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Distinct Contributions of Adverse Childhood Experiences and Resilience Resources: A Cohort Analysis of Adult Physical and Mental Health

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Abstract

Although evidence is rapidly amassing as to the damaging potential of early life adversities on physical and mental health, as yet few investigations provide comparative snapshots of these patterns across adulthood. This population-based study addresses this gap, examining the relationship of adverse childhood experiences (ACEs) to physical and mental health within a representative sample ($n = 19,333$) of adults, comparing the prevalence and explanatory strength of ACEs among four birth cohorts spanning ages 18–79. This assessment accounts for demographic and socioeconomic factors, as well as both direct and moderating effects of resilience resources (social/emotional support, life satisfaction, and sleep quality). Findings demonstrate (1) increasing trends of reported ACEs across younger cohorts, including time period shifts such as more prevalent family incarceration, substance abuse, and divorce, (2) significant bivariate as well as independent associations of ACEs with poor health within every cohort, controlling for multiple covariates (increasing trends in older age for physical health), and (3) robust patterns wherein resilience resources moderated ACEs, indicating buffering pathways that sustained into old age. Theoretical and practice implications for health professionals are discussed.

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Keywords

adverse childhood experiences; mental health; physical health; adult health; cohort analysis

INTRODUCTION

Recent research is incrementally recognizing that early life conditions set the stage for an array of later health and functional outcomes. Several lines of work are contributing to an emerging appreciation of childhood as, at least partially, the roots of later well-being. Work within the child development arena is revealing the importance, for example, of shifting from single to multiple forms of maltreatment with evidence that polyvictimization poses exceptional risk to youth, with effects that persist into later life (Cyr et al., 2012; Finkelhor, Turner, Hamby, & Ormrod, 2011; Hooven, Nurius, Logan-Greene, & Thompson, 2012). The CDC-sponsored research on adverse childhood experiences (ACEs) has demonstrated robust and consistent effects on a spectrum of later life outcomes (for overviews see Anda et al., 2006; Larkin, Shields, & Anda, 2012), including indicators of family strain as well as victimization. In addition to physical and mental health outcomes, results are highlighting pathways to later well-being associated with education and employment (Sansone, Leung, & Wiederman, 2012; Zielinski, 2009), yet complexly, with factors such as views about perceived possibility suggesting these trajectories are not wholly deterministic (Schafer, Ferraro, & Mustillo, 2011).

Recent calls urge fuller consideration of life course approaches that permit insights as to early adversity's relationship to unfolding health statuses—moving beyond specific disease categories to consider more cumulative, aggregate dimensions of health as well as potential protective factors to ameliorate the negative impact of early stressors (Davidson, Devaney, & Spratt, 2010; Ferraro & Shippee, 2009). Moreover, the literature has been largely bifurcated, examining physical or mental health separately, rarely simultaneously to allow understanding of whether the processes are parallel. Concurrent examination provides a more synthesized assessment, relevant as the effects of stress diffuse across domains (Pearlin, 1989). Snapshots across adulthood of the relationship of ACEs to health offers age-anchored guidance to service providers engaging in preventive or remedial care with differing age groups. This study aims to address this need, undertaking assessment of ACEs on both physical and mental health, distinguishing four age groups defined by birth cohorts within a conservative analysis that controls for other health influences such as demographic and socioeconomic characteristics as well as resilience resources.

THEORIZED MECHANISMS

We draw from theorizing and research findings regarding both neurophysiological processes that link early adversity to later outcomes and ways that stressful conditions threaten individuals' adaptive capacities and exacerbate early stressor effects (Pearlin, Schieman, Fazio, & Meersman, 2005). Neurophysiological dysregulation involves a kind wear and tear or "weathering" (Geronimus, Hicken, Keene, & Bound, 2006) of biological systems involved in the response to chronic and toxic stressors. Allostatic load, referring to the physiological burden of stress responding that requires repeated attempts to re-achieve

balanced or homeostatic functioning, has been broadly supported across varying forms of life stress and health outcomes (Juster, McEwen, & Lupien, 2010). Changes in the brain and the perpetual flood of stress-related hormones tax the body, leading to susceptibility to disease and premature aging of biological systems (Danese & McEwen, 2012). These changes may be apparent in emotional functioning (hyperarousal, anxiety, distress) as well as key health preserving functions such as sleep (Strine & Chapman, 2005). Impaired sleep can be both an indicator of high or chronic stress and can also exacerbate its effects (Greenfield, Less, Friedman, & Springer, 2011). Hyperarousal and neurological dysregulations stemming from childhood adversity are theorized to interfere with individuals' ability to calm sufficiently and maintain sleep, yielding both decreased and less restful sleep experiences (Chapman et al., 2011). Daytime fatigue thereafter impairs functioning and may result in risky behaviors such as extensive caffeine or other stimulant use.

