

The Psychological Consequences of Disability over the Life Course: Assessing the Mediating Role of Perceived Interpersonal Discrimination

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Abstract

We examine whether perceived interpersonal discrimination mediates the association between disability and psychological well-being (depression, negative and positive affect) and how these processes differ across the life course. Data are from two waves (2004–2006; 2013–2014) of the Midlife in the United States (MIDUS; $N = 2,503$). Perceived discrimination accounts for 5% to 8% of the association between disability and the three mental health outcomes. Moderated mediation analyses reveal significant age differences; perceived discrimination is a stronger explanatory mechanism among midlife (ages 40–64) relative to older (age 65+) adults. Disability stigma takes a heightened psychological toll at midlife, a life stage when adults are expected to be able-bodied and interact with a diverse social network, which may be a source of interpersonal mistreatment. Among older adults, for whom impairment is expected and common, the psychological impact of disability may operate through other pathways. We discuss implications for research and practice.

Keywords

disability, discrimination, mental health, stigma

Disability encompasses any condition of the body or mind that makes it difficult to engage in activities and interact with one's environment. More than 20 million U.S. adults report that they cannot or have "a lot" of difficulty with seeing, hearing, mobility, communication, cognition, or self-care (National Center for Health Statistics 2017). Rates of impairment among young and midlife adults have risen dramatically in recent years, alongside population aging and a corresponding increase in physical limitation (Brown et al. 2017; Joffe-Walt 2013). Persons with disability are vulnerable to compromised emotional well-being, due in part to their lower levels of social integration and activity, diminished sense of self-efficacy, poorer quality employment, reduced work hours, and financial strain (Brown and Barrett 2011; Caputo and Simon 2013; Freedman et al. 2017; Yang 2006).

We propose that experiences of interpersonal discrimination—or the microaggressions and slights that occur in day-to-day interactions—also may contribute to the poorer emotional well-being of persons with disability. Research consistently shows that persons with mental illness (Ruscinova et al. 2011), "visible" conditions like hearing-aid use (Erler and Garstecki 2002), and physical conditions that limit daily activities like walking or

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lifting (Namkung and Carr 2019) are vulnerable to discriminatory and demeaning treatment. However, we know of no studies that formally evaluate the extent to which interpersonal discrimination contributes to mental health differentials between those with versus without impairment, or the extent to which these patterns vary over the life course. Disability is more prevalent, expected, and accepted among older adults relative to their working-age counterparts and may render them less vulnerable to distressing interpersonal mistreatment. About 15% of middle-aged adults in the United States have some difficulty performing basic daily activities, and this proportion rises steadily with age, reaching 30% among persons ages 65 and older (Brown et al. 2017). Because health problems and accompanying impairments are increasingly common with advancing age, older adults may be less likely to experience and less emotionally vulnerable to interpersonal mistreatment relative to their younger counterparts (Menec and Perry 1995).

We use data from two waves of the Midlife in the United States (MIDUS) survey, a random sample survey of more than 3,000 men and women ages 35 to 84 in 2004–2005, to examine prospectively: (1) the extent to which the effects of disability on three dimensions of psychological well-being (depressive symptoms, negative affect, and positive affect) are mediated by perceived interpersonal discrimination and (2) whether the relative explanatory power of perceived discrimination differs across four life-course stages (young adulthood, early midlife, later midlife, and old age). Analyses are adjusted for demographic, health, and psychological characteristics that may confound associations among disability, perceived discrimination, and well-being. Identifying potentially modifiable factors that compromise the psychological well-being of U.S. adults with impairment is an important public health concern (Krahn, Walker, and Correa-De-Araujo 2015). Interpersonal mistreatment of persons with disability could further undermine the well-being of this already vulnerable population.

BACKGROUND

Psychological Consequences of Disability

Disability refers to a condition that impairs one's ability to perform activities of daily living (ADLs), such as walking up a flight of stairs, or instrumental activities of daily living (IADLs), which encompass complex behaviors like preparing meals (Verbrugge and Jette 1994). Adults with impairments that are not

accommodated may struggle to carry out activities, maintain social relationships, and live independently. They also may quit work or abandon leisure activities that were once a source of pleasure and may feel their independence and autonomy are undermined (Freedman et al. 2017). Consequently, impairment is associated with heightened depressive symptoms and compromised daily mood, life satisfaction, and self-esteem (Caputo and Simon 2013; Freedman et al. 2017; Mancini and Bonanno 2006), with prospective studies documenting that effects operate from disability to distress rather than vice versa (Gayman, Turner, and Cui 2008; Yang 2006).

The association between disability and compromised mental health is consistent with key themes of the stress paradigm (Pearlin et al. 2005). Stressors encompass acute events, such as losing one's job, and chronic strains, such as a long-term impairment, that undermine well-being. Chronic strains are particularly detrimental to emotional well-being due to their extended duration and capacity to spill over into multiple life domains, including work and family. Persistent stress exposure also threatens one's immune, digestive, cardiovascular, sleep, and reproductive systems, which renders one vulnerable to psychological distress (Carr 2014; Pearlin et al. 2005). Disability also may diminish one's internal coping resources, including mastery and self-esteem, as well as external coping resources, including social support. Coping resources are critical to sustaining emotional well-being in the face of chronic stress (Carr, Cornman, and Freedman 2019; Turner and Noh 1988; Yang 2006).

Stress perspectives identify a further process through which a stressor undermines mental health; the primary stressor (e.g., disability) may trigger secondary stressors such as financial insecurity, work strains, involuntary unemployment, or marital conflict, which may further erode one's well-being (Shandra 2018; Turner and Turner 2004). We propose that discriminatory or demeaning interpersonal encounters are a potentially important yet underexplored secondary stressor through which disability undermines mental health. Interpersonal mistreatment of persons with impairment could threaten their well-being directly, consistent with research on the negative psychological consequences of discrimination including racism (Williams and Williams-Morris 2000), sexism (Pavalko, Mossakowski, and Hamilton 2003), sizeism (Carr and Friedman 2005), ageism (Vogt Yuan 2007), and homophobia (Bostwick et al. 2014). Perceived discrimination also can amplify the harmful psychological consequences of vulnerability factors like obesity (Tsenkova et al. 2011).

Stigmatization and Perceived Discrimination toward Persons with Disability

Classic stigma theories assert that persons with impairment may be devalued and mistreated by others. Goffman (1963) defined stigma as any personal attribute that is “deeply discrediting” to its possessors; these attributes include “blemishes of individual character,” “abominations of the body,” and “tribal stigmata” (p. 3). Persons with functional limitations arguably fall into the former two categories. Goffman’s writings suggested that persons with disabilities are “disqualified from full social acceptance” (p. 3) because their condition is unappealing to others and may be viewed as a signal that they are not fully capable of carrying out their expected social roles. Especially in capitalist societies where being able-bodied is viewed as a marker of competence and capacity to work, persons with activity-limiting impairments also may be treated as if they possess a “blemish of individual character”—a malingerer who is exaggerating or faking symptoms to evade work and other responsibilities (Lingsom 2008). Contemporary conceptualizations of stigmatization underscore that this devaluation is carried out by social institutions and individuals who denigrate and exclude. This mistreatment may encompass institutional discrimination that blocks access to education, employment, and health care and interpersonal slights and microaggressions that may undermine one’s well-being (Link and Phelan 2001).

