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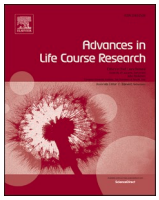

Daily health and well-being among caregivers with multiple adverse childhood experiences: The role of family support and strain☆

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ABSTRACT

Background and objective: Caregiving for aging parents is a prevalent experience for middle- and older adults in the US. Utilizing a life course perspective to family caregiving, this study examined the associations between providing care to parents and four daily well-being outcomes while also testing the moderating roles of Adverse Childhood Experiences (ACEs) and current family support or strain.
Participants and setting: Using data from the National Study of Daily Experiences 3, a daily diary project of the Midlife in the United States study (MIDUS), we analyzed a sample of 434 caregivers and their 1123 daily diary records. A multilevel modeling approach was used to examine intra-individual patterns.
Results: For caregivers who reported three or more ACEs, daily negative affect was higher on days they provided care compared to days they did not. For these caregivers, positive family support buffered the associations between daily caregiving to parents and higher negative affect, lower positive affect, and poorer sleep quality. Family strain exacerbated the effects of daily caregiving to parents on higher negative affect, lower positive affect, more physical symptoms, and poorer sleep quality.
Conclusions: ACEs may play a crucial role in contextualizing caregivers' daily health outcomes. The findings of the current study enhance our understanding of adult-child caregivers who experienced multiple ACEs and highlight their need for trauma-informed support.

In the U.S., the number of family caregivers for older adults increased from 18.2 million in 2011–24.1 million in 2022, with many adult children playing primary roles in this care (Luichies et al., 2021; Wolff et al., 2025). While caregiving can be rewarding, the challenges and burdens associated with caring for aging parents are well-documented (Pillemer et al., 2020; Schulz et al., 2020). Previous studies have identified several health-related risk factors, including limited social support and poor relationship quality with the care recipients (Luichies et al., 2021; Merz et al., 2009; Pillemer et al., 2020; Pearlin et al., 1990).

The life-course perspective is a well-established framework for understanding factors that affect caregiver outcomes, emphasizing that the caregiving role of adult children is influenced not only by their current family context but also by earlier experiences in their family of origin (Kong et al., 2021). More recently, research on Adverse Childhood Experiences (ACEs) has emerged as a critical lens within this perspective, highlighting the long-term impact of childhood adversity on adult caregiving roles and well-being (Kong & Moorman, 2015; Liu et al., 2018; Qin et al., 2023).

These studies, however, have primarily focused on specific traumatic events, such as abuse and neglect, without evaluating a broader range of adverse childhood experiences. Prior research on family violence indicates that adverse events within a family rarely occur in isolation; rather, they are often part of a complex web of interrelated issues. Therefore, a more holistic approach is necessary to assess the exposure to multiple adversities and their potential long-term impacts on adult caregivers (Brown et al., 2019; Finkelhor et al., 2007; Nurius et al., 2015).

The current study aims to advance the life-course approach to family

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caregiving by investigating how childhood adversity and current family support or strain affect the association between caring for aging parents and health and well-being outcomes. We used daily diary data from the third wave of the National Study of Daily Experiences (NSDE 3) within the Midlife in the US (MIDUS) studies to improve the empirical rigor of our analysis. The daily dairy methodology (Almeida, 2004; Almeida et al., 2020) allowed us to examine within-person associations between caregiving to parents and daily outcomes, including negative and positive affect, physical symptoms, and sleep quality. That is, we investigated how day-to-day variations in providing care to parents were associated with changes in the same individuals' emotional and physical well-being. This study has the potential to deepen scientific understanding of caregivers who have experienced childhood adversity, ultimately informing programs and services to better support caregivers with unique circumstances and needs.

1. The Life Course and the Stress Process Frameworks in Caregiving

The stress and coping models (Pearlin et al., 1990; Lazarus & Folkman, 1984) are among the most widely referenced frameworks in family caregiving research. These conceptual models highlight how caregiving stress can influence the health and well-being of caregivers, with the impact depending on the caregiving context. Several contextual factors have been identified as influencing the association between caregiving stress and caregivers' health and well-being. These factors include caregivers' background characteristics (e.g., gender, socio-economic status), psychological resources, coping strategies, and the perceptions and availability of social support (Apgar & Zerrusen, 2024; Raina et al., 2004; Schulz et al., 2020).

The life course perspective (Elder et al., 2003) suggests that an individual's early life experiences can accumulate and either interact with or mediate current life circumstances to affect later life outcomes and relationships. This perspective provides important insights into the potential moderating and mediating factors that connect caregiver stress to health and well-being. Taking into account the historical context of a person's life trajectory, this perspective helps us make conceptual connections between past experiences and their current circumstances and outcomes (Elder, 1994; Elder et al., 2003; Settersten, 2015). When considering the stress process, examining the relational histories between adult-child caregivers and their aging parents may help us better understand caregiving experiences and caregivers' health and well-being.

A limited number of studies have explored the experiences and outcomes of caregivers who experienced parental maltreatment during their childhood and are now adult-child caregivers for their once-abusive parents. These studies utilized data from two national surveys: the MIDUS and the Wisconsin Longitudinal Study. Findings indicate that about 9–26 % of adult-child caregivers reported having a history of childhood maltreatment inflicted by the parent they now care for (Kong & Moorman, 2015; Kong, 2018). Caregivers with such a background exhibited more negative mental health outcomes compared to those who were not maltreated, and contributing factors included lower self-esteem, the use of maladaptive coping strategies, and diminished emotional closeness with their parents (Kong & Moorman, 2015; Kong, 2018; Kong et al., 2021; Liu et al., 2018; Qin et al., 2023). These studies, however, primarily focused on cross-sectional associations and overlooked the nuanced interactions with the broader family.

1.1. Moderating Roles of Adverse Childhood Experiences and Current Family Support in Caregiving for Aging Parents

We sought to combine the life course perspective with stress and coping models to examine how the extent of childhood adversity could affect outcomes for these caregivers. In addressing childhood adversity, we employed a comprehensive assessment of adverse childhood experiences (ACEs), as defined by Felitti et al. (1998). ACEs encompass a collection of potentially traumatic events during childhood, such as emotional, physical, or sexual abuse, emotional or physical neglect, parental divorce, witnessing domestic violence, mental health problems, substance abuse, or imprisonment of a family member (CDC, 2020; Felitti et al., 1998; Ports et al., 2020). The foundational research on ACEs demonstrated significant associations between self-reports of ACEs and various health outcomes in adulthood (Felitti et al., 1998). Since then, numerous studies have replicated and extended the findings, confirming the long-term harmful effects of ACEs across various domains in adult life, including sociodemographic deprivation (Walsh et al., 2019), reduced flourishing (Wang et al., 2022), and poor relationship quality with spouses/partners (Andersson et al., 2021).