Stress conditions, appraisal-based psychological responding, and neurophysiological accommodations tend to conspire against amassing social and coping reserves, resulting in deficits in domains such as self-esteem, optimism, and adequate social ties (Miller, Chen, & Parker, 2011). Children growing up in adverse environments have been shown, for example, to have significantly weaker social connections in adulthood and childhood (Sperry & Widom, 2013) as well as more negative and distrustful tendencies in perceiving others and future possibilities (Miller et al., 2011). In a similar vein, social cognitive products such as life satisfaction are vulnerable to negative influence of toxic or persistent adversity (Honkalampi et al., 2005; Meichenbaum, 2005). Life satisfaction is thought to reflect more than contentment about one's current achievements and status; instead it is believed to relate to overall optimism and positivity toward the world and oneself (Suldo & Huebner, 2004). It thus reflects emotional resiliency to turbulence in one's life, especially important for those burdened with early adversities.

Early life adversities set the stage for developmental outcomes such as pessimism, less effective interpersonal skill development, and stress-related stress/vigilance patterns. These, in turn, make it harder for individuals to develop positive outlooks, form high quality social bonds, and maintain quieting habits such as positive sleep patterns that could otherwise help ameliorate physical and psychological strain (Greenfield et al., 2011; Matthews, Gallo, & Taylor, 2010; Uchino, 2009). Within a life course framework, these processes illustrate challenges to resilience. To the extent that patterns of lesser resilience resources continue into adulthood, patterns of dysregulated stress responding are likely to continue, thereby sustaining higher allostatic loads, making individuals more likely to be distressed and develop chronic conditions (Danese & McEwen, 2012). Failure to form and sustain social, psychological, and health asset behaviors (captured in this study as social support, life satisfaction, and sleep quality) complicates achieving important life goals, meaning that effects may resonate and compound across the lifespan (e.g., Draper et al., 2008).

These pathways illuminate the mechanisms of erosion of well-being, but they also provide important targets of potentially ameliorative interventions for those who have experienced early life adversities. As research moves increasingly to later life implications of childhood adversity, insight into health pathways across life phases is needed, not only to distinguish

life course processes that occur across adulthood, but also to better inform practitioners of the needs of age groups they may encounter in clinical settings (e.g., Dube, Felitti, Dong, Chapman, Giles, & Anda, 2003; Schafer & Ferraro, 2012). However, much of the research on the relationship of ACEs on health has examined adults in aggregate, which may mask differences across adult life stages and the extent to which other factors modify that relationship. Adding to findings about ACE associations with specific disorders, we focus more on daily functional impairment through ill days. Addressing these informational gaps is particularly important for service providers, wherein life period distinctions provide guidance for work with their populations.

STUDY QUESTIONS

The current study draws from a state public health survey, structuring age-graded groups in adulthood to support demographic analysis of early life adversity across adulthood. This sample allows, within available data, a general population portrayal of the functional relationship of childhood adversity within a risk and protective factors framework. The following research questions are addressed: First, is childhood adversity assessed through ACEs differentially prevalent across cohorts of adults? Second, does childhood adversity sustain significant independent associations with physical and mental health impairment through all cohorts, controlling for study covariates (demographics, socioeconomic status [SES], resilience resources)? Third, is childhood adversity associated with physical and mental health impairment in the same way across cohorts, or are changing trends evident across the lifespan? And finally, do indicators of resilience resources buffer the negative effects of childhood adversity on health, and, if so, is this benefit evident across cohorts? Consistent with our theoretical foundations, we hypothesize that ACEs will demonstrate significant associations with health far into adulthood, combining with health/wealth contributions of SES, and health promotive benefits of behavioral and psychosocial resources.

METHODS

Sample

Data were obtained from the Behavioral Risk Factor Surveillance System (BRFSS) for Washington State, which is a random-digit-dialed telephone survey delivered annually (cross-sectional) by health departments in collaboration with the Centers for Disease Control and Prevention (CDC, 2011). Eligibility was limited to English- and Spanish-speaking adults aged 18 years or older who were non-institutionalized. While the bulk of the sample is derived from landlines, a proportion of the sample includes exclusive cellular phone users. The sample is weighted to adjust for a variety of demographic characteristics to be representative of Washington State (WA Department of Health, 2010). The study sample ($N = 19,333$) includes all individuals who received questions about adverse childhood experiences in 2009 and 2010. The study sample consisted of 60.5% females and the following racial/ethnic composition: 87.8% Caucasian, 1.2% African American, 2.2% Asian, 0.3% Hawaiian/Pacific Islander, 1.1% Native American, 4.6% Hispanic and 2.8% other or mixed race. Average age was 56.1 years ($SD = 16.4$). 21.7% of the sample's household income was \$25,000 or less, 30.0% reported \$75,000 or more. 5.2% of the

sample never received a high school diploma, 22.3% had a high school education only, 32.3% attended some college, and 40.2% had a college degree and/or advanced training.