Discrimination against persons with functional limitations is prohibited by law in the United States. The Americans with Disability Act (ADA), passed by Congress in 1990 and amended in 2008, prohibits discrimination on the basis of disability in many settings, including employment, public services (e.g., transportation), public accommodations, and telecommunications. The ADA also requires employers to provide reasonable accommodations to qualified individuals with a disability. The ADA is based on a broad definition of “disability” that covers both mental and physical conditions; a condition need not be severe or permanent to qualify an individual for accommodations (Jasper 2008). Despite these formal protections, legal cases and media reports of persons being mistreated on the basis of health problems, even relatively minor ones such as back problems, controlled diabetes, or a speech impediment, are common (McMahon and Shaw 2005). For example, workers with activity limitations earn less, receive less training and benefits, are less likely to participate in decision-making, and are more likely

to exit employment relative to their counterparts without such conditions (Schur et al. 2009). Institutional discrimination also is documented in health care settings; patients with poorer self-rated health are more likely to report receiving inferior services compared to their counterparts in better health (LaVeist, Rolley, and Diala 2003).

Yet institutional discrimination represents a modest share of all stigmatizing encounters. Other subtle yet pernicious forms of stigmatization, including interpersonal slights, may affect psychological well-being, especially for those whose health and functioning are already compromised (Link and Phelan 2001). Studies based on large national surveys of U.S. adults (Namkung and Carr 2019) and smaller regional samples (Brown 2017; Kilpatrick and Taylor 2018) as well as studies focused on persons with psychiatric conditions (Kassam, Williams, and Patten 2012) and visible conditions such as hearing-aid use (Erler and Garstecki 2002) show that persons with disability experience microaggressions in everyday life, including bullying and disrespectful treatment. Likewise, focus group interviews of persons with sensory or physical limitations revealed they often felt they were treated like “second-class citizens” and that their intelligence and skills were underestimated (Keller and Galgay 2010:249–50).

We use data from a nationally representative sample of U.S. adults to explore whether persons with difficulty performing daily activities report compromised mental health and the extent to which these associations are accounted for by perceived interpersonal discrimination. Drawing on stigma theories, we separately evaluate three subtypes of interpersonal mistreatment (treated disrespectfully, treated as if one has a character flaw, and harassment/insults) as well as a composite measure (encompassing all three subscales) to identify the specific ways stigmatization may undermine well-being.

Life Course Differences in Disability-Related Discrimination and Its Psychological Consequences

We also evaluate whether perceived interpersonal discrimination is an equally powerful mediator of the disability–mental health link at four distinctive life course stages: young adulthood, early midlife, later midlife, and old age. We expect that interpersonal mistreatment will be a particularly strong mediator for working-age persons relative to their older counterparts because disability among older persons may be more culturally normative and expected, thus

treated less harshly. Disablement diminishes individuals' "abilities to act in necessary, usual, [and] expected...ways in their society" (Verbrugge and Jette 1994:3). Thus, impairment may be seen as more discrediting to working-age persons because it violates expectations regarding physically and economically active, independent, and "able-bodied" adults (McPherson 1994). Because functional impairment is less common in young (age 30–39) and middle (age 40–64) adulthood relative to old age (age 65+), it may be a more salient personal characteristic that elicits stigmatizing treatment from others (Barreto and Ellemers 2015).

Structural factors also may contribute to greater stigmatization of persons with disability in midlife versus later life. The size and diversity of one's social networks and life spaces diminish with age such that working-age persons interact in a wider array of social settings and with a more extensive network of persons who may be the source of stigmatization (Baker, Bodner, and Allman 2003). By contrast, older adults' social networks diminish, especially after retirement, such that they tend to interact with a smaller and more close-knit group of friends, relatives, and confidantes (Charles and Carstensen 2010); this more selective social circle may be less inclined to mistreat an older adult with impairment (Luong, Charles, and Fingerma 2011). Older adults with impairment may be treated with support and empathy, whereas their younger counterparts may be treated with disdain or disrespect by coworkers or acquaintances (Menec and Perry 1995).

Age-related changes in emotion regulation also may affect how persons with impairment respond emotionally to unkind or stigmatizing personal encounters. Older adults have less extreme emotional responses to stress and a greater capacity to see the "good" even in unpleasant situations relative to their younger counterparts (Charles and Carstensen 2010). This capacity to see the positive (and ignore or diminish the negative) is especially the case with interpersonal encounters. Older adults report fewer interpersonal tensions, experience less stress following such tensions, and are more likely to respond passively and avoid arguments relative to younger adults even when objective levels of interpersonal tensions are held constant (Birditt and Fingerma 2005; Birditt, Fingerma, and Almeida 2005; Charles and Carstensen 2008).

Finally, the experience of disablement changes over the life course such that disability tends to be more severe and multifaceted among older adults (National Center for Health Statistics 2017). Consequently, other secondary stressors such as

difficulty navigating one's home, reduced social participation, social isolation, and a diminished sense of autonomy may be more salient for older adults' mental health relative to the secondary stressor of interpersonal mistreatment (Brown 2015; Brown and Barrett 2011). Thus, we carry out moderated mediation analyses to examine whether the strength of perceived discrimination as a mediator of the disability–mental health relationship differs in young adulthood (age 30–39), early (age 40–49) and late (age 50–64) midlife, and later life (age 65+).

We consider three conceptually and statistically distinct dimensions of psychological well-being (depressive symptoms, negative affect, and positive affect) given well-established age differences in how individuals experience and report their mental health symptoms. Positive affect refers to pleasant emotions such as feeling happy, whereas negative affect reflects unpleasant moods such as sadness or nervousness during the past 30 days (Watson, Clark, and Tellegen 1988). Older adults tend to report more frequent positive affect, less frequent negative affect, and more frequent co-occurrence of the two relative to younger persons (Charles and Carstensen 2010). Depressive symptoms, as measured in the MIDUS, refer to a period of two weeks or more over the past year in which one experienced symptoms such as sadness and lethargy (Kessler, Mickelson, and Williams 1999). Given this relatively long period of retrospection, older adults' depressive symptom reports may be understated, reflecting recall and positivity biases (Knäuper and Wittchen 1994; Reed and Carstensen 2012).

We adjust all analyses for demographic, health, and psychosocial factors that may confound statistical associations among disability, discrimination, and mental health. Persons from socially and economically disadvantaged groups, including women, ethnic minorities, and persons of lower socioeconomic status, are especially vulnerable to physical disability (Brown et al. 2017; Krahn et al. 2015), discriminatory treatment (Carr, Jaffe, and Friedman 2008; Kessler et al. 1999), and compromised mental health (Kessler et al. 1999). We adjust for body mass index (BMI) and chronic health conditions because they are associated with elevated disability risk (Kassam et al. 2012; Krahn et al. 2015), perceived discrimination (Carr and Friedman 2005; Kessler et al. 1999), and psychological well-being (Carr and Friedman 2005). We adjust for trait neuroticism, which may render one particularly cognizant of and emotionally reactive to unpleasant encounters such as interpersonal mistreatment (Carr et al. 2008). Finally, we control for baseline

mental health measures to address concerns regarding possible endogeneity among reports of perceived discrimination and mental health.