Building on prior findings focusing on a specific type of ACE and its relevance to mental health outcomes for adult-child caregivers (Kong & Moorman, 2015; Kong, 2018; Liu et al., 2018; Kong et al., 2021), we hypothesize that exposure to multiple ACEs may further undermine caregivers' health and well-being (Hughes et al., 2017; Bellis et al., 2015). These prior studies have noted that exposure to three or more, or four or more ACEs, depending on the number of items comprising the ACE scale, has been consistently associated with elevated risks for long-term health problems. Specifically, for adults with histories of multiple ACEs, their parents may have inflicted violence upon them or did not take measures to protect them from such adversities during their upbringing, which can affect their current relationships and interactions with their parents (Band-Winterstein, 2014; Hu et al., 2024; Savla et al., 2013). Despite the potentially harmful effects, these adult children might care for their parents out of obligation or constrained choice rather than freely made decisions, as their caregiving may be influenced by moral or cultural norms of filial responsibility, a lack of public policies to support options for care for the parent, or other family circumstances and dynamics (Qian et al., 2024; NAC and AARP, 2015).

We also consider the level of family support available to caregivers as another context and potential moderator, alongside ACEs, in shaping caregiving outcomes. We focus on family-level social support, which refers to the perceived availability of instrumental and/or emotional support from other family members, often including both positive (e.g., encouragement, shared caregiving tasks) and negative (e.g., conflict, criticism) aspects of family dynamics (Sapin et al., 2016; Umberson & Thomeer, 2020). In stress and coping models of caregiving, social support is a widely recognized contextual factor that can help mitigate the impact of stressors on caregivers' health and well-being (Xu et al., 2021). Additionally, adults with a history of childhood abuse tend to report lower levels of positive family support and higher levels of family strain compared to those without such experiences, which were further linked to poorer psychological functioning (Kong et al., 2019; Shaw & Krause, 2002). More research indicates that negative childhood experiences within parent-child relationships can undermine the extent and quality of caregiving for aging parents (Kong et al., 2022; Lin & Hammersmith, 2024; Lin & Wu, 2019). However, further work is needed to better understand the nuanced dynamics involving ACEs and family support within the context of caregiving.

Positive family support can have powerful and fulfilling benefits, especially for individuals who have experienced multiple ACEs (Brinker & Cheruvu, 2016). The long-term effects of ACEs may be lessened if adult-child caregivers receive positive support from their families (Webster et al., 2022; Carvalho et al., 2021). However, adults who experienced childhood adversity often perceive greater relationship strain and receive more negative support from their family members compared to those without such experiences. These negative family interactions may worsen the adverse impact of ACEs on caregiving outcomes (Apgar & Zerrusen, 2024).

1.2. The Present Study

Based on the life course and stress and coping frameworks, this study

examines how ACEs and current family support or strain shape the daily well-being outcomes of individuals providing care for aging parents. Our main conceptual contribution lies in a comprehensive assessment of various types of childhood adversities (ACEs), extending prior studies that focused on specific, single types of adversity in family caregiving. Our methodological contribution is to employ a daily diary approach, a growing, rigorous method in caregiving research that examines the daily experience of caregivers in real time and minimizes the gap between the actual provision of care and subsequent reflections on daily outcomes such as daily sleep patterns (van de Straat, 2021), psychological well-being (Telzer & Fuligni, 2009), and daily affect (Liu et al., 2015). More importantly, this approach allows for the estimation of within-person associations– that is, how day-to-day variations in caregiving relate to changes in the same individuals' emotional and physical states, while controlling for the influence of person-level attributes (Mehl & Conner, 2013).

We hypothesize the following:

(a) There are within-person associations between caregiving for parents and negative outcomes across days (i.e., higher negative affect, lower positive affect, more physical symptoms, and poorer sleep quality);

(b) Multiple adverse childhood experiences (ACEs) exacerbate the negative within-person associations between caregiving for parents and daily outcomes;

(c) Positive family support buffers the within-person associations between caregiving for parents and daily outcomes for caregivers with higher ACEs compared to those with lower ACEs;

(d) Family strain exacerbates the within-person associations between caregiving for parents and daily outcomes for individuals with higher ACEs compared to those with lower ACEs.

2. Methods

2.1. Study Sample and Data Source

Data were obtained from the third wave of the Midlife in the United States study (MIDUS) and the National Study of Daily Experiences (NSDE). MIDUS is a longitudinal study that began in 1995–1996 and surveyed 7108 Americans aged 25–74 about the various aspects of adult lives such as family relationships, lifestyles, and health/well-being. Follow-up surveys were conducted in 2004–2006 (MIDUS II) and 2013–2014 (MIDUS III) with high retention rates (e.g., 77 % of living participants responded to the MIDUS III telephone survey; Ryff et al., 2019).

NSDE is an ancillary project of MIDUS, wherein a subsample of MIDUS respondents participated in daily diary surveys through telephone interviews over eight consecutive evenings. Unlike other time-use surveys, such as the American Time Use Survey (ATUS), which collect a single diary day per person focusing mainly on time allocation, NSDE surveys gather repeated daily measures from the same individuals, enabling more precise examination of temporal associations at the individual level, particularly for psychosocial variables such as daily affect or physical symptoms. Respondents were asked about their daily events and experiences that occurred in the past 24 h. During 2017–2019, NSDE 3 was administered to 1236 individuals who participated in NSDE 2 and completed the MIDUS 3 telephone survey. Among these study participants, 75.5 % of the respondents completed all eight interview days, 88.8 % completed at least seven interview days, and 93.3 % completed at least six interview days.

The final study sample included 434 NSDE 3 respondents (1123 person-days) who reported providing daily disability-related assistance to any family member or friend at least one day. Among them, 55 individuals reported providing care to a parent on one or more days, and these reports were used to construct the key predictor variable indicating parental caregiving. Caregiving to other types of family members (e.g., spouse, child) was included as covariates.

