

Self-Acceptance and Purpose in Life Are Mechanisms Linking Adverse Childhood Experiences to Mortality Risk

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ABSTRACT

Objective: Adverse childhood experiences (ACEs) are associated with an increased risk of premature mortality, but it is not clear why. Individuals with ACEs tend to have lower self-acceptance and purpose in life, which may be pathways between ACEs and risk of premature mortality. As such, we tested whether purpose and self-acceptance are mechanisms that link ACEs to mortality risk.

Methods: We used the Midlife in the United States Survey ($N = 6218$; mean [standard deviation] = 46.89 [12.94] years) to test whether these factors were indirect pathways between ACEs and mortality hazards over 24 years of follow-up. We used a comprehensive ACE measure that included 20 possible childhood adversities including emotional and physical abuse, household instability, socioeconomic climate, and ill health.

Results: ACEs significantly increased mortality risk (hazard ratio = 1.028, 95% confidence interval = 1.008–1.047, $p = .006$). Self-acceptance and purpose accounted for an estimated 15% and 4% of the ACEs-mortality relation, respectively. These effects withstood a range of adjustments and sensitivity analyses.

Conclusions: ACEs may affect mortality risk partially through lower self-acceptance and purpose during adulthood. Given that self-acceptance and purpose may change through intervention, these factors may be useful targets for individuals with ACEs that could lead to a longer life.

Key words: adverse childhood experiences, mortality, self-acceptance, purpose, adversity, socioeconomic status.

INTRODUCTION

Adverse childhood experiences (ACEs) have wide-ranging consequences across the life span (1), including mortality risk (for a review, see Ref. (2)) that is accumulative (risk not plateauing) in nature (3). Given the complex nature of such experiences and their health-relevant consequences, it is likely that mechanisms permeate a variety of interconnected and complex systems. Two potential mechanisms may be self-acceptance, defined as positive attitudes toward oneself, in addition to acknowledging and accepting multiple aspects of self (4), and purpose in life (purpose), defined as a perceived sense of a goal-directed direction in life (4,5).

In early childhood, a child's sense of self is thought to predominantly depend on how they are treated by their caretakers (6,7). Therefore, those who are raised by caregivers who lack empathy, provide care on a conditional basis, and so on, may experience challenges with self-acceptance. This notion is supported by literature reporting negative associations between ACEs (particularly childhood abuse) and self-acceptance in adulthood (8,9). Self-acceptance has also been associated with some of the long-term poor health correlates of childhood physical and emotional abuse in adulthood (9,10).

Self-acceptance in adulthood had further been associated with a lower risk of premature mortality (11). As such, self-acceptance may be a mechanism in the relation between ACEs and lifelong health processes: The experiences of ACEs may be associated with lower self-acceptance, which subsequently increases the risk of premature mortality.

Similar to self-acceptance, purpose is associated with a wide array of health outcomes (12,13), including mortality risk (14,15). Purpose has been reported as of considerable importance within the context of developing resilience and particularly relevant in coping processes (16). For instance, purpose may enable life events to be meaningfully contextualized and negative aspects of past experiences diminished or viewed as valuable aspects of one's life journey (17). Similar to self-acceptance, ACEs have been associated with lower purpose in adulthood (18), which may be one mechanism through which ACEs increase the risk of premature mortality.

ACEs = adverse childhood experiences, MIDUS = Midlife in the United States

SDC Supplemental Digital Content

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ACEs are associated with mortality risk, but underlying mechanisms are likely multifaceted. Childhood adversity tends to be associated with less self-acceptance and purpose (18–20), although there are some exceptions (21). Similar to research examining mediators in the personality–mortality risk relation (22,23), partial (not full) mediation would be expected if it exists. In other words, given the complex processes involved in determining why ACEs are associated with mortality risk, it is likely that any specific pathway would not account for all the associations. Partial mediation is not trivial. For instance, one circulating immunity biomarker has been found to account for an estimated 30% of the reason why conscientiousness is related to mortality risk (22). In the context of mechanisms that are potentially modifiable (i.e., interventions to increase self-acceptance and/or purpose), there is the potential to be able to disrupt the pathway to improve longevity outcomes.