DATA AND METHODS

Data

Analyses were based on data from the National Survey of Midlife Development in the United States, a longitudinal survey of a national probability sample of noninstitutionalized, English-speaking adults ages 25 to 74 in 1995–1996, who were selected via random digit dialing from working telephone banks in the continental United States (MIDUS 1, $N = 7,108$). Study participants were reinterviewed at ages 35 to 84 in 2004–2006 (MIDUS 2, $N = 4,963$) and ages 43 to 94 in 2013–2014 (MIDUS 3, $N = 3,294$). Retention rates were 75% between MIDUS 1 and MIDUS 2 and 77% between MIDUS 2 and MIDUS 3 after adjusting for mortality (Radler and Ryff 2010). For further detail, see <https://www.icpsr.umich.edu/icpsr-web/ICPSR/series/203>.

We used MIDUS 2 and MIDUS 3 to prospectively examine associations between disability and perceived discrimination reported at MIDUS 2 and psychological outcomes assessed in MIDUS 3. We used data from MIDUS 2 only to ascertain associations between disability status and contemporaneous perceived interpersonal discrimination; a prospective exploration of disability status at one wave and perceived discrimination 10 years later would raise concerns regarding the instability of impairment over lengthy time periods (Lin and Kelley-Moore 2017).

Our analytic sample includes respondents who completed both a telephone interview and self-administered questionnaire in MIDUS 2 and MIDUS 3 ($N = 2,555$). We excluded 52 respondents whose disability status was missing, resulting in a final analytic sample of 2,503 persons. Item-specific missing data were less than 1% across all variables, except body weight, which was 3.9%. We indicated these cases with a dichotomous “weight missing” variable because refusal to report one’s weight is correlated with poorer mental health and more frequent reports of discrimination relative to normal-weight persons (Carr et al. 2008; Chau et al. 2013).

Measures

Psychological well-being. *Depressive symptoms* were assessed with the World Health Organization Composite International Diagnostic Interview Short

Form (Kessler et al. 1999). Participants indicated whether they “felt sad, blue, or depressed” or “lost interest in most things” for two weeks or more within the past 12 months. Those who endorsed either item were asked seven follow-up questions (yes or no) assessing the specific symptoms experienced: (1) lose interest in most things; (2) feel more tired out or low on energy than is usual; (3) lose your appetite; (4) have more trouble falling asleep than usual; (5) have a lot more trouble concentrating than usual; (6) feel down on yourself, no good, or worthless; and (7) think a lot about death. Consistent with previous MIDUS studies (Namkung, Greenberg, and Mailick 2016; Robinson, Sutin, and Daly 2017), we constructed a depressive symptoms score based on these two measures, with scores ranging from 0 to 7 (0 = no two-week period of depressed affect or anhedonia in the past 12 months; 7 = more depressive symptoms).¹

Positive and negative affect were assessed with subsets of the Affect Balance Scale (Bradburn 1969). *Positive affect* ($\alpha = .89$) captured how often during the past 30 days the respondent felt: cheerful, in good spirits, extremely happy, calm and peaceful, satisfied, and full of life. *Negative affect* ($\alpha = .80$) referred to how often during the past 30 days they felt: so sad nothing could cheer you up, nervous, restless or fidgety, hopeless, everything was an effort, and worthless. Response categories ranged from 1 (none) to 5 (all the time) and were averaged such that higher scores reflected more frequent positive or negative affect (Mroczek and Kolarz 1998). The zero-order correlation between the negative affect and depression outcomes was .40, affirming their statistical and conceptual distinctiveness.

Disability. Disability was assessed in the self-administered questionnaire with items adapted from the SF-36, capturing difficulty with nine activities of daily living (Ware and Sherbourne 1992). Participants were asked, “How much does your health limit you in doing each of the following: lifting or carrying groceries; bathing or dressing yourself; climbing several flights of stairs; bending, kneeling, or stooping; walking more than a mile; walking several blocks; walking one block; vigorous activity (e.g., running, lifting heavy objects); moderate activity (e.g., bowling, vacuuming)?” Response categories were not at all, a little, some, and a lot. We classified participants as having a limitation if they reported at least “some” difficulty on any of the nine items, consistent with previous MIDUS analyses (Friedman 2016; Namkung and Carr 2019). The

most common limitation reported among persons with impairment was vigorous activity (90%), followed by kneeling, bending, or stooping (46%) and walking a mile (41%). We conducted sensitivity analyses in which we used a more stringent measure, classifying persons as having a disability if they indicated “a lot” on any of the nine items. Multivariate results were remarkably consistent regardless of the measure used, yet model fit was superior with the broader measure (at least some impairment). The former measure also provided a sufficient subsample size for mediated moderation analyses testing effects of age group by impairment status (sensitivity analyses are presented in Appendix Tables 1a and 1b in the online version of the article).

We carried out additional sensitivity analyses using a measure of new-onset cases of impairment (i.e., persons who reported some difficulty at MIDUS 2 but not MIDUS 1). Model fit was superior, and effect sizes were larger for our original measure; we suspect this reflects both statistical power and the fact that the new-onset cases were of shorter duration. As such, they may be less consequential for mental health than impairments of longer duration that increase one’s exposure to potential discrimination (supplementary analyses presented in Appendix Table 2 in the online version of the article).

Perceived interpersonal discrimination. *Perceived interpersonal discrimination* ($\alpha = .91$) referred to how often on a day-to-day basis a respondent experiences each of the following (Kessler et al. 1999): (1) treated with less courtesy, (2) treated with less respect than other people, (3) received poorer service at restaurants or stores, (4) people acted as if you are not smart, (5) people acted afraid of you, (6) treated as if dishonest, (7) treated as if not as good as others, (8) called names or insulted, and (9) threatened or harassed. Response categories were never, rarely, sometimes, and often. Responses were averaged, and scores ranged from 1 to 4, where a 4 reflects greater frequency of perceived daily mistreatment.

We conducted sensitivity analysis in which we used three subscales of perceived mistreatment, consistent with MIDUS analyses showing three conceptually and statistically distinct subtypes of perceived discrimination (Carr et al. 2008; Namkung and Carr 2019). *Lack of respect* ($\alpha = .91$) indicated the frequency with which one was treated with less courtesy or respect than other people, received poorer service than other people, and was treated as if not smart or not as good as other

people. *Blemish of character* ($\alpha = .72$) referred to the frequency with which one was treated as if they were dishonest or are frightening to others. *Insulted/harassed* ($\alpha = .82$) referred to the frequency with which one was insulted and threatened/harassed. We focused largely on the overall scale because results were highly consistent across the three subscales.

Age group. We created four categories of: young adulthood (ages 30–39), early midlife (ages 40–49), late midlife (ages 50–64), and later life (age 65+), consistent with earlier studies of impairment over the life course (Namkung and Carr 2019).

Control variables. All analyses were adjusted for demographic and socioeconomic characteristics at baseline (MIDUS 2) that are established correlates of psychological well-being and perceived discrimination: gender (1 = female; 0 = male), race-ethnicity (1 = racial or ethnic minority; 0 = non-Hispanic white), marital status (1 = currently married; 0 = unmarried), education (less than high school, high school graduate [reference], some college, college graduate or higher), and employment status (1 = currently working; 0 = not working). We adjusted for two physical health indicators, BMI and the presence of at least 1 of 27 medical conditions in the past 12 months (e.g., asthma, hypertension). BMI was calculated from participants’ self-reported height and weight, and classified into four categories (underweight/normal [reference], overweight, obese, refusal/don’t know), consistent with those used by the National Heart, Lung and Blood Institute (1998). Underweight status (i.e., BMI less than 18.5) was not associated with discrimination or psychological well-being, so we combined this very small category with normal weight. Finally, we adjusted for the personality trait neuroticism ($\alpha = .74$) using an established four-item scale (Rossi 2001). Respondents indicated how much each of four adjectives described them: moody, worrying, nervous, and calm (reverse-coded). Responses were averaged and ranged from 1 to 4, with higher scores indicating higher levels of neuroticism.