3. Measures

3.1. Daily, Within-Person Measures from the NSDE Study

3.1.1. Daily caregiving to parents

Respondents were asked if they provided disability-related assistance on a particular day (i.e., "since (this time/we spoke) yesterday, did you spend any time providing assistance to someone who has a disability, health problem, or other special needs?"), and if so, to whom they provided such care. The care recipient list included close family members such as parents, spouses, or children and individuals in one's larger social network such as friends and neighbors. We created a binary variable indicating whether (=1) or not (=0) respondents provided disability-related assistance to parents on a given day. This variable for each day was used as a within-person indicator of daily caregiving to parents. In order to control for a between-person indicator of daily caregiving to parents, we created respondents' overall exposure to parental care by calculating the proportion of study days that caregiving to parents had occurred.

3.1.2. Daily affect

Daily negative and positive affect were assessed using the Positive and Negative Affect Schedule scales (PANAS; Watson et al., 1988; Charles et al., 2023). Each day, respondents were asked about how much they experienced 14 different negative emotions, including being restless or fidgety, nervous, worthless, everything was an effort, and hopeless ($\alpha = 0.87$). Daily positive affect was measured by responses to 13 positive emotions, including being in good spirits, cheerful, confident, enthusiastic, and satisfied ($\alpha = 0.93$). Respondents rated the items on a 5-point scale (0 = none of the time, 4 = all of the time). Total scores for each day were calculated by averaging the specific affect items.

3.1.3. Daily physical symptoms

Daily physical symptoms were assessed using a shortened version of the physical symptom checklist (Larsen & Kasimatis, 1991; Leger et al., 2015). Respondents were asked about whether (=1) or not (=0) they experienced 23 different symptoms each day, including headaches, backache, muscle soreness, sore throat, fever, nausea, diarrhea, chest pain, dizziness, and other symptoms/discomforts. A total score for each day was calculated by summing the number of yes responses.

3.1.4. Daily sleep quality

Each day, respondents were asked about their subjective sleep quality (Buysse et al., 1991) last night using a single item and rated the item on a 4-point scale (0 = very bad, 4 = very good). Because the item assessed last night's sleep quality, we regressed it on both lagged (previous day) and concurrent (same day) measures of caregiving to parents in the analytic models.

3.2. Between-Person Measures from the MIDUS Study

3.2.1. Adverse childhood experiences (ACEs)

Based on the guidance of Danielson and Sanders (2018), respondents' exposure to ACEs was measured by retrospective self-reports of seven different childhood adversities: mother's or father's neglect, mother's or father's emotional abuse, mother's or father's physical abuse, sexual assault (perpetrator not specified), living with a household member with substance abuse problems, parental divorce/separation/death during childhood, and financial distress. We note that, due to data limitations, it is not possible to confirm which parent received the caregiving reported on different days. Supplementary Table 1 lists specific items and response categories of the ACEs items in MIDUS. Each of the seven ACE items was recoded as a binary variable (1 = experienced the specific adverse event, 0 = did not experience the event), which was then summed to create a composite score of ACEs. To assess the effect associated with high levels of conflict and adversity (Hughes

et al., 2017), we dichotomized the composite score of ACEs, where 3 or more ACEs (= 1) indicated exposure to multiple ACEs versus 0–2 ACEs (= 0).

3.2.2. Family support and strain

Family support measures included positive and negative aspects (Walen & Lachman, 2000). The items were not assessed daily but were drawn from the main MIDUS 3 survey in 2013–2014. Positive family support was measured by eight items that asked about respondents' perceptions of support availability from spouses/partners and other family members. First, four items were asked about relationships with a spouse: (a) "How much does your spouse or partner really care about you?" (b) "how much does he/she understand the way you feel about things?" (c) "how much can you rely on him/her for help if you have a serious problem?" and (d) "how much can you open up to him/her if you need to talk about your worries?" The same set of four questions was asked about the relationship with other family members (e.g., "Not including your spouse or partner, how much do members of your family really care about you?"). Respondents rated the items on a 4-point scale (1 = not at all, 2 = a little, 3 = some, 4 = a lot). The total score was calculated by averaging these eight items (α = 0.85), with higher scores indicating greater positive family support.

Family strain was measured by eight items. First, four items were asked regarding the relationship with a spouse: How often does your spouse or partner (a) "make too many demands on you?" (b) "criticize you?" (c) "let you down when you are counting on him/her?" (d) "get on your nerves?" The same set of four questions was asked regarding the relationship with other family members (e.g., "Not including your spouse or partner, how often do members of your family make too many demands on you?"). Respondents rated the items on a 4-point scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often). The total score was calculated by averaging these eight items (α = 0.80), with higher scores indicating greater negative strain.

3.2.3. Covariates

Informed by existing literature on intergenerational caregiving (Luichies et al., 2021; Pillemer et al., 2020; Schulz et al., 2020), we controlled for a set of socio-demographic variables, including gender, race/ethnicity, partnership status (married or cohabitating vs. unmarried, divorced, separated, or widowed), age, education level (treated as continuous; Boylan et al., 2015; Morozink et al., 2010), and self-rated health. We also controlled for daily caregiving to spouses, children, siblings, and friends/others.

3.3. Analytic Strategy

We conducted two-level random-intercept models to examine hypotheses. The multilevel modeling approach can account for the nested data structure where an individual is considered a cluster (Level 2; between-person level) and repeated measures across the eight days are considered variations within an individual (Level 1; within-person level). This data structure allowed us to disaggregate between-person and within-person components in daily predictors, such as daily caregiving to parents (Curran & Bauer, 2011). While between-person associations concern the cross-sectional differences between individuals (e.g., daily affect of individuals who cared more days versus those who cared less), within-person associations examine variations within an individual and their associated changes (e.g., one's daily affect on caregiving days versus non-caregiving days). In the study sample, about half of the respondents provided daily disability-related assistance to parents for one or two days. Pearson's correlation coefficient between the positive and negative family support measures was −0.52 ($p < .001$), so we estimated their moderating effects in separate models. STATA software was used for the set of analyses.

4. Results

Table 1 presents descriptive statistics of the sample characteristics. In the total sample of 434 adult caregivers, 62.3 % were women, 80.2 % were non-Hispanic white, and 63.4 % were married. On average, respondents were 63.1 years old (range: 43 –90), reported 3 or more years of college ($M = 7.82$, $SD = 2.47$), and reported a good health status ($M = 3.50$, $SD = 0.97$). On average, the respondents reported 1.4 ACEs. A series of bivariate analyses were conducted to examine significant differences in key outcome measures by the ACEs groups: a) those who experienced 0–2 ACEs, and b) those who experienced 3 or more ACEs. We did not observe a significant difference in daily caregiving to parents or daily sleep quality based on levels of Adverse Childhood Experiences (ACEs). However, we did find statistically significant differences among groups: individuals with 3 or more ACEs, compared to those with 0–2 ACEs, reported higher levels of daily negative affect, increased daily physical symptoms, greater family strain, lower daily positive affect, and less family support (Supplementary Table 2).

