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Lifetime adversity predicts depression, anxiety, and cognitive impairment in a nationally representative sample of older adults in the United States

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Abstract

Objective: Although life stress and adversity are wellknown risk factors for mental health problems and cognitive impairment among older adults, limited research has comprehensively examined the impact of both childhood and adulthood adversity on psychiatric and cognitive impairment symptoms over a prolonged period. To address this issue, we investigated how lifetime adversity exposure is related to symptoms of depression, anxiety, and cognitive impairment in a nationally representative, longitudinal sample of older adults in the United States.

Method: We analyzed data from the Health and Retirement Study (1992–2016). The sample included 3496 individuals (59.9% female), aged ≥64 years old (M_{age} = 76.0 ± 7.6 years in 2016). We used the individual-level panel data and ordinary least squares regressions to estimate associations between childhood and adulthood adversities, and later-life depression, anxiety, and cognitive impairment.

Results: Many participants experienced a significant early life (38%) or adulthood (79%) stressor. Moreover, experiencing one childhood adversity (vs. none) was associated with a 17.4% increased risk of adulthood adversity. Finally, as hypothesized, childhood adversity exposure was related to experiencing more depression and anxiety symptoms in later life, whereas adulthood

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CONFLICT OF INTEREST STATEMENT

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stressor exposure predicted more cognitive impairment as well as more depression and anxiety symptoms.

Discussion: These findings demonstrate significant associations between lifetime adversity and symptoms of depression, anxiety, and cognitive impairment in older adults. Screening for lifetime stressors may thus help healthcare professionals and policymakers identify individuals who could potentially benefit from interventions designed to reduce stress and enhance resilience.

Keywords

anxiety; childhood adversity; cognitive impairment; depression; life stress

1 | INTRODUCTION

Mental health problems such as depression and anxiety are particularly prevalent and impactful among older adults in the United States (Butters et al., 2008). For example, 2.7% of older adults aged ≥65 years experienced major depressive disorder (MDD) over the last 12 months and 8.2% have a lifetime diagnosis of MDD (Hasin et al., 2005). Anxiety disorders are also highly comorbid with depression among older adults, with up to 46% of older adults with depression also reporting an anxiety disorder (Ayers et al., 2007). The impact of late-life depression and anxiety are further exaggerated by comorbid cognitive impairment, especially dementia, during this developmental period (Sagna et al., 2014). It was recently estimated that Alzheimer-type dementia affected 6.7 million adults aged ≥65 in 2023 (CDC, 2023) and was the 5th leading cause of death among older adults in 2010 (CDC, 2023), costing the United States alone approximately $612 billion in 2021 (Alzheimer's Association, 2021). Notably, the number of deaths attributed to Alzheimer's disease, as documented on death certificates, more than doubled, experiencing a significant 145% increase between 2000 and 2019 (Alzheimer's Association, 2023). If the current situation prevails, 12.7 million people aged 65 years and older are projected to have Alzheimer's dementia by 2050 (Matthews et al., 2019).

Consistent with the life course perspective (Richards & Deary, 2005) and resembling the impact of psychological trauma on health (Van der Kolk, 2003), lifetime adversity has been recognized as a significant risk factor for poor mental health (Felitti et al., 1998; Slavich & Shields, 2018) and cognitive impairment among older adults (Peavy et al., 2009). Adversity encompasses ongoing hardships and mistreatment individuals face throughout their lives, whereas trauma involves exposure to distressing or life-threatening events (Felitti et al., 1998; Lazarus & Folkman, 1984; Van der Kolk, 2003). In the seminal Kaiser Permanente study on adverse childhood experiences (ACEs), respondents reported a variety of abuse experiences, including sexual abuse (22.0%), psychological abuse (11.1%), and physical abuse (10.8%), which were associated with a greater risk of alcoholism, drug abuse, depression, and suicide attempts in a stepwise fashion (Felitti et al., 1998).

Research has shown that stressor exposure disproportionately affects populations based on several factors, including socioeconomic status (SES), marital status, gender, and race/ethnicity (Armstrong et al., 2018). Reactions to such stressors also vary across individuals (Giletta et al., 2018; McLoughlin et al., 2022; Quinn et al., 2020). From the perspective

of coping theory (Lazarus & Folkman, 1984), for example, individuals with lower SES, such as lower income (Adler et al., 1994) or education (Ross & Wu, 1995), are more prone to adopting unhealthy behaviors, such as substance abuse (Wills et al., 1998) and to engage in risky sexual behaviors (Hillis et al., 2001). Consequently, childhood adversity and subsequent behaviors may predict mental health and cognitive status later in life (Clarke et al., 2015).