To that end, this study examined self-acceptance and purpose as possible mediating pathways that link ACEs to mortality risk across adulthood. In doing so, we used a comprehensive measure of ACEs, an approach for mediation of survival effects (24,25) and a large and well-characterized sample, which was followed for 24 years.

METHODS

Open Science

Data for this study are publicly accessible (26). The analytical code and associated documents are publicly accessible (27). This study was not preregistered.

Participants

Data were from the Midlife in the United States (MIDUS) study, which started in 1995 with 7108 noninstitutionalized adults (26). Of the 7108 from the primary sample, 6128 adults had data available

TABLE 1. Descriptive Statistics of the Present Baseline Sample

	Deceased (n = 1244)	Alive (n = 4974)	Complete Sample (N = 6218)
	Mean (SD)/%	Mean (SD)/%	Mean (SD)/%
ACEs	3.64 (3.09)	3.53 (2.99)	3.55 (3.01)
Purpose in life	15.41 (3.99)	16.81 (3.44)	16.53 (3.60)
Self-acceptance	16.28 (3.51)	16.69 (3.48)	16.61 (3.49)
Age at baseline, y	59.82 (10.71)	43.66 (11.33)	46.89 (12.94)
Sex (female)	47.7%	53.8%	52.6%
Race (White)	91.6%	90.1%	90.4%
Marital status			
Married	62.6%	69%	67.7%
Separated	1.5%	2.6%	2.4%
Divorced	14.9%	12.6%	13.1%
Widowed	13%	3%	5%
Never married	8%	12.7%	11.8%
Education	6.24 (2.53)	7.01 (2.44)	6.86 (2.48)
Chronic conditions	3.26 (2.83)	2.18 (2.28)	2.39 (2.44)
Depressed affect	0.70 (1.85)	0.75 (1.88)	0.74 (1.88)

SD = standard deviation; ACEs = adverse childhood experiences.

for the basic model in this study in 1995 (mean [standard deviation], or M [SD] = 46.89 ± 12.94 years, range = 20–75 years; women: M [SD] = 47.02 ± 13.04 years, range = 20–75 years; men: M [SD] = 46.75 ± 12.82 years, range = 24–75 years). In accordance with the Declaration of Helsinki, all protocols reported within this study were granted full ethical approval as part of the MIDUS Project.

Those who were alive at the time of the final update in 2018 ($n = 4974$) were younger ($t = -47.10, p < .001$, 95% confidence interval [CI] of difference = -16.87 to -15.52), were more likely to be female ($\chi^2 = 14.71, p < .001$), had higher levels of education ($t = 9.95, p < .001$, 95% CI of difference = 0.63 to 0.93), were more likely to be married ($\chi^2 = 231.21, p < .001$), had fewer chronic conditions ($t = -12.53, p < .001$, 95% CI of difference = -1.26 to -0.92), had higher purpose ($t = 11.36, p < .001$, 95% CI of difference = 1.16 to 1.65), and had higher self-acceptance ($t = -1.32, p < .001$, 95% CI of difference = 0.20 to 0.64) than those who were deceased. No significant differences were observed on final update for race ($\chi^2 = 2.76, p = .11$), ACEs ($t = -1.06, p = .29$, 95% CI of difference = -0.29 to 0.09), or depressive affect ($t = 0.91, p = .18$, 95% CI of difference = -0.63 to 0.17). See Table 1.

Adverse Childhood Experiences

All measures of ACEs were assessed at MIDUS 1. A comprehensive 20-item measure of ACEs was compiled, which measured five broad categories: emotional abuse, physical abuse, adverse family structure, disadvantaged socioeconomic status, and poor health. Consistent with the definition of childhood by the UN Convention on the Rights of the Child (28), items were included if they occurred up to the age of 18 years. Indicators of poor health were reported from the specific age of 16 years. As discussed in detail elsewhere (3), items were identified based on empirical and theoretical relevance. Emotional and physical abuses were measured by the Conflict Tactics Scale (29). Adverse family structure, disadvantaged socioeconomic status, and poor health at age 16 years were assessed through self-report measures. Each item was dummy coded to indicate exposure (coded 1) or no exposure (coded 0). The 20 items were summed into an overall ACE score that ranged from 0 to 20. See Table S1, Supplemental Digital Content, <http://links.lww.com/PSYMED/A982>, for an outline of each dimension, type of adversity, and item definitions (3).