Tables 2 and 3 summarize the results of the multilevel models predicting daily negative affect. In Table 2, the key findings indicated that the main effect of within-person daily caregiving on daily negative affect was not statistically significant. Additionally, experiencing 3 or more ACEs did not significantly predict daily negative affect (Model 1). However, the between-person effect of caregiving on daily negative affect was statistically significant ($b = 0.30$, $se = 0.10$, $p < .01$). Specifically, individuals who cared for their parents more days on average exhibited greater daily negative affect throughout the study period compared to those who cared less frequently.

In Model 2, having 3 or more ACEs significantly moderated the within-person association between caregiving for parents and higher daily negative affect ($b = 0.39$, $se = 0.11$, $p < .001$). While Model 1 indicated no association between more caregiving days and negative

Table 1
Descriptive Statistics of the Study Sample (N = 434).

Variables	N or Mean (SD)	% or Observed Min./Max.
Gender	168	38.71 %
Male	266	61.29 %
Female		
Race	348	80.18 %
White	53	12.21 %
Black	33	7.60 %
Others		
Partnered	289	66.59 %
Age	63.13 (9.67)	43/90
Education	7.82 (2.47)	2/12
Self-rated health	3.50 (0.97)	1/5
Number of children	2.61 (1.78)	0/12
Cumulative score of ACEs	1.38 (1.44)	0/7
No ACE	153	35.25 %
1–2 ACEs	190	43.78 %
3 or more ACEs	91	20.97 %
Family support	3.49 (0.58)	1/4
Family strain	2.07 (0.59)	1/4
Daily caregiving to parents	0.11 (0.31)	0/1
Daily negative affect	0.21 (0.28)	0/2.86
Daily positive affect	2.74 (0.68)	0.08/4
Daily physical symptoms	2.57 (2.64)	0/15
Daily sleep quality	3.10 (0.58)	1/4

Note. Education was coded as: 1 = no school/some grade school, 2 = junior high school, 3 = some high school, 4 = ged, 5 = graduated from high school, 6 = 1–2 years of college, 7 = 3 or more years of college, 8 = college graduation (2-year, vocational), 9 = college graduation (4–5 year), 10 = some graduate school, 11 = master's degree, 12 = PhD or other advanced professional degree. Self-rated health was rated on a 5-point Likert scale (1 = poor; 5 = excellent). Family support/strain was rated on a 4-point scale (1 = not at all; 4 = a lot). Daily affect was rated on a 5-point scale (0 = none of the time; 4 = all of the time). Daily sleep quality was rated on a 4-point scale (0 = very bad; 4 = very good).

Table 2
Within-Person Association between Daily Caregiving to Parents and Daily Negative Affect: Moderating Effects of ACEs and Family Support.

	Daily Negative Affect		
	Model 1	Model 2	Model 3
	b (s.e.)		
Intercept	0.44 (0.11)***	0.45 (0.11)***	0.43 (0.13)**
Daily caregiving to parents (BP)	0.30 (0.10)**	0.26 (0.10)**	0.25 (0.09)**
Daily caregiving to parents (WP)	−0.12 (0.09)	−0.15 (0.09)	−0.31 (0.24)
3 or more ACEs[a]	0.03 (0.04)	−0.01 (0.04)	−0.01 (0.19)
Family support	−0.06 (0.03)*	−0.06 (0.03)*	−0.05 (0.03)
Daily caregiving to parents (WP) * 3 or more ACEs		0.38 (0.11)***	3.32 (0.61)***
Family support * 3 or more ACEs			0.00 (0.05)
Daily caregiving to parents (WP) * Family support			0.05 (0.06)
Daily caregiving to parents (WP) * 3 or more ACEs * Family support			−0.89 (0.18)***
Daily caregiving to spouse	0.02 (0.06)	0.03 (0.06)	0.02 (0.06)
Daily caregiving to children	0.09 (0.06)	0.09 (0.06)	0.09 (0.06)
Daily caregiving to sibling	0.04 (0.07)	0.04 (0.07)	0.03 (0.07)
Daily caregiving to friends and others	0.02 (0.05)	0.02 (0.05)	0.02 (0.05)
Male	−0.06 (0.03)	−0.05 (0.03)	−0.04 (0.03)
Black[b]	−0.01 (0.05)	−0.01 (0.05)	−0.03 (0.05)
Other races[b]	−0.08 (0.05)	−0.06 (0.05)	−0.06 (0.05)
Number of children	−0.02 (0.01)*	−0.02 (0.01)	−0.01 (0.01)
Partnered	−0.01 (0.04)	−0.01 (0.03)	−0.02 (0.03)
Age	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Education	0.01 (0.01)	0.00 (0.01)	0.01 (0.01)
Self-rated health	−0.06 (0.02)***	−0.07 (0.02)***	−0.07 (0.02)***
Random effect (95 % CI)			
Variance of intercept	0.05 (0.04, 0.06)	0.05 (0.04, 0.06)	0.04 (0.03, 0.05)
Residual variance	0.06 (0.05, 0.06)	0.06 (0.05, 0.06)	0.06 (0.05, 0.06)

Note. WP: within-person, BP: between-person. *$p < .05$, **$p < .01$, ***$p < .001$. [a]Reference category is 0–2 ACEs. [b]Reference category is White.

affect, Model 2 showed that this association was significant for individuals with a history of 3 or more ACEs. In other words, for caregivers who reported three or more ACEs, daily negative affect was higher on days they provided care compared to days they did not. In Model 3, which examined the moderating effects of both ACEs and family support, we found a significant three-way interaction. Greater family support buffered the within-person association between caregiving and higher daily negative affect for caregivers with 3 or more ACEs ($b = -0.89$, $se = 0.18$, $p < .001$). We conducted simple slopes tests, and Fig. 1 illustrates this three-way interaction. The first slope (indicating 3 or more ACEs with greater family support) was negative and significant (gradient $= -0.36$; $p < .05$), while the second slope (indicating 3 or more ACEs with less family support) was positive and significant (gradient $= 1.33$, $p < .001$).

