

Does Early-Life Misfortune Increase the Likelihood of Psychotropic Medication Use in Later Life?

Research on Aging

2018, Vol. 40(6) 558–579

© The Author(s) 2017

Reprints and permissions:

sagepub.com/journalsPermissions.nav

DOI: 10.1177/0164027517717045

journals.sagepub.com/home/roa

Patricia M. Morton¹ and Kenneth F. Ferraro^{2,3}

Abstract

Life-course research has linked childhood experiences to adult mental illness, but most studies focus on anxiety or depressive symptoms, which may be transient. Therefore, this study investigates whether childhood misfortune is associated with taking psychotropic medication, a measure reflecting an underlying chronic mental disorder. Data are from three waves of a national survey of 2,999 U.S. men and women aged 25–74 years. Four domains of childhood misfortune (childhood socioeconomic status, family structure, child maltreatment, and poor health) are considered—specified as separate domains and a single additive measure—as key predictors of psychotropic medication use. Findings reveal an association between additive childhood misfortune and adult psychotropic medication use, net of adult risk factors. Psychotropic medication use is also more likely during the 20-year study for adults who experienced maltreatment and poor health during childhood. These results reveal the importance of early intervention to reduce consumption of psychotropic medications and associated costs.

¹ Department of Sociology, Wayne State University, Detroit, MI, USA

² Department of Sociology, Purdue University, West Lafayette, IN, USA

³ Center on Aging and the Life Course, Purdue University, West Lafayette, IN, USA

Corresponding Author:

Patricia M. Morton, Department of Sociology, Wayne State University, 656 W. Kirby, Detroit, MI 48202, USA.

Email: mortonp@wayne.edu

Keywords

child abuse, life course, mental health, MIDUS, psychotropic drugs

World-wide, mental illness accounts for more disability than any other type of illness and is projected to be the leading cause of disease burden by 2030 (World Health Organization, 2012, 2013). Within the United States, approximately 25% of adults have a mental illness and *almost half* of adults will develop at least one mental illness at some point during their lifetime (Mark, Levit, Buck, Coffey, & Vandivort-Warren, 2007; Reeves et al., 2011). The associated costs of treating mental health in the United States are also staggering (Reeves et al., 2011). Moreover, mental illness can lead to and/or exacerbate physical ailments, including cardiovascular diseases and cancer—the leading causes of death in the United States (Chapman, Perry, & Strine, 2005; El-Gabalawy, Katz, & Sareen, 2010; Evans et al., 2005). Thus, understanding the etiological pathways of mental health is imperative for health and aging policy in order to reduce mental illness prevalence and the associated morbidity, mortality, and health-care costs.

Life-course research has revealed the salient role of childhood experiences in the development of mental illnesses. Although one may anticipate that negative events and experiences compromise mental health during childhood and adolescence, considerable research has linked noxious childhood events and misfortune to adult mental health conditions. For instance, childhood maltreatment, low socioeconomic status (SES), and poor health have been connected to affective disorders, anxiety, and mood disorders in later life (Clark, Caldwell, Power, & Stansfeld, 2010; Draper et al., 2008; Felitti et al., 1998; Hudson et al., 2003; Melchior, Moffit, Milne, Poulton, & Caspi, 2007).

The majority of studies examining the early-life antecedents of adult mental health rely on measures of anxiety or depressive symptoms, which may be transient. Most adults experience occasional bouts of depressive symptoms or anxiety, but comparatively few seek professional help—either in the form of psychotherapy or in the form of medication—to deal with the symptoms. Given the association between childhood misfortune and adult mental illness, it is logical to hypothesize that adults who experienced childhood misfortune would be more likely to use psychotropic medications. Using a prescribed psychotropic medication requires disclosing one's psychological distress to a psychiatrist or primary care physician. Although psychotropic drug use may indicate belief in or access to mental health treatment, psychotropic medication also likely reflects the escalation of

distress to a more serious and/or chronic condition (Linden et al., 1999). Moreover, psychotropic drugs are among the most widely prescribed medications (Mark, 2010). It is estimated that 11% of U.S. adults are taking a prescribed psychotropic medication—and this rate has risen considerably over time (Paulose-Ram, Safran, Jonas, Gu, & Orwig, 2007).

Given the financial and health burdens of mental illness, proliferation of life-course gerontology research, and increasing use of psychotropic medication, research is needed to identify early-life experiences that may influence the use of psychotropic medication. Therefore, the present study investigates whether childhood misfortune is associated with the use of psychotropic medication in adulthood.

Early Misfortune and the Life Course

To the authors' knowledge, only one other study has investigated the relationship between childhood misfortune and adult psychotropic medication, reporting a dose–response relationship (Anda et al., 2007). Given the limited research, we draw from life-course epidemiology to specify two propositions to guide the analyses.

First, there are sensitive periods throughout the life course when people are more vulnerable to the environment (Ben-Shlomo & Kuh, 2002). Often, these sensitive periods occur during a time of significant development, such as fetal and child development. Several life-course frameworks posit that childhood—from birth to age 17—is a sensitive period during which there is increased susceptibility to environmental insults, leading to long-term health consequences (Ferraro & Shippee, 2009; Hertzman & Boyce, 2010). Life-course theories conceptualizing childhood as a sensitive period often point to biological and social factors to explain why all periods of childhood comprise a sensitive period. Childhood, from birth through adolescence, is replete with rapid periods of change and development (Hertzman & Boyce, 2010). Biologically speaking, this translates into a physiologically sensitive period during which external experiences can impact physiology, including mental health conditions. Rapid periods of growth throughout childhood include cognitive development in the early years as well as puberty in the later years of childhood. In addition, childhood entails a period of relatively limited agency on part of the actor; consider, for example, mandatory education and parental SES (Ferraro & Shippee, 2009). Agency may increase as children grow older, but their environment is still heavily influenced by their guardians.

