEs
Any physical condition						
PCE only (unadjusted)	0.79***	0.94	1.00	—	—	—
	(0.70–0.88)	(0.83–1.06)				
PCEs (adjusted)	0.84**	0.93	1.00	1.00	1.18*** (1.08–1.29)	1.54*** (1.38–1.72)
	(0.75–0.94)	(0.83–1.05)				
PCEs + ACEs (adjusted)	0.92	0.99	1.00	1.00	1.10*	1.35***
	(0.80–1.04)	(0.87–1.13)			(1.00–1.20)	(1.20–1.52)
Any psychiatric condition						
PCE only (unadjusted)	0.73**	0.83	1.00	—	—	—
	(0.58–0.92)	(0.66–1.03)				
PCE only (adjusted)	0.84	0.94	1.00	—	—	—
	(0.67–1.05)	(0.76–1.17)				
PCEs + ACEs (adjusted)	0.99	0.99	1.00	1.00	1.12	1.47**
	(0.77–1.27)	(0.79–1.25)			(0.89–1.42)	(1.14–1.90)
Any psychiatric or physical condition						
PCE only (unadjusted)	0.72***	0.87*	1.00	—	—	—
	(0.65–0.80)	(0.78–0.98)				
PCE OR ACE only (adjusted)	0.78***	0.87*	1.00	—	—	—
	(0.70–0.87)	(0.78–0.97)			(1.08–1.29)	(1.38–1.72)
PCEs + ACEs (adjusted)	0.85**	0.91	1.00	1.00	1.15***	1.42***
	(0.75–0.95)	(0.80–1.02)			(1.05–1.26)	(1.26–1.56)

Results shown are the HRs, using survey-weighted Cox proportional hazards regression models. Covariates in the treatment model included continuous age, sex, a 5-category race/ethnicity measure, educational attainment, health insurance, and income as measured by percentage of federal poverty level. Statistical significance is indicated at the 5% level: * $P < .05$; ** $P < .01$; *** $P < .001$. —, not applicable.

and a 41.5% greater hazard of developing any physical or psychiatric condition (CI 1.271–1.593) in a given year.

DISCUSSION

This is the first nationally representative study to demonstrate the relationship between PCEs and adult mental and physical health outcomes while accounting for ACEs. It is the first study to show that PCEs are not only independently associated with improved health status and reduced overall mental or physical health condition risk but also that the strength of this association varies with (ie, is statistically moderated by) an individual's ACE score and strongest when the burden of ACEs was small. When looking at mental and physical condition diagnoses separately, this study showed a dose-dependent relationship between PCEs and risk of psychiatric conditions after controlling for ACEs. Higher PCE scores were associated with a lower annual hazard of diagnosis in adulthood of a mental or physical health condition, even after controlling for ACEs, consistent with later onset and later diagnosis.

Our study adds to the body of literature linking greater PCEs to better mental health during adulthood. Although the magnitude of the relationship between higher PCE score and lower risk of mental illness does decrease after controlling for ACE burden, the association persists. One proposed mechanism that could explain this is the "stress-buffering" hypothesis that individuals exposed to PCEs are more resilient to health challenges and this can potentially counter the effects of ACEs.[49,50] Our finding that PCEs may be protective against poor adult self-reported health and mental health while controlling for ACEs is certainly consistent with this model, but we did not observe greater protective effects in those with greater ACE burden. Instead, our results suggest that PCEs offer mental health protective effects that largely operate independent of ACE burden, with a smaller additional impact at the margins through PCEs' moderating effects on ACE health associations.[33,34] This is in contrast to the findings from Bethell et al that those with the highest ACE burden experienced greater reductions from increased PCE scores in their risk of depression and poor mental health. There are many potential explanations for these different findings, including differences in how the outcomes were defined (clinician diagnoses that included anxiety in our study versus inclusion of a self-assessment of more poor than good mental health days without including anxiety by Bethell et al) and differences in study sample population (nationally representative versus Wisconsin adults).

The strength of relationship between adult physical health outcomes and PCE score differed depending on an individual's ACE burden in our study. Although greater PCEs were associated with a slight reduction in the risk of any physical

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diagnosis, this was not significant after controlling for ACEs overall. However, after allowing for this association to vary across different ACE counts, PCEs were most consistently associated with a reduction in the risk of having any diagnosis (physical or psychiatric) and any physical diagnosis among those with fewer ACEs.

Our study was not sufficiently powered to find significant relationships between PCEs and individual conditions, such as diabetes and cardiovascular disease. However, when these conditions were combined into a composite measure, there was a trend toward lower hazards and thus older age at diagnosis among those with more PCEs. Thus, it is possible that any differences in specific disease prevalence across PCE groups may not have had enough time or sample to manifest. Though we lacked statistical power to see a significant effect for many individual disease diagnoses, we did find that higher PCE score was associated with older age at diagnosis specifically for any physical diagnosis. This suggests that, assuming that age at diagnosis is a proxy for age at onset, higher PCE score may protect individuals exposed to ACEs from early onset of these physical illnesses. In contrast, we did not find an association between PCEs, ACEs, and age at diagnosis for any psychiatric diagnosis during adulthood, possibly because psychiatric conditions tend to develop during the late teenage years and early adulthood and, as such, there may be very little accumulation during later adulthood where our study had greatest resolution.

Our findings suggest that PCEs play a role in enhancing health resilience, promoting healthy outcomes while also protecting from poor mental and physical health conditions.[16,51,52] Previous studies have identified that positive parent–child relationships, school engagement, and neighborhood support, individual domains reflected in our composite PCE score, are critical resilience factors.[53,54] Just as ACEs can represent threats to the development of caregiving relationships, increasing an individual's allostatic load and increasing their risk of disease throughout their life course,[55,56] our study of PCEs suggests that social cohesion and supportive relationships can be protective. Indeed, other studies have found lower levels of epigenetic aging and lower biomarkers associated with chronic illness among adults who reported positive childhood social relationships, even in the setting of childhood adversity, across multiple life stages.[57–59] Future research should continue to examine the relationship between PCEs, ACEs, and adult health outcomes to guide the development of public health interventions that engage individuals, their families, and their communities to promote relational health.[21,60]

Our study used retrospective recall of ACEs and PCEs. To ameliorate potential recall bias, we used PCE and ACE measures that were reported 5 years before the reported health outcomes. Further, as in any observational study, unmeasured confounders, like many of our measured sociodemographic characteristics vary by PCE level, could have affected our findings, though we used doubly robust models to minimize confounding. The associations found cannot be interpreted as causative. Additionally, we used age at diagnosis as a proxy for age at onset of health condition; this may overestimate age at onset, particularly among those with poor access to health care.

CONCLUSIONS

This is the first national study to find an association between a composite PCE score and adult mental and physical health outcomes. Overall, our results suggest a dose-dependent buffering relationship between PCE score and risk of poor adult overall health and mental health conditions that persists after controlling for ACEs, and the relationship between PCEs and lower risks of any physical and mental health conditions varies by ACE burden. Interventions that promote PCEs may improve health across the life course.

ABBREVIATIONS

ACE: adverse childhood experience
aRR: adjusted risk ratio
CI: confidence interval
CRCS: Childhood Retrospective Circumstances Study
HR: hazard ratio
PCE: positive childhood experience
PSID: Panel Study of Income Dynamics

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