Table 3
Within-Person Association between Daily Caregiving to Parents and Daily Negative Affect: Moderating Effects of ACEs and Family Strain.

	Daily Negative Affect		
	Model 1	Model 2	Model 3
		b (s.e.)	
Intercept	0.04 (0.08)	0.04 (0.08)	−0.03 (0.09)
Daily caregiving to parents (BP)	0.30 (0.09)**	0.26 (0.10)**	0.32 (0.10)**
Daily caregiving to parents (WP)	−0.12 (0.09)	−0.15 (0.09)	0.12 (0.17)
3 or more ACEs[a]	0.04 (0.04)	−0.00 (0.04)	0.24 (0.11)*
Family strain	0.10 (0.03)***	0.10 (0.02)***	0.13 (0.03)***
Daily caregiving to parents (WP) * 3 or more ACEs		0.37 (0.11)**	−4.59 (0.71)***
Family strain * 3 or more ACEs			−0.11 (0.05)*
Daily caregiving to parents (WP) * Family strain			−0.15 (0.07)*
Daily caregiving to parents (WP) * 3 or more ACEs * Family strain			2.10 (0.30)***
Daily caregiving to spouse	0.03 (0.06)	0.03 (0.06)	0.02 (0.06)
Daily caregiving to children	0.09 (0.06)	0.09 (0.06)	0.10 (0.06)
Daily caregiving to sibling	0.03 (0.07)	0.03 (0.07)	0.03 (0.07)
Daily caregiving to friends and others	0.02 (0.05)	0.02 (0.05)	0.02 (0.05)
Male	−0.04 (0.03)	−0.03 (0.03)	−0.04 (0.03)
Black[b]	−0.02 (0.05)	−0.02 (0.05)	−0.05 (0.04)
Other races[b]	−0.09 (0.05)	−0.08 (0.05)	−0.07 (0.05)
Number of children	−0.02 (0.01)*	−0.01 (0.01)	−0.01 (0.01)
Partnered	−0.01 (0.03)	−0.02 (0.03)	−0.01 (0.03)
Age	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Education	0.00 (0.01)	0.00 (0.01)	0.00 (0.01)
Self-rated health	−0.06 (0.02)***	−0.07 (0.02)***	−0.06 (0.01)***
Random effect (95 % CI)			
Variance of intercept	0.05 (0.04, 0.06)	0.04 (0.04, 0.05)	0.03 (0.03, 0.04)
Residual variance	0.06 (0.05, 0.06)	0.06 (0.05, 0.06)	0.06 (0.05, 0.06)

Note. WP: within-person, BP: between-person. *$p < .05$, **$p < .01$, ***$p < .001$. [a]Reference category is 0–2 ACEs. [b]Reference category is White.

Table 3 examined the moderating effects of ACEs and family strain. We found a significant three-way interaction, as illustrated in Fig. 2. Specifically, family strain exacerbated the association between caregiving and higher daily negative affect for caregivers with 3 or more ACEs ($b = 2.11$, $se = 0.30$, $p < .001$). The simple slope test indicated that this slope was positive and significantly differed from all other slopes ($p < .001$; gradient $= 3.36$, $p < .001$).

Tables 4 and 5 summarize the results of the multilevel models predicting three additional outcomes: daily positive affect, daily physical symptoms, and daily sleep quality. In these models, we did not find any significant within-person effects of caregiving. Furthermore, we did not find any significant moderating effects of ACEs on the within-person associations. Therefore, the corresponding hypotheses were not supported for these outcomes.

We did find statistically significant three-way interactions, as shown in Table 4, indicating that family support plays a protective role for individuals with 3 or more ACEs. Fig. 3 illustrates that the negative impact of caregiving for parents on daily positive affect was exacerbated

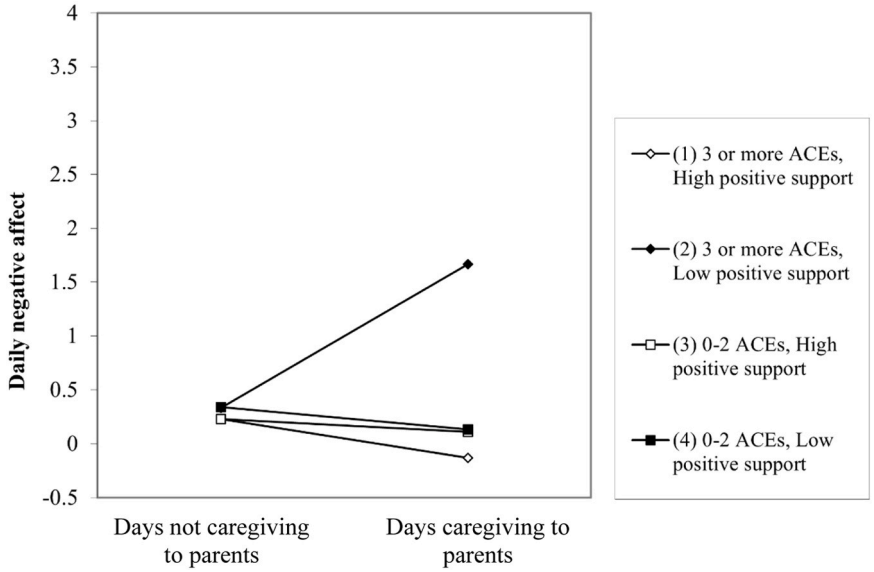

Fig. 1. Within-Person Association between Daily Caregiving to Parents and Daily Negative Affect: Moderating Effects of ACEs and Family Support.