Analytic Plan

We first conducted bivariate analyses comparing all measures by disability subgroup; we conducted *t* tests for continuous measures and chi-square tests for categorical variables. Second, we estimated ordinary least squares (OLS) regression models to identify the effects of baseline functional limitation and perceived

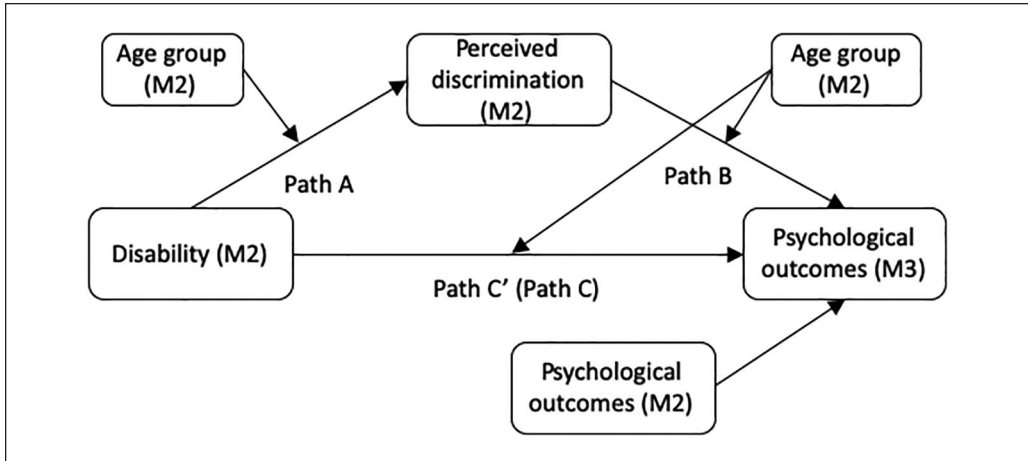


Figure 1. A Conceptual Model of Moderated Mediation.

Note: MIDUS = Midlife in the United States study; M2 = MIDUS 2; M3 = MIDUS 3. Path C' indicates direct effect of disability on psychological outcomes, and path C indicates total effect, a combination of the direct effect and indirect effect (path A \times path B) of disability.

discrimination (MIDUS 2) on the three well-being outcomes at the 10-year follow-up (MIDUS 3). Third, we estimated structural equation models to evaluate the extent to which the longitudinal associations between functional limitations and well-being were mediated by perceived interpersonal discrimination. Fourth, we tested the moderating role of life-course stage in the mediation patterns (i.e., conditional indirect effects) and in the direct associations between functional impairment and psychological outcomes. Our final conceptual model with moderated mediation by age group is presented in Figure 1.

All analyses were performed in Stata Version 15. For the (moderated) mediation analyses, we used the *sem* and *nlcom* commands to estimate the structural equation models using the maximum likelihood method. To test the presence of significant mediation or indirect effects, Path A (functional impairment \rightarrow perceived discrimination) and Path B (perceived discrimination \rightarrow psychological outcomes) coefficients were multiplied (Preacher and Hayes 2008).² All mediation analyses were adjusted for baseline psychological outcome measures (only for Path B) and sociodemographic, health, and personality covariates (both for Paths A and B). We also tested differential mediation effects for disability via perceived discrimination across the four age groups. We evaluated moderation effects by age group by including two-way interactions on all three paths (i.e., functional impairment \times age group on Paths A and C, perceived discrimination \times age group on Path B). Moderated mediation was documented when

mediation effects of perceived discrimination (i.e., the purported pathway linking disability status with mental health) differed significantly by age group

RESULTS

Bivariate Analysis

Table 1 shows that about half of the analytic sample (47%) reports at least some functional impairment at baseline (MIDUS 2). Persons with disability are over-represented among older adults (ages 65+), women, and unmarried persons. A socioeconomic gradient also is evident, such that adults with impairment are less likely to be employed and have fewer years of education relative to those without impairment. Disability is linked to higher rates of obesity and chronic medical conditions: Adults with (vs. without) disabilities are more likely to be classified as obese (36% vs. 18%) and to report a chronic condition (88% vs. 64%). They also report significantly higher levels of neuroticism ($M = 2.12$ vs. 1.98) and more frequent interpersonal discrimination ($M = 1.46$ vs. 1.37) than adults without impairment. Persons with impairment also report significantly higher scores on all three discrimination subscales, including disrespectful treatment ($M = 1.59$ vs. 1.47), insults or harassment ($M = 1.33$ vs. 1.29), and being treated as if they have a character flaw ($M = 1.26$ vs. 1.21). They also report poorer mental health, with significantly more depressive symptoms and negative affect and lower levels of positive affect at both study waves.

Table 1. Univariate and Bivariate (by Disability Status) Statistics.

Variables ^a	Total	No Disability (2004–2006)	Any Disability (2004–2006)	Group Difference ^b
	%, M (SD)	%, M (SD)	%, M (SD)	
Baseline characteristics				
<i>Age group</i>				
Young adulthood (age 30–39)	6	9	3	$p < .001$
Early midlife (age 40–49)	23	30	15	
Late midlife (age 50–64)	45	45	45	
Later life (age 65 or older)	26	16	37	
Gender (1 = female)	56	50	63	$p < .001$
Race-ethnicity (1 = minority)	8	8	7	$p = .626$
<i>Marital status</i>				
Currently married	72	76	68	$p < .001$
Previously married (widowed, divorced, separated)	20	15	26	
Never married	8	9	7	
<i>Education</i>				
Less than a high school diploma	5	3	7	$p < .001$
High school graduate	24	20	29	
Some college	28	27	28	
College degree or higher	43	50	35	
Working status (1 = currently working)	67	77	56	$p < .001$
<i>Body weight</i>				
Under- or normal weight	32	38	24	$p < .001$
Overweight	38	41	36	
Obese	26	18	36	
Refused to report weight	4	3	5	
Any medical condition (1 = yes)	75	64	88	$p < .001$
Neuroticism (range = 1–4)	2.05 (.62)	1.98 (.62)	2.12 (.62)	$p < .001$
Perceived discrimination (range = 1–4)	1.41 (.49)	1.37 (.46)	1.46 (.51)	$p < .001$
Lack of respect subscale (range = 1–4)	1.53 (.62)	1.47 (.56)	1.59 (.62)	$p < .001$
Blemish of character subscale (range = 1–4)	1.31 (.51)	1.29 (.49)	1.33 (.54)	$p < .05$
Harassment subscale (range = 1–4)	1.24 (.46)	1.21 (.43)	1.26 (.49)	$p < .01$
Mental health outcomes				
<i>Depressive symptoms (range = 1–7)</i>				
Baseline (M2)	.58 (1.68)	.43 (1.44)	.76 (1.91)	$p < .001$
Follow-up (M3)	.56 (1.65)	.38 (1.34)	.77 (1.92)	$p < .001$
<i>Positive affect (range = 1–5)</i>				
Baseline (M2)	3.46 (.68)	3.58 (.64)	3.32 (.71)	$p < .001$
Follow-up (M3)	3.44 (.72)	3.57 (.67)	3.30 (.74)	$p < .001$
<i>Negative affect (range = 1–5)</i>				
Baseline (M2)	1.47 (.53)	1.39 (.45)	1.57 (.45)	$p < .001$
Follow-up (M3)	1.46 (.57)	1.36 (.48)	1.58 (.64)	$p < .001$
N	2,503	1,339	1,164	
%		53	47	

Source: Midlife Development in the United States (MIDUS), second wave (2004–2006; M2) and third wave (2013–2014; M3). Baseline refers to 2004–2006, and follow-up refers to 2013–2014.

