

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Child Abuse & Neglect

journal homepage: www.elsevier.com/locate/chiabuneg

Research article

Double disadvantage: Health impacts of parenting a child with a disability for parents with prior exposure to childhood maltreatment



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ARTICLE INFO

Keywords:

Child abuse and neglect
Lifespan perspective
Longitudinal analysis
Nonnormative parenting

ABSTRACT

Background: Parenting a child with a disability has been shown to take a toll on physical health in mid to late life. However, the additional impact of a history of childhood maltreatment has not been explored.

Objective: This study examined the moderating effect of exposure to childhood maltreatment on the longitudinal associations between parenting a child with a disability and physical health. We also examined whether this interaction was conditional on parent gender.

Methods: Data were obtained from 3178 participants in the Midlife in the United States (MIDUS) study. We used linear mixed modeling to estimate the independent and interactive effects of a history of childhood maltreatment, parenting a child with a disability, and parent gender on physical health over three waves of assessment spanning nearly two decades. We used three distinct measures of health including a composite based on two self-rated health items, chronic conditions, and functional limitations.

Results: Key results showed that a history of childhood maltreatment exacerbated the adverse health effect of parenting a child with a disability for mothers, but not fathers.

Conclusions: Findings suggest that a history of early maltreatment may create a context that makes it more difficult to cope with the demands of caring for a child with a disability, and the accompanying stress has a detrimental effect on health.

1. Introduction

Parents of a child with a developmental disorder or mental health problem face ongoing stressors related to their child's disability, and these stressors have been shown to take a toll on health in later adulthood (Ha, Hong, Seltzer, & Greenberg, 2008; Namkung, Greenberg, Mailick, & Floyd, 2018). However, little is known about the role of contextual factors such as childhood experiences with parents that may interact with one's adult experience as a parent. According to the lifespan perspective (Baltes, 1987), the impact of lifelong caregiving for a child with a disability can be more fully captured by considering early life experiences that may help to shape the later parenting role. In particular, the lasting effects of exposure to abuse or neglect during childhood may interact with the stressors inherent in parenting a child with a disability such that these individuals' health is further compromised. To address this gap, the current study examined whether exposure to abuse or neglect in childhood moderates the negative health consequences of

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<https://doi.org/10.1016/j.chiabu.2020.104505>

Received 18 November 2019; Received in revised form 11 February 2020; Accepted 13 April 2020

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parenting a child with a disability across adulthood.

1.1. Theoretical framework: a lifespan perspective

According to the lifespan perspective, individual development is a life-long process that is embedded in a matrix of biological, psychological, social, and evolutionary influences. Two important categories of influences are *age-graded* influences and *nonnormative* influences (Baltes, 1987). Age-graded influences are defined as factors that are tightly associated with chronological age (e.g., biological maturation) and typically account for similarity among development among individuals. Nonnormative influences refer to experiences or events that are not tied to a specific age and do not occur for most people (for example, exposure to childhood maltreatment or parenting a child with a disability). While the lifespan perspective is concerned with describing typical patterns of aging and development, it also encourages attention to individual differences in those trajectories. Thus, nonnormative influences are important because they represent a source of interindividual variability in development.

Another feature of the lifespan perspective is the recognition that individuals' past experiences can cumulatively and interactively influence later life psychosocial and health outcomes, even when those experiences are separated by years or decades (Alwin, 2012). Growing evidence supports a stress sensitization effect, in which childhood adversity increases vulnerability to psychological disorders following adult stressful events (McLaughlin, Conron, Koenen, & Gilman, 2009). Extending this idea to physical health, it is likely that exposure to maltreatment increases vulnerability to the health outcomes associated with the stresses of long-term caregiving. Rather than showing independent effects on health, this perspective holds that the vulnerability produced by childhood maltreatment will interact with the stress inherent in parenting a child with a disability. However, this idea has not yet been tested.

1.2. Health effects of parenting a child with a disability and gender differences

Parents of children with developmental or mental health problems face challenges that often continue beyond the time when most offspring reach independence. Common stressors include financial burdens related to the child's condition, time demands, managing behavior problems, and worry about the child's future (Brehaut et al., 2011; Lecavalier, Leone, & Wiltz, 2006; Weiss, 2002). Parents also experience emotional burdens related to the social stigma of disabilities and a sense of loss for the person that the child might have become (Lefley, 1989; Turnbull et al., 1993). This increased exposure to stressors can increase risk for physical health problems, and evidence has shown that parents of a child with a disability report poorer overall health, more physical health symptoms and more functional limitations than parents with a child without a disability (Ha et al., 2008; Namkung et al., 2018; Yamaki, Hsieh, & Heller, 2009).

It is often assumed that the effects of caregiving are stronger for mothers than fathers. In support, a meta-analysis of over 200 studies reported that caregiving increased gender differences in depression and physical health, with women experiencing more negative outcomes (Pinquart & Sörensen, 2006). However, population-based studies of parents of a child with a disability have reported mixed findings regarding this gender difference. Specifically, some studies reported differences for certain aspects of physical health (Homan, Greenberg, & Mailick, 2019; Seltzer, Floyd, Song, Greenberg, & Hong, 2011), some studies found no gender differences (Ha et al., 2008), and yet others used women-only samples or did not test for gender differences (Namkung et al., 2018; Yamaki et al., 2009).

