

Adverse Childhood Experiences, Marital History, and Midlife Health

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Abstract

Adverse childhood experiences (ACEs) have enduring consequences for health and well-being throughout the life course. We draw on recent evidence that exposure to ACEs shapes developmental processes central to self-regulation, trust, and the formation of secure intimate ties to posit that ACEs affect patterns of marriage and divorce over the life course. Our analysis of 35 years of nationally representative panel data from the National Longitudinal Study of Youth (NLSY79) ($n = 5,784$) indicates that exposure to more adverse childhood experiences is positively associated with risk of divorce, but not with the probability of marrying versus remaining unmarried. These patterns hold for white men and women but not their black counterparts. Importantly, we find that, for white women, a substantial portion of the well-established link between divorce and later life health is partly spurious – explained by the joint effect of ACEs on both marital history and later life health. Controlling for the influence of ACEs on marital history and midlife health reduces the estimated effect of having divorced on health at age 50 by 22% for white women and 18% for white men who are still divorced at age 50. Health differences between the never-married and those in their first marriage at age 50 are not explained by ACEs for black or white men or women.

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A growing body of research points to adverse childhood experiences (ACEs) as fundamental determinants of health and well-being throughout the life course (Ehlert 2013; McEwen and McEwen 2017; Shonkoff et al. 2012). These effects appear to operate through a complex web of psychosocial, behavioral, and physiological pathways, the nature of which remains poorly understood. The consequences of childhood adversity for the stability and quality of relationships in adulthood may be particularly important (Umberson et al. 2014). A central tenet of attachment theory is that stressful childhood experiences that disrupt the development of trust and security hinder the formation and development of intimate ties throughout life. Our first goal is to develop and test hypotheses about the influence of childhood adversity on patterns of marriage and divorce throughout the adult life course.

Second, we consider whether this largely ignored link between childhood adversity and marital history has relevance for one of the most established findings in family demography—the presumed causal effect of marital experiences on later life health. Because adverse childhood experiences are so strongly associated with health and mortality (REFS), observing that they have a joint influence on marital patterns has important implications for models of the marital health advantage. Failure to control for adverse childhood experiences in estimating the effects of marriage and divorce on later life health may substantially overstate the marital health advantage. We test these hypotheses by analyzing 35 years of nationally representative panel data from the National Longitudinal Study of Youth (NLSY79). Respondents were age 14-21 in 1979 and followed annually or biennially through 2014, when almost all respondents have reached age 50.

BACKGROUND

Adverse Childhood Experiences and Health Across the Life Course

The phrase “adverse childhood experiences” (ACEs) was developed to capture all types of abuse, neglect, and generally traumatic experiences occurring to individuals under 18 years of age. These traumatic events include child abuse (emotional, physical, and sexual) as well as emotional and physical neglect and various household challenges (domestic violence, substance abuse, mental illness, separation/divorce) and incarceration of a household member. An ACE study of 17,000 respondents, undertaken between 1995 and 1997 showed shockingly high trauma prevalence with 36% of respondents reporting no ACEs, 26% with one instance, 16% with two, 9.5% with three, and 12.5% with four or more (Felitti et al. 1998). A followup 2010 Behavioral Risk Factor Surveillance System ACE Module found that overall trauma (59.3%) had declined slightly since the 10 years prior (64%) (CDC 2015).

ACEs have been found to be associated with a host of childhood and adult health outcomes. Analyses of the original Kaiser HMO data showed relationships between ACEs and mental health disturbances, somatic health disturbances, substance abuse, and various sexual risk factors (Dube et al. 2003; Hillis et al. 2001). As might be expected, the mental health implications of ACEs can be quite widespread and severe (Edwards et al. 2003; Hussey, Chang, and Kotch 2006). For instance, ACEs have been associated with young adult depressive symptoms, drug abuse, and anti-social behavior (Schilling, Aseltine, and Gore 2008) as well as adult depressive disorder (Chapman et al. 2004). ACEs have also been linked to health risk indicators such as high blood pressure (Gooding et al. 2014) and obesity (Shin and Miller 2012) in young adulthood, to health conditions in adulthood including cancer, diabetes, and stroke (Bellis et al. 2014), and to premature mortality (Kelly-Irving et al. 2013).