Measures

Demographics—Respondents were asked to report their age (in years) and their sex (as male/female). They were also asked which of the following groups best represented their race: White, Black or African American, Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, Multiracial, or other. Respondents who said yes to a separate item asking whether they were of Hispanic heritage were so categorized.

SES

Two variables captured socioeconomic status: income (eight categories: less than \$10,000 per year, \$10,000 to \$14,999, \$15,000 to \$19,999, \$20,000 to \$24,999, \$25,000 to \$34,999, \$35,000 to \$49,999, \$50,000 to \$74,999, and more than \$75,000; range = 1–8) and education (six categories: no school or kindergarten only, elementary school, some high school, high school diploma or GED, some college, college degree; range = 1–6).

ACES

The ACE measure consisted of 11 yes/no questions pertaining to the respondents' childhood (before age 18) condensed into eight categories: household mental illness, household substance abuse (alcohol or illicit drugs), family member incarceration, parental divorce, witnessing domestic violence, physical abuse, sexual abuse (sexual touching or forced sex), and emotional abuse (CDC, 2010). The aggregate ACE score is calculated as the sum of dichotomized "yes" responses across the eight categories. ACE score was dichotomized as low (0–2) and high (3+) for Table 1.

Resilience Resources—*Sleep quality* assessed how many nights per month respondents reported sufficient sleep (range = 0–30). *Support* is a single item on a Likert scale (0 = never, 5 = always) that asked how often respondents got the social and emotional support they need (range = 1–5). Another single item assessed *life satisfaction*, or how satisfied participants were with their lives so far (1 = very dissatisfied, 4 = very satisfied; range = 1–4). For ease of interpretation, all variables are coded such that higher scores reflect greater well-being.

Health and Mental Health—TWO parallel questions assessed *physical health* and *mental health*. Each question asked, "Thinking about your [physical/mental] health, ... for how many days during the past 30 days was your [physical/mental] health not good?" These variables were somewhat skewed (*physical health* $M = 4.08$, $SD = 8.54$, skewness = 2.10, Kurtosis = 6.42; *mental health* $M = 3.14$; $SD = 7.27$, skewness = 2.74, kurtosis = 9.58), thus all analyses were repeated with transformed variables. As there were no substantial differences, the untransformed results are presented here for ease of interpretation.

Analysis Plan

All analyses were conducted using Stata 12.1 survey commands to adjust for sampling weighting used in BRFSS to correct for sampling bias. Four age categories to reflect birth

cohorts of 15 years each were constructed: 18–34 years old (31.9% of sample), 35–49 years old (28.0%), 50–64 years old (27.6%), and 65–79 years old (12.5%). We excluded those over age 80 (4%) because of high mortality and morbidity rates at that advanced age. Fifteen-year cohorts were selected to balance interpretability and power to detect differences. Prior literature has frequently relied on fifteen year brackets to analyze ACE effects (e.g., Dube et al., 2003). This is also in line with age brackets that state policymakers have used to describe community differences (Hall, Porter, Longhi, Becker-Green, & Dreyfus, 2012). Descriptive statistics for study variables across the four cohorts, and across low- and high-ACE exposures, may be found in Table 1.

Problems with missingness were minor—generally less than 3% for any variable. The exception to this was income, on which 10% of the cases were missing, which is not uncommon in social science research (Kim, Egarter, Cubbin, Takahashi, & Braveman, 2007). To determine how the missing data affected results, all analyses were repeated in Mplus, which uses Full Information Maximum Likelihood (FIML) methods to account for missing data (Muthén & Muthén, 1998–2010). These results were nearly identical to the original results in Stata; no parameter changed by more than a hundredth place and there were no differences in significance. We retained the results from Stata in order to provide standard and easily understandable fit statistics.

The first research question regarding distribution of ACEs across the adulthood cohorts is addressed in Table 2. The second and third research questions regarding distinctive contribution of ACEs to poor physical and mental health within a multivariate framework is addressed through two-step linear regressions, run separately for each cohort (see Tables 3 and 4). The first step accounts for demographic characteristics (age, sex, race), total ACE score, and current SES (income, education). Resilience resources were entered as a separate step to assess their impact on ACE coefficients and contribution to the models. The fourth research question regarding the ameliorative potential of resilience resources was undertaken through testing moderator effects of resources on ACEs in relationship to physical and mental health. To test for moderation effects, we entered each resilience resource variable and its interaction term (multiplicative term with the ACE score) separately into regressions, controlling for demographics, ACE score, and SES (results provided at bottom of Tables 3 and 4). Testing multiple moderators separately in this manner is common to avoid confusing colinearity effects (Fairchild & MacKinnon, 2009). The b coefficients in all models can be interpreted as the number or proportion of days per month of more or less poor health associated with each increment of that independent variable, controlling for the effects of all other factors.