1.3. Long-term health effects of child maltreatment and gender differences

Although the connection between parenting a child with a disability and health in mid to late adulthood has been well-documented, researchers have not yet considered the early life experiences of these parents. Yet it is increasingly recognized that childhood experiences can have a powerful impact on adult health. Child maltreatment, in particular, has been linked with poor self-rated health (Irving & Ferraro, 2006), higher rates of medical problems (Wegman & Stetler, 2009), and increased functional limitations (Chartier, Walker, & Maimark, 2007). Furthermore, these long-term effects seem to be more severe for women. A recent longitudinal investigation found that women, but not men, who reported childhood experience of emotional or physical abuse were at increased risk of all-cause mortality during the 20-year follow-up period (Chen, Turiano, Mroczek, & Miller, 2016). Self-reports of emotional abuse during childhood have been shown to robustly predict lower self-rated health for adult women, but not men (Irving & Ferraro, 2006). Although linkages between child maltreatment and a wide range of adult health outcomes have been documented for both genders, a meta-analysis reported that effect sizes were larger when analyses were restricted to only women (Wegman & Stetler, 2009).

1.4. Potential interactions between childhood maltreatment and parenting a child with a disability

In addition to the evidence linking child maltreatment to poorer adult health, it is likely that a history of a troubled early home environment interacts with the unique challenges of parenting a child with a disability. It has been shown that women with a history of adverse childhood experiences (including exposure to abuse or neglect) have difficulties with child-rearing (Belsky, Conger, & Capaldi, 2009; Sroufe, Egeland, Carlson, & Collins, 2005) and these difficulties may be exacerbated when parenthood involves a child with a disability. In general, parents who were physically abused as children have been shown to report lower satisfaction with raising their own children and increased likelihood of impaired parenting (Libby, Orton, Beals, Buchwald, & Manson, 2008). A qualitative study of parents raised in substance-abusing homes marked by high rates of physical and emotional abuse and neglect

found that participants described parenting as extremely demanding and stressful (Tedgård, Råstam, & Wirtberg, 2018). Many of the participants said that they lacked constructive models for how to raise a child and frequently feared that they were doing an inadequate job. These fears are likely compounded by low self-esteem which has been consistently linked with a history of childhood abuse (Riggs, 2010). Empirical work has shown that childhood abuse is associated with reduced social supports and networks in adulthood (Sperry & Widom, 2013); thus, parents of a child with a disability may find themselves lacking relationships with others who could help them negotiate the parenting challenges that they face. In summary, early parental abuse or neglect may predispose parents of a child with a disability to greater perceived stress and ultimately, poorer physical health.

1.5. The present study

Although ample evidence has documented the detrimental health consequences of (a) parenting a child with a disability and (b) childhood abuse or neglect, to date, no study has explored how these nonnormative influences interact to affect adult health. Such research would advance our understanding of the long-term impacts of maltreatment for specific populations, highlighting the need for intervention and support for parents who are doubly at risk. Further, most population-based investigations of the health outcomes of child abuse or parenting a child with a disability have explored adult health at a single time point. The present study attempted to fill this gap in the literature using multilevel modeling, which enabled description of typical health trajectories over a 20-year period as well as testing of variables that explain between-person variability in those trajectories. Based on recommendations to treat physical health as a multidimensional construct (Patrick & Erickson, 1993), we employed three different measures of adult health, each measured at three time points.

Based on the lifespan perspective and reviews of previous research, we stated three hypotheses:

Parenting a child with a disability will be associated with poorer adult health (lower self-rated health, more chronic conditions, and more functional limitations) over time. This effect was expected to be stronger for women.

Exposure to abuse or neglect during childhood will be associated with poorer adult health over time. This effect was expected to be stronger for women.

Exposure to abuse or neglect during childhood will amplify the detrimental effects of parenting a child with a disability on adult health over time. This effect was expected to be stronger for women.

2. Method

2.1. Study sample

Data were drawn from Waves 1, 2, and 3 of the Midlife Development in the United States study (MIDUS; Brim, Ryff, & Kessler, 2004), a national sample of 7108 English-speaking, non-institutionalized adults ranging in age from 25 to 74 when they were first assessed in 1995–1996 (Time 1; T1). Two additional waves of data collection were conducted approximately 9 and 18 years later with approximately 70 % of respondents participating at each subsequent wave: MIDUS 2 (T2) and MIDUS 3 (T3). A telephone interview conducted by a trained interviewer and a self-administered questionnaire were conducted at all three time points. Our sample included 3178 MIDUS participants who had at least one child by the time of the T1 assessment, had valid data for childhood abuse and neglect (assessed at T1), and had completed the child roster (which included questions about offspring disabilities) at T2.

MIDUS 2 included questions to identify respondents who had a child with a developmental or serious mental health problem. If parents responded affirmatively, he or she was asked the child's diagnosis and when the symptoms first appeared. The first analytic sample consisted of 180 participants who had a child with a developmental problem or a serious mental health problem with an onset before T1. The children had a range of developmental disabilities, including learning disabilities or other intellectual disabilities, attention deficit/hyperactivity disorder, cerebral palsy, epilepsy, Down syndrome, or other developmental disorders. Mental health problems included bipolar disorder, depression, schizophrenia, anxiety disorders, drug/alcohol problems, or other mental health problems. The comparison analytic sample consisted of 2998 participants who had at least one living child at the T1 assessment and valid data for childhood abuse or neglect but did not report that any of their children had a developmental disability or serious mental health condition.