^aMissingness was less than 1% across all control and outcome variables.

^bChi-square tests (for categorical variables) and t tests (for continuous variables) were used to assess significant differences between the two groups.

To provide a fuller descriptive portrait of how disability is experienced over the life course, we carried out supplemental descriptive analyses showing age differences in the specific types of discrimination and health conditions reported by persons with impairment (see Appendix Tables 3a and 3b in the online version of the article). Young and midlife persons with impairment report significantly more frequent experiences on each of the nine discrimination items relative to both older adults with impairment and their same-age peers without impairment. Interestingly, among older adults, persons with versus without disability do not differ significantly in their responses to any of the nine discrimination items, suggesting that disability-related discrimination is highest in midlife yet is not detected among older adults. The specific health conditions experienced by persons with disability in each age group also differ significantly. Among younger and midlife persons with impairment, the most common conditions are visible (e.g., tooth problems) or directly affect mobility (most notably joint problems), whereas older persons also report frequent chronic conditions like high blood pressure (see Appendix Table 3b in the online version of the article). Overall, these results suggest that daily experiences of persons with versus without impairment are distinct for midlife persons yet do not differ starkly among retirement-age adults.

Longitudinal Associations among Disability, Discrimination, and Well-Being

OLS Regression. We first examine prospective associations between disability and the three psychological outcomes. Table 2 shows OLS regression coefficients for our focal predictors only (full results presented in Appendix Tables 4a to 4c): Model 1 estimates the effects of disability, adjusting for sociodemographic characteristics, health, and neuroticism; Model 2 incorporates baseline mental health; and Model 3 further adds perceived discrimination. Persons with disability report significantly more depressive symptoms ($B = .19, p < .001$) and negative affect ($B = .15, p < .001$) and less positive affect ($B = -.14, p < .001$) at the 10-year follow-up, adjusting for all controls (see Model 1). These effects diminish by 15% (depressive symptoms), 33% (negative affect), and 50% (positive affect) yet remain sizable and statistically significant after baseline psychological symptoms are controlled (see Model 2). The effects of disability status further diminish by 6% for depressive symptoms and 3%

for positive and negative affect when perceived discrimination is added to Model 3.

Structural equation (mediation) analyses. Path analyses reveal the direct and indirect pathways linking disability and perceived discrimination with the three psychological outcomes. Figures 2 through 4 display results of the mediation analyses; coefficients are plotted for ease of interpretation (a summary of the results is presented in Appendix Table 1a in the online version of the article). Figure 2 shows that persons with impairment report more frequent daily discrimination ($B = .166, p < .001$), and discrimination in turn predicts increased depressive symptoms from baseline to follow-up ($B = .079, p < .001$) net of all covariates. Similarly, perceived daily discrimination is associated with decreased positive affect ($B = -.020, p < .01$, see Figure 3) and increased negative affect ($B = .041, p < .001$, see Figure 4).

Perceived discrimination accounts for a modest proportion of the link between physical impairment and well-being. Indirect effects of impairment are .13 for depressive symptoms ($p = .01$), .07 for negative affect ($p < .01$), and $-.003$ for positive affect ($p < .05$). In total, 8.2% of the total effect of impairment on depressive symptoms is mediated through perceived discrimination. The proportions of total effects mediated (effect ratios) are 5.2% for positive affect and 7.3% for negative affect. Supplementary analyses (for summary, see Appendix Table 5 in the online version of the article) for the three discrimination subscales reveal that disrespectful treatment shows the greatest mediation effects (effect ratios are 8.5% for depressive symptoms, 4.1% for positive affect, and 8.6% for negative affect). The association between disability and positive affect was mediated by disrespectful treatment only. Being treated as if one had a character flaw and being insulted/harassed mediated the effects of disability on both depressive symptoms and negative affect, although these effect ratios were considerably lower than for disrespectful treatment.

Moderated Mediation Analyses

Finally, we evaluate the extent to which the mediation processes documented in Figures 2 through 4 vary by life-course stage. We find that associations between functional impairment and perceived discrimination are significantly moderated by age group such that associations are stronger for working-age adults than for those aged 65 or older; $\chi^2(3)$ ranges from 10.85 to 11.26, $p < .05$, for the models on three psychological outcomes. Similarly, we find

Table 2. Effects of Disability Status and Perceived Discrimination at Baseline (MIDUS 2) on Psychological Well-Being Outcomes at Follow-up (MIDUS 3).

	Depressive Symptoms		
	Model 1	Model 2	Model 3
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
Disability status ^a	.19*** (.04)	.16*** (.04)	.15*** (.04)
Young adulthood (age 30–39) ^b	.35*** (.09)	.22* (.09)	.21* (.09)
Early midlife (age 40–49) ^b	.34*** (.06)	.23*** (.06)	.23*** (.06)
Late midlife (age 50–64) ^b	.22*** (.05)	.16** (.05)	.16** (.05)
Baseline depressive symptoms		.15*** (.01)	.15*** (.01)
Perceived discrimination			.16*** (.04)
Constant	–1.03*** (.09)	–.78*** (.09)	–.94*** (.10)
Adjusted R ²	.07	.13	.14
	Negative Affect		
	Model 1	Model 2	Model 3
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
Disability status ^a	.15*** (.02)	.09*** (.02)	.09*** (.02)
Young adulthood (age 30–39) ^b	.15** (.05)	.04 (.04)	.02 (.04)
Early midlife (age 40–49) ^b	.10** (.03)	.01 (.03)	–.00 (.03)
Late midlife (age 50–64) ^b	.02 (.03)	–.05* (.02)	–.06* (.02)
Baseline negative affect		.47*** (.02)	.46*** (.02)
Perceived discrimination			.08*** (.02)
Constant	–.46*** (.05)	–.60*** (.04)	–.68*** (.05)
Adjusted R ²	.22	.36	.36
	Positive Affect		
	Model 1	Model 2	Model 3
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
Disability status ^a	–.14*** (.02)	–.07*** (.01)	–.07*** (.01)
Young adulthood (age 30–39) ^b	–.17*** (.04)	–.10** (.03)	–.09** (.03)
Early midlife (age 40–49) ^b	–.09*** (.02)	–.01 (.02)	–.01 (.02)
Late midlife (age 50–64) ^b	–.03 (.02)	.02 (.02)	.03 (.02)
Baseline positive affect		–.30*** (.01)	.30*** (.01)
Perceived discrimination			–.04** (.01)
Constant	1.01*** (.04)	–.43*** (.06)	–.39*** (.06)
Adjusted R ²	.18	.36	.37

Source: Midlife Development in the United States, second wave (MIDUS 2; 2004–2006) and third wave (MIDUS 3; 2013–2014).