Because of the well-documented linkage with a host of related behavioral and health status outcomes, the effect of adverse childhood experiences can be thought of as exposure to

toxic stress which can have far-reaching impacts on physiological and behavioral adaptations. Toxic stress is defined as “excessive or prolonged activation of stress response systems in the absence of the buffering protection of supportive and responsive adult caregiving (Shonkoff 2012).” Physiologically, toxic stress disrupts homeostasis and affects brain development and other biological systems in childhood in ways that impair cognitive performance, executive function, and self-regulation, with long term implications for physical and mental health (McEwen and McEwen 2017). ACEs have been linked with immune dysfunction and inflammation which, in turn, predispose individuals to chronic health problems throughout life (Shonkoff et al. 2012). Behaviorally, childhood adversity is associated with risk factors (Halonon et al. 2014) including binge drinking (Shin, Edwards, and Heeren 2009), heavy episodic drinking (Shin, Miller, and Teicher 2013), smoking (Kestila et al. 2006; Rehkopf et al. 2016), substance abuse (Bellis et al. 2014) and obesity (Rehkopf et al. 2016).

Because ACEs research emerged directly from a public health and biomedical framework, research on their consequences has heavily focused on later life health, disease, and biological mechanisms. The result is that we know very little about how ACEs influence key developmental processes across the life course which themselves are strongly linked to later health: family patterns like marriage, divorce, and fertility, as well as socioeconomic attainment processes like education, occupation, and mobility. This represents a substantial gap in knowledge. Failure to incorporate ACEs into research on social influences on health may lead to biased estimates of these effects. Further, our understanding of social inequalities in health across these domains (e.g., by marital status, class, family structure, race, etc.) may be biased if we ignore a more fundamental influence of ACEs on each. In the section that follows, we draw on research and theory on the developmental and psychosocial consequences of childhood

adversity to theoretically develop a hypothesis that exposure to ACEs decreases the likelihood of marriage and increases the risk of divorce.

Childhood Adversity and Marital History

Although no published research has considered whether ACEs influence marriage and divorce, such a hypothesis is consistent with psychological theory and recently suggested by empirical work on relationship quality. Research and theory on insecure attachment shows that children exposed to high levels of stress or disadvantage experience heightened perceptions of threat (Chen et al. 2004; Miller, Chen, and Parker 2011) and anger (Pollak and Sinha 2002) in their social relationships and are more hostile and less trusting of others (Barefoot et al. 1991; Lynch, Kaplan, and Shema 1997). Umberson and colleagues (2014, 2016) recently posited, therefore, that by undermining trust and increasing perceptions of threat and anger, childhood adversity may increase the risk of unstable and strained intimate ties throughout the life course. In support of their hypothesis, they found that an index of 8 ACEs predicted greater strain in intimate relationships in adulthood among black men and women (Umberson et al. 2014). Black men in their related qualitative study who experienced high levels of childhood adversity reported greater vigilance to threat in their relationships and described withdrawing emotionally and physically from relationship stress and conflict, which they believed contributed to relationship dissolution. We build on this work to test whether exposure to ACEs is associated with a reduced probability of marriage by age 50 and with an increased risk of divorce, conditional on marriage, in a nationally representative sample of adults followed for 35 years.

Marriage and Health: Is Childhood Adversity a Confounder?

Establishing the association of childhood adversity with later marital patterns is important for an additional reason: such an association, if it exists, is strongly and directly relevant to many

of the statistical models used to support the well-established effect of marriage on health and well-being. Once viewed as a “social fact,” the status of the marital health advantage in the literature has been gradually undermined by evidence of selection and by findings that divorce and widowhood are more consequential for health than being married versus unmarried (Williams and Umberson 2002?). The availability of nationally representative longitudinal data on cohorts who have reached older ages has allowed for more rigorous estimates of a potential causal effect of marriage and divorce on health. This has resulted in a substantial clarification of the magnitude and heterogeneity of the “case for marriage,” at least in terms of its consequences for adult health and well-being (Waite and Gallagher 2002).

But despite improvements in data and methodology, the issue of selection versus causation remains an open one. Our inability to control for all possible health-relevant background conditions that shape complex human phenomena like marriage and divorce inevitably leads our models to overstatement their causal effects on health. We can minimize this bias, though, to the extent that we have a better understanding of the full range of background characteristics that might confound the association of marriage with health. We posit a substantial influence of ACEs on marital patterns that, in conjunction with the well-established effect of ACEs on health, may render the “social fact” of the marital health advantage partially spurious.

DATA AND METHODS

Data

The 1979 National Longitudinal Survey of Youth (NLSY79) (Bureau of Labor Statistics, 2016) is an ongoing survey of a nationally representative sample of 12,686 young men and women ages 14 to 22 years in 1979. The study originally included oversamples of black,

Hispanic, military, and poor white respondents. Although the military and economically disadvantaged white oversamples were dropped prior to 1991, the remaining respondents were interviewed annually through 1994 and biennially since. By 2014, data on detailed union histories had been continuously collected over a 35-year period, and measures of health and well-being ascertained at age 40, a time when chronic health problems begin to emerge.