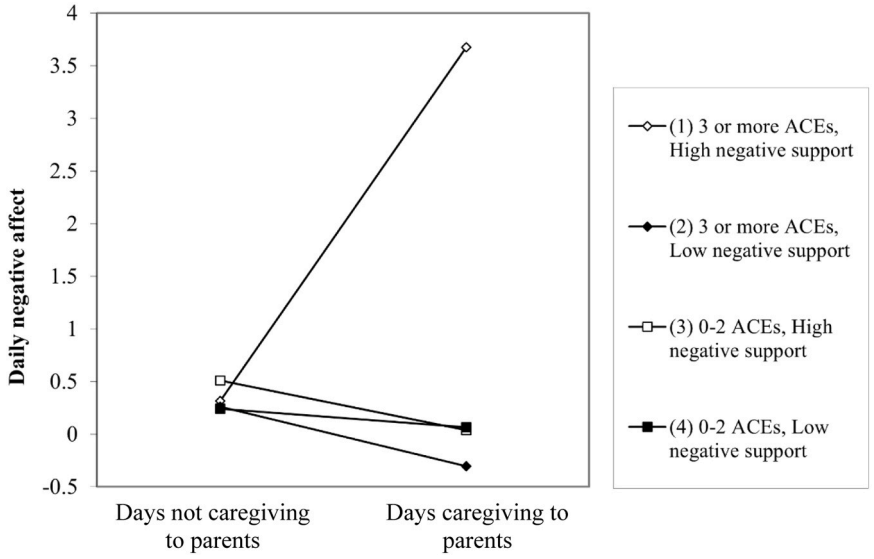

Fig. 2. Within-Person Association between Daily Caregiving to Parents and Daily Negative Affect: Moderating Effects of ACEs and Family Strain.

for those with 3 or more ACEs and lower levels of family support. For this group, the simple slope was negative and significant (gradient = −1.33, $p < .05$). Conversely, caregivers with 3 or more ACEs who had greater support showed a positive and marginally significant simple slope (gradient = 0.66, $p = 0.069$). A similar pattern emerged in the model predicting daily sleep quality, as depicted in Fig. 4. Table 5 summarizes the results of the models that examined the moderating roles of ACEs and family strain on various daily outcomes. Our findings consistently indicated that higher family strain exacerbated the harmful effects of caregiving for parents among those with 3 or more ACEs (See Figures S1–S3).

4.1. Supplementary analyses

To further investigate the nature of moderation, we separated family support measures into two types 1) spousal support and 2) support from extended family excluding partners and spouses. Tables S3 and S4 summarize the results of the models that examined the moderating effects of non-spousal family support. These results were substantially consistent with the main analytic models that we used the total family support variable. We also estimated the same sets of models using spousal support as the moderator. However, we did not find any other statistically significant main effects or moderating effects of daily caregiving, ACEs, and spousal support on the set of daily outcomes. These findings suggest that the significant effects of family support may primarily stem from relationships with non-spousal family members.

Additionally, we tested the moderating effects of ACEs and family support in other types of family caregiving, such as caregiving to spouses, children, and siblings. We did not uncover any significant moderating effects of ACEs and support in these associations, which aligns with our hypothesis that these relationships are particularly crucial for caregivers of parents.

5. Discussion

This study employs a life course approach to intergenerational caregiving by examining the long-term effects of childhood adverse experiences and the family context. It builds on previous research that

Table 4
Within-Person Association between Daily Caregiving to Parents and Other Daily Outcomes: Moderating Effects of ACEs and Family Support.

	Daily positive affect	Daily physical symptoms *b* (s.e.)	Daily sleep quality[c]
Intercept	1.80 (0.28)***	3.71 (1.12)**	2.84 (0.29)***
Daily caregiving to parents (BP)	−0.40 (0.17)*	−0.27 (0.83)	−0.23 (0.23)
Daily caregiving to parents (WP)	0.30 (0.47)	−0.53 (2.02)	1.04 (0.52)*
3 or more ACEs[a]	−0.46 (0.42)	1.33 (1.60)	0.26 (0.40)
Family support	0.21 (0.07)**	−0.20 (0.28)	0.08 (0.07)
Daily caregiving to parents (WP) * 3 or more ACEs	−3.54 (1.42)*	5.52 (5.20)	−3.90 (1.28)**
Family support * 3 or more ACEs	0.12 (0.12)	−0.28 (0.46)	−0.07 (0.12)
Daily caregiving to parents (WP) * Family support	−0.03 (0.13)	0.24 (0.53)	−0.27 (0.14)*
Daily caregiving to parents (WP) * 3 or more ACEs * Family support	1.02 (0.42)*	−1.77 (1.55)	1.17 (0.38)**
Daily caregiving to spouse	0.02 (0.10)	0.33 (0.52)	−0.01 (0.14)
Daily caregiving to children	−0.04 (0.11)	0.80 (0.52)	−0.13 (0.14)
Daily caregiving to sibling	−0.10 (0.13)	−0.38 (0.63)	−0.01 (0.17)
Daily caregiving to friends and others	0.11 (0.09)	0.07 (0.47)	−0.05 (0.13)
Male	0.20 (0.06)	−1.42 (0.24)***	0.03 (0.06)
Black[b]	0.14 (0.10)	−0.69 (0.39)	0.02 (0.10)
Other races[b]	0.03 (0.12)	−0.38 (0.44)	−0.01 (0.11)
Number of children	0.04 (0.02)*	−0.09 (0.07)	0.00 (0.02)
Partnered	0.06 (0.07)	−0.16 (0.29)	−0.04 (0.07)
Age	0.00 (0.00)	0.03 (0.01)*	0.00 (0.00)
Education	−0.03 (0.01)*	−0.10 (0.05)*	−0.02 (0.01)
Self-rated health	0.14 (0.03)***	−0.72 (0.13)***	0.09 (0.03)**
Random effect (95 % CI)			
Variance of intercept	0.28 (0.24, 0.33)	2.83 (2.21, 3.62)	0.14 (0.10, 0.19)
Residual variance	0.14 (0.13, 0.16)	4.31 (3.87, 4.80)	0.36 (0.32, 0.40)

Note. WP: within-person, BP: between-person. *$p < .05$, **$p < .01$, ***$p < .001$. [a]Reference category is 0–2 ACEs. [b]Reference category is White. [c]Lagged measure of caregiving to parents on daily sleep quality was not statistically significant and thus removed from the model.

has highlighted the lasting impact of childhood maltreatment on the mental health of adult-child caregivers (Kong et al., 2021; Liu et al., 2018; Qin et al., 2023). One of our innovations is the use of daily diary data to investigate the within-person associations between caregiving to parents and four daily well-being outcomes. Additionally, we used the

Table 5
Within-Person Association between Daily Caregiving to Parents and Other Daily Outcomes: Moderating Effects of ACEs and Family Strain.