Note: *N* = 2,503. Models used z-scores for all three outcomes. All models adjusted for gender, race-ethnicity, marital status, education, current employment status, BMI category, has one or more chronic conditions, and trait neuroticism.

^aReference category is no disability.

^bReference category is age 65+.

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

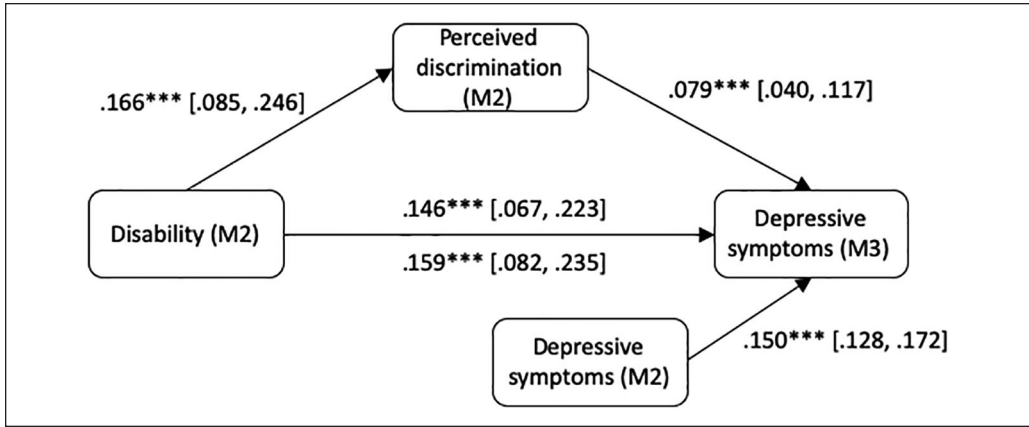


Figure 2. Perceived Interpersonal Discrimination Mediating Longitudinal Association between Disability and Depressive Symptoms.

Note: Values are based on z-scores. Models are adjusted for age group, gender, race, marital status, education, employment status, BMI category, having one or more chronic conditions, and neuroticism. Regression coefficients and 95% confidence intervals (in brackets) are presented. The values shown on underside of model path “physical disability → depressive symptom” indicate the total effect, and the ones on upside of the path indicates the direct effect. MIDUS = Midlife Development in the United States; M2 = MIDUS 2; M3 = MIDUS 3.

*** $p < .001$.

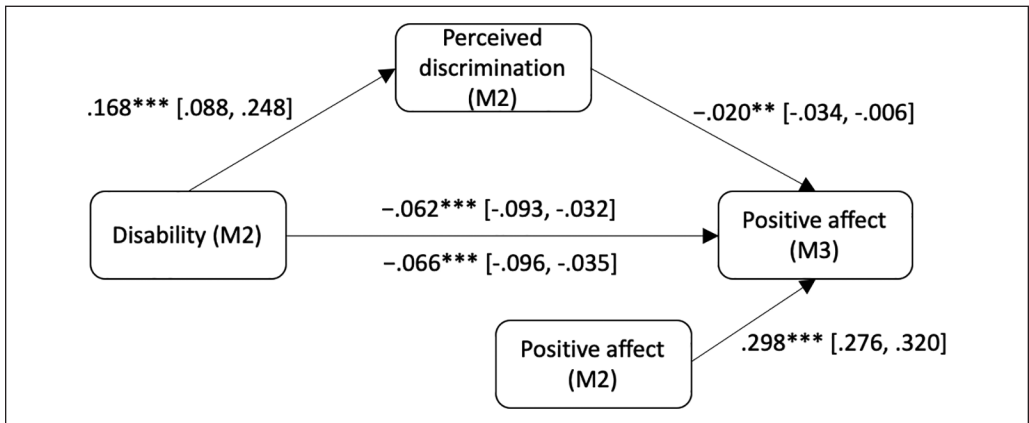


Figure 3. Perceived Interpersonal Discrimination Mediating Longitudinal Association between Disability and Positive Affect.

Note: Values are based on z-scores. Models are adjusted for age group, gender, race, marital status, education, employment status, BMI category, having one or more chronic conditions, and neuroticism. Regression coefficients and 95% confidence intervals (in brackets) are presented. The values shown on underside of model path “physical disability → positive affect” indicate the total effect, and the ones on upside of the path indicates the direct effect. MIDUS = Midlife Development in the United States; M2 = MIDUS 2; M3 = MIDUS 3.

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

evidence of significant moderation for the disrespectful treatment subscale; $\chi^2(3)$ ranges from 11.15 to 11.67, $p < .05$. However, we do not detect significant moderation for the subscales of blemished character and insult/harassment.

As Figure 5 shows, the moderated mediation effects are statistically significant for the outcomes of depressive symptoms and negative affect but not positive affect. Perceived interpersonal discrimination significantly mediates the association between impairment

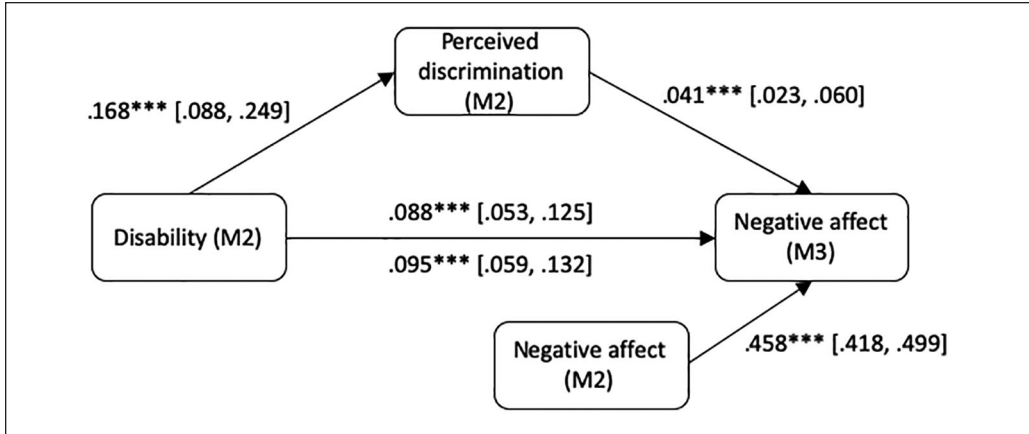


Figure 4. Perceived Interpersonal Discrimination Mediating Longitudinal Association between Disability and Negative Affect.

Note: Values are based on z-scores. Models are adjusted for age group, gender, race, marital status, education, employment status, BMI category, having one or more chronic conditions, and neuroticism. Regression coefficients and 95% confidence intervals (shown in brackets) are presented. The values shown on underside of model path “physical disability → negative affect” indicate the total effect, and the ones on upside of the path indicates the direct effect. MIDUS = Midlife Development in the United States; M2 = MIDUS 2; M3 = MIDUS 3.