Empirically, many studies examining broad ranges of childhood have connected disadvantageous events and experiences during childhood to anti-social behavior, anxiety, depression, substance dependency, and poor self-rated mental health (Bures, 2003; Draper et al., 2008; Felitti et al., 1998; Horwitz, Widom, McLaughlin, & White, 2001; Pirkola et al., 2005; Schilling, Aseltine, & Gore, 2007; Turner & Lloyd, 1995). Therefore, we expect that childhood misfortune will be associated with adult mental health status, resulting in increased risk of using a prescribed psychotropic medication.

Second, although all humans face hard times during life, prior research reveals the importance of *accumulated* misfortune, especially when experienced early. Many studies show that accumulated childhood leads to poor health in adulthood—and this includes both physical (Morton, Turiano, Mroczek, & Ferraro, 2016; Felitti et al., 1998; O’Rand & Hamil-Luker, 2005) and mental health (Anda et al., 2007; Felitti et al., 1998; Pirkola et al., 2005; Schilling, Aseltine, & Gore, 2008; Turner & Lloyd, 1995). Although the research is compelling, misfortune can amass in varied ways. First, childhood misfortune may be manifest within a single domain. For instance, research shows that specific types of misfortune (e.g., child maltreatment) are quite consequential to adult health (Chartier, Walker, & Naimark, 2009; Clark et al., 2010; Draper et al., 2008; Felitti et al., 1998; Hudson et al., 2003; Melchior et al., 2007; Morton, Schafer, & Ferraro, 2012; Schilling et al., 2007). Second, disadvantageous events or circumstances may be related to other types of misfortune via risk clustering (Ben-Shlomo & Kuh, 2002). For instance, child maltreatment is often associated with SES (Trickett, Aber, Carlson, & Cicchetti, 1991). Thus, misfortune may proliferate across domains, even during a specific life period such as childhood. Failure to account for different domains of misfortune may lead to overestimates of the effect of a single type on adult mental health.

To measure an array of accumulated misfortune, most researchers have chosen one of the two strategies: treat each domain separately or add across domains (see O’Rand & Hamil-Luker, 2005; Felitti et al., 1998, respectively). In the present study, we compare results using these alternative specifications of childhood misfortune. Based on prior research, we expect that additive childhood misfortune (ACM) will increase the risk of taking psychotropic medications and that certain domains of childhood misfortune may be independently associated with adult psychotropic medication use. We hypothesize a linear relationship between childhood misfortune and adult psychotropic drug use based on the results of the prior childhood misfortune–adult psychotropic medication study (Anda et al., 2007) but also investigate nonlinear forms of misfortune.

The potential contributions of the study are 4-fold. First, unlike the original study of the relationship between childhood misfortune and psychotropic medication that relied on persons enrolled in the San Diego Kaiser Health Plan, the present study uses a large, nationally representative population survey, making the study generalizable to the adult U.S. population (Anda et al., 2007). Second, the dependent variable focuses solely on medications that are used to treat depression and/or anxiety specifically. In addition to distinguishing antidepressants and anxiolytics from other psychotropic drugs, such as stimulants and hypnotics, this measure more accurately addresses the mental health consequences of childhood misfortune since psychotropic medication can be prescribed for physical health issues (e.g., headaches; Mark, 2010). Third, we utilize longitudinal data to assess change in psychotropic drug uses over time. Fourth, we not only examine the relationship between a sum of childhood insults and psychotropic medication but also examine specific domains of childhood misfortune to determine whether selected insults are more consequential to this outcome. In addition, we examine the plausibility of nonlinear relationships between childhood misfortune and adult psychotropic drug use and test for threshold effects.

Method

Sample

Data from three waves of the National Survey of Midlife Development in the United States (MIDUS) were analyzed. Initiated in 1995, MIDUS is a nationally representative random-digit-dial sample of noninstitutionalized, English-speaking men and women aged 25–74 years residing in the 48 contiguous states (Brim et al., 2016; Kessler, DuPont, Berglund, & Wittchen, 1999). Older adults (aged 65–74 years) and males were oversampled. Initially, respondents participated in a computer-assisted telephone interview (70% response rate). Respondents were then mailed a self-administered questionnaire (87% response rate, yielding overall baseline response rate of 61% and sample size of 3,032; $N = 2,999$ after excluding age-ineligible respondents [10] and those missing on the dependent variable [23]). Respondents were followed-up approximately every 10 years, providing two additional waves of data. Wave 2 (W2) was collected from 2004 to 2006 and had a compounded response rate of 61%, whereas Wave 3 (W3) was collected between 2013 and 2014 with a compounded response rate of approximately 62%. All independent variables were assessed at baseline (W1), but the outcome is measured at all three surveys. The data are deidentified and

publicly available (defined as exempt from review at our institutional review board).

Measures

Psychotropic medication. The dependent variable was drawn from the questionnaire for all three waves. At each wave, respondents were asked if they had taken prescription medication for nerves, anxiety, or depression in the past 30 days (coded 1 = *yes*, 0 = *otherwise*). Using this binary measure of psychotropic medication, we estimated baseline models (W1) as well as trajectories of psychotropic drug use over time (W1–W3), as described below. Although MIDUS contains information on several types of medications, the present study focuses on prescribed antidepressants and anxiolytics—the two most common types of psychotropic drugs (Paulose-Ram, Jonas, Orwig, & Safran, 2004).

Descriptive statistics for all variables are presented in Table 1. Approximately 10.8% of respondents at W1 had used psychotropic medication in the past 30 days, which reflects U.S. population rates of psychotropic medication use in other studies (Paulose-Ram et al., 2007). At W2, approximately 21% of the sample was taking psychotropic medications, whereas about 19% of the sample was taking psychotropic medications at W3.

Childhood misfortune. Fourteen indicators of childhood misfortune were used to create four domains: *SES*, *family structure*, *maltreatment*, and *health*. Childhood SES was comprised of three indicators: receipt of welfare or Aid to Dependent Children assistance, financially worse off than others, less than a high school education for father (or mother if father was absent). Childhood family structure was based on three indicators: lack of male in household, parental divorce, and parental death. Child maltreatment was based on six indicators: physical abuse by father, mother, or other and emotional abuse by father, mother, or other. Childhood health items included 2 items: poor mental or physical health.