RESULTS

ACEs Prevalence Across Age Cohorts and Association With Study Variables

Table 1 provides an overview of associations of ACEs with study variables. Consistent patterns were evident across each age group wherein those with higher childhood adversities reported significantly poorer health, lower current income and education, and lesser levels of all three resilience resources.

Table 2 displays the distribution of ACEs by birth year cohorts, which varied significantly, with greater ACEs concentrated in the younger age groups. For example, more than three times the individuals aged 18–34 reported five or more ACEs compared to the oldest group. Relative to the types of ACEs, older age respondents were less likely than younger respondents to report family mental illness, imprisonment, or parental divorce, with less substantial levels of witnessed family violence, physical, and emotional abuse.

Hierarchical Regressions Explaining Poor Physical Health

Each birth cohort regression model achieved significance, with modest levels of variance explained (see Table 3). Within these multivariate analyses, demographic characteristics demonstrated few consistent patterns as single predictors, except that younger females were more likely to report poorer physical health. Overall, findings are consistent with observed health trends, with Asian Americans reporting stronger health benefits and others (Native American, mixed race) faring more poorly (Thoits, 2010). As race is broadly associated with a range of factors that serve as intermediary risk contributors to health (lower SES, greater adversity exposure), racial categories alone do not consistently demonstrate health effects (Turner, 2013).

As hypothesized, higher ACE scores were associated with more poor health days after controlling for other study variables. The strongest contribution was observed for the oldest age group; for each ACE experienced, respondents reported nearly a full day more each month of poor health in the first step. Education coefficients were in anticipated directions, lesser education associated with more poor health, but did not achieve unique significance when controlling for income and demographics. Lower income was significantly related to poor health days for all age cohorts, net of other variables in both steps. The addition of resilience resources generally muted the contribution of income.

The addition of resilience resources significantly contributed to variance explained in all models and served to lessen the *b* coefficients for income and ACEs, demonstrating that resilience resources explain some of the shared variance between ACEs and physical health (Lindenberger & Pötter, 1998; Mirowsky, 2013). Sufficient sleep and life satisfaction were significant direct contributors, with life satisfaction among older respondents being associated with more than two days fewer poor health days per month for each level of satisfaction. Support was only significant for the youngest cohort. All resilience factors emerged as significant moderators of the relationship of ACEs to poor health, with moderating effects of life satisfaction extended to the oldest age group. An example of these moderation effects may be seen in Figure 1 (generated using the unstandardized two-way macro provided by Dawson, n.d.). Although those with higher life satisfaction (+1 *SD*) have fewer days of poor health even among respondents with few ACEs (−1 *SD*), the protective potential of satisfaction is more evident among those with higher ACEs (+1 *SD*), where number of poor health days remains low—a flat trend compared to a worsening health trend for high ACE respondents with low satisfaction (−1 *SD*).

Hierarchical Regressions Explaining Poor Mental Health

As with physical health, all models achieved significance; total variance explained was higher for mental than physical health (Table 4). As before, few demographic characteristics were significant. Females were more likely to report higher poor mental health days, accounting for other variables, while Asians generally reported better mental health, consistent with prior results (Thoits, 2010). ACE scores were significantly explanatory, controlling for other variables, of poorer mental health for all age groups. The strongest results were evident for those ages 18–34 where respondents (who had the greatest number of ACEs overall; Table 2) experienced nearly a full day more of poor mental health for each adverse childhood experience as indicated in the first regression step. Higher income was significantly related to better mental health for all age groups; education was a significant net contributor only for those ages 50–64.

As with physical health, the addition of the resilience resource variables contributed substantially to the variance explained in all models. Sleep, support, and life satisfaction were significant contributors for all age groups when controlling for the effects of each other as well as step one covariates. Resilience factors served to mute the *b* coefficients for income and ACEs, again suggesting explanation of shared variance. Tests of moderation of these variables were similar to those for physical health, with social support as well as life satisfaction being significant moderators of ACEs effects on mental health for the oldest adults. The visual trends would be similar to that illustrated in Figure 1.

DISCUSSION

These findings add to the literature connecting early life adversity and later health erosion in a number of ways: (1) concurrent assessment of both physical and mental health within a multi-level analysis of demographics, ACEs, and SES as co-contributors, (2) distinguishing birth cohorts within a population-based sample to enable comparative examination of profiles of adverse childhood experiences and their relationship to health outcomes, and (3) inclusion of health-supportive resources to enable assessment of their resilience potential through direct effects as well as moderation of the effects of early childhood adversity. The resilience resource results provide important insights both for mechanisms of health erosion and possible targets for interventions throughout the lifespan. A strength of these findings is that coefficients may be interpreted literally, as days per month during which individuals' health suffered, thus facilitating translation into economic, quality of life, and service response terms.