Recent cross-sectional research has shown an association between life stress and late-life cognitive health in homogeneous population sample such as Japanese (Tani et al., 2020), Finnish (Donley et al., 2018), and Aboriginal Australian older adults (Radford et al., 2017). Meta-analyses have also suggested that adverse experiences in childhood are linked to unhealthy behaviors (Hughes et al., 2017, 2021; Wiss & Brewerton, 2020), poorer mental health (Hughes et al., 2017, 2021; Morgan et al., 2021; Racine et al., 2021), obesity (Wiss & Brewerton, 2020), cancer (Hughes et al., 2017), cardiovascular diseases (Brindle et al., 2022), and cognitive impairment (Corney et al., 2022). However, only a limited number of studies have extensively explored both adverse mental health and cognitive impairment symptoms as outcome variables in the context of both childhood and adult adverse experiences using nationally representative longitudinal data.

To address this significant gap in the literature, we drew data from a longitudinal, nationally representative sample of older adults in the United States to (a) examine how childhood adversity, as well as key socioeconomic, demographic, and health behavior factors, are associated with adulthood adversity; (b) investigate how childhood adversity is associated with subsequent psychiatric and cognitive impairment symptoms among older adults; and (c) document how adulthood adversity predicts psychiatric and cognitive impairment symptoms among older adults. This study thus elucidates prospective associations between life stressor exposure and psychiatric and cognitive impairment symptoms in older adults, which could, in turn, help identify populations at risk for developing stressrelated mental health problems and cognitive impairment in later life.

2 | METHOD

2.1 | Study population

Participant data were derived from the publicly available RAND version (i.e., Longitudinal as well as Fat files) of Health and Retirement Study (HRS) (1992–2016) and Leave-Behind modules (2006–2012) as well as the restricted (i.e., sensitive health) HRS Harmonized Cognitive Assessment Protocol (HCAP) (2016). Data sets were merged by the household- and individual-level identification number (HHIDPN) and the survey year (WAVE) (Bugliari et al., 2023). The biennial HRS survey includes a nationally representative sample of older adults in the United States and oversamples minority ethnic groups. We used 13 waves of data collected from 1992 to 2016, as the crucial outcome variables (e.g., based on the Mini-Mental State Examination [MMSE]) were last recorded in 2016. Analyses were limited to participants who responded to the Leave-Behind modules and the psychosocial and lifestyle questionnaires, and HCAP. Further details of the HRS design, sampling procedures, data collection, and response rates are described elsewhere (Heeringa & Connor, 1995). The

analytic sample size, based on the number of participants completing the final wave (2016), was 3496 adults, aged ≥64 years old.

2.2 | Measures

2.2.1 | Childhood and adulthood adversity—Childhood and adulthood adversity (Table 2) were evaluated using a list of lifetime potential traumatic events (Krause et al., 2004). Indicators of adversity were specifically selected based on prior research demonstrating that greater lifespan adversity is associated with accelerated aging (e.g., shortened telomeres) (Puterman et al., 2016). Across the survey modules, seven childhood adversity items that occurred before the age of 18 were asked: (1) Had their family received help from relatives because of financial difficulties? (2) Did their family ever have to relocate due to financial difficulties? (3) Had their father ever lost his job? (4) Had their parents' substance and alcohol use caused problems at home? (5) Had they ever experienced physical abuse? (6) Had they repeated a year at school? and (7) Had they been in trouble with the police? The first three items of childhood financial adversity were asked during survey years 1996–2012 and were obtained from the RAND HRS Fat files. The next four items of social and traumatic childhood adversity were collected in survey years 2006, 2008, 2010, and 2012 from HRS Leave-Behind modules. Respondents skipped these questions if they had already answered in a prior round. Each measure was coded as a binary variable (yes or no) and was summed into a cumulative index of childhood adversity (possible range: 0–7) (Puterman et al., 2016). A prior study tested the reliability of childhood adversity items in HRS by assessing the 4-year test–retest reliability and found high agreement in scoring social and traumatic childhood adversity items, ranging from 92% to 96% (Burgin et al., 2021).

Ten adulthood adversity items were asked: whether, at any point of time between 1992 and 2014, the respondents (1) had received Medicaid coverage, (2) had received food stamps, (3) had been unemployed and looking for work, or temporarily laid off, and whether, at any age after 17 they had experienced (4) the death of a child, (5) the death of a spouse, (6) a natural disaster, (7) being wounded in combat, (8) a partner addicted to drugs or alcohol, (9) being the victim of a physical attack, and (10) a spouse or child with a serious illness. The first three items of adulthood financial adversity as well as the death of a spouse item were asked during survey years 1992–2016 and were obtained from the RAND HRS Fat files. The six items, which pertain to social and traumatic adulthood adversity, were gathered from HRS Leave-Behind modules in survey years 2006, 2008, 2010, and 2012. Respondents skipped these questions if they already answered in a previous round. Each measure was coded as a binary variable (yes or no) and was summed into a cumulative index of adulthood adversity (possible range: 0–10) (Puterman et al., 2016).