From a starting sample of 9,986, we constructed an analytic sample of 5,985 respondents (59.9% of the total sample) after making the following sample exclusions: (1) 2,390 who were not interviewed in 2012 or 2014 when most ACEs data were collected (largely due to panel attrition), (2) 384 who married before age 18 (the age referent for the ACEs measures), (3) 8 missing data on marital history at age 50, (4) 460 missing data on their mother's education, (5) 62 missing data on other covariates, and (7) 163 missing data on health at age 50.

Measures

Adverse Childhood Experiences (ACEs): Exposure to six adverse childhood experiences was retrospectively assessed at baseline: (1) emotional neglect: "Before age 18, how much parental love and affection did you experience growing up?" (dichotomized 1=a little or none at all; 0 = a great deal or quite a lot), (2) physical abuse: "Before age 18, how often did a parent or adult in your home ever hit, beat, kick or physically harm you in any way? Do not include spanking." (dichotomized 1 = more than once; 0 = never or once), (3) alcoholism in home: "Before age 18, did you live with anyone who was an alcoholic or problem drinker?" (dichotomized: 1 = yes; 0 = no), (4) mental illness in home: "Before age 18, did you live with anyone who was depressed, mentally ill, or suicidal?" (dichotomized 1 = yes; 0 = no), (5) death of a biological parent, and (6) parental absence. Parental absence is defined here as: (a) living with a biological or adoptive mother or father at birth but not living with that parent for greater

than a four month period at some point before age 19 or (b) never having lived with any biological or adoptive mother or father. The measure excludes parental absence due to parental death as this a separate ACE in our scale. It also excludes those who are in category (a) solely because they left home to live on their own at age 17 or 18. Our parental absence variable is a more comprehensive measure than the indicators of parental divorce or separation or parental incarceration that are included in some ACE scales. It captures these experiences as well as others that result in traumatic separation from parents (e.g., foster care placement, group home residence).

Responses to each of the six items were summed to create a 1-5 scale as there were no respondents who experienced 6 ACEs. In analyses that treat the ACE scale as categorical, it is topcoded at 4 because the number of respondents reporting 5 ACEs was too small to include in a separate category.

In the NLSY79, as in most studies, ACEs are reported retrospectively which could lead to measurement error. While older studies of the validity of self-reported data on child maltreatment have concluded that, if collected properly, these data are valid (Allen, Leadbeater, and Aber 1994; Dembo et al. 1992), a more recent study (Hardt and Rutter 2004) finds a non-trivial rate of false negatives (with rare false positives), but argues that validity concerns are largely a threat to minor and poorly defined incidents. Further, one study reports high test-retest reliability among adults (Dube et al. 2004) while another study finds good to excellent agreement between retrospective ACEs and documented childhood maltreatment (Pinto, Correia, and Maia 2014)—most importantly, this study finds that discordance in self-reported experiences are not related to current physical and psychological symptoms, suggesting that the reliability of retrospective self-reports are not related to health status at the time of reporting. These

conclusions engender confidence that although retrospective ACE recall may involve some measurement error, validity and reliability are relatively high and unrelated to current health status.

Health at Midlife. Health is measured at age 40 with the Physical Health Composite Score of the SF-12 health scale (Ware, Kosinski, and Keller 1996). The scale is based on items assessing self-assessed health, physical functioning and mobility limitations. A particular strength of our study is the measurement of health at age 40 for all respondents. A central tenet of life course epidemiology is that socially patterned exposures to stress that begin in early life take a cumulative toll on health (Lynch and Smith 2005). Moreover, because many chronic diseases have long latency periods (Ben-Shlomo and Kuh 2002; Kuh et al. 2003), measuring health outcomes too early in the life course may understate the health consequences of childhood adversity.

Marital History. Dummy variables distinguish those who, by age 50: (a) had never-married, (b) were in their first marriage (*reference*), (c) had divorced one or more times. Preliminary analyses further disaggregated category (c) as follows: (d) divorced from first marriage, (e.) in the second marriage, (f) divorced from second spouse, and (g) in the third marriage. With very few exceptions, our preliminary models revealed few differences in exposure to ACEs across groups (d) – (g) or in the effect of (d) – (g) on age 50 health despite sufficient cell sizes in most of these groups. We therefore use the three category dummies in order to highlight the most important effects and to sufficiently power the race- and gender-stratified analyses.