The physical and emotional maltreatment variables drew from Straus's Conflict Tactics Scale (Straus, 1979). Examples of physical maltreatment include slapped, threw something at them, and burned or scalded them. Examples of emotional maltreatment include insulted or swore at them, sulked or refused to talk to them, and threatened to hit them. Response categories ranged in frequency from never to often, with *sometimes or often* coded as 1 and *never or rare* coded as 0. Previous research has demonstrated

Table 1. Descriptive Statistics From the National Survey of Midlife Development in the U.S. Study.

Variables	Range	Mean (<i>SD</i> ^a)
Psychotropic medication, W1	0,1	0.11
Psychotropic medication, W2	0,1	0.21
Psychotropic medication, W3	0,1	0.19
Childhood misfortune		
Additive childhood misfortune ^b	0–4	1.38 (0.95)
Domains of misfortune		
Childhood socioeconomic status	0–3	0.74 (0.80)
Family composition	0–2	0.26 (0.56)
Child maltreatment	0–2	0.85 (0.87)
Poor health	0–2	0.12 (0.37)
Covariates		
Age ^c	20–74	47.06 (13.12)
Female	0,1	0.52
Black	0,1	0.07
Education ^c	4–20	13.78 (2.62)
Income ^d	0–300	66.77 (59.35)
Married	0,1	0.64
Divorced	0,1	0.19
Widowed	0,1	0.06
Never married	0,1	0.12
family strain ^e	1–4	2.13 (0.62)
Pack-years smoked ^f	0–203.70	16.27 (26.13)
Obese	0,1	0.25
Private health insurance	0,1	0.79
Mental health insurance coverage	0,1	0.56

Note. $N = 2,999$. Statistics are assessed at baseline (W1) except for W2 and W3 psychotropic medication.

^aThe standard deviation of a dichotomous variable is omitted because it is a function of the mean. ^bMeasured as count of misfortune experienced during childhood. ^cMeasured in years.

^dMeasured in thousands of dollars. ^eMeasured as a scale of 4 items. ^fMeasured as total number of lifetime pack-years smoked.

that the Conflict Tactics Scale measures have high validity but low internal consistency reliability due to the rare occurrence of certain events, under-reporting due to social desirability, and the lack of association among some indicators (Dowd, Kinsey, Wheeless, & Suresh, 2004; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). To aid internal consistency, we followed Straus, Hamby, Finkelhor, Moore, and Runyan's (1998) recommended dichotomization of the indicators.

Dummy variables for poor mental health and physical health were created by differentiating those who reported *poor or fair* (coded 1) from those who reported *good or better* (coded 0; Haas, 2007).

Each of the 14 indicators was coded as dummy variables, with 1 indicating that the respondent reported experiencing the misfortune during childhood. We summed the indicators within each domain to create the four domains of misfortune. The formulation of domains was based on prior research and tetrachoric factor analysis (Anda et al., 2007; Felitti et al., 1998; Morton, Mustillo, & Ferraro, 2014; Turner, Wheaton, & Lloyd, 1995).

To investigate the additive effect of childhood misfortune, we followed the approach of the Adverse Childhood Experiences studies by Felitti and associates (1998). ACM was created by dichotomizing each domain (1 = respondent reported at least of one indicator in the respective domain) and summing across the domains to create an additive count of misfortune (0–4). This approach also ensures that each domain is given equal weight, regardless of how many indicators comprise it. These two formulations of misfortune—four separate domains and a simple summary score (ACM) of childhood misfortune—were utilized to investigate alternative specifications of childhood misfortune.

As shown in Table 1, the variable for ACM reveals that most people experienced at least one domain of childhood misfortune, with a mean of 1.38. The most common domain of misfortune experienced was child maltreatment, with a mean of 0.85, whereas the least common domain of misfortune was poor childhood health (mean = 0.12).

Demographics. To adjust for demographic differences in psychotropic medication use, age, sex, race, education, income, and marital status were included as covariates (Paulose-Ram et al., 2004). Dummy variables were created for race (1 = *Black*; 0 = *otherwise*) and sex (1 = *female*). Education and income were continuous variables. Education ranged from 4 to 20 years, whereas income—measured in thousands of dollars—ranged from 0 to 300. A series of dummy variables were created for marital status indicating whether the respondent was married, divorced, widowed, or had never married. Married was the referent.

Adult risk factors. To account for adult risk factors, a variable of family strain was included. Family strain was based on 4 items asking respondents how often family members made demands on and criticized them, let them down, and got on their nerves. Family strain was constructed by calculating the mean of these 4 items, and ranges from 1 to 4, with higher values indicating

higher levels of strain ($\alpha = .80$). Measures of family strain were guided by the work of Schuster, Kessler, and Aseltine (1990) and prior use of the scale (Walen & Lachman, 2000).

Although children of misfortune are prone to engage in lifestyles that affect health, analyses were adjusted for smoking and obesity (Chartier et al., 2009; Felitti et al., 1998). Smoking was measured in pack years (total years smoked multiplied by daily average number of cigarettes smoked, divided by 20—number of cigarettes per pack). Participants who had never smoked were coded as 0. Total pack-years smoked ranged from 0 to 203.7. Obesity was coded as a dummy variable (body mass index $\geq 30 = 1$).

Since use of prescribed psychotropic medication may also be related to health insurance coverage, we adjusted for two health insurance variables: private health insurance and health insurance covered mental health. Private health insurance was coded as a dummy variable, with 1 indicating that the *respondent had private health insurance*, 0 otherwise. Similarly, a dummy variable for mental health insurance coverage was created with 1 indicating that the *respondent's health insurance covered mental health*, 0 otherwise. As shown in Table 1, the sample has higher mean income and education than the national average, most have private insurance, and Black adults are underrepresented.

Statistical Analysis

Analysis was conducted in two phases using Stata, Version 14. First, we estimated a series of logistic regressions to assess the relationships between childhood misfortune and adult psychotropic drug use at baseline (W1). To replicate the original childhood misfortune–psychotropic medication study, the first Models (1 and 2) examined the cumulative effect of childhood misfortune and used ACM as the key predictor (Anda et al., 2007). To establish a baseline relationship between ACM and psychotropic medication, ACM was the only predictor included in the first model. In the fully adjusted Model 2, all of the independent variables were used to predict the dependent variable. Logistic regression Models 3 and 4 were reestimated by treating each domain of childhood misfortune as separate variables to investigate whether certain types of misfortune are associated with psychotropic medication at W1. Similarly, the third model used only the childhood misfortune domains as predictors whereas the fourth model adjusted for all covariates.