2.2.2 | Depression symptoms—Depressive symptomatology was assessed using the Center for Epidemiological Studies-Depression (CES-D) scale (Radloff, 1977) from the RAND HRS file, spanning the years 1994–2016. The assessed symptoms of depression included felt depressed, everything was an effort, restless sleep, was [not] happy, felt lonely, [did not] enjoy life, felt sad, and could not get going (Townsend et al., 2001). Respondents were asked how frequently they had experienced each of the eight symptoms during the past

week: 1 (*all or almost all*), 2 (*most of the time*), 3 (*some of the time*), and 4 (*none or almost none*). To obtain a total score, responses were converted to yes (i.e., 1 and 2) or no (i.e., 3 and 4), with higher scores indicating greater depression symptomatology (possible range: 0–8) (Lewinsohn et al., 1997).

2.2.3 | Anxiety symptoms—The Beck Anxiety Inventory, administered from 2006 to 2012, was used to assess symptoms of anxiety (i.e., had fear of the worst happening, was nervous, felt hands trembling, had a fear of dying, and felt faint) (Beck et al., 1988) through the HRS Leave-Behind modules. Respondents were asked how frequently they had experienced these five symptoms during the past week. Responses included 1 (*never*), 2 (*hardly ever*), 3 (*some of the time*), and 4 (*most of the time*), and were averaged to produce an index of anxiety, with higher scores indicating greater symptoms of anxiety (possible range: 1–4) (Brenes et al., 2005).

2.2.4 | Cognitive impairment—Cognitive impairment was measured using the MMSE and total cognition summary score. The MMSE, administered in the 2016 HRS HCAP data set, was used to identify participants with a probable diagnosis of Alzheimer's disease (Tombaugh & McIntyre, 1992). It combines scores from five cognitive domains—orientation (10 points), memory (3 points each for registration and recall), attention/calculation (5 points), language (8 points), and visuospatial abilities (1 point)—and indicates respondents' general mental status, specifically dementia (Creavin et al., 2016), with higher scores indicating a lower cognitive impairment risk (Guerrero-Berroa et al., 2009). A distinct measure of cognitive functioning in the HRS utilized the total cognition summary score (Proulx et al., 2018), which was assessed in the RAND HRS file (1996–2014) and HRS Fat file (2016). This score was derived from various tests, including a 10-word immediate and delayed recall test for memory, serial 7s subtraction test to assess working memory, and counting backwards to evaluate attention and processing speed, resulting a score in a range of 0–35 (Ofstedal et al., 2005). A higher total cognition summary score indicates better cognition.

2.3 | Covariates

We included several a priori covariates in the main models, including the study year and demographic factors such as age, sex (male, female), race/ethnicity (non-Hispanic White, non-Hispanic African American, other), and marital status (living with or without a spouse/partner). We also included socioeconomic factors, specifically total household income and education level (less than high school, GED/High school, some college, college and above), as well as health behaviors, namely cigarette smoking (never smoked, formerly but not now, and currently smoking), average number of alcoholic drinks consumed per day, and total physical activity level ranging between 0 and 18 (Tucker-Seeley et al., 2009).

2.4 | Data analyses

We used the ordinary least squares regression method with the individual-level panel data from the HRS to estimate the effect of childhood and adulthood adversity on psychiatric symptoms of depression and anxiety (only for childhood adversity), and cognitive impairment symptoms among older adults, all while controlling for the socioeconomic,

demographic, and health behavioral factors described above. The time-varying covariates were incorporated into the models using once-lagged values to prevent recent covariates from predicting past outcomes. Anxiety symptoms were not predicted by adult adversity, as the documentation of anxiety symptoms only extended until 2012, and adult adversity could have occurred after that timeframe. We used the person-level weights provided by the HRS to account for the panel nature of the data and to ensure that the sample was nationally representative for noninstitutionalized older adults in the United States (Heeringa & Connor, 1995). We clustered standard errors at the person-level to adjust for the potential correlation of errors over time within the same person. Stata/MP 15 was used to perform the statistical analyses.

3 | RESULTS

3.1 | Sample characteristics

Table 1 shows the main characteristics of the sample. Participants' mean age during the final study year (2016) was 76.0 ± 7.6 years, and 15.7% and 11.0% were non-Hispanic African American and Hispanic, respectively, 44.7% were living without a spouse or partner, and 59.9% were female. Regarding SES, participants had an average total household income of $60,058 (±$94,630) in 2016, and 18.7% of them did not obtain a high school diploma. In terms of health behaviors, 47.5% of participants reported prior cigarette smoking (7.6% were current smokers), whereas 44.9% had never smoked cigarettes. On average, participants consumed 0.3 alcoholic drinks per day (±0.7), and their total physical activity level ranged between 0 and 18, with an average of 6.5 (±6.5). More than 60% reported having no childhood stressors (average 0.6 ± 0.9), whereas those who reported having one and two or more childhood stressors comprised 25% and 13% of the sample, respectively. In comparison, only 21% of participants reported experiencing no adulthood adversity (average 1.8 ± 1.4), whereas approximately 27%, 25%, and 27% of participants reported having 1, 2, and ≥3 adulthood adversities, respectively.

3.2 | Types and number of adversity experiences

Table 2 displays the types and frequency of participants' stressful experiences during childhood and adulthood. The two childhood adversities reported most frequently were parents who had used drugs or alcohol (15.2%) and repeating a class in school (13.6%); in contrast, the two most frequently reported adulthood adversities were a spouse or child with a serious illness (35.3%) and a partner who was addicted to drugs or alcohol (22.2%).