ACE Profiles

Findings regarding number of ACE exposures for the current sample are very similar to those reported from prior CDC-Kaiser Permanente surveys (Dube et al., 2003). Using the same age brackets, both samples indicate higher proportions of younger respondents reporting one or more ACEs and considerably higher proportions (3.5–4 times) of 18–35-years-olds reporting five or more ACEs relative to those 65 and older. This may be due to several factors, one being limitations in recall as well as attrition of older respondents from a sampling pool due to death or disabling illness that precluded participation. Other

contributing factors may include period and cohort effects (Glenn, 2003), that are difficult to distinguish in cross-sectional data, but may also be linked to differential willingness to report potentially stigmatizing experiences such as family mental illness or abuse (Finkelhor, Shattuck, Turner, & Hamby, 2013).

Table 2 also suggests that conditions associated with the times may also play a role. Those 18–34, relative to 65–79-year-olds, were twice or more likely to experience parental divorce or family mental illness in childhood and nine times more likely to have a family member imprisoned. In contrast, relatively stable proportions of exposure to abuse-related experiences across cohorts up to the oldest cohort suggest attrition as a cause for those differences. Non-maltreatment forms of childhood adversity may be related to broader social policy and trends, such as those of increasing incarceration and divorce, which pose risks for children's welfare and health trajectories.

Conjoint Assessment of ACEs and Income for Physical and Mental Health

In addition to the step-dose relationship of ACEs established for a range of specific health disorders (CDC, 2013), we see here evidence of broad-based impact on daily life functioning impairment associated with poor health. The oldest respondents, for example, indicate experiencing nearly an additional day each month of poor physical health for each adversity experienced in childhood, and younger respondents indicated the same trend relative to their daily mental health, effects which would persist for those with very limited resilience resources. Additional health threats were linked to income, with data trends indicating nearly a half a day to a day of poorer health associated with each decrement of income, in addition to that accorded by childhood adversity exposure. Although significant, negative health associations with income were lower for 18–35-year-olds, possibly reflecting financial supports by families of origin for younger respondents who were in student and transitional statuses to independent adulthood. This persistent pattern of ACEs combined with economic disadvantage poses a form of double jeopardy for health wherein both neurophysiological and compromised social position processes contribute distinct and cumulative effects, perhaps especially for females (Evans & Kim, 2010; Matthews et al., 2010).

Individuals with high ACEs have been found to get sicker earlier, stay sicker longer, and report more chronic illnesses (Danese, Pariante, Caspi, Taylor, & Poulton, 2007; Packard et al., 2011). In the current findings, ACE effects in relationship to daily poor physical health were most notable for those in the oldest age cohort. This is congruent with theorizing about weathering (Geronimus et al., 2006), wherein physical health effects related to biological stress processes were accumulating over time, leading to development of chronic conditions. Even if detected, these stressors may have had less functional impairment in earlier adulthood and only be fully expressed through daily impairment by age 65.

In contrast, ACE effects related to daily mental health were more evident for younger respondents, particularly those 18–35. Young adults will be much more proximal to their adverse experiences, some of which may have been experienced in adolescence. The bulk of this age cohort is considered to be emergent adulthood, in which sensitive significant developmental tasks are underway. This very high level of health impairment signals

substantial vulnerability to current and subsequent mental health problems, a trend that lessens but only somewhat across the next two life periods. The limited mental health impact for the oldest respondents may be a matter of attrition—with those most deeply ACE-affected having died or not accessible for survey participation—or healing factors such as experience, maturity, a potential reckoning with the past, and embracing of the present (Happell, 2011).

Although this somewhat inverse trend is notable, it is essential to recognize that ACE impacts continue to affect older adults' mental health, and younger adults' physical health, even if the average effects are less pronounced during those life periods. Thus, practitioners must be attentive to holistic health for individuals made vulnerable by childhood adversity. Mental health impacts early in adulthood may signal greater risk of a range of health problems as they age, making effect interventions to ameliorate stress and distress crucial.

Resilience Resources and Health

The resilience resource factors tested here are representative of theoretically interrelated factors that both ensue from and contribute to distress and physical health wear and tear. The contribution made by these factors in the regression models was robust, providing significant increases in explanation of variance for each age cohort, and they provide important information applicable across a spectrum of populations. These malleable resilience resources represent targets for client education, assessment, and intervention as well as links to other risk and protective factors (e.g., physical activity, healthy eating, substance use) that can be incorporated into prevention, therapeutic treatment and case management (Nurius, Green, Logan-Greene, & Longhi, 2013). We will discuss each resilience resource and associated clinical recommendations below.