Second, we estimated a series of binary random effects models to evaluate the relationship between childhood misfortune and adult psychotropic medication over time. Mean-centered age was used as the time metric, along with

a squared time metric to allow for nonlinearity in psychotropic drug use. For each specification of childhood misfortune—ACM and separate domains—two random-intercept models were estimated. The first model estimated the unadjusted effect of childhood misfortune on adult psychotropic medication, whereas the second model adjusted for all covariates. For each model, item-missing data for the independent variables was imputed by chained equations. Because no variable had more than 5% missing, we imputed five values for each independent variable with missing data.

A series of sensitivity analyses were conducted to examine the effect of additional covariates and alternative forms of childhood misfortune. Because use of psychotropic drug medication may reflect belief in efficacy of traditional medicine, preliminary models adjusted for respondent's belief in the doctor's ability to improve respondent's health. We also examined the effect of mortality bias using a Heckman selection model. Neither belief in doctor nor the mortality selection λ was significant and overall conclusions remained. Therefore, final models presented do not include these variables.

For childhood misfortune, we conducted sensitivity analyses using a squared term of ACM and domain thresholds to test for nonlinear relationships because emerging evidence suggests that the relationship between early-life misfortune and later-life health is not always linear. Results indicated that only a linear relationship between childhood misfortune and adult psychotropic drug use was statistically significant and is, therefore, used in the analysis presented. Since the association between ACM and adult psychotropic medication use may be reflecting the childhood misfortune measure of poor mental health, sensitivity analyses were also performed to exclude the possibility that the ACM finding was merely a measure of continuity of poor mental health throughout the life course. When poor mental health was removed from the ACM measure and used as control, the effect of the revised ACM measure remained significant and direct in the fully adjusted model. Therefore, the results displayed use the ACM measure that includes poor mental health.

Results

Table 2 displays the results of regressing W1 adult psychotropic medication use on childhood misfortune. Model 1 reveals the relationship between ACM and psychotropic medication without adjusting for any covariates: ACM increases the likelihood of psychotropic medication use (odds ratio [OR] = 1.435; $p < .001$). For each additional childhood misfortune, the odds of taking psychotropic medication increase by about 44%. Model 2 adjusts for

Table 2. Logistic Regressions of W1 Psychotropic Medication on Independent Variables, MIDUS, 1995–1996.

Variables	Model 1	Model 2	Model 3	Model 4
	OR [95% CI]	OR [95% CI]	OR [95% CI]	OR [95% CI]
Childhood misfortune				
ACM	1.435 [1.27, 1.62] ^{***}	1.272 [1.12, 1.45] ^{***}		
Childhood SES			1.299 [1.13, 1.49] ^{***}	1.150 [0.98, 1.35]
Family composition			1.067 [0.87, 1.30]	1.011 [0.82, 1.25]
Child maltreatment			1.206 [1.05, 1.38] ^{**}	1.207 [1.04, 1.40] [*]
Poor health			1.528 [1.18, 1.98] ^{***}	1.350 [1.02, 1.79] [*]
Covariates				
Age		1.019 [1.01, 1.03] ^{**}		1.020 [0.01, 1.03] ^{**}
Female		2.259 [1.71, 2.98] ^{***}		2.309 [1.74, 3.06] ^{***}
Black		0.754 [0.44, 1.28]		0.807 [0.47, 1.37]
Education		0.934 [0.89, 0.99] [*]		0.939 [0.89, 0.99] [*]
Income		1.000 [1.00, 1.00]		1.000 [1.00, 1.00]
Divorced ^a		1.810 [1.34, 2.45] ^{***}		1.779 [1.31, 2.42] ^{***}
Widowed ^a		0.920 [0.55, 1.55]		0.898 [0.53, 1.52]
Never married ^a		1.133 [0.70, 1.83]		1.127 [0.70, 1.82]
Family strain		1.548 [1.26, 1.91] ^{***}		1.493 [1.21, 1.84] ^{***}
Pack-years smoked		1.006 [1.00, 1.01] ^{**}		1.006 [1.00, 1.01] ^{**}
Obese		1.072 [0.81, 1.42]		1.086 [0.82, 1.44]
Private health insurance		0.551 [0.40, 0.76] ^{***}		0.553 [0.40, 0.77] ^{***}
Mental health insurance		2.192 [1.63, 2.95] ^{***}		2.193 [1.63, 2.95] ^{***}
Model F test	35.43 ^{***}	11.89 ^{***}	10.55 ^{***}	9.86 ^{***}

Note. N = 2,999. MIDUS = Midlife Development in the United States; ACM = additive childhood misfortune; SES = socioeconomic status; OR = odds ratio; CI = confidence interval.

^aMarried is the referent.

*p < .05. **p < .01. ***p < .001 (two-tailed tests).

demographics and potential risk factors in adulthood. In this fully adjusted model, ACM remained significant ($OR = 1.272, p < .001$). For each additional childhood misfortune, the odds of taking psychotropic medication increase by approximately 27%, when adjusting for all other variables. Several covariates were also significant. Age, female, divorce, family strain, smoking, and mental health insurance were all associated with an increase in the likelihood of using psychotropic medication. Older respondents were more likely to report using psychotropic medication ($OR = 1.019, p < .01$). Compared to men, women were more than twice as likely to take psychotropic medication ($OR = 2.259, p < .001$). Compared to married respondents, those who were divorced had almost double the risk of taking psychotropic medication ($OR = 1.810, p < .01$). Individuals who experienced higher levels of family strain manifested a higher probability of taking psychotropic medication ($OR = 1.548, p < .01$). Smoking was associated with a higher risk of using psychotropic medication ($OR = 1.066, p < .01$). Individuals whose health insurance covered mental health had a higher probability of taking psychotropic medication ($OR = 2.192, p < .001$). Education and private health insurance were associated with lower odds of taking psychotropic medication ($OR = 0.934, p < .05$; $OR = 0.551, p < .001$, respectively).