3.3 | Adversity, mental health, and cognitive impairment symptoms

Table 1 also shows the bivariate associations between the covariates and the last-observed psychiatric and cognitive impairment symptoms. Childhood adversity was positively associated with symptoms of depression and anxiety, in addition to a lower cognitive summary score (all *ps* < .001). Participants who experienced more adulthood adversities exhibited more symptoms of depression and cognitive impairment (MMSE, total cognition summary score) (all *ps* < .001). Females exhibited significantly more depression symptoms than males ($p < .001$), whereas males had a lower risk of cognitive impairment (MMSE) compared to females ($p = .006$). In general, individuals living without a spouse or partner,

Hispanic and non-Hispanic African Americans (compared to Whites), and those with lower educational attainment (compared to higher attainment), exhibited more depression, anxiety, and cognitive impairment symptoms (all *ps* < .001). Additionally, current cigarette smokers demonstrated more depression, anxiety, and cognitive impairment symptoms compared to individuals who never smoked or formerly smoked but quit (all *ps* < .001, except for MMSE with $p = .032$).

3.4 | Childhood adversity predicting adulthood adversity

Table 3 shows the results of the regression analysis examining how childhood adversity and socioeconomic, demographic, health behavior factors at previous waves (i.e., once-lagged) were related to adulthood adversity by presenting coefficient estimates and percent changes (i.e., coefficient estimates/mean of dependent variable × 100). On average, adulthood adversity ($M = 1.72$) was 17.4% greater for participants with one childhood adversity than for those without any such stressor exposure ($p = .003$). Similarly, on average, females experienced 11.9% more adulthood adversities than males ($p = .023$), and those living with a spouse or partner at previous waves had 12.3% fewer adulthood adversities than those not living with a spouse or partner at previous waves ($p = .011$). Non-Hispanic African Americans and Hispanics had 21.7% ($p = .016$) and 24.0% ($p = .022$) more adulthood adversities, respectively, than non-Hispanic Whites. Once-lagged total household income did not significantly predict adulthood adversity in terms of SES. However, individuals with a GED/High school diploma and those with a college and above education experienced 16.5% ($p = .023$) and 21.6% ($p = .009$) fewer adulthood adversities, respectively, compared to individuals with less than a high school education. Among the health behaviors, an increase of one unit in the once-lagged physical activity level, which ranged between 0 and 18, was associated with a 6% decrease in adulthood adversities (p = .040).

3.5 | Childhood adversity predicting mental health and cognitive impairment symptoms

Table 4 shows the results of regression analyses, accounting for socioeconomic, demographic, and health behavior factors from previous waves, to investigate how childhood adversity (occurring before the age of 18) predicted psychiatric and cognitive impairment symptoms in later life. Participants who experienced two or more childhood adversities had later-life CES-D scores (overall $M = 1.38$) that were 25.8% higher than those without any childhood adversity ($p = .025$). Late-life anxiety scores (overall $M = 1.53$) were 5.0% higher ($p = .019$) and 10.1% higher ($p = .004$) for participants who experienced one and two or more childhood adversities as compared to those without any childhood stressors, respectively. In turn, childhood adversity was unrelated to late-life MMSE (overall $M =$ 26.62) and the total cognition summary score (overall $M = 21.34$), the latter of which became nonsignificant while controlling for participants' education level.

3.6 | Adulthood adversity predicting mental health and cognitive impairment symptoms

Table 5 displays the results of regression analyses, accounting for socioeconomic, demographic, and health behavior factors from previous waves, to investigate the associations between adversity during adulthood and late-life psychiatric and cognitive impairment symptoms. Participants who experienced one, two, or three or more adulthood adversities had CES-D scores (overall $M = 1.38$) that were 18.6% ($p = .003$), 24.2%

($p < .001$), and 51.1% ($p < .001$), higher, respectively, as compared to those without any adulthood adversity. Participants experiencing one, two, or three or more adulthood adversities had MMSE scores (overall $M = 26.62$) that were 2.8% ($p = .008$), 2.9% ($p = .024$), and 2.3% ($p = .034$) lower, respectively, than those not experiencing any adulthood adversity. Participants who experienced two adulthood adversities showed a 2.9% ($p = .014$) decrease in total cognition summary (overall $M = 21.34$) compared to those without any adulthood adversity.

4 | DISCUSSION

Given the significant prevalence of mental health problems and cognitive impairment among older adults (Ayers et al., 2007; Butters et al., 2008; Hasin et al., 2005; Sagna et al., 2014), recent longitudinal studies have investigated how ACEs affect cognitive function (Feeney et al., 2013; Sharifian et al., 2020; Xiang et al., 2022) and mental health (Arpawong et al., 2022) in both United States (Arpawong et al., 2022; Sharifian et al., 2020; Xiang et al., 2022) and Irish older adult populations (Feeney et al., 2013). These studies have consistently revealed poorer mental health and cognitive outcomes among older adults exposed to childhood adversity (Arpawong et al., 2022; Feeney et al., 2013; Sharifian et al., 2020; Xiang et al., 2022). However, none of these studies have comprehensively evaluated the roles of both childhood and adulthood adversities in relation to both psychiatric and cognitive impairment symptoms over an extended time period. The present study addressed this critical gap by estimating how both childhood and adulthood adversity are related to symptoms of late-life depression, anxiety, and cognitive impairment between 1992 and 2016, using a nationally representative, longitudinal sample of older adults in the United States.