Sleep has emerged as an important predictor of poor physical and mental health. In our results, sufficient sleep was both consistently associated with fewer days of physical and mental health and had significant interactions with ACEs for all but the oldest age group. Greater early life adversity is associated with later sleep disturbance (Chapman et al., 2011), which lessens it as an available resource and this deficit may even exacerbate ACE effects. Service providers across settings can routinely assess and address sleep problems given its relevance for school, work, and health outcomes. As demonstrated in Figure 1, moderation trends indicate that those individuals with high ACEs and weak sleep patterns have significantly poorer health—suggesting value in ACEs screening and client education regarding ACEs relationship to biological processes and the potential of sleep and other health behaviors to buffer vestiges of these early adversities.

Psychosocial factors such as social support and life satisfaction are established health protective factors (Kawachi, Kennedy, & Glass, 1999) and theorized to play important roles in the pathways between early life adversity as well as socioeconomic status and health (Matthews et al., 2010; Shonkoff et al., 2011). Similar to sleep, both offered direct relationships to health as well as moderating effects of the relationship of ACEs to health. Due to factors such as depression and social isolation being particularly germane risk factors for older adults (Findlay, 2003), support and life satisfaction are important assessment and intervention targets. Increasing emphasis under the Affordable Care Act on linkages

between physical and behavioral health and collaborative care facilitate assessment across health and community care settings on factors such as sufficient social support to manage day-to-day stressors. Larkin, Felitti, and Anda (2014) outline a range of ACE-informed psychosocial supports spanning parenting, cognitive-behavioral, coping, and social network applicable to varied age groups and settings.

Although all three resilience resources provided contributions independent of each other, life satisfaction offered the strongest direct effects. Every increment in life satisfaction was associated, for example, with two or more days less poor mental health, and strong physical health impact, relative to the different age groups. Given the high-level of impact of ACEs on young adults relative to mental health impairment, the very strong moderator term of life satisfaction in buffering the effect of those ACE mechanisms on mental health functioning is particularly noteworthy. We view life satisfaction as a global indicator of quality of life; clinicians in all settings can ascertain whether there are major impediments to client's psychosocial well-being (Velikova et al., 2004). Identification of these barriers to happiness may provide clients the opportunity to improve mental and physical health outcomes.

Implications

These findings lead to enriched approaches to understanding risk and protective factors and targets for work with clients to halt or ameliorate cascading health impacts of early adversity. Addressing health behaviors that may be derivative of early trauma such as risk taking and self-medicating is clearly important as is primary prevention of early life adversity. Less recognized, however, have been psychosocial resources and behavioral patterns such as sleep as powerful, malleable, and accessible targets to improve health and well-being in the aftermath of early life adversity. This is consistent with emergent findings of prosocial interventions that foster mindfulness, social connection, and emotional regulation and incorporate stress neurobiology into preventive and therapeutic services (Bruce, Gunnar, Pears, & Fisher, 2013; Davidson & McEwen, 2012). Understanding how factors such as life satisfaction interact with adverse childhood experiences to impact adult physical and mental health helps to inform the potential reach of health practice to increase functioning in multiple life areas. Three important mutable targets are identified here: sleep, social support, and life satisfaction. All three of these may be relatively easily assessed in clinical settings, either using established instruments or with a brief conversation. Service providers can then either make suggestions or refer clients to appropriate resources to facilitate change and ameliorate the impact of early adversity.

These findings also argue for the importance of ACEs research for practitioners including but also beyond pediatric settings, where prevention and early intervention are requisite. Each of the age cohorts in this analysis corresponds to some variation in social and health care settings and practitioners. Those serving 18–35-year-olds will span adolescent, school, work, and family care settings as individuals are establishing adult identities, employment, and life partnerships. These practitioners will see clients with the highest ACE forms reporting notable impact on current mental health. Trauma-informed intervention, including recognition of increased risk of revictimization, development of chronic conditions already underway, as well as prevention, are particularly salient to interrupting negative

neurophysiological and developmental cascades. The corpus of research on ACE impacts strongly urge practitioners to routinely assess ACEs in their practice, in order to identify the most vulnerable clients and effectively tailor interventions (Edwards, Anda, Felitti, & Dube, 2003).