Models 3 and 4 are parallel but replace ACM with the four domains of childhood misfortune. In Model 3, childhood SES, child maltreatment, and poor health predicted W1 adult psychotropic medication use, net of other childhood misfortune domains. For each additional indicator of socioeconomic disadvantage, the odds of taking psychotropic medication increase by approximately 30% ($p < .001$). For each additional indicator of child maltreatment, the odds of taking psychotropic medication increase by approximately 21% ($p < .01$). For each additional indicator of poor health, the odds of taking psychotropic medication increase by approximately 53% ($p < .01$).

When adult covariates were added in Model 4, the effect of childhood SES was attenuated and became nonsignificant. Child maltreatment and poor health remained significant and associated with an increase in the likelihood of using psychotropic medication ($OR = 1.207, p < .05$; $OR = 1.350, p < .05$, respectively). Among the covariates, age, female, education, divorce, family strain, smoking, private health insurance, and mental health insurance were significant and revealed similar associations observed in Model 2.

Table 3 displays the results of the random effects modeling to examine the relationship between ACM and adult psychotropic medication. Although not shown, the unconditional means model indicated that the intraclass correlation was .59 (59% of the variability in psychotropic drug use is due to

Table 3. Random Effects Models for W1–W3 Psychotropic Medication, MIDUS, 1995–2014.

	Model 1	Model 2
	OR [95% CI]	OR [95% CI]
Fixed effects		
Intercept	0.023 [0.02, 0.04]***	0.015 [0.00, 0.04]***
Age	1.060 [1.05, 1.07]***	1.061 [1.05, 1.08]***
Age ²	0.999 [0.99, 1.00]***	0.999 [0.99, 1.00]***
Childhood misfortune		
ACM	1.510 [1.30, 1.76]***	1.220 [1.04, 1.43]*
Covariates		
Female		2.731 [1.99, 3.75]***
Black		0.540 [0.285, 1.04]
Education		0.913 [0.86, 0.97]**
Income		0.999 [1.00, 1.00]
Divorced ^a		1.812 [1.24, 2.65]**
Widowed ^a		0.411 [0.21, 0.81]*
Never married ^a		1.279 [0.76, 2.16]
Family strain		2.159 [1.51, 2.48]***
Pack-years smoked		1.004 [1.00, 1.01]
Obese		1.099 [0.79, 1.53]
Private health insurance		0.576 [0.38, 0.86]**
Mental health insurance		2.066 [1.48, 2.88]***
Random effects		
Random intercept ^b	2.343 (0.15)***	2.185 (0.15)***
Model <i>F</i> test	30.18***	10.99***

Note. $N = 2,999$. MIDUS = Midlife Development in the United States; ACM = additive childhood misfortune; OR = odds ratio; CI = confidence interval.

^aMarried is the referent. ^bCoefficients (standard error) are displayed for random effects.

* $p < .05$. ** $p < .01$. *** $p < .001$ (two-tailed tests).

differences between people, not within). Model 1 includes the time metric and ACM. Both the linear and quadratic terms for age were significant. The linear term was positive, whereas the quadratic term was negative, indicating that as respondents got older, the effect of age lessened. ACM was a significant, positive predictor of adult psychotropic drug use ($OR = 1.510$, $p < .001$). Each additional childhood misfortune raised the odds of taking psychotropic medication in adulthood by 51%. The random intercept was significant, indicating variation in individual differences in the overall average level of response ($b = 2.343$, $p < .001$).

Model 2 added adult covariates to Model 1. The effect of ACM was slightly attenuated but remained significant. ACM increased the odds of taking psychotropic medication ($OR = 1.220, p < .01$), net of adult covariates. The linear and quadratic terms for age as well as the random intercept remained significant. Among the covariates, female ($OR = 2.731, p < .001$), divorced ($OR = 1.812, p < .01$), family strain ($OR = 2.159, p < .001$), and mental health insurance ($OR = 2.066, p < .001$) increased the odds of taking psychotropic medication. Education ($OR = 0.913, p < .01$), widowhood ($OR = 0.411, p < .05$), and private health insurance ($OR = 0.576, p < .01$) lowered the odds of taking psychotropic medication.

Table 4 displays the parallel results of the random effects modeling to examine the relationship between each domain of misfortune and adult psychotropic medication. Model 1 includes the time metric and each domain of misfortune. The linear and quadratic terms for age again illustrate that the positive effect of age on psychotropic drug use weakens over time. Among the four domains of misfortune, child maltreatment and poor health predicted psychotropic drug use. Each additional indicator of child maltreatment raised the odds of taking psychotropic medication in adulthood by 41% ($p < .001$), net of other domains; and the odds of taking psychotropic medication in adulthood increased doubled ($p < .0001$) for each additional indicator of poor health. The random intercept was significant, indicating variation in individual differences in the overall average level of response ($b = 2.333, p < .001$).

Model 2 adds adult covariates to Model 1. Although the effects of child maltreatment and poor health were attenuated, they remained significant and raised the odds of taking psychotropic medication in adulthood ($OR = 1.306, p < .01$; $OR = 1.489, p < .05$, respectively). The linear and quadratic terms for age as well as the random intercept also remained significant. Similar to Model 2 in Table 3, gender, education, marital status, family strain, and health insurance were significant predictors of psychotropic drug use.

Discussion

Informed by the life-course perspective, we found evidence demonstrating that childhood is a sensitive period for adult mental health development: *disadvantageous childhood experiences have long-term consequences on adult mental health*. Using MIDUS data, we observed that childhood misfortune raises the risk of using psychotropic medication in middle and later life, even after adjusting for demographic, socioeconomic, and lifestyle risk factors. Moreover, the conclusion held in the cross-sectional and longitudinal

Table 4. Random Effects Models for W1–W3 Psychotropic Medication, MIDUS, 1995–2014.