Consistent with recent research (Bürgin et al., 2021), we found that childhood adversity was positively associated with adulthood adversity. As the life course perspective suggests (Giele & Elder, 1998), participants with one childhood adversity experienced 17.4% more stressors in adulthood than those without any childhood adversity. This finding indicates that the effects of lifetime adversity can persist for an extended period and suggests a possible continuity of life stressor exposure that could accumulate to negatively impact lifespan health. These findings are similar to another prior study, which found that adult offspring of Holocaust survivors who experienced childhood trauma had significantly higher levels of emotional abuse and neglect later in life (Murphy et al., 2023; Yehuda et al., 2001). The mechanism through which adversity persists across generations has been previously reported (Feeney et al., 2013) but is not fully understood and necessitates further investigation.

Engaging in unhealthy behaviors can negatively impact health in several ways. For example, our study found that symptoms of depression and anxiety, as well as cognitive impairment, were more frequent for current cigarette smokers. Our supplemental and bivariate analyses showed that participants who had experienced childhood adversity tended to have alcohol drinking problems (drinking two or more alcoholic beverages per day), were previous or current smokers (vs. never smoked), and were obese (body mass index ≥ 30 kg/m^2) during the study period. Similarly, those who experienced adulthood adversity tended to be previous or current smokers and obese. A prior study revealed that some children exposed to

early life stress show positive functional adaptations leading to better coping and resilience against adversities later in life (Gröger et al., 2016). On the other hand, other children may engage in maladaptive behavior (Gröger et al., 2016). These behavioral strategies that could contribute to behavioral problems (Miller et al., 2011) and negative health outcomes, such as serious injuries, motor vehicle accidents, being shot/stabbed, or beaten up, and substance dependence (Enoch et al., 2010). Unhealthy behaviors adopted during childhood are likely to be maintained during adulthood (Hofvander et al., 2009), and have been linked to the development and progression of dementia (Rusanen et al., 2011). However, additional studies are needed to further examine how various health behaviors impact psychiatric and cognitive impairment symptoms in older adults, especially while considering other relevant factors, such as SES.

When controlling for health behaviors and socioeconomic factors, we found that symptoms of depression and anxiety were predicted by both childhood and adulthood adversity. Other studies have indicated that childhood adversity may be associated with a higher probability of experiencing an adulthood psychiatric disorder, major depression (Radford et al., 2017), panic disorder and anxiety (McEwen et al., 2012), and mood disorders (McEwen et al., 2012; Radford et al., 2017). Although the mechanisms underlying these associations remain unclear, childhood adversity may lower the threshold needed to develop depressive symptoms following recent life stress (Slavich et al., 2011) and may activate neurobiological pathways (e.g., involving inflammation) that can induce both depression and anxiety symptoms (Slavich, 2020, 2022; Slavich & Irwin, 2014; Slavich et al., 2023). The cumulative impact of life stress can also affect cognitive functions (Shields et al., 2017; Shields & Slavich, 2017). Prior studies have examined links between depression and cognitive impairment (Bennett & Thomas, 2014; Hayes et al., 2012). Our supplementary analysis supports this association by revealing a relation between declining cognitive function, as measured by MMSE and the total cognition summary score, and an increase in symptoms of depression (measured by CES-D) and anxiety in previous waves, even after controlling for lifetime adversities. In addition, we found that adult adversities predicted lower cognitive functions as indexed by both the MMSE and total cognition summary score, which is consistent with a prior study (Greenberg et al., 2014).

As mentioned above, adopting unhealthy behaviors may lead to cognitive decline and possibly dementia (Lovallo et al., 2013). In addition, the observed association between lifetime adversity and cognitive impairment symptoms could have a biological basis whereby lifetime stress triggers the reprogramming of immune cells through epigenetic markings, posttranslational modifications, and/or tissue remodeling (Miller et al., 2011). The resulting hormonal milieu can have a stronger pro-inflammatory tendency, coupled with behavioral proclivities; this may lead to vigilance, mistrust, poor social ties, impulsivity, future discounting, and a less healthy lifestyle (Miller et al., 2011). Specifically, the epigenetic processes as a consequence of maltreatment may diminish brain-derived neurotrophic factor gene expression, lower cognitive abilities (Ehlert, 2013), or increase susceptibility to the neurological effects of early life stress (Weder et al., 2014). The increased pro-inflammatory state may expedite an amyloid cascade while reducing cognitive reserves and accumulating hippocampal insults, which may accelerate the onset of cognitive

decline and dementia (Ritchie et al., 2015). As the present study did not include biological variables, these associations must be investigated in future research.