*** $p < .001$

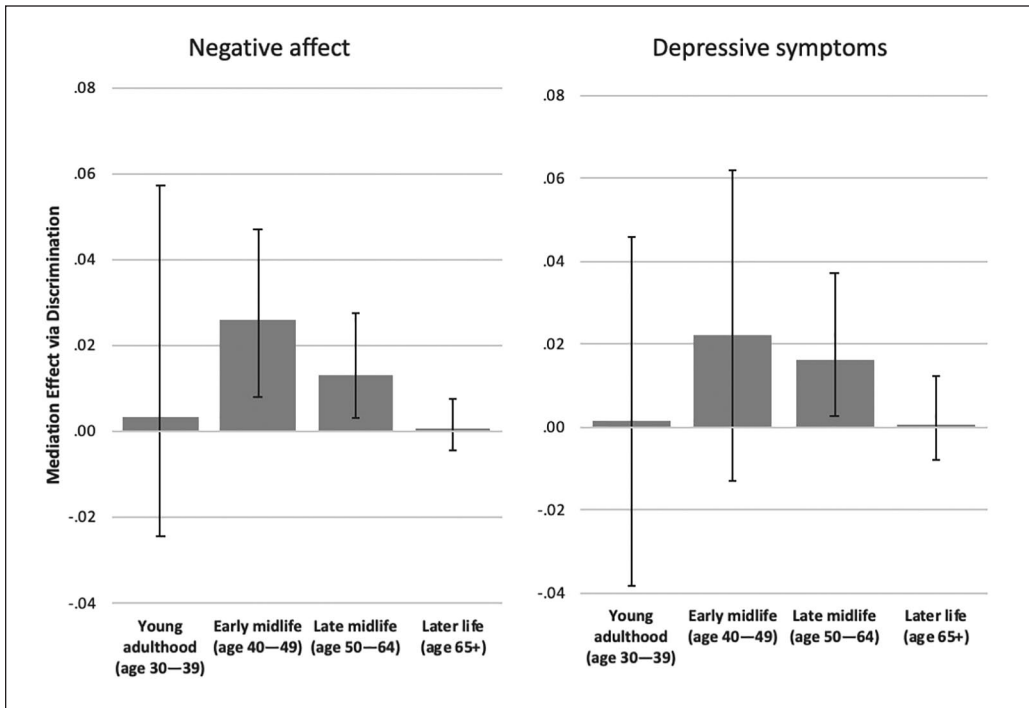


Figure 5. Differential Mediation Effects of Perceived Discrimination in the Association between Functional Impairment and Psychological Well-being by Life Stage.

Note: Bar graphs quantify mediation or indirect effects, and error bars on each bar indicate 95% confidence intervals based on bootstrapped resampling.

and negative affect (left panel) for early-midlife ($B = .026, p < .05$) and late-midlife ($B = .013, p < .05$) adults ages 40 to 49 and 50 to 64, respectively. By contrast, discrimination is not a significant mediator for adults aged 65+. Similarly, the right panel shows a significant mediation effect in the association between impairment and depressive symptoms among late-midlife adults ages 50 to 64 only ($B = .016, p < .05$). Comparable results emerged when we used the subscale of disrespectful treatment but not for the subscales of blemished character and harassment.

We found no statistically significant interactions between age and perceived discrimination (Path B) or between age and impairment in models predicting psychological well-being (Path C) regardless of whether the composite or subscale measures of interpersonal mistreatment were used. Overall, the direct impacts of functional impairment and perceived discrimination on the three psychological well-being measures do not differ significantly by age, although the extent to which discrimination mediates the impairment–mental health linkage is significantly larger among working-age versus older adults.

DISCUSSION

Our study is the first we know of to explore prospectively whether the link between disability and three aspects of psychological well-being is accounted for by perceived interpersonal discrimination. Recognizing that physical impairment is considered normative in later life and is more highly stigmatized for younger persons (Namkung and Carr 2019), we also examined whether the psychological consequences of impairment differ by life-course stage and the extent to which perceived discrimination accounts for these effects.

Three main findings emerged. First, disability is a significant predictor of all three psychological outcomes even after controlling for baseline measures of mental health and covariates. However, these effects were not moderated by age, demonstrating that the negative consequences of disability for mood and depressive symptoms are similar in magnitude among young, midlife, and older adults. Our findings are consistent with prior studies documenting strong linkages between disability and depression (Turner and Noh 1988; Yang 2006) or mood (Caputo and Simon 2013), and further reveal that positive dimensions of mental health are undermined by disability for persons of all ages. This is an important finding because our measure of disability was broad and encompasses persons with relatively modest level of impairments (i.e., “some”

difficulty on any of nine daily activities, e.g., climbing a few flights of stairs), whereas previous studies focus on the severity of impairment and well-being (Caputo and Simon 2013; Freedman et al. 2017; Yang 2016). We found that these effects remained sizable and statistically significant after BMI and chronic medical conditions were controlled. Thus, our results suggest that even a slightly diminished capacity to carry out expected roles—a condition affecting nearly half of MIDUS respondents—can be a source of distress for adults over the life course, underscoring the importance of identifying why and how so that effective interventions may be developed.

Second, our mediation analyses revealed that the link between disability and well-being is partly accounted for by perceived interpersonal discrimination, with this mediator accounting for 5% to 8% of the association. Although this is a modest proportion mediated, even a small proportion of total effect mediated may have important practical implications when the total effect is large (Preacher and Kelley 2011). Disability status has large and significant effects on negative and positive affect (see R^2 in the regression Model 1), with larger effects than other sociodemographic characteristics, medical conditions, and BMI category. Thus, even a modest mediation effect of disability via interpersonal mistreatment suggests a potential site for intervention.

Our moderated mediation analyses further revealed that these patterns held only for midlife adults and not for young or retirement-age adults. The youngest MIDUS participants came of age and entered the labor force following the 1990 passage of the ADA. As such, they may have received more responsive accommodations, the benefit of school-to-work or work-based initiatives, and more thoughtful treatment in their work and social encounters in adulthood (Shandra and Hogan 2008). However, given the relatively small number of younger adults in our sample, the nonsignificant results also may reflect statistical power. The distinctive ways that disability affects the lives of younger adults warrants further exploration.

For midlife persons with impairment, who have more expansive social networks and life spaces than their older counterparts, interpersonal mistreatment and microaggressions perpetuated by service providers, colleagues, and significant others are significantly more frequent (as shown in Appendix Table 3a in the online version of the article). These discriminatory encounters may constitute a chronic strain that is consequential for one’s everyday life,

making them a critical pathway linking impairment status with psychological well-being (Baker et al. 2003; Charles and Carstensen 2010; Luong et al. 2011).

For older adults, a very different scenario emerged. While disability was a significant predictor of mental health outcomes among those ages 65+, experiences of discrimination were not a significant mediator. Supplemental descriptive analyses showed that older persons with impairment reported significantly less frequent mistreatment along all nine specific indicators relative to their younger counterparts. Moreover, among older adults, those with impairment did not report significantly more frequent discriminatory treatment on any of the nine items relative to their age peers without impairment. This may reflect the fact that disability is normative and expected and thus less likely to be stigmatized in later life (Menec and Perry 1995). Moreover, older adults' more narrowly drawn social networks and life spaces may limit their encounters to a close-knit group of significant others who may be less inclined to mistreat them (Baker et al. 2003; Charles and Carstensen 2010; Luong et al. 2011).