Parents who did not complete the questions regarding child maltreatment or the T2 child roster were more likely to be male ($\chi^2 = 30.43, p < .001$), more likely to identify as a minority racial status ($\chi^2 = 14.38, p < .001$), and were significantly younger ($t = -9.41, p < .001$). We included each of these covariates in our linear mixed models in order to deflect the possibility of bias due to missingness (Singer & Willett, 2003). The MIDUS data sets are publicly accessible through the Inter-university Consortium for Political and Social Research, and this study was deemed exempt from institutional review.

2.2. Measures

2.2.1. Physical health

We used three measures of physical health that were consistently measured at three time points: self-reported physical health, chronic conditions, and functional limitations. Self-reported physical health was assessed at all three times points with the following two items: "In general, would you say your physical health is excellent, very good, good, fair, or poor?"; and "Using a scale from 0 to 10 where 0 means 'the worst possible health' and 10 means 'the best possible health,' how would you rate your health these days?". The first item was transformed to a 0–10 scale, and the two items were averaged. Scores ranged from 0 to 10 with higher scores

representing better health. Self-rated health has been consistently longitudinally linked to a range of objective health outcomes across socioeconomic groups (Benyamini, 2011) and both items used here have been specifically linked with mortality in the MIDUS data (Ferraro & Wilkinson, 2015).

Chronic conditions were assessed by asking participants if they had ever had any of the following 27 conditions: asthma, bronchitis, or emphysema, tuberculosis, other lung problems, bone or joint diseases, sciatica, lumbago, or recurrent backache, persistent skin trouble, thyroid disease, hay fever, recurring stomach trouble, urinary or bladder problems, constipations, gall bladder trouble, persistent foot trouble, varicose veins requiring treatment, AIDS or HIV infection, autoimmune disorders, trouble with gums or mouth, persistent trouble with teeth, high blood pressure, migraine headaches, chronic sleeping problems, diabetes or high blood sugar, neurological disorders, stroke, ulcer, hernia or rupture, and piles or hemorrhoids. Only conditions that were assessed at all three time points were included (Marmot, Ryff, Bumpass, Shipley, & Marks, 1997) and conditions that were primarily psychological were not included (e.g., substance use problems or anxiety). Affirmative responses were summed to create a total index of chronic conditions ranging from 0 to 27, with higher scores indicating more chronic conditions.

Functional limitations were assessed by asking participants to indicate on a four-point scale (1 = *a lot*, 4 = *not at all*) the extent to which their health limited their ability to do each of the following tasks: lifting or carrying groceries; climbing several flights of stairs; bending, kneeling or stooping; walking more than a mile; walking several blocks; engaging in moderate activity; and engaging in vigorous activity. Scores were reverse-coded and averaged across each of the seven items, with higher scores indicating greater impairment.

2.2.2. Child abuse and neglect

Childhood exposure to parental emotional or physical abuse was retrospectively assessed at T1 using items drawn from the Conflict Tactics Scale (Straus, Gelles, & Steinmetz, 1980), which has been widely used in family violence research (Straus, 2007). Emotional abuse was measured by the item: "When you were growing up, how often did your mother/father or the woman/man who raised you, insult you or swear at you; sulk or refuse to talk to you; stomp out of the room; do or say something to spite you; threaten to hit you; smash or kick something out of anger?" Participants responded using a 4-point scale (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*); for this study, emotional abuse was coded as present if the respondent indicated that either parent *often* engaged in the behavior (Danielson & Sanders, 2018). Physical abuse was measured by the item: "When you were growing up, how often did your mother/father or the woman/man who raised you, push, grab, or shove you; slap you, or throw something at you?" Severe physical abuse was measured by the item: "When you were growing up, how often did your mother/father or the woman/man who raised you, kicked, bit, or hit you with a fist; hit or tried to hit you with something; beat you up; choked you; burned or scalded you?" Physical abuse was coded as present if either parent *often* engaged in the physically abusive behavior or if either parent *rarely*, *sometimes*, or *often* engaged in the severely abusive behavior (Danielson & Sanders, 2018).

Child neglect was assessed at T1 using seven items from the Parental Affection in Childhood Scales (Rossi, 2001). Participants were asked to rate their relationship with their mother/father during the years they were growing up on a scale from 1 (*excellent*) to 5 (*poor*). Scores were recoded so that higher scores reflected a better relationship and transformed to a 4-point scale. Participants responded to the following six questions separately for their mother and father using a 4-point scale (1 = *a lot*, 2 = *some*, 3 = *a little*, 4 = *not at all*): "How much did she/he understand your problems and worries; how much could you confide in her/him about things that were bothering you; how much love and affection did she/he give you; how much time and attention did she/he give you when you needed it; how much effort did she/he put into watching over you and making sure you had a good upbringing; how much did she/he teach you about life?" Items were reverse coded so that high scores reflected higher levels of parental affection and the mean of the 14 items (seven items for the maternal scale and seven items for the paternal scale) was calculated. A mean of 2.0 or less across the 14 items was coded as emotional neglect (Danielson & Sanders, 2018). Cronbach's alpha for this scale for the present study was $\alpha = .92$. We coded abuse or neglect as present if participants experienced any of the three domains of maltreatment (emotional abuse, physical abuse, or neglect).