	Daily positive affect	Daily physical symptoms *b* (s.e.)	Daily sleep quality[c]
Intercept	3.12 (0.18)***	0.95 (0.75)	3.34 (0.20)***
Daily caregiving to parents (BP)	−0.46 (0.17)**	0.05 (0.83)	−0.28 (0.23)
Daily caregiving to parents (WP)	0.14 (0.34)	3.04 (1.51)*	−0.14 (0.41)
3 or more ACEs[a]	−0.35 (0.27)	2.49 (0.99)*	−0.57 (0.25)*
Family strain	−0.29 (0.07)***	0.98 (0.25)***	−0.10 (0.06)
Daily caregiving to parents (WP) * 3 or more ACEs	3.87 (1.65)*	−16.68 (6.26)**	3.88 (1.61)*
Family strain * 3 or more ACEs	0.13 (0.12)	−0.97 (0.44)*	0.27 (0.11)*
Daily caregiving to parents (WP) * Family strain	0.03 (0.16)	−1.43 (0.64)*	0.14 (0.17)
Daily caregiving to parents (WP) * 3 or more ACEs * Family strain	−1.67 (0.68)*	7.03 (2.60)**	−1.68 (0.67)*
Daily caregiving to spouse	0.02 (0.10)	0.27 (0.52)	−0.01 (0.14)
Daily caregiving to children	−0.04 (0.11)	0.81 (0.52)	−0.15 (0.14)
Daily caregiving to sibling	−0.09 (0.13)	−0.35 (0.63)	−0.02 (0.17)
Daily caregiving to friends and others	0.11 (0.09)	0.11 (0.47)	−0.06 (0.13)
Male	0.16 (0.07)*	−1.35 (0.24)***	0.04 (0.06)
Black[b]	0.18 (0.10)	−0.81 (0.38)*	0.02 (0.10)
Other races[b]	0.07 (0.12)	−0.40 (0.44)	−0.01 (0.11)
Number of children	0.04 (0.02)*	−0.09 (0.38)*	0.00 (0.02)
Partnered	0.08 (0.07)	−0.11 (0.28)	−0.07 (0.07)
Age	0.00 (0.00)	0.03 (0.01)**	0.00 (0.00)
Education	−0.03 (0.01)*	−0.10 (0.05)*	−0.01 (0.01)
Self-rated health	0.14 (0.03)***	−0.70 (0.13)***	0.09 (0.03)**
Random effect (95 % CI)			
Variance of intercept	0.28 (0.23, 0.34)	2.62 (2.03, 3.37)	0.14 (0.10, 0.19)
Residual variance	0.14 (0.13, 0.16)	4.31 (3.88, 4.80)	0.36 (0.32, 0.40)

Note. WP: within-person, BP: between-person. *$p < .05$, **$p < .01$, ***$p < .001$. [a]Reference category is 0–2 ACEs. [b]Reference category is White. [c]Lagged measure of caregiving to parents on daily sleep quality was not statistically significant and thus removed from the model.

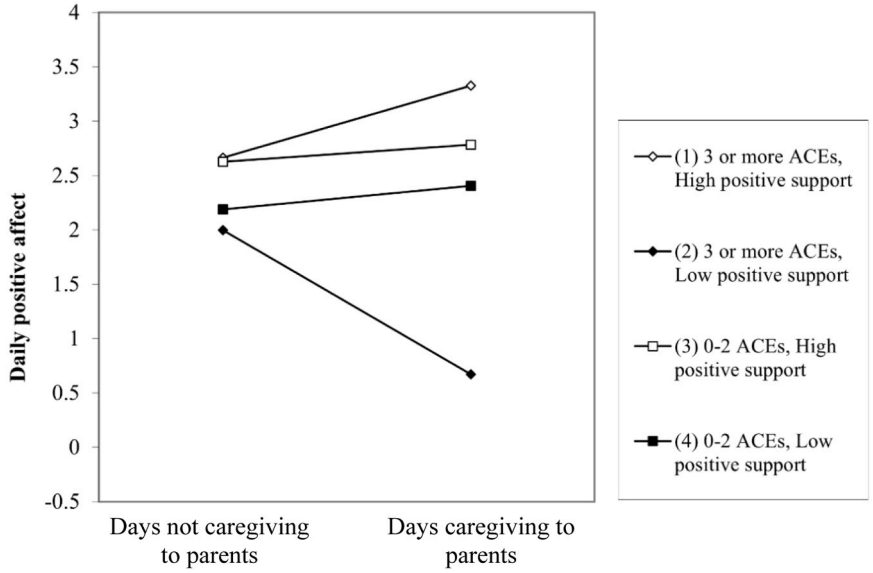

Fig. 3. Within-Person Association between Daily Caregiving to Parents and Daily Positive Affect: Moderating Effects of ACEs and Family Support.

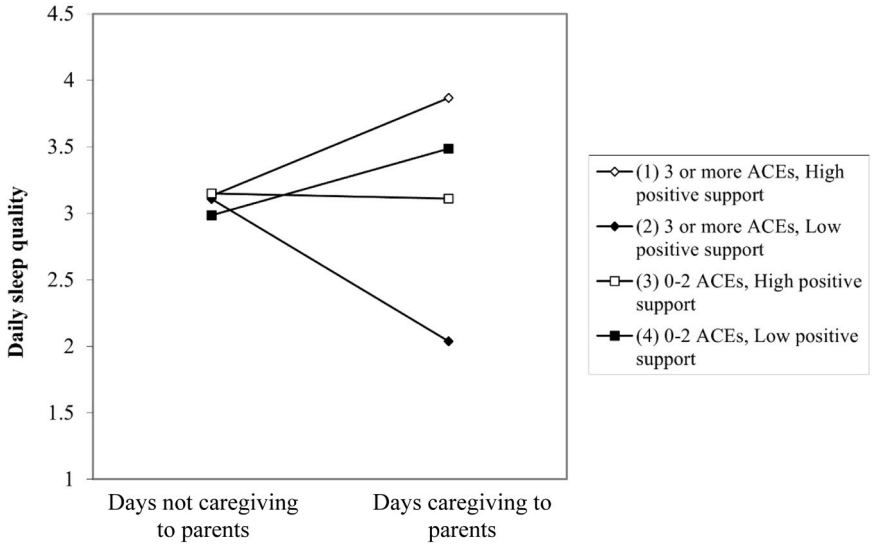

Fig. 4. Within-Person Association between Daily Caregiving to Parents and Daily Sleep Quality: Moderating Effects of ACEs and Family Support.

ACEs framework (Felitti et al., 1998) to comprehensively assess various aspects of childhood adversity, emphasizing how exposure to multiple ACEs can affect adult caregiver outcomes. Our hypotheses also included an examination of how past and present family dynamics interact, specifically by assessing the moderating roles of both ACEs and current family support or strain.