Interestingly, the significant association we found between childhood adversities and total cognitive summary score became nonsignificant when educational attainment was included in the model. Prior research has indicated that education could serve as a mediator, influencing the impact of ACEs on cognitive function (Montez & Hayward, 2014). That study found that individuals from socioeconomically disadvantaged backgrounds who achieved higher education levels had comparable or even better total and active life expectancies than those from advantaged childhoods with lower education levels (Montez & Hayward, 2014). Similarly, a study among English adults found no association between childhood adversity and later-life memory function, and the inclusion of socioeconomic circumstances in the model attenuated the once-significant association between being in a residential care institution and memory function (O'Shea et al., 2021). It is plausible that individuals who experienced adversity in childhood may exhibit resilience (Werner, 1997) by effectively adapting to adversity or maintaining healthy cognitive aging through their developed healthy behaviors (Richards & Deary, 2005).

4.1 | Strengths and limitations

The present study makes a valuable contribution to the literature on stress and health insofar as it used a comprehensive individual-level, longitudinal data set spanning an extended study period from 1992 to 2016, dating back to when the researchers first initiated this project. This extensive timeframe allowed for a thorough exploration of the association between lifetime adversity and symptoms of depression, anxiety, and cognitive impairment in later stages of life.

At the same time, several limitations should be noted. First, since this was an observational study, causal conclusions cannot be drawn from the data. Second, the adversity measures did not assess other commonly occurring stressors (e.g., sexual assault, neglect/deprivation) or stressor exposure timing or duration, which are important variables to consider (Monroe & Slavich, 2020; Slavich, 2016, 2019). The absence of exposure timing information prevented us from adjusting for the total number of years assessed per individual, which could be relevant. Additionally, childhood and adulthood adversity were retrospectively measured by self-reports. Although multiple decades passed between the initial exposure to adversity and subsequent recall, these self-reports also could have been influenced by factors such as social desirability and cognitive biases that can affect reporting accuracy (Puterman et al., 2016). Nevertheless, prior studies have found high test-retest agreement among childhood adversity measures across time (Bürgin et al., 2021). Furthermore, it is important to consider that measurement errors in the responses could potentially introduce attenuation bias to our study results. The estimate would be biased toward zero, as participants who experienced severe childhood or adulthood adversity may also have died earlier or been institutionalized in greater proportions. Consequently, the present analyses may be more likely to underestimate the true negative effects of childhood and adulthood adversity on health, merely providing the lower bound estimates of the effects.

Third, the sample size was reduced when merging multiple data sets, thus making statistical estimation less precise. Fourth, it is possible that attrition could have biased our analyses, as the longitudinal data of 24-year period was used. However, the HRS's attrition rate is low, with a reinterview rate of over 90% (Banks et al., 2011). Additionally, although it would be ideal to have nonmissing data, our research design does not necessarily require a balanced panel. We accounted for missing data by applying panel weights that enable us to interpret our findings as being representative of the HRS's original nationally representative sample population. Furthermore, it is likely that those who suffered most from adverse life experiences were likely to leave the sample even if there was nonrandom attrition. Fifth, in our prediction of cognition, we did not incorporate depressive symptoms as a covariate. This decision was based on the potential mediating role of depressive symptoms on the association between stress and cognition, which could obscure the primary association we aimed to investigate — the direct impact of adversity on cognition. Finally, because the study was not designed to elucidate mechanisms linking stress with psychiatric symptoms or cognitive impairment, additional research is needed to neural, immune, and other processes that could play a role (Slavich, 2020, 2022; Slavich et al., 2023).

5 | CONCLUSIONS

In conclusion, we found that lifetime adversity was significantly associated with subsequent late-life depression, anxiety, and cognitive impairment symptoms in a nationally representative, longitudinal sample of older adults in the United States. These data highlight the long-term negative impacts of stressor exposure on health, as well as the potential roles that health behaviors and socioeconomic factors play in promoting late-life mental health and cognitive impairment difficulties. The data further suggest that policymakers, health care providers, and researchers who want to understand psychosocial risk for poor mental and cognitive health may benefit from assessing stressor exposure over the life course as a means of evaluating a common risk factor for several key health outcomes (Polick et al., 2021; Valderhaug & Slavich, 2020). Indeed, assessing stressor exposure may be beneficial in health care settings insofar as health care providers who are knowledgeable about patients' adversity histories may be better able to provide trauma- and resilience-informed care that includes intervening to reduce the negative effects that lifetime adversity has on mental and cognitive health.

Looking forward, several evidence-based strategies exist for reducing the negative health impacts of stress on mental and cognitive health (Shields et al., 2020), but additional research is needed to elucidate the biological processes underlying these effects (Furman et al., 2019). Such work may lead to new pharmacological treatments for dementia (LaMotte, 2019). It may also yield new theories of how lifetime adversity accumulates to impact a wide variety of health outcomes that collectively cause substantial morbidity and mortality (Slavich & Shields, 2018).