2.2.3. Control variables

Demographic variables included baseline characteristics of age (continuous), gender (0 = *male*, 1 = *female*), education (0 = *high school or less*, 1 = *some college or more*), and race (coded 0 = *white*, 1 = *other* because of the small number of minorities in the sample).

2.3. Analytic approach

First, we examined descriptive statistics for the two groups of parents and tested for differences using chi-square tests (for dichotomous variables) and *t*-tests (for continuous variables).

We used linear mixed modeling to describe a) within-person change in physical health across time and b) how these changes differed across people. Specifically, we tested how the physical health of parents of a child with a disability differed over time relative to parents who did not report that any of their children had a disability. We also tested whether exposure to childhood abuse or neglect and parental gender moderated the effects of parenting a child with a disability on physical health.

For each measure of physical health, we developed a model including two random effects, that is, intercept (individual differences at T1) and slope (individual variation in the linear trajectories). Using a forward modeling approach, we started with an unconditional means model (Model 1) and an unconditional growth model (Model 2). Next, we entered a set of control demographic variables (age at T1, gender, education, race, number of children at T1) to determine whether these initial conditions explained T1 variability

Table 1
Descriptive statistics for sociodemographics and key variables by parent status.

	Parent did not report a child with a disability (N = 2998)		Parent reported a child with a disability (N = 180)		χ^2
	N	%	N	%	
Female	1672	55.8	117	65.0	5.88*
Race (% non-White)	174	5.9	7	4.0	1.10
Education (some college)	1860	62.2	109	60.6	.19
Abused or neglected	842	28.1	62	34.4	3.37
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Number of children	2.74	1.36	3.34	1.46	-5.69***
T1 age	49.15	11.85	51.09	11.43	-2.14*
T2 age	58.07	11.80	60.01	11.43	-2.15*
T3 age	65.97	10.80	68.99	10.35	-3.11**
T1 self-rated health	7.07	1.73	6.85	1.88	-1.62
T2 self-rated health	6.87	1.87	6.51	2.01	2.47*
T3 self-rated health	6.57	2.01	6.18	2.36	2.27*
T1 chronic conditions	2.16	2.21	2.76	2.86	-3.47**
T2 chronic conditions	2.25	2.34	2.90	2.90	-3.58***
T3 chronic conditions	2.85	2.35	3.34	2.95	-3.36***
T1 functional limitations	1.53	.71	1.60	.74	-1.35
T2 functional limitations	1.82	.88	2.08	.95	-3.81***
T3 functional limitations	2.02	.95	2.35	.95	-3.63***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

and linear change in physical health (Model 3). Subsequent analyses introduced parent status and its interaction with gender to Model 3 and their relationships with both T1 physical health and change in health over time was examined. Next, exposure to childhood abuse or neglect and its interaction with gender were individually entered to Model 3 (that is, the model including the demographic covariates). Finally, in order to test the differential effects of caregiving and exposure to childhood abuse or neglect for mothers and fathers, interactions between parent status, childhood abuse or neglect, and parent gender were added to the model. We used restricted maximum likelihood estimation for the unconditional means and unconditional growth models and we used full maximum likelihood for testing fixed effects (West, Welch, & Galecki, 2015). SPSS version 26 was used for all analyses.

One of the advantages of linear mixed models is that the spacing and number of waves of assessment can vary across individuals. However, if a data set is substantially unbalanced, the computing iterative algorithms that estimate the variance components may not converge. The MIDUS sample has a broad age range (25–75 at T1) and this broad range in conjunction with not all persons having all waves of data led to problems with model convergence in preliminary analyses. For this reason, we defined time as years since the T1 assessment and included age at T1 (centered on the sample mean age at T1) as a covariate.

3. Results

Descriptive statistics for all three waves and T1 demographic characteristics for both groups of parents are presented in Table 1. Parents who had a child with a disability were more likely to be female, and on average, this group of parents was older and had more children than those in the comparison group. The two groups did not differ regarding education, race, or exposure to child abuse or neglect. As shown in Table 1, the group of parents who had a child with a disability reported poorer self-rated health and more functional limitations at T2 and T3. They reported more chronic health conditions than the comparison parents at all three time points. These descriptive statistics and *t*-test results are presented to give an overview of the data and aid interpretation of the linear mixed model analyses.

Table 2 presents the results of the mixed model analysis for self-rated health. Model 1 (the unconditional means model) indicates that average self-reported health across the total sample was 6.82 ($p < .001$). The intraclass correlation indicated that 67 % of the total variation in self-rated health was due to differences between respondents.

Model 2 (the unconditional growth model) shows that self-rated health decreased by .02 every year after T1. The decrease in the within-subjects variance indicates that including a slope term described self-rated health over time better than the unconditional means model, and the difference in the -2 log-likelihood statistic was significant ($\chi^2(1) = 4739.83, p < .001$), again confirming that the unconditional growth model was superior to the unconditional means model.

Model 3 introduced demographic control variables (age, gender, education, race, and number of children at T1) as predictors of both intercept and slope. Higher starting age was significantly related to lower self-rated health and a more rapid decline over time. Gender was not related to self-rated health at T1, but women showed a slower decline in self-rated health over time. Education was related to better self-rated health and a slower decrease in self-rated health over time. Persons who were non-White had significantly lower self-rated health, but race was not related to change in health over time. Number of children at T1 was related to poorer self-rated health but was not related to change in health over time. Introduction of these demographic variables produced a small decrease in intercept variance. The difference in the -2 log likelihood statistic was significant (relative to Model 2 refitted under full maximum likelihood; $\chi^2(10) = 770.40, p < .001$), confirming that Model 3 had significantly better fit than Model 2.