	Model 1	Model 2
	OR [95% CI]	OR [95% CI]
Fixed effects		
Intercept	0.025 [0.02, 0.04]***	0.017 [0.01, 0.05]***
Age	1.063 [1.05, 1.08]***	1.063 [1.05, 1.08]***
Age ²	0.999 [0.99, 1.00]***	0.999 [0.99, 1.00]***
Childhood misfortune		
Childhood SES	1.152 [0.96, 1.38]	1.020 [0.84, 1.23]
Family composition	1.027 [0.79, 1.33]	0.918 [0.71, 1.19]
Child maltreatment	1.410 [1.19, 1.67]***	1.306 [1.10, 1.56]**
Poor health	2.002 [1.39, 2.87]***	1.489 [1.04, 2.13]*
Covariates		
Female		2.831 [2.06, 3.90]***
Black		0.590 [0.31, 1.13]
Education		0.912 [0.86, 0.97]**
Income		0.999 [1.00, 1.00]
Divorced ^a		1.762 [1.20, 2.58]**
Widowed ^a		0.405 [0.20, 0.80]**
Never married ^a		1.238 [0.73, 2.09]
Family strain		1.815 [1.41, 2.33]***
Pack-years smoked		1.004 [1.00, 1.01]
Obese		1.121 [0.81, 1.56]
Private health insurance		0.568 [0.38, 0.85]**
Mental health insurance		2.049 [1.47, 2.86]***
Random effects		
Random intercept ^b	2.333 (0.15)***	2.172 (0.15)***
Model <i>F</i> test	16.51***	9.44***

Note. *N* = 2,999. MIDUS = Midlife Development in the United States; SES = socioeconomic status; OR = odds ratio; CI = confidence interval.

^aMarried is the referent. ^bCoefficients (standard error) are displayed for random effects.

p* < .05. *p* < .01. ****p* < .001 (two-tailed tests).

analyses—and whether examining cumulative or specific domains of childhood misfortune.

Our findings are consistent with a prior study of Health Maintenance Organization (HMO) enrollees (Anda et al., 2007), but the present study used a nationally representative, longitudinal survey of the U.S. adult population and tested alternative specifications of misfortune to further elucidate the relationship between childhood misfortune and adult psychotropic

medication use. Beyond sample differences and the distinct profiles of childhood misfortune in the two studies, it should be noted that the prior study used a broader measure of psychotropic medication, including antipsychotics, stimulants, hypnotics, and lithium-based medications (Anda et al., 2007). Whereas psychotropic drugs can be prescribed for a variety of symptoms—from headaches to alcohol abuse—the present study employed a more conservative approach by limiting the measurement of psychotropic medications to prescriptions used for depression and anxiety only. Even with different measures of childhood misfortune and a more exclusive measure of psychotropic medication, this study was able to uncover the same pattern: Regardless of the type of misfortune, *the accumulation of noxious experiences during childhood is associated with the use of psychotropic medication in adulthood*. However, we also observed that the effect of ACM lessened over time.

Additional analyses also revealed that two specific childhood domains—child maltreatment and poor health—increased risk of using psychotropic medication among adults. Whereas the finding of poor health is expected on the grounds of life-course mental health continuity, the effect of child maltreatment abuse is noteworthy. Since child maltreatment research tends to primarily focus on the effects of sexual and physical abuse, this study adds to the growing literature contending that the impact of physical *and emotional* abuse is long term as well (Chartier et al., 2009; Corso, Edwards, Fang, & Mercy, 2008). These findings also reveal that alternative specifications of misfortune should be examined to identify which specific forms of childhood misfortune are consequential to adult mental health.

This study should be considered in light of its limitations. First, due to data limitations, analyses were not adjusted for parental history of mental health. If there is an intergenerational transmission of mental health, the present study is not able to capture it and, therefore, may be overestimating the impact of childhood misfortune. Second, the retrospective nature of the childhood data creates the potential for recall bias. However, we controlled for several adult factors that might influence recollection (Vuolo, Ferraro, Morton, & Yang, 2014). Third, it is possible that psychotropic medication use led to higher reporting of childhood misfortune, but we consider this unlikely, especially because the longitudinal analyses revealed new cases of psychotropic drug use at Waves 2 and 3. Fourth, those with the most adverse early-life conditions are probably omitted due to higher risks of incarceration (e.g., prison, institutionalization) or premature mortality. By omitting those who are incarcerated, this study is likely underestimating the uptake of psychotropic medication, resulting in a conservative estimate of the

association between childhood misfortune and psychotropic medication use. Fifth, there may be more proximal influences that impact psychotropic drug use, including adult misfortune, that occur during sensitive periods of adulthood. Although we attempted to account for potential adult risk factors such as smoking and obesity, other factors may be implicated. Future research should attempt to disentangle the effect of exposure to disadvantage during childhood from other sensitive periods in the life course.

Sixth, using psychotropic medication as the outcome variable may also underestimate the prevalence of mental illness in the sample as some respondents with depression or anxiety may prefer alternative therapies while others may not have access to a mental health-care provider or prescription medication. Indeed, health insurance coverage was associated with use of psychotropic drugs. Regardless, even with this specific measure of mental health, an association between childhood misfortune and prescribed psychotropic medication was uncovered. Although these results may underestimate the true mental health consequences of childhood misfortunes, the findings of this study nonetheless bring attention to a potentially underserved population with respect to mental health: children of misfortune.

Conclusion

Given the scant literature on childhood misfortune and adult psychotropic medication, several recommendations are presented for future research. First, alternative specifications of childhood misfortune should be investigated to determine whether the association between childhood misfortune and psychotropic medication varies by duration or magnitude of childhood misfortune. If possible, subsequent research also should utilize finer gradations of childhood that distinguish between different periods of childhood (e.g., early childhood vs. adolescence), especially if testing critical period hypotheses. Second, future research should draw from longitudinal studies to identify the mechanisms linking childhood misfortune to adult psychotropic medication. Although on a different outcome (mortality), the approach by Pudrovskaya and Anikputa (2014) is an exemplar. Third, these findings should be integrated into the current research on successful aging. One of the three fundamental components of successful aging is engagement with life, which involves interpersonal relationships and productive activity (Rowe & Kahn, 1997). Given the effects of mental health on interpersonal relationships and productive activity, future research should investigate whether early misfortune interferes with the journey to successful aging via its lasting influence on mental health.