In relation to the first hypothesis, we did not find significant within-person effects of caregiving for parents on four daily outcomes. However, we did find a significant between-person effect, indicating that respondents who provided care for more days during the study period reported higher levels of daily negative affect compared to those who provided care for fewer days. For the second hypothesis, which examined the moderating effects of ACEs on these associations, we found that for caregivers who reported three or more ACEs, daily negative affect was higher on days they provided care compared to days they did not. While there was no main effect of caregiving on negative affect, this association was significant for those reporting 3 or more ACEs compared to those with 0–2 ACEs. Although there is little previous research examining the patterns of ACEs among caregivers of aging parents (Hu et al., 2024), our findings suggest that such histories can exacerbate daily caregiving stress. Furthermore, our novel use of daily diary data provided both conceptual and empirical rigor in exploring the daily experiences and stress processes associated with caregiving, adding to the call for further research employing the daily diary methodology (Almeida, 2004; Almeida et al., 2020).

Regarding the third and fourth hypotheses, we found that the impact of ACEs on the daily caregiving dynamics varied based on the level of family support or strain. Specifically, for respondents who reported 3 or more ACEs, positive family support mitigated the negative associations between caregiving to parents and both daily affect and sleep quality. Conversely, family strain exacerbated the negative effects of caregiving on all four daily outcomes. These findings align with existing research that highlights the protective roles of family support for caregivers (National Academies of Sciences, Engineering, & Medicine, 2016). Our study underscores the importance of family support for individuals who have experienced multiple ACEs. Prior studies have shown that those who faced childhood adversity often perceive lower levels of positive support and higher levels of family strain (Kong et al., 2019). Our

findings contribute to this body of literature by demonstrating that family strain may particularly undermine the outcomes for caregivers of parents.

Notably, supplementary analyses showed that when distinguishing between spousal support and non-spousal family support, significant results were associated primarily with non-spousal family support – such as that provided by parents or siblings – rather than from spouses. Studies have shown that childhood adversity can have lasting negative effects on interactions and relationships with one's family of origin, particularly reducing emotional closeness with parents or siblings (Band-Winterstein, 2014; Kong & Goldberg, 2022; Savla et al., 2013). Our findings suggest that these enduring relational patterns may be reflected in the context of family caregiving.

Further, significant moderating effects of ACEs and family support were evident in daily caregiving for parents but not for caregivers of other family members. This may indicate a unique impact of ACEs (Hu et al., 2024). It is possible that experiencing multiple adversities or childhood trauma is closely related to the relationship with their parents, leading to these effects being particularly pronounced in caregiving situations involving parents.

Consistent with a life-course approach, caregiving for aging parents can serve as a context in which ACEs get under the skin to impact caregivers' health (Apgar & Zerrusen, 2024; Hu et al., 2024). Our findings suggest that when adult caregivers had experienced multiple ACEs, they may display a pattern of cumulative disadvantage, where their childhood disadvantages lead to a range of subsequent challenges throughout their lives, resulting in poor outcomes as caregivers (Apgar & Zerrusen, 2024; Ferraro & Kelley-Moore, 2003). These caregivers may continue to encounter difficulties stemming from their own childhood trauma while managing the potential consequences of this adversity (e.g., a lack of resources and support) and dealing with health issues due to caregiving stress (Band-Winterstein, 2014; Wuest et al., 2007). Although our results suggest that bolstering social support may help mitigate the impact of childhood adversity on the outcomes for adult caregivers, future research should further explore strategies to reduce the effects of multiple ACEs and improve the lives of these caregivers, as well as their capacity to fulfill their caregiving responsibilities.

The current study has limitations. First, the MIDUS daily diary study sample was not specifically designed to represent the population of caregivers of parents in the US; however, its demographic characteristics (e.g., age range, gender distribution, and racial/ethnic composition) broadly align with national statistics on family caregivers (AARP and National Alliance for Caregiving (NAC), 2020). Additionally, we were unable to cover the full scope of ACEs as outlined by Felitti et al. (1998), omitting some key events, such as having lived with a household member who was mentally ill or had been incarcerated. This omission limits direct comparisons to other ACE literature that includes these additional ACE measures. Furthermore, these ACE items were measured through retrospective self-reports, which may involve recall errors. We could not determine whether the parents receiving care had directly perpetuated the violence captured by the ACE measures. Lastly, we note limitations related to the measure of daily parental caregiving, which only captured whether caregiving occurred on a given day but did not assess caregiving intensity (e.g., hours per day) or co-residence status, limiting our ability to examine the effects of caregiving intensity. Relatedly, the focal subgroup of adult-child caregivers providing care to parents was modest in size ($n = 55$), with most providing care on one or two days. However, the use of daily diary data with repeated observations per individual helps enhance statistical power through multilevel modeling (Almeida, 2004; Bolger et al., 2003).

Despite the limitations, our study makes a significant contribution by employing a novel approach to examine caregivers of aging parents who have experienced childhood trauma, using the ACEs framework. Caregiving for aging parents involves not only current tasks and challenges but also grappling with past family adversity and emotional experiences related to the parents (Kong et al., 2021; Liu et al., 2018; Rodrigues et al., 2022; Schulz et al., 2020). Therefore, ACEs may play a crucial role in contextualizing the health of these caregivers. Additionally, the level of positive and negative family support can significantly influence the health effects stemming from such experiences, either mitigating or exacerbating them. Our findings are robust, based on within-person associations drawn from daily diary data in a national survey of midlife and older adults. Given that caregiving for aging parents is a common experience for this demographic (Schulz et al., 2020), our research highlights the importance of providing trauma-informed support (United States Department of Health and Human Services, SAMHSA, 2014) for caregivers who have faced childhood adversity. Further research is needed to deepen our understanding of adult-child caregivers with histories of childhood trauma, particularly regarding their unique struggles, coping strategies, and the specific mechanisms of cumulative disadvantages. This knowledge could inform targeted intervention and support programs tailored for these caregivers.

CRediT authorship contribution statement

Yin Liu: Writing – review & editing, Methodology, Conceptualization. **David M. Almeida:** Writing – review & editing, Methodology, Conceptualization. **Jooyoung Kong:** Writing – review & editing, Writing – original draft, Methodology, Funding acquisition, Formal analysis, Conceptualization. **Stephanie Robert:** Writing – review & editing, Methodology, Conceptualization.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.alcr.2025.100704.

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