Table 2
Linear mixed model analysis of changes in self-rated health.

	Model 1	Model 2	Model 3	Final model
Random effects				
Intercept	6.82 (.03)***	7.04 (.03)***	7.14 (.14)***	7.34 (.14)***
Time		-.02 (.002)***	.02 (.009)*	.02 (.009)*
Fixed effects				
Age			-.01 (.002)**	-.01 (.003)*
Age × Time			-.001(.0002)***	-.001(.0002)***
Female			-.09 (.06)	-.05 (.07)
Female × Time			.01 (.004)*	.01 (.004)*
Education			.57 (.06)***	.54 (.06)***
Education × Time			.02(.004)***	.02 (.004)***
Non-White			-.25 (.13)*	-.23 (.12)
Non-White × Time			-.002 (.008)	
Children			-.05 (.02)*	-.05 (.02)*
Children × Time			.00 (.001)	
Parent status				-.17 (.26)
Child abuse or neglect				-.34 (.10)***
Parent status × Female				.41 (.31)
CAN × Female				-.16 (.13)
PS × CAN				-.04 (.42)
PS × CAN × Female				-1.27 (.53)*
Variance components				
Within-subjects	1.28 (.02)	.74 (.02)	.72 (.02)	.72 (.02)
Intercept	2.59 (.08)	2.16 (.07)	2.07 (.07)	2.01 (.07)
Slope		.005 (.0004)	.005 (.0004)	.005 (.0004)
Covariance		-.003 (.004)	-.007 (.004)	-.006 (.004)
Intraclass correlation	.67			
Model fit				
-2 log likelihood	35625.13	30885.30	30098.90	30017.06
AIC	35629.13	30893.30	30130.90	30057.06
BIC	35643.45	30921.56	30243.70	30198.05

Note. Non-White refers to all racial groups except White. Children refers to number of children at T1. CAN = child abuse or neglect (coded 1 if it occurred). PS = parent status (coded 1 for parents of a child with a disability). Values presented for Models 1 and 2 are based on restricted maximum likelihood estimation. Values presented for Models 3 and 4 are based on full maximum likelihood estimation.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

The predictors of primary interest were entered individually to Model 3. For reasons of space, full results for these intermediate models are not presented in Table 2. When introduced to Model 3, neither parent status nor its interaction with gender significantly predicted either the intercept or the slope, indicating that parents of a child with a disability did not report worse health than comparison parents, and their change in self-rated health over time was no different from the comparison parents. Further, there was no evidence that mothers of a child with a disability had worse health than fathers of a child with a disability, or a different rate of change over time. Exposure to child abuse or neglect predicted poorer health at T1 ($B = -.30$, $SE = .10$, $p = .002$) and its interaction with gender was significant ($B = -.31$, $SE = .13$, $p = .02$). Neither of these effects was significantly associated with change in self-rated health over time. That is, individuals who were exposed to maltreatment as a child experienced the same rate of decline in self-rated health as the total sample, regardless of gender.

The final model included parent status, child abuse or neglect, their interaction, and the three-way interaction between parent status, child abuse or neglect, and gender. None of these predictors significantly explained variance in slope; for parsimony, they were not retained in the final model. There were two significant predictors beyond the demographic controls: exposure to childhood abuse or neglect, and the three-way interaction between parent status, child abuse or neglect, and gender. That is, for all participants, exposure to child abuse or neglect was negatively associated with health, but mothers of a child with a disability who had themselves experienced abuse or neglect reported significantly poorer health at baseline ($B = -1.27$, $SE = .53$, $p = .016$). Because their health declined at the same rate as the overall sample, this result indicates that these mothers experienced lower self-rated health across the 18 years of the study.

Table 3 presents the results of the mixed model analysis for chronic conditions. Model 1 (the unconditional means model) showed that the mean number of chronic conditions for the total sample was 2.34 and 57 % of the total variation in chronic conditions was due to differences between respondents. Model 2 showed that chronic conditions increased by .03 every year after T1 and the significant difference in the -2 log-likelihood statistic ($\chi^2(1) = 121.53$, $p < .001$), confirmed that the unconditional growth model was superior to the unconditional means model.

Model 3 introduced demographic control variables. The model failed to converge using an unstructured covariance matrix for the random effects. Covariance between the slope and intercept was low, so we specified a diagonal covariance matrix, and this covariance structure did converge. Based on the -2LL statistic, (relative to Model 2 refitted with a diagonal covariance matrix under full maximum likelihood; $\chi^2(10) = 1010.93$, $p < .001$), Model 3 had significantly better fit than Model 2.

Table 3
Linear mixed model analysis of changes in chronic conditions.