Self-Acceptance and Purpose

Self-acceptance and purpose were assessed at MIDUS 1 with items from the Ryff Scales of Psychological Wellbeing (4) rated on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). Three items measured self-acceptance (“I like most parts of my personality”; “When I look at the story of my life, I am pleased with how things have turned out so far”; and “In many ways I feel disappointed about my achievements in life”) and three items measured purpose in life (“Some people wander aimlessly through life, but I am not one of them”; “I live life one day at a time and don’t really think about the future”; and “I sometimes feel as if I’ve done all there is to do in life”). Where appropriate, scores were reversed so that higher scores reflected higher levels of both factors. Examination of reliability assumptions indicated that it was not appropriate to report Cronbach α . This was due to violations of τ equivalence, in that indicators were not approximately equally important. Reporting α when this assumption is not met greatly underestimates

reliability (30,31). A more robust measure of internal consistency appropriate to the data (including cohort studies more generally) due to fewer assumptions of the data is the McDonalds ω coefficient (32–34). The internal consistency was adequate for both measures in MIDUS ($\omega = 0.62$ for self-acceptance, $\omega = 0.59$ for purpose). For test-retest correlations and correlation matrices, see Tables S2 and S3, Supplemental Digital Content, <http://links.lww.com/PSYMED/A982>.

Confounding Variables

The following variables were included as confounding variables: sex (male, female), race (other, White), education (highest level of education rated on a scale from “no schooling or some grade school” to “professional degrees” such as PhD or MD), marital status (e.g., married, separated, divorced, widowed, never married), and chronic conditions (total number of doctor-diagnosed medical conditions; e.g., hypertension, heart disease, diabetes, cancer, stroke). Depressive affect was examined in sensitivity analyses as a further confounding variable, assessed with seven items (e.g., During two weeks in past 12 months, when you felt sad, blue, or depressed, did you... “think a lot about death”) scored from 0 to 7. Higher scores indicated higher depressive affect.

Mortality

Vital status was collated through several methods (National Death Index, longitudinal sample maintenance, and closeout interviews), with the most recent update in October 2018. Because of only the year and month of death being available for each deceased individual, the 15th of the month was assigned as their date of death. Time to death was defined as age at death, or at the final update for those reported alive (censored). We used age at death as it is a natural metric in observational studies, in addition to adjusting for age (35). In total, there were 1244 deaths across follow-up ($M [SD] = 72.33 \pm 12.09$ age at death in years; range = 30.61–95.39 years); 4974 participants were reported alive on their most recent update. Follow-up duration was on average 21.21 years ($SD = 5.10$ years; range = 0.08–23.84 years). Mortality data were routinely collated across the follow-up period.

Analyses

Analyses were conducted using *R* (36) and Mplus Version 8 (37). Cox proportional hazards modeling was used to estimate time to event for those deceased, including those censored. A structural equation model framework was used to estimate mediation in Cox proportional hazards to allow for direct and indirect effects on survival time (38). CIs are reporting 95% bias-corrected 1000 bootstrapped thresholds. The use of bias correction and bootstrapping reduces the possibility of introducing skew that could bias estimates. Self-acceptance and purpose were tested simultaneously as mediators to evaluate both variables as an indirect pathway in the predictive effect of ACEs for mortality hazards. This approach is critical because it allows for assessment of both mediators together, as their combined indirect effect may significantly explain the association between both factors and mortality. This approach also incorporates the correlation between the indirect effects (39).

Examination of chronic conditions revealed the presence of extreme outlier observations ($n = 7$). Chronic conditions were winsorized to 13, which was deemed to be the closest observation not deemed suspect. To check if winsorization impacted estimates,

results for the main analyses were conducted with winsorizing at both 12 and 14. Results did not differ. Two models tested whether self-acceptance and purpose mediated the pathway between ACEs and mortality risk. Specifically, model 1 examined both mediation pathways for ACEs on mortality, with each variable adjusted for sex, race, marital status, and education. In addition to model 1 confounding variables, model 2 further adjusted for chronic conditions. Results outlined in Table 2 provide individual mediating pathways, mediation pathways collectively, and the direct pathway from ACEs to mortality risk. Two sensitivity analyses tested the robustness of the mediation. First, participants who died within 2 years of the baseline assessment were excluded from the analysis. Second, depressive affect was included as an additional covariate.