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in The Health and Retirement Study at https://hrs.isr.umich.edu/data-products.

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TABLE 1

Variables of interest by last-observed mental health and cognitive impairment symptoms (unweighted) (n = 3496).

	% or Mean (±SD)								
	All	**CES-D in 2016**	***p*** [a]	**Anxiety in 2012**	***p***	**MMSE in 2016**	***p***	**Total cognition summary score in 2016**	***p***
Age (in 2016)	76.0 (±7.6)								
Sex			<.001		.075		.006		.087
Male	40.1	1.1 (±1.6)		1.5 (±0.6)		26.4 (±3.8)		21.1 (±5.0)	
Female	59.9	1.6 (±2.0)		1.6 (±0.6)		26.8 (±4.0)		21.5 (±5.5)	
Marital status (in 2016)			<.001		<.001		<.001		<.001
Living without a spouse/partner	44.7	1.8 (±2.1)		1.6 (±0.6)		26.1 (±4.4)		20.3 (±5.5)	
Living with a spouse/partner	55.3	1.1 (±1.7)		1.5 (±0.5)		27.1 (±3.4)		22.1 (±5.0)	
Race/ethnicity			<.001		<.001		<.001		<.001
Non-Hispanic White	71.1	1.2 (±1.8)		1.5 (±0.5)		27.2 (±3.6)		22.3 (±4.9)	
Non-Hispanic African American	15.7	1.7 (±2.0)		1.6 (±0.6)		25.3 (±4.2)		18.9 (±5.5)	
Hispanic	11.0	2.1 (±2.3)		1.6 (±0.7)		25.2 (±4.6)		18.8 (±5.7)	
Other	2.3	1.6 (±1.7)		1.6 (±0.6)		25.4 (±4.3)		20.7 (±5.4)	
Total household income (in 2016)	$60,058 (±$94,630)								
Education			<.001		<.001		<.001		<.001
Less than high school	18.7	2.1 (±2.2)		1.7 (±0.7)		23.9 (±4.6)		17.1 (±5.2)	
GED/High school	35.1	1.4 (±1.9)		1.6 (±0.6)		26.6 (±3.6)		20.8 (±4.9)	
Some college	22.7	1.3 (±1.8)		1.5 (±0.5)		27.5 (±3.5)		22.5 (±4.5)	
College and above	23.6	1.0 (±1.7)		1.4 (±0.5)		27.8 (±3.0)		24.0 (±4.5)	
Cigarette smoking (in 2016)			<.001		<.001		.032		<.001
Never smoked	44.9	1.4 (±1.9)		1.5 (±0.6)		26.7 (±4.0)		21.6 (±5.5)	
Formerly but not now	47.5	1.3 (±1.8)		1.5 (±0.6)		26.6 (±3.8)		21.2 (±5.2)	
Current	7.6	1.8 (±2.2)		1.6 (±0.6)		26.3 (±3.6)		20.7 (±5.3)	
Mean number of alcohol drink per day (in 2016)	0.3 (±0.7)								
Total physical activity (0–18) (in 2016)	6.5 (±6.5)								
Childhood adversity (0–6) (1992–2014)	0.6 (±0.9)		<.001		<.001		<.001		<.001
0	62.0	1.2 (±1.8)		1.5 (±0.5)		26.7 (±3.8)		21.6 (±5.3)	
1	25.0	1.4 (±1.9)		1.6 (±0.6)		26.9 (±3.4)		21.4 (±5.1)	

	% or Mean (±SD)								
	All	**CES-D in 2016**	***p*** [a]	**Anxiety in 2012**	***p***	**MMSE in 2016**	***p***	**Total cognition summary score in 2016**	***p***
2+	13.0	1.9 (±2.2)		1.7 (±0.6)		26.8 (±3.5)		21.3 (±4.9)	
Adulthood adversity (0–8) (1992–2014)	1.8 (±1.4)		<.001		-		<.001		<.001
0	21.0	0.9 (±1.6)		-		27.2 (±3.4)		22.1 (±5.0)	
1	26.7	1.1 (±1.7)		-		26.7 (±4.0)		21.6 (±5.2)	
2	25.1	1.6 (±1.9)		-		26.4 (±4.1)		21.0 (±5.4)	
3+	27.2	1.8 (±2.1)		-		26.4 (±4.0)		20.8 (±5.5)	

Abbreviations: CES-D, Center for Epidemiological Studies-Depression; MMSE, Mini-Mental State Examination; SD, standard deviation.

[a] *p* Value based on multivariate tests on means (mvtest on Stata). A higher CES-D score (observed in 2016) indicates worse depression. A higher anxiety score (observed in 2012) indicates worse anxiety. A higher MMSE score (observed in 2016) indicates a lower risk of cognitive impairment. A higher total cognition summary score (observed in 2016) indicates better cognition.