	Model 1	Model 2	Model 3	Final model
Random effects				
Intercept	2.34 (.04)***	2.15 (.04)***	.43 (1.19)*	.18 (.18)
Time		.03 (.003)***	-.02 (.01)	-.02(.01)
Fixed effects				
Age			.03 (.003)***	.03 (.003)***
Age × Time			.001 (.0002)***	.001 (.0002)***
Female			.57 (.08)***	.48 (.08)***
Female × Time			.003 (.01)	
Education			-.40 (.08)***	-.41 (.07)***
Education × Time			-.01 (.006)	
Non-White			.32 (.17)	.37 (.14)*
Non-White × Time			.02 (.01)	
Children			.06 (.03)*	.07 (.03)**
Children × Time			.002 (.002)	
Parent status				.31 (.31)
Child abuse or neglect				.41 (.11)***
Parent status × Female				-.35 (.37)
CAN × Female				.38 (.15)**
PS × CAN				.13 (.50)
PS × CAN × Female				1.34 (.63)*
Variance components				
Within-subjects	2.58 (.05)	2.35 (.06)	2.34 (.06)	2.34 (.06)
Intercept	2.96 (.10)	2.90 (.10)	2.55 (.09)	2.41 (.09)
Slope		.003 (.001)	.002 (.0005)	.002 (.0005)
Intra-class correlation	.57			
Model fit				
-2 log likelihood	36052.80	35931.27	34905.48	34794.11
AIC	36056.80	35937.27	34935.48	34828.11
BIC	36070.86	35958.64	35040.73	34947.39

Note. Non-White refers to all racial groups except White. Children refers to number of children at T1. CAN = child abuse or neglect (coded 1 if it occurred). PS = parent status (coded 1 for parents of a child with a disability). Values presented for Models 1 and 2 are based on restricted maximum likelihood estimation. Values presented for Models 3 and 4 are based on full maximum likelihood estimation.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

The predictors of primary interest were entered individually to Model 3 (not shown in Table 2). When introduced to Model 3, parent status significantly predicted the intercept ($B = .39$, $SE = .17$, $p = .02$) but did not predict the slope and neither of these effects was conditional on gender. This result indicates that parents of a child with a disability reported more chronic conditions than comparison parents but the rate of change in chronic conditions did not differ from the overall sample. Further, there was no evidence that mothers of a child with a disability had more chronic conditions than fathers of a child with a disability. When introduced to Model 3, exposure to child abuse or neglect predicted a higher intercept ($B = .45$, $SE = .13$, $p < .001$) and this effect was conditional on gender ($B = .58$, $SE = .17$, $p = .001$), indicating that mothers who experienced child abuse or neglect reported more chronic conditions than fathers who experienced child abuse or neglect. Neither child abuse or neglect or its interaction with gender predicted rate of change in chronic conditions over time.

Complete results for the final model are presented in Table 3. Nonsignificant slope terms were not retained for the final model. There were three significant predictors beyond the demographic controls: exposure to childhood abuse or neglect, its interaction with gender, and the three-way interaction between parent status, child abuse or neglect, and gender. That is, exposure to childhood maltreatment was associated with more chronic conditions, and this effect was stronger for women ($B = .38$, $SE = .15$, $p = .008$). However, mothers of a child with a disability who had themselves experienced abuse or neglect reported the highest rates of chronic conditions ($B = 1.34$, $SE = .63$, $p = .03$). None of these predictors was significantly associated with the rate of change in chronic conditions and thus, are not included in the final model.

Table 4 presents the results of the mixed model analysis for functional limitations. Model 1 showed that the mean number of functional limitations for the sample was 1.72 and 36 % of the total variation in functional limitations was due to differences between respondents. Model 2 indicated that on average, functional limitations increased over time ($B = .02$, $SE = .001$) and the significant difference in the -2 log-likelihood statistic demonstrated the improvement in model fit when individual slopes were allowed to vary ($\chi^2(1) = 1122.26$, $p < .001$).

Model 3 introduced age, gender, education, race, and number of children as predictors of both intercept and slope. Intercept variance decreased with the introduction of these demographic variables, and the difference in the -2 log-likelihood statistic was significant (relative to Model 2 refitted under full maximum likelihood; $\chi^2(10) = 1110.61$, $p < .001$).

Next, our key predictors were entered singly to Model 3 (not shown in Table 4). Parent status and its interaction with gender were introduced to Model 3; neither of these predictors was significantly associated with the intercept or slope. Next, exposure to

Table 4
Linear mixed model analysis of changes in functional limitations.

	Model 1	Model 2	Model 3	Final model
Random effects				
Intercept	1.72 (.01)***	1.58 (.01)***	.86 (.06)***	.80 (.06)***
Time		.02 (.001)***	-.05 (.01)***	-.05 (.01)***
Fixed effects				
Age			.01 (.001)***	.02 (.001)***
Age × Time			.002 (.0001)***	.002 (.0001)***
Female			.23 (.03)***	.21 (.03)***
Female × Time			-.003 (.003)	
Education			-.18 (.03)***	-.17 (.03)***
Education × Time			-.01 (.005)***	-.01 (.003)***
Non-White			.18 (.006)**	.15 (.05)**
Non-White × Time			-.01 (.01)	
Children			.03 (.01)**	.02 (.01)*
Children × Time			-.001 (.001)	
Parent status				.10 (.11)
Child abuse or neglect				.14 (.04)***
Parent status × Female				-.15 (.13)
CAN × Female				.05 (.05)
Parent status × CAN				-.22 (.17)
PS × CAN × Female				.62 (.21)**
Variance components				
Within-subjects	.68 (.01)	.50 (.01)	.48 (.01)	.48 (.01)
Intercept	.38 (.02)	.12 (.02)	.07 (.02)	.07 (.02)
Slope		.002 (.0002)	.002 (.0002)	.002 (.0002)
Covariance		.01 (.001)	.01 (.001)	.01 (.001)
Intra-class correlation	.36			
Model fit				
-2 log likelihood	24062.16	22939.90	21811.07	21753.30
AIC	24066.16	22947.90	21843.07	21791.30
BIC	24080.29	22976.15	21955.86	21925.24