Thirty-five- to fifty-year-olds are balancing work and family obligations, with among some of the highest life stress indices, and those aged 50–64 are beginning to also juggle support needs of aging parents and their own life transitions concerning work and family roles. In both these age groups, both ACEs and income limitations are taxing daily functioning of physical and mental health (Talbot et al., 2009). Risk-taking behaviors and physical and mental health symptoms, may not only be interrelated (e.g., self-medicating to treat pain, sleep problems, or anxiety/depression), but may exemplify maladaptive coping strategies used to deal with early life trauma experiences that require attention. Screenings are rare, although needed for those in the relative black box of middle age, as is education about the neurobiology of stress and the benefits of psychosocial resources in addition to health habits. Understandings of embodiment of cumulative adversity and inequality urges gerontologists to directly consider factors like ACEs as ongoing, yet modifiable, sources of influence on health (Ferraro & Shippee, 2009), enhancing coping strategies with physical health symptoms, and keeping spirits high even in light of loss and suffering (Dickens, Richards, Greaves, & Campbell, 2011).

Limitations

Although our results are consistent with findings of other studies, the cross-sectional nature of these kind of health surveillance data precludes certainty as to causality, cannot control for early mortality (e.g., least healthy adults not represented through death or residence in settings that restrict access), and reliance on self-reported measures of physical and mental health statuses. This latter concern is offset by the now very substantial empirical base of step-dose relationship of ACEs to diagnosed health conditions as well as findings of self-assessed health to be reliable indicators of actual health statuses (Nurius, Logan-Greene, & Green, 2012; Oswald & Wu, 2009).

A limitation of most surveillance data is a relative paucity of measures. BRFSS is designed to track broad health statuses, often with single item indicators and limited assessment of factors such as psychosocial functioning and coping or resilience resources. It is reassuring that each indicator of resilience had theoretical support, and the magnitude and stability of the results are strong, despite limited measurement strength. Although our findings are consistent with those with related research questions (e.g., Min, Minnes, Kim, & Singer, 2013), it is important to interpret these findings with caution. Future research should address the associations between resilience resources and physical and mental health with validated measures with stronger psychometric qualities.

CONCLUSION

The impact of early life adversity has spawned attention to childhood as a time when the roots of illness begin to become established (Shonkoff, Boyce, & McEwen, 2009). This study contributes to the literature in its demonstration of statistically distinctive ACE effects

at each juncture of the adult course—evident even in the transitional cusp into adulthood and persisting into elderly years. However, evidence indicating resilience across the life span is promising. These findings add to others in emphasizing the value of early life interventions to prevent early adversities and curb powerful cascades through individuals, families, and communities. Also evident is the importance of a life course perspective to support assessment, vigilance, and evidence-informed practices to support health and resilience. As the knowledge base concerning ACE impacts advances, researchers must strive to leverage findings into broad-based recommendations regarding interventions and community responses for policymakers (Thoits, 2010).

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Distinct Contributions of ACEs

FIGURE 1.
Interaction effects of life satisfaction * ACEs on poor physical health days per month for those ages 35–49.

TABLE 1

Study Variable Distributions across Low and High ACE Histories

	Age 18–34	Age 35–49	Age 50–64	Age 65–79
Poor physical health days				
Low ACEs	1.78***	2.41***	3.20***	3.88***
High ACEs	3.74	4.72	5.86	7.32
Poor mental health days				
Low ACEs	2.61***	2.54***	2.48***	1.67***
High ACEs	6.55	5.59	5.55	2.97
Income				
Low ACEs	6.02***	6.88***	6.68***	5.95***
High ACEs	5.54	6.39	6.18	5.58
Education				
Low ACEs	4.83***	5.25***	5.25***	5.05
High ACEs	4.58	5.03	5.10	5.06
Sufficient sleep nights				
Low ACEs	21.15***	21.19***	22.77***	25.66***
High ACEs	16.91	18.28	20.56	22.36
Socioemotional support				
Low ACEs	4.34***	4.28***	4.28***	4.33**
High ACEs	4.03	4.02	4.04	4.18
Life satisfaction				
Low ACEs	3.41***	3.46***	3.47***	3.52***
High ACEs	3.16	3.22	3.22	3.37

**
p .01,

p .001.

TABLE 2

ACE Profiles Across Birth Cohorts

Cumulative ACE score	Age 18–34		Age 35–49		Age 50–64		Age 65–79		Design-based <i>F</i>
	1975–1991	31.9%	1960–1974	28.0%	1945–1959	27.7%	1930–1944	12.5%	
0	33.04%		31.35%		36.64%		48.26%		10.29***
1	20.84		22.24		22.69		23.75		
2	14.27		15.02		14.61		12.84		
3	10.13		11.04		10.19		6.68		
4	7.42		7.82		7.01		4.59		
5+	14.31		12.53		8.86		3.88		
Distribution of specific ACE items									
Parental depression	29.49%		24.7%		20.17%		12.16%		58.84***
Parental substance use	33.55		35.1		33.17		22.48		23.09***
Parental imprisonment	13.74		06.61		03.65		01.55		112.89***
Parental divorce	34.86		33.12		20.93		17.16		87.57***
Witnessing violence	18.34		19.06		16.53		11.28		13.90***
Physical abuse	18.92		21.08		18.31		12.87		72.09***
Emotional abuse	37.56		37.54		36.73		23.74		28.94***
Sexual abuse	10.56		15.95		15.18		12.57		16.07***

p .001.