Schoenfeld Residual Analysis suggested a potential violation of proportionality for ACEs. That is, the effect of ACEs on mortality did not remain constant over time. This violation was expected because the extensive follow-up period coupled with the expectation that those lower in ACEs would survive much later into the follow-up period, thereby reducing power. Although the approach of SEM incorporating proportional hazards modeling is robust to violations of the proportionality assumption, checks were conducted to ensure reported estimates were not significantly impacted. Examination using a stratification (40) of the follow-up period of before and after 12 years (midpoint) was conducted. This check revealed an expected slight weakening of the effect over time with no change in significance. Thus, we are confident that the violation of proportionality was minor and does not impact the overall pattern of findings in the study.

RESULTS

ACEs were significantly associated with increased mortality risk, an association that held with the additional adjustment for chronic health conditions, such that mortality risk increased by 2.8% with each 1-unit increase in ACEs. Self-acceptance and purpose partially mediated the association between ACEs and mortality risk, both individually and collectively (Table 2). Within model 1, self-acceptance and purpose accounted for 17.95% and 5.88% of the relation between ACEs and mortality risk, respectively. When adjusting for chronic health conditions in model 2, self-acceptance and purpose remained significant and accounted for an estimated 14.81% and 4.17% of the ACEs and mortality relation (Table 2).

Several sensitivity analyses were conducted. Estimates were unchanged when those who died within 2 years of baseline were excluded or when depressive affect was included as an additional covariate. Given the low zero-order correlation coefficients among purpose items, we reran the fully adjusted mediation model replacing the purpose composite with each of the three items. Mediation coefficient estimates were virtually identical using either the composite or each individual item (Table S4, Supplemental Digital Content, <http://links.lww.com/PSYMED/A982>).

DISCUSSION

Consistent with our hypotheses, both self-acceptance and purpose link ACEs and mortality risk during adulthood. Examination of each factor revealed that both dimensions provided an indirect (mediating) pathway such that higher ACEs were associated with lower levels of self-acceptance and purpose, which partially contributed to the elevated mortality risk. These observed significant effects remained robust after additional adjustment and in sensitivity

TABLE 2. Mediation Models for ACEs Predicting Mortality

	ACEs	
	Purpose in Life	Self-Acceptance
	Estimate/HR (95% CI), <i>p</i>	Estimate/HR (95% CI), <i>p</i>
Model 1 ^a		
Indirect effect ^{b,c}	0.002 (0.001–0.004), .004	0.007 (0.003–0.011), <.001
Total effect ^{d,c}	0.034 (0.012–0.054), .001	0.039 (0.016–0.058), <.001
Full indirect effect ^{e,c}		0.010 (0.006–0.014), <.001
Direct effect ^{f,g}		1.040 (1.021–1.060), <.001
AIC		105,604.46
BIC		105,786.24
Model 2 ^a		
Indirect effect ^{b,c}	0.001 (0.000–0.003), .029	0.004 (0.001–0.007), .013
Total effect ^{d,c}	0.024 (0.004–0.044), .018	0.027 (0.006–0.047), .008
Full indirect effect ^{e,c}		0.005 (0.002–0.009), .001
Direct effect ^{f,g}		1.028 (1.008–1.047), .006
AIC		104,683.10
BIC		104,891.74

ACEs = adverse childhood experiences; HR = hazard ratio; CI = confidence interval; AIC = Akaike information criterion; BIC = Bayesian information criterion.

Model 1 adjusts for sex, race, marital status, and education. Model 2, in addition to the previous adjustment, adjusts for chronic conditions.

^a Model 1 (*n* = 6202), model 2 (*n* = 6188).

^b Effect of ACEs on mortality through the indirect path.

^c The estimate is presented.

^d Effect of the indirect path and direct path of ACEs on mortality.

^e Sum of the indirect paths.

^f Direct effect of ACEs on mortality not adjusting for purpose or self-acceptance.

^g The HR is presented.

analyses. Given the multitude of contributors to the relation between ACEs and mortality risk, partial mediation was expected. Although we found purpose to be an important contributing factor in the ACEs-mortality relation, self-acceptance seemed to be of particular importance.