Note. Non-White refers to all racial groups except White. Children refers to number of children at T1. CAN = child abuse or neglect (coded 1 if it occurred). PS = parent status (coded 1 for parents of a child with a disability). Values presented for Models 1 and 2 are based on restricted maximum likelihood estimation. Values presented for Models 3 and 4 are based on full maximum likelihood estimation.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

childhood abuse or neglect and its interaction with gender were introduced to Model 3. Childhood abuse or neglect was associated with elevated functional limitations at T1 ($B = .10$, $SE = .04$, $p = .02$), and its interaction with gender was also significant ($B = .11$, $SE = .06$, $p = .04$). Neither of these effects significantly explained slope variance.

As shown in Table 4, the final model introduced parent status, child abuse or neglect, their interaction, and their interaction with gender. Like the other health variables, there was little unexplained slope variance and none of the predictors entered after Model 3 showed significant associations with slope. Nonsignificant fixed effects were removed from the model. Exposure to childhood abuse or neglect was related to more functional limitations at T1 ($B = .14$, $SE = .04$, $p < .001$). However, there was a significant three-way interaction between parent status, child abuse or neglect, and gender ($B = .62$, $SE = .21$, $p = .003$), indicating that mothers of a child with a disability who themselves had experienced abuse or neglect as a child had significantly more functional limitations than other people who had experienced abuse or neglect as a child.

4. Discussion

This study extends our understanding of the long-term health effects of two nonnormative influences (parenting a child with a disability and exposure to childhood maltreatment) by examining them simultaneously and explicitly testing their interaction. A consistent and compelling finding was that previous exposure to maltreatment exacerbated the detrimental health effect of parenting a child with a disability for mothers, but not fathers. The three-way interaction between gender, parenting a child with a disability, and exposure to maltreatment significantly predicted poorer self-rated health and elevated chronic conditions and functional limitations at baseline. Given that the rate of change over time was not related to any of these predictors or their interactions, mothers who were maltreated and had a child with a disability had poorer health across all three waves of the study.

A limited body of work has explored the joint effects of adult stressors and early adversity, including maltreatment. A key finding from a study based on MIDUS data was that early life adversity and recent life stressors (assessed via a comprehensive list of possible adulthood events such as being a victim of physical or sexual assault, death of a child, experiencing bankruptcy, jail detention) had unique and additive contributions to health at midlife (measured via inflammation biomarkers; Hostinar, Lachman, Mroczek,

Seeman, & Miller, 2015). That is, the study found no evidence of interactive effects between early experience of a troubled home environment and stressful adult life events. The authors concluded that the *stress accumulation model* best accounted for their findings. According to this model, the total accumulation of stress over time leads to “wear and tear” on physiological systems, ultimately leading to impaired health (Seeman, Epel, Gruenewald, Karlamangla, & McEwen, 2010). Importantly, the model implies that early adversity and recent life events are independent in terms of their effects on health.

In contrast, the present study found that experience of childhood maltreatment and nonnormative parenting had synergistic effects on physical health. As expected, and consistent with substantial previous research, we found that exposure to maltreatment had a significant detrimental effect on health for parents in general, and a stronger effect for women. However, this effect was amplified for mothers of a child with a disability. While early maltreatment has been linked with elevated parenting stress and is likely to influence one’s parenting in a variety of negative ways (Sroufe et al., 2005), it is plausible that these difficulties are exacerbated when the parent is confronted with a child-rearing situation fraught with unique and chronic challenges. Rather than having an additive effect, early maltreatment may create a context that makes it more difficult to cope with the demands of caring for a child with a disability. This interpretation of our results is consistent with the lifespan perspective which posits that early experiences have the potential to shape later experiences, resulting in different outcomes for the persons involved.

Gender moderated this relationship, such that mothers with a history of maltreatment and a child with a disability experienced the greatest health impairments. Women tend to be more emotionally invested in parenting than men, and they tend to derive more of their sense of self from this role (Scott & Alwin, 1989; Simon, 1992). They also perform more caregiving duties, are exposed to more care-related stressors, and are more likely to use emotion-focused coping when facing stressful situations (Bianchi, Sayer, Milkie, & Robinson, 2012; Kelly, Tyrka, Price, & Carpenter, 2008; Pinquart & Sørensen, 2006). Thus, any factor that increases stress (such as a child with a disability) might have a greater effect on women. Our results did not show a gender effect for parent status alone; however, when the additional risk factor of a history of childhood maltreatment was considered, we found that women were at a clear disadvantage. This finding suggests a stress sensitization effect in which the heightened vulnerability conferred by a history of maltreatment (which has been shown to have more severe effects for women) magnified the effect of parenting a child with a disability.

One way that early maltreatment may influence the later parenting context is through social resources. For example, childhood abuse is associated with reduced social support and a lack of help seeking behaviors that would provide access to existing resources (Sperry & Widom, 2013). Yet social support is a key resource for people facing a stressful situation as it may provide tangible assistance or advice, help individuals alter the meaning of the situation, or help individuals manage their response to the situation. Thus, mothers who were maltreated who have a child with a disability are confronted with a double disadvantage: they experience more stress but have fewer resources to deal with the stress.