TABLE 3
 Hierarchical Regressions Predicting Number of Poor Physical Health Days per Month (Unstandardized b coefficients)

	Age 18–34		Age 35–49		Age 50–64		Age 65–79	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
R^2	0.06	0.09	0.07	0.11	0.10	0.16	0.05	0.12
F	6.06***	6.15***	13.49***	15.65***	33.33***	40.83***	11.26***	18.12***
Demographics								
Age	0.01	0.01	0.09**	0.11***	0.01	0.04	0.01	0.02
Female	0.60*	0.67*	0.84**	0.80**	0.46	0.47	−0.09	−0.25
Hispanic	−0.48	−0.29	−0.80	−0.73	−0.02	−0.22	3.06	3.69*
Black	−0.66	−0.71	1.52	1.71	3.36**	3.08*	0.94	1.50
Asian	−0.29	−0.44	−0.42	−0.44	−1.04*	−0.22	−0.26	−0.16
Native Amer.	0.29	0.40	1.54	1.38	1.32	1.21	1.02	0.79
Mixed/Other	−0.87	−0.92	−0.40	−0.71	1.44	1.63	1.22	0.71
Childhood Adversity								
ACE score	0.51***	0.39***	0.43***	0.26**	0.54***	0.35***	0.81***	0.53***
SES								
Income	−0.28**	−0.23*	−0.75***	−0.57***	−1.10***	−0.83***	−0.81***	−0.59**
Education	−0.05	−0.05	−0.11	−0.08	−0.60**	−0.45*	−0.35	−0.18
Resilience resources:								
Sleep		−0.07***		−0.12***		−0.16***		−0.20***
Support		−0.37*		−0.02		0.28		0.13
Life satisfaction		−0.47		−1.38***		−2.14***		−2.41***
Moderation tests ^a								
Sleep * ACEs	−0.46**		−0.33*		−0.53***		−0.16	
Support * ACEs	−0.43**		−0.46**		−0.35*		−0.46	
Life satisfaction * ACEs	−0.44*		−0.55***		−0.46***		−0.62***	

* $p < .05$,

p .01,

p .001.

p Moderation tests were undertaken in separate regressions, controlling for demographics, SES, ACEs, and each resilience resource separately.

TABLE 4
Hierarchical Regressions Predicting Days per Month of Poor Mental Health (Unstandardized b coefficients)

	Age 18–34		Age 35–49		Age 50–64		Age 65–79	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
R^2	0.10	0.25	0.09	0.23	0.10	0.25	0.04	0.16
F	9.74***	18.12***	19.98***	38.46***	41.10***	64.22***	7.84***	15.42***
Demographics								
Age	0.00	0.02	0.05	0.05	–0.01	0.04	–0.08**	–0.07***
Female	0.92*	1.06**	1.17***	1.24***	0.64**	0.75***	0.57*	0.59*
Hispanic	–1.23	–0.70	–0.89	–0.61	–0.97	–0.95	–0.57	–0.33
Black	–1.89	–2.08*	–0.90	–0.59	1.12	0.94	–0.02	0.43
Asian	–1.11	–1.37*	–0.70	–1.09*	–1.52***	–1.20**	–0.42	–0.82
Native Amer.	–1.92	–1.53	–1.24	–1.57	–1.37	–1.30	0.58	–0.56
Mixed/Other	–0.23	–0.21	–0.70	–1.19	0.26	0.38	0.90	0.75
Childhood Adversity								
ACE score	0.91***	0.54***	0.67***	0.38***	0.71***	0.42**	0.31***	0.11
SES								
Income	–0.28**	–0.07	–0.79***	–0.46***	–0.93***	–0.46***	–0.44***	–0.18*
Education	–0.40	–0.20	0.00	–0.01	–0.41**	–0.26	–0.33	–0.24
Resilience resources:								
Sleep		–0.14***		–0.16***		–0.15***		–0.12***
Support		–0.74**		–1.03***		–0.42**		–0.46**
Life satisfaction		–3.46***		–2.26***		–3.41***		–2.47***
Moderation tests ^a								
Sleep * ACEs		–0.46*		–0.42*		–0.49***		–0.08
Support * ACEs		–0.84***		–1.00***		–0.66**		–0.62**
Life satisfaction * ACEs		–0.90***		–0.61***		–0.63***		–0.51**

*
p .05,

p .01,
p .001.

Moderation tests were conducted in separate analyses controlling for demographics and SES.