TABLE 2

Adversity experiences of study participants (unweighted) from 1992 to 2014 in the Health and Retirement Study (HRS) (n = 3496).

	n	%
Childhood adversity		
Relocated due to financial difficulties	132	3.8
Family received financial help	126	3.6
Father ever unemployed	138	4.0
Trouble with police before age 18	170	4.9
Repeated school	477	13.6
Physically abused	249	7.1
Parents used drugs or alcohol	532	15.2
Adulthood adversity		
Experienced the death of a child	587	16.8
Experienced the death of a spouse	487	13.9
Experienced a natural disaster (after age 17)	740	21.2
Fired a weapon in combat	208	6.0
Ever had a partner addicted to drugs or alcohol	775	22.2
Been a victim of a physical attack (after age 17)	264	7.6
Ever had a spouse or child with a serious illness	1234	35.3
Ever received Medicaid	714	20.4
Ever received food stamps	723	20.7
Ever been unemployed looking for work or temporarily laid off	477	13.6

TABLE 3

Regression analysis examining associations between childhood adversity and adulthood adversity from 1992 to 2016 in the Health and Retirement Study (HRS) (n = 3496).

	Coef.	Δ%	*p*
Childhood adversity (reference = 0)			
1	0.30	17.4	.003
2+	0.18	10.6	.249
Age	−0.01	−0.4	.515
Gender (reference = male)			
Female	0.20	11.9	.023
Once-lagged marital status (reference = living without a spouse/partner)			
Living with a spouse/partner	−0.21	−12.3	.011
Race/ethnicity (reference = non-Hispanic White)			
Non-Hispanic African American	0.37	21.7	.016
Hispanic	0.41	24.0	.022
Other	0.02	1.2	.928
Once-lagged total household income	<0.001	<0.001	.781
Education (ref = less than high school)			
GED/High school	−0.28	−16.5	.023
Some college	−0.02	−1.4	.863
College and above	−0.37	−21.6	.009
Once-lagged cigarette smoking (ref = never smoked)			
Formerly but not now	0.15	8.7	.079
Current	0.14	8.1	.380
Once-lagged alcohol use	−0.05	−2.9	.281
Once-lagged total physical activity	−0.01	−0.6	.040

Note: We controlled for study year (wave). Δ% = (Coefficient/$M_{\text{dependent variable}}$) × 100.

Abbreviation: Coef., coefficient.

TABLE 4

Regression analyses examining associations between childhood adversity and mental health and cognitive impairment symptoms from 1992 to 2016 in the Health and Retirement Study (HRS) (n = 3496).

	CES-D			Anxiety			MMSE			Total cognition summary score		
	Coef.	**Δ%**	***p***	**Coef.**	**Δ%**	***p***	**Coef.**	**Δ%**	***p***	**Coef.**	**Δ%**	***p***
Childhood adversity (reference = 0)												
1	0.08	6.1	.351	0.08	5.0	.019	0.04	0.2	.876	−0.09	−0.4	.694
2+	0.36	25.8	.025	0.15	10.1	.004	−0.04	−0.1	.928	0.06	0.3	.854

Note: A higher CES-D (observed 1994–2016) indicates worse depression. A higher anxiety score (observed 2006–2012) indicates worse anxiety. A higher MMSE score (observed 2016) indicates a lower risk of dementia. A higher total cognition summary score (observed 1996–2016) indicates better cognition. We control for age, sex, race/ethnicity, education, and study year (wave) in all models. We also control for once-lagged marital status, total household income, cigarette smoking, alcohol use, and total physical activity in all models. Standard errors are adjusted for heteroscedasticity and clustered at the individual-level. Δ% = (Coefficient/$M_{\text{dependent variable}}$) × 100.

Abbreviations: CES-D, Center for Epidemiological Studies-Depression; Coef., coefficient; MMSE, Mini-Mental State Examination.

TABLE 5

Regression analyses examining associations between adulthood adversity and mental health and cognitive impairment symptoms from 1992 to 2016 in the Health and Retirement Study (HRS) (n = 3496).

	CES-D			MMSE			Total cognition summary score		
	Coef.	**Δ%**	***p***	**Coef.**	**Δ%**	***p***	**Coef.**	**Δ%**	***p***
Adulthood adversity (reference = 0)									
1	0.26	18.6	.003	−0.76	−2.8	.008	−0.43	−2.0	.076
2	0.33	24.2	<.001	−0.76	−2.9	.024	−0.61	−2.9	.014
3+	0.70	51.1	<.001	−0.60	−2.3	.034	−0.47	−2.2	.058

Note: A higher CES-D (observed 1994–2016) indicates worse depression. A higher MMSE score (observed 2016) indicates a lower risk of dementia. A higher total cognition summary score (observed 1996–2016) indicates better cognition. We control for age, sex, race/ethnicity, education, and study year (wave) in all models. We also control for once-lagged marital status, total household income, cigarette smoking, alcohol use, and total physical activity in all models. Standard errors are adjusted for heteroscedasticity and clustered at the individual-level. Δ% = (Coeffcient/$M_{\text{dependent variable}}$) × 100.

Abbreviations: CES-D, Center for Epidemiological Studies-Depression; Coef., coefficient; MMSE, Mini-Mental State Examination.