Covariates. Covariates include indicators of: (1) race/ethnicity (black, Hispanic, other, *ref* = white), (2) age in 1979, (3) number of children by age 50, (4) nonmarital first birth (5) urban

residence at age 14, (6) residence in the U.S. South at age 14, (7) the respondent's mother's years of education, (8) the respondent's mother's age at first birth, (9) household unemployment at age 14 (no one in the household worked for pay and (10) religious affiliation in childhood (Baptist, Catholic, other religion, no religion, *ref* = Liberal Protestant). Dichotomous variables are coded as '1' for yes and '0' for no.

(Table 1 about here)

RESULTS

NOTE: Analyses shown here use a 3 category indicator of marital history (never married, in 1st marriage, ever divorced). Our final model will use a disaggregated variable with 4 categories: (never married, in 1st marriage, in 2nd or 3rd marriage, in 1st or 2nd divorce to differentiate the ever divorced who are currently divorced at age 50 from the ever divorced who are currently married at age 50).

Descriptive Statistics

Means and standard deviations or percentages for all variables are shown in Table 1. More than half of respondents reported at least one adverse childhood experience with 30% reporting only one. An additional 13.8% reported 2 childhood adversities, 6.6% reported 3 and 4% reported 4 or 5 ACEs. Exposure to each of the individual items is also consistent with national estimates, including the 1995/97 Kaiser study which reported rates of 26% with one ACE, 16% with two ACEs, 9.5% with 3, and 12.5% with 4+ (CDC 2015).

(Table 2 about here)

Analysis 1: Do ACEs predict Marital History at Age 50

Results of models testing our first hypothesis that ACEs predict predict marital history at age 50 are shown in Table 2. Multinomial logistic regression models regress age 50 marital

history (being never married, ever divorced, in a first marriage (ref)) on the ACEs index, R's mother's background characteristics, R's childhood household environment, and R's number of children at age 50. Our hypotheses are partially supported for white men and women: Exposure to more ACEs is associated with a significantly greater risk of having divorced by age 50 compared to being in a first marriage. ACEs are not significantly associated with the probability of being in one's first marriage versus being never-married for white men and women. ACEs are not associated with either dimension of marital history for black men and women.

(Table 3 about here)

Analysis 2: Do ACEs confound the association of marital history with age 50 health

We next test the hypothesis that the well-established effect of marital history on later life health is partly spurious due to the joint association of ACEs with both marital history and health at age 50. Results are presented in Table 3. Model 1 for each race/gender group estimates the effect of marital history on age 50 health without including the ACEs index, which is entered in Model 2. The results indicate that the estimated effect of having divorced (versus being in a first marriage) is reduced by 24% for white women and 7% for white men (but note that our final models which disaggregate the "ever divorced" category indicate that the effect of divorce is reduced by 18% for white men who are currently divorced at age 50.. The estimated effect of divorce history on age 50 health is barely affected by controlling for ACEs for other groups, nor is the estimated effect of being never-married versus married for all groups.

DISCUSSION

Our results lead to two central conclusions about the links between adverse childhood experiences, marital history, and age 50 health. First, we provide the first evidence in a nationally representative sample that marital instability may be strongly rooted in early life

developmental processes linked to adverse childhood experiences; greater exposure to adverse childhood experiences is strongly associated with increased risk of divorcing by age 50 compared to being in a first marriage among white men and women. Research and theory suggests that the patterns we observe may reflect a process in which toxic stress experienced in critical periods early in the life course undermines secure attachment, resulting in both a strong desire for forming intimate ties at early ages and, paradoxically, with difficulties in maintaining stable secure adult relationships (Umberson et al. 2016).

Second, we find evidence that estimates of the effect of divorce on the health of white men and women may be substantially overstated by failing to account for the influence of adverse childhood experiences on both marital history and later life health. Exposure to childhood adversity appears to be a fundamental precursor of the propensity to divorce among white women. It is noteworthy that ACEs emerges as such an important confounder of the link between divorce and health, especially given limitations of the ACEs scale in the NLSY which excludes sexual abuse. As a result, our estimates are likely conservative and we might see an even greater reduction in the estimated effect of divorce on health were we able to control for experiences of sexual abuse.

The discussion will further consider why we find little evidence that ACEs influence marital history for black men and women.