Another way that childhood maltreatment may alter the parenting context is through coping strategies. Problem-focused coping strategies attempt to manage or alter a stressful situation by taking active steps to resolve the issue or by seeking advice while avoidant coping strategies involve denial or minimization of stressors through substance use or distraction (Lazarus & Folkman, 1984; Roth & Cohen, 1986). In regard to health, problem-focused coping has been linked with slower disease progression, fewer treatment side effects, and reduced symptoms while avoidant coping shows the opposite pattern (Aldwin & Yancura, 2004). Further, among aging parents of a child with a disability, avoidant coping exacerbated the effects of stress on depressive symptoms (Piazza, Floyd, Mailick, & Greenberg, 2014). However, people who were maltreated as children tend to show increased reliance on avoidant coping strategies and reduced use of problem-focused coping strategies (Arslan, 2017; Leitenberg, Gibson, & Novy, 2004). Thus, maltreated mothers of a child with a disability are likely to use less effective forms of coping despite higher levels of stress.

Longitudinal analyses revealed a detrimental effect of parenting a child with a disability on chronic conditions, but not self-rated health or functional limitations. Most of the extant research exploring the effects of caregiving on health has used cross-sectional designs and indeed, our preliminary analyses involving a static comparison at each wave of assessment showed that parents of a child with a disability did report significantly poorer health on all three health outcomes relative to the comparison parents. The most straightforward explanation for this discrepancy is that our longitudinal analyses involved multiple demographic control variables, but the cross-sectional comparisons did not. We also did not find evidence that gender moderated the effect of parenting a child with a disability. Other studies of caregiving using the MIDUS data have produced mixed results regarding this particular gender effect, and again, discrepancies may be due to the specific control variables and health outcomes used.

In longitudinal analyses, only mothers of a child with a disability who themselves had experienced maltreatment had consistently poorer health over time. Further, this effect was evident at baseline and remained consistent over time. That is, the average health trajectory for these mothers neither diverged from nor converged with the overall trajectory for the sample of parents, but remained consistently lower for self-rated health, and consistently higher for chronic conditions and functional limitations. This finding implies that the harmful effect on health is evident in midlife (average age at T1 was about 49 years) but does not balloon as these women grow into late adulthood. It may be that the relative contributions of nonnormative parenting and childhood maltreatment change over time. Some scholars have suggested that the effects of childhood experiences on adult health become more diffuse over time and other factors, such as health behaviors or educational attainment, gain significance (Montez & Hayward, 2014; Nurius, Fleming, & Brindle, 2018). Other work has shown that parents of offspring with disabilities show a normative pattern of health and well-being through midlife but detrimental health effects start to become apparent when they are in their mid-60s (Namkung et al., 2018). Thus, it may be that as the direct influence of childhood maltreatment on health begins to wane, the long-term effects of lifelong caregiving for adult children with disabilities become more evident and the net effect is a relatively stable rate of overall change in health.

This study had several limitations. First, due to the relatively small sample of parents who had a child with a disability and had also experienced maltreatment, we collapsed all forms of maltreatment into one dichotomous exposure variable. As a result, we were

unable to test the possibility that different forms of maltreatment would have different effects on health. Similarly, we did not test differential health impacts of different types of disabilities. A second limitation was that we relied on retrospective reports of abuse and neglect. However, a review of the available evidence concluded that when abuse or neglect is retrospectively reported to have occurred, affirmative reports are likely to be correct (Hardt & Rutter, 2004). Unfortunately, the evidence also indicates that about a third of persons who experienced documented childhood abuse or neglect do not report its occurrence when asked about it as an adult. Thus, it is likely that some of the respondents in this study who reported no exposure to maltreatment did experience it.

This study also had several strengths. First, by using a linear mixed model approach, we were able to take into account all three waves of MIDUS data. Linear mixed models do not require complete data for each participant, so concerns about attrition were minimized. This approach also allowed us to describe the typical health trajectory for the entire sample, as well as variables that altered those trajectories for individuals. Second, we obtained the same pattern of results using three distinct aspects of adult physical health. This convergent evidence strengthens confidence in our results. Third, we used a nationally representative data set which increases the generalizability of the findings. It is important to note that the sample of parents of children with disabilities was not specifically recruited for a study of caregiving effects as is the case with most research on such parents. For this reason, our data is less vulnerable to self-selection bias. Finally, this study is the first to simultaneously explore the effects of early maltreatment and lifelong caregiving for a child with a disability using a longitudinal design.

In conclusion, this study extends the existing literature on parenting a child or adult with a developmental disability or mental health problem by showing that a history of childhood maltreatment can exacerbate mid to late-life health impacts. This finding implies that it is important to provide services for these parents, such as respite care, in-home family support, or counseling services. However, intervention research has been limited and much remains to be learned about how and when to best meet the needs of families across the life course. Future research should explore specific potential mechanisms underlying the long-term health effects, such as lack of social support or use of maladaptive coping strategies; such work would identify possible areas for intervention. In addition, it is important to consider the timing of intervention. It is possible that investing in services and supports earlier in the life course might help to shape a more adaptive parenting environment, thereby mitigating the long-term effects of stress. Finally, this study highlights the importance of taking contextual factors into account when exploring the long-term effects of parenting and suggests that future research, including intervention research, should continue to consider such factors.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declarations of interest

None.

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