A key contribution of the present study is its implication for public health policy. By connecting adult use of psychotropic medication to early-life events, this study demonstrated that risk factors for mental health do not always stem from proximal influences, adding to the recent literature connecting early-life events to adult use of psychotropic medications (Anda et al., 2007; Ekblad, Gissler, Lehtonen, & Korkeila, 2011). Taken together, these findings translate into health prevention policy by identifying a vulnerable population for whom mental health services should be provided and interventions tailored, preferably targeting these individuals of misfortune at younger ages to reduce exposure to or the lifetime costs of early insults. Identifying those who are at risk of requiring psychotropic medications in early adulthood may decrease the long-term consumption of psychotropic medications to cope with early misfortune.

Authors' Note

Data were made available by the Inter-university Consortium for Political and Social Research, Ann Arbor, MI. Neither the collector of the original data nor the Consortium bears any responsibility for the analyses or interpretations presented here.

Acknowledgments

The authors would like to thank Glen Ray Hood, Ann Howell, Sarah A. Mustillo, and Lindsay R. Wilkinson for their comments on an earlier version of the article.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Support for this research was provided by grants from the National Institute on Aging (R01 AG033541 and AG043544).

References

- Anda, R. F., Brown, D. W., Felitti, V. J., Bremner, J. D., Dube, S. R., & Giles, W. H. (2007). Adverse childhood experiences and prescription psychotropic medications in adults. *American Journal of Preventive Medicine*, *32*, 389–394.
- Ben-Shlomo, Y., & Kuh, D. (2002). A life course approach to chronic disease epidemiology: Conceptual models, empirical challenges, and interdisciplinary perspectives. *International Journal of Epidemiology*, *31*, 285–293.

- Brim, O. G., Baltes, P. B., Bumpass, L. L., Cleary, P. D., Featherman, D. L., Hazzard, W. R., . . . Michael, G. (2016). *National Survey of Midlife Development in the United States (MIDUS), 1995-1996*. ICPSR02760-v11. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 03-23. Retrieved from <http://www.icpsr.umich.edu:8080/NACDA-STUDY/02760.xml>
- Bures, R. M. (2003). Childhood residential stability and health at midlife. *American Journal of Public Health, 93*, 1144-1148.
- Chapman, D. P., Perry, G. S., & Strine, T. W. (2005). The vital link between chronic disease and depressive disorders. *Preventing Chronic Disease, 2*, A14.
- Chartier, M. J., Walker, J. R., & Naimark, B. (2009). Health risk behaviors and mental health problems as mediators of the relationship between childhood abuse and adult health. *American Journal of Public Health, 99*, 847-854.
- Clark, C., Caldwell, T., Power, C., & Stansfeld, S. A. (2010). Does the influence of childhood adversity on psychopathology persist across the lifecourse? A 45-year prospective epidemiological study. *Annals of Epidemiology, 20*, 385-394.
- Corso, P. S., Edwards, V. J., Fang, X., & Mercy, J. A. (2008). Health-related quality of life among adults who experienced maltreatment during childhood. *American Journal of Public Health, 98*, 1094-1100.
- Dowd, K., Kinsey, S., Wheelless, S., & Suresh, R., & NSCAW Research Group. (2004). *National Survey of Child and Adolescent Well-Being (NSCAW): Wave 1 data file user's manual*. Research Triangle Park, NC: Research Triangle Institute.
- Draper, B., Pfaff, J. J., Pirkis, J., Snowdon, J., Lautenschlager, N. T., Wilson, I., & Almeida, O. P. (2008). Long-term effects of childhood abuse on the quality of life and health of older people: Results from the depression and early prevention of suicide in general practice project. *Journal of the American Geriatrics Society, 56*, 262-271.
- Ekblad, M., Gissler, M., Lehtonen, L., & Korkeila, J. (2011). Relation of prenatal smoking exposure and use of psychotropic medication up to young adulthood. *American Journal of Epidemiology, 174*, 681-690.
- El-Gabalawy, R., Katz, L. Y., & Sareen, J. (2010). Comorbidity and associated severity of borderline personality disorder and physical health conditions in a nationally representative sample. *Psychosomatic Medicine, 72*, 641-647.
- Evans, D. L., Charney, D. S., Lewis, L., Golden, R. N., Gorman, J. M., Krishan, K. R. R., . . . Valvo, W. J. (2005). Mood disorders in the medically ill: Scientific review and recommendations. *Biological Psychiatry, 58*, 175-189.
- Felitti, V. J., Anda, R. F., Nordenburg, D., Williamson, D. F., Spitz, A. M., Edwards, V., . . . Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. *American Journal of Preventive Medicine, 14*, 245-258.
- Ferraro, K. F., & Shippee, T. P. (2009). Aging and cumulative inequality: How does inequality get under the skin? *The Gerontologist, 49*, 333-343.