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Table 1: Percentages or Means (and standard deviations) by marital history at age 50: ($n = 2,324$)

	Never Married	In 1 st Marriage	Ever Divorced
ACEs index (continuous)	0.84 (0.96)	0.75 (0.98)	0.94 (1.10)
ACEs index (categorical)			%
0			
1	33.2%	29.7%	31.8%
2	13.5%	11.6%	13.6%
3	3.8%	4.6%	6.2%
4 or 5	2.3%	2.0%	3.9%
SF-12 Health Scale (age 50)	4741.97 (1197.84)	5074.13 (885.32)	4927.53 (1011.86)
Women ($0 = Men$)	45.5%	49.9%	55.23%
R's mother's education (years)	10.64 (3.25)	11.14 (3.31)	10.89 (3.01)
R's mother's age at R's birth (yrs)	26.60 (6.50)	27.07 (6.26)	26.22 (6.46)
Home environment at age 14			
Urban (<i>ref = not urban</i>)	82.7%	78.6%	79.7%
South (<i>ref = not South</i>)	37.6%	32.3%	37.3%
No employed adult	18.3%	8.2%	10.9%
Race/Ethnicity			
Black	55.3%	23.5%	29.2%
Hispanic	16.2%	17.5%	18.9%
Other	1.9%	3.2%	3.6%
White			
Religious Affiliation in Childhood			
Baptist	39.7%	23.9%	29.8%
Catholic	27.5%	38.4%	34.2%
Liberal Protestant			%
Other Religion	8.8%	10.6%	11.3%
No Religion	4.6%	3.3%	4.2%
Number of Children Born (age 50)	1.08 (1.32)	2.07 (1.16)	2.01 (1.24)
N	932	2,373	2,339

Table 2: Multinomial logistic regression estimates of the effect of ACEs on marital history (*ref = in first marriage*) at age 50 by race and gender

	White Women		White Men		Black Women		Black Men	
	Never Married	Ever Divorced	Never Married	Ever Divorced	Never Married	Ever Divorced	Never Married	Ever Divorced
ACEs index	0.19 (0.106)	0.24*** (0.05)	0.08 (0.03)	0.17** (0.06)	-0.05 (0.09)	0.07 (0.08)	0.04 (0.11)	0.14 (0.10)
Home environment age 14								
Urban	-0.23 (0.23)	-0.07 (0.14)	0.08 (0.23)	0.57 (0.13)	-0.18 (0.22)	0.22 (0.21)	0.64** (0.25)	0.32 (0.22)
South	-0.33 (0.30)	0.19 (0.13)	-0.23 (0.24)	0.25 (0.13)	-0.68*** (0.18)	-0.07 (0.17)	-0.17 (0.19)	0.17 (0.18)
No employed adult	-1.25 (1.08)	0.60* (0.30)	1.03* (0.41)	0.28 (0.30)	0.37 (0.22)	0.00 (0.21)	0.22 (0.23)	-0.27 (0.24)
R's mother's background								
Education (years)	-0.01 (0.05)	-0.07*** (0.03)	-0.01 (0.04)	-0.07** (0.03)	-0.03 (0.04)	0.02 (0.03)	-0.15*** (0.04)	-0.05 (0.03)
R's age 1979 (years)	-0.09 (0.06)	-0.05* (0.03)	-0.09 (0.04)	-0.12 (0.03)	0.10* (0.04)	0.06 (0.04)	-0.01 (0.04)	0.04 (0.04)
Number of children born (age 50)	-1.63*** (0.16)	-0.16*** (0.05)	-1.68*** (0.13)	-0.09 (0.05)	-0.44*** (0.07)	-0.05 (0.07)	-0.50*** (0.07)	0.09 (0.06)
Constant	1.57 (1.21)	1.76 (0.58)	1.73 (0.91)	0.91 (0.56)	-0.15 (0.88)	-1.14 (0.82)	2.08* (0.91)	-0.60 (0.84)
	1,360		1,427		913		868	

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3: Age 50 self-assessed health regressed on marital history at age 50 and covariates (Model 1) and ACEs (Model 2) by race and gender

	White Women		White Men		Black Women		Black Men	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Marital History Age 50								
Never married	-425.56*** (117.81)	-394.12*** (116.30)	-294.60*** (74.82)	-290.07*** (74.31)	-266.52** (96.20)	-271.08** (95.72)	-256.57** (86.06)	-253.67** (85.95)
Ever divorced	-193.69*** (57.35)	-149.23** (57.01)	-120.07** (45.50)	-104.987** (45.30)	-47.05 (87.99)	-38.34 (87.59)	-97.77 (80.30)	-90.56 (80.18)
<i>(ref = in 1st marriage)</i>								
ACEs index	---	-149.83*** (24.05)	---	-100.08*** (22.99)	---	-117.90** (36.92)	---	-73.11 (39.34)
	1,427		1,351		913		868	

Notes: Model controls for all covariates shown in Table 2; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$