Self-acceptance may be critically important within the context of ACEs, particularly as they relate to mortality risk across adulthood. This relation is also conceptually feasible when one considers life span developmental processes (41), such as those relevant to biobehavioral health at critical periods and accumulatively across the life span (42). In other words, self-acceptance is likely not just an important predictor of health during periods of critical development such as childhood, but also accumulatively throughout life. This is why ACEs likely erodes an individual accepting multiple aspects of self (self-acceptance), which then shortens longevity. The biobehavioral pathways linking self-acceptance are likely to permeate a vast array of processes. For instance, self-acceptance within this context likely impacts brain processes responsible for stress and emotional control (43), psychological health (44), and so on.

Purpose was also an indirect pathway linking ACEs to mortality risk. These findings are important within the context of research that reports that ACEs diminish purpose in adulthood (18). As such, ACEs likely erode purpose, which in turn reduces longevity. Thus, targeted purpose interventions may be particularly promising for those who have survived ACEs. This may particularly be the case if they address the aspect of purpose, which relates to

the contextualization of negative experiences to being valued experiences or an intrinsic aspect of one's life. The biobehavioral mechanisms underpinning purpose in this relation are likely multifaceted. Purpose has been linked to a wide range of health-related processes from psychophysiological responsivity to broad disease processes, including emotional recovery from negative stimuli (45), health behaviors (46), cardiovascular events (14), and incident dementia (13).

This study had several limitations. The sample was predominantly White and relatively high in education. Thus, it is unclear how findings would generalize to more vulnerable populations such as those from racial minorities or from lower socioeconomic strata. This can leave a study susceptible to survival bias (healthy survival effects), in that those with the highest risk of ACEs would likely be significantly underrepresented (3), in addition to missing those already deceased before study outset. Recalling past adversities could sometimes be considered a potential limitation; however, recall seems consistent across time, with evidence suggesting an underreporting as opposed to overreporting of childhood adversities (47). Although the present study used a very comprehensive measure of adversity, we did not examine certain adversities known to be important (e.g., sexual abuse). It was beyond the remit of this study, but future research would benefit from examining possible associations with lifetime adversity (48). Although our scoring approach to ACEs is an important indicator of accumulative events and consistent with existing research (1), important information

is missing. Despite the data not being collated in this archival dataset, as highlighted by D'Arcy-Bewick and colleagues (2,3), it would be important for future research to thoroughly examine the characteristics underlying specific ACEs. Consistent with existing research examining mortality related pathways (22,23), we would expect a broad range of mechanisms beyond those we examined to underpin the ACE-mortality relation. It would also be beneficial for adequately powered replications to be conducted that would use larger scales, which could provide more nuance. Given that ACEs, self-acceptance, and purpose were assessed at the same time point, it would be important for future research to consider whether current levels may predict retrospective reporting of ACEs. Although unlikely given that the ACE measure was focused on occurrences of an event rather than characteristics of an experience, it would be important for this to be considered in the interpretation of this study. Finally, it is also important for future research to consider that short scales can often lower α values if items are intended to provide coverage of a broad construct (49). The supplemental analyses in the current study found that the coefficients were nearly identical when each of the three items on the purpose scale was tested separately, which indicates that the three items are capturing aspects of purpose relevant to ACEs and mortality, even if only modestly related to each other. Future research, however, could use measures of purpose with more items and higher α reliability.

Despite these limitations, this study makes a significant contribution to the existing literature. The individual connections between each of the factors within this study have been previously suggested; however, this study meaningfully connects these factors in a rigorous and well-powered study. Both self-acceptance and purpose do seem to be important indirect pathways linking ACEs to mortality risk across adulthood. These findings have important implications for future research and practice. Both individual and societal interventions aimed at promoting self-acceptance and purpose may be beneficial for individuals who have experienced ACEs. Further research is needed to understand the underlying biobehavioral mechanisms through which both self-acceptance and purpose impact health. Although our study findings showed that most who experience ACEs will likely have less self-acceptance and purpose, it does not mean that every single person will. Variability would be expected with some of those with greater ACEs having high self-acceptance and purpose. Determining the reasons for these differences will be paramount for future research. Taken together, our study makes a significant contribution to the literature on the long-term impact of ACEs while highlighting the importance of considering psychological factors, namely, self-acceptance and purpose.

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