- Haas, S. A. (2007). The long-term effects of poor childhood health: An assessment and application of retrospective reports. *Demography*, *44*, 113–135.
- Hertzman, C., & Boyce, T. (2010). How experience gets under the skin to create gradients in developmental health. *Annual Review of Public Health*, *31*, 329–347.
- Horwitz, A. V., Widom, C. S., McLaughlin, J., & White, H. R. (2001). The impact of childhood abuse and neglect on adult mental health: A prospective study. *Journal of Health and Social Behavior*, *42*, 184–201.
- Hudson, M. H., Mertens, A. C., Yasui, Y., Hobbie, W., Chen, H., & Gurney, J. G., . . . Childhood Cancer Survivor Study Investigators. (2003). Health survivors of adult long-term survivors of childhood cancer: a report from the Childhood Survivor Study. *Journal of the American Medical Association*, *290*, 1583–1592.
- Kessler, R. C., DuPont, R. L., Berglund, P., & Wittchen, H. U. (1999). Impairment in pure and comorbid generalized anxiety disorder and major depression at 12 months in two national surveys. *American Journal of Psychiatry*, *156*, 1915–1923.
- Linden, M., Lecrubier, Y., Bellantuono, C., Benkert, O., Kisely, S., & Simon, G. (1999). The prescribing of psychotropic drugs by primary care physicians: An international collaborative study. *Journal of Clinical Psychopharmacology*, *19*, 132–140.
- Mark, T. L. (2010). For what diagnoses are psychotropic medications being prescribed? *CNS Drugs*, *24*, 319–326.
- Mark, T. L., Levit, K. R., Buck, J. A., Coffey, R. M., & Vandivort-Warren, R. (2007). Mental health treatment expenditure trends, 1986–2003. *Psychiatric Services*, *58*, 1041–1048.
- Melchior, M., Moffitt, T. W., Milne, B. J., Poulton, R., & Caspi, A. (2007). Why do children from socioeconomically disadvantaged families suffer from poor health when they reach adulthood? A Life-Course Study. *American Journal of Epidemiology*, *166*, 966–974.
- Morton, P. M., Mustillo, S. A., & Ferraro, K. F. (2014). Does childhood misfortune raise the risk of acute myocardial infarction in adulthood? *Social Science & Medicine*, *104*, 133–141.
- Morton, P. M., Turiano, N. A., Mroczek, D. K., & Ferraro, K. F. (2016). Childhood misfortune, personality, and heart attack: Does personality mediate risk of myocardial infarction? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*.
- Morton, P. M., Schafer, M. H., & Ferraro, K. F. (2012). Does childhood misfortune increase cancer risk in adulthood? *Journal of Aging and Health*, *24*, 948–984.
- O’Rand, A. M., & Hamil-Luker, J. (2005). Processes of cumulative adversity: Childhood disadvantage and increased risk of heart attack across the life course. *Journal of Gerontology: Social Sciences*, *60B*, 117–124.

- Paulose-Ram, R., Jonas, B. S., Orwig, D., & Safran, M. A. (2004). Prescription psychotropic medication use among the U.S. adult population: Results from the Third National Health and Nutrition Examination Survey, 1988-1994. *Journal of Clinical Epidemiology*, *57*, 309-317.
- Paulose-Ram, R., Safran, M. A., Jonas, B. S., Gu, Q., & Orwig, D. (2007). Trends in psychotropic medication use among U.S. adults. *Pharmacoepidemiology and Drug Safety*, *16*, 560-570.
- Pirkola, S., Isometsä, E., Aro, H., Kestilä, L., Hämäläinen, Veijola, J., . . . Lönnqvist, J. (2005). Childhood adversities as risk factors for adult mental health disorders. *Social Psychiatry and Psychiatric Epidemiology*, *40*, 769-777.
- Pudrovska, T., & Anikputa, B. (2014). Early-life socioeconomic status and mortality in later life: An integration of four life-course mechanisms. *Journal of Gerontology: Social Sciences*, *69*, 451-460.
- Reeves, W. C., Strine, T. W., Pratt, L. A., Thompson, W., Ahluwalia, I., & Dhingra, S. S., . . . Centers for Disease and Control and Prevention (CDC). (2011). Mental illness surveillance among adults in the United States. *MMWR Surveillance Summary*, *60*, 1-29. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/su6003a1.htm?s_cid=su6003a1_w
- Rowe, J. W., & Kahn, R. L. (1997). Successful aging. *The Gerontologist*, *37*, 433-440.
- Schilling, E. A., Aseltine, Jr., R. H., & Gore, S. (2007). Adverse childhood experiences and mental health in young adults: a longitudinal survey. *BMC Public Health*, *7*, 30-40.
- Schilling, E. A., Aseltine, R. H., & Gore, S. (2008). The impact of cumulative childhood adversity on young adult mental health: Measures, models, and interpretations. *Social Science & Medicine*, *66*, 1140-1151.
- Schuster, T. L., Kessler, R. C., & Aseltine, R. H. (1990). Supportive interactions, negative interactions, and depressive mood. *American Journal of Community Psychology*, *18*, 423-438.
- Straus, M. A. (1979). Measuring intrafamily conflict and violence: The Conflict Tactics (CT) Scales. *Journal of Marriage and Family*, *41*, 75-88.
- Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the parent-child Conflict Tactics Scales: Development and psychometric data for a national sample of American parents. *Child Abuse and Neglect*, *22*, 249-270.
- Trickett, P. K., Aber, J. L., Carlson, V., & Cicchetti, D. (1991). Relationship of socioeconomic status to the etiology and developmental sequelae of physical child abuse. *Developmental Psychology*, *27*, 148-148.
- Turner, R. J., & Lloyd, D. A. (1995). Lifetime traumas and mental health: The significance of cumulative adversity. *Journal of Health and Social Behavior*, *36*, 360-376.

- Turner, R. J., Wheaton, B., & Lloyd, D. A. (1995). The epidemiology of social stress. *American Sociological Review, 60*, 104–125.
- Vuolo, M., Ferraro, K. F., Morton, P. M., & Yang, T. Y. (2014). Why do older people change their ratings of childhood health? *Demography, 51*, 1999–2023.
- Walen, H. R., & Lachman, M. E. (2000). Social support and strain from partner, family, and friends: Costs and benefits for men and women in adulthood. *Journal of Social and Personal Relationships, 17*, 5–30.
- World Health Organization. (2012). *Global burden of mental disorders and the need for a comprehensive, coordinated response from health and social sectors at the country level*. Retrieved February 13, 2017, from http://apps.who.int/gb/ebwha/pdf_files/WHA65/A65_10-en.pdf?ua=1
- World Health Organization. (2013). *Mental health action plan 2013-2020*. Geneva: World Health Organization.

Author Biographies

Patricia M. Morton is an assistant professor of sociology at Wayne State University. Her research examines how early-life conditions produce unequal opportunities and constraints which impact health and aging throughout the life course.

Kenneth F. Ferraro is a distinguished professor of sociology and the director of the Center on Aging and the Life Course at Purdue University. His recent research focuses on health inequality over the life course. He has also developed cumulative inequality theory, a theoretical framework elucidating how stratification processes unfold over the life course with respect to health and aging.