Our results suggest that secondary stressors other than perceived discrimination—such as social isolation, a diminished sense of self-efficacy, and reduced activity—may be more powerful mechanisms linking disability to psychological well-being among older adults (Brown and Barrett 2011; Caputo and Simon 2013; Freedman et al. 2017; Yang 2006). We carried out supplementary mediation analysis and evaluated the extent to which environmental mastery, autonomy, perceived control, family relationship strains, and marital strain mediated the association between disability and psychological well-being among older adults. Not one was a statistically significant mediator; we suspect that potential pathways not included in the MIDUS, such as time use and changes in daily activities, may be plausible yet unexplored mechanisms. We encourage future research identifying the specific pathways through which disability undermines the psychological well-being of older adults.

Third, we found that one subtype of discrimination—being treated disrespectfully—is particularly consequential for the well-being of persons with disability. Our supplemental analyses (shown in Appendix Table 5 in the online version of the article) revealed the greatest mediation effect for this subscale and also found that it was the only subscale that mediated the association between disability and positive affect. We speculate that disrespectful treatment is particularly

distressing for persons with impairment because of its breadth, pervasiveness, and the feelings of demoralization it may engender. Disrespect conveys claims about one's competence and undermines one's dignity, making it particularly painful (Janoff-Bulman and Werther 2008). By contrast, insults and harassment are relatively infrequent (see Appendix Table 3a in the online version of the article), so persons with impairment may attribute this mistreatment to traits of the person doing the stigmatizing rather than internalizing the experience (Major, Quinton and McCoy 2002). Future studies should delve more fully into the particular subtypes of interpersonal discrimination that are especially harmful, paying close attention to disrespectful treatment given the centrality of respect to human dignity (Janoff-Bulman and Werther 2008).

Our results also convey a broader message for the study of stress and mental health; the explanatory mechanisms linking a stigmatized identity, such as disablement, and psychological well-being may differ markedly by social location. Our moderated mediation analyses clearly show that perceived interpersonal discrimination was a significant pathway linking disability with psychological well-being for working-age adults but not older adults. The use of moderated mediation analyses may be a useful tool for understanding the consequences of secondary stressors more generally. One reason why studies may fail to detect significant pathways linking stigma to well-being is that a particular pathway may be significant for one subgroup only, a pattern that may be concealed or "cancelled out" using a coarser approach. Documenting for whom a secondary stressor is harmful also will inform appropriate practices and interventions.

Limitations

Our study has several limitations that bear on the generalizability of the results and motivate future research. First, the stronger mediation effects detected among midlife versus older persons may reflect cohort rather than age effects, such that members of the Baby Boom and Generation X cohorts are more sensitive to experiences of discrimination relative to older cohorts. However, although there is evidence that cohort membership may affect one's awareness of and willingness to report discrimination (Namkung and Carr 2019), it is less clear that cohort membership would affect emotional responses to this discrimination among persons with impairment. Given compelling literature on age

differences in emotional responses to difficult interpersonal encounters (Charles and Carstensen 2010), we find age moderation arguments more persuasive, although these contrasts could be further fleshed out in future analyses.

Second, we used a broad self-reported measure of impairment rather than a specific measure of the impairment-related condition. However, self-reported function is widely considered an important patient-centered measure (Brown et al. 2017) that is a robust predictor of subsequent adverse health outcomes, including mortality risk (Carey et al. 2004). Third, the MIDUS relies on perceptions rather than formally documented or confirmed reports of mistreatment. Furthermore, our analysis did not consider whether participants attribute the mistreatment to their own impairment or to a character flaw of the person doing the discrimination. However, perceiving that one is mistreated (regardless of the cause) is stressful in its own right and may have important consequences for the perceiver's well-being.

Fourth, MIDUS does not obtain detailed information on underlying diagnoses or conditions that specifically undermine functioning, limiting our capacity to explore how experiences of discrimination may vary based on the specific health condition. To partially address this limitation, we examined whether persons with versus without impairment differed with respect to the medical conditions experienced over the prior 12 months. Persons with disability reported higher rates of 25 of the 27 conditions considered. Furthermore, our multivariate and moderated mediation analyses barely changed in magnitude or significance when medical conditions were adjusted. Thus, our results suggest that it is the manifestation of one's conditions, such as difficulty walking, that elicits mistreatment from others rather than the underlying conditions. Future studies could further distinguish "visible" versus "invisible" health conditions given that the former may render one particularly vulnerable to discriminatory treatment and the mental health consequences thereof.

Finally, we considered only life-course stage as a moderator; it is plausible that the mediation effects of discrimination we documented also may be more pronounced for persons with other social or economic disadvantages, including persons with lower levels of education, ethnic minorities, or women. We conducted supplemental analyses and found no significant differences on the basis of gender (results available from authors). Future studies with larger subsamples of ethnic minorities and economically disadvantaged persons should further explore factors that intensify or diminish

the mediating role of perceived discrimination for understanding the mental health of persons with impairment.

Despite these limitations, our study reveals that perceived interpersonal discrimination is a pathway through which disability undermines three distinctive aspects of mental health, especially for midlife adults. These findings have potentially important implications for public health. The proportion of working-age persons either reporting a physical impairment or receiving disability payments has increased steadily over the past two decades (Joffe-Walt 2013). Theoretical writings suggest that specific stigmas eliciting negative reactions from others may change over time as knowledge, values, and public acceptance of "devalued" conditions and behaviors change (Goffman 1963). As more individuals experience relatively young onset of physical limitations, biases may be reduced because awareness of disability-based inequities may increase. However, if disability continues to prematurely befall (and become associated with) members of historically stigmatized groups, including persons of lower socioeconomic status, ethnic minorities, and persons with mental health conditions or obesity, the stigma may intensify.

We focused specifically on interpersonal discrimination that occurs in daily encounters with coworkers, service providers, and even friends and family. Educating personal caregivers for persons with impairment as well as service providers across a range of industries is critical. Persons with impairment—especially those of working age—may avoid or delay seeking services like home repairs and bank loans or may not reach out to kin or neighbors for personal care as a way to protect themselves from mistreatment. The latter is particularly troubling given that persons with impairment have disproportionately high rates of 25 of the 27 health conditions considered in our study. Efforts to minimize stigmatization and mistreatment of persons with functional limitation may be critical in mitigating this accumulation of disadvantage and the implications thereof for their overall well-being (Link & Phelan 2001).

SUPPLEMENTAL MATERIAL

Appendix Tables 1 through for 5 are available in the online version of the article.

NOTES

1. In preliminary analyses, we considered an alternative measure based on four depressive symptoms,

dropping the three somatic symptoms (low energy, trouble sleeping, lost appetite). Our multivariate results were virtually identical. For example, using the four-item outcome, the coefficient of disability on depressive symptoms in Model 3 of Table 2 was .15 ($SE = .04$) versus .16 ($SE = .04$) when the seven-item outcome was used. Thus, we present results based on the full scale to retain comparability with prior MIDUS studies (all models available from authors).

2. The *nlcom* command in Stata calculates standard errors using the delta method, which assumes a normal distribution of the products of Path A and Path B coefficients as well as interaction terms. Bootstrapping, a nonparametric resampling procedure, is an alternative method for testing mediation that does not impose the assumption of normality on the sampling distribution. Bootstrapping involves repeatedly sampling from the data set and estimating the indirect or mediation effect in each resampled data set. We conduct bootstrapping based on 1,000 random resamples of the data to obtain standard errors and confidence intervals of indirect effects (Preacher and Hayes 2008; Preacher, Rucker, and Hayes 2007).

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