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Physical Disability and Increased Loneliness among Married Older Adults: The Role of Changing Social Relations

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Abstract

Examining the social context of disablement, we investigated how changes in social relations affect loneliness among married older men and women. With longitudinal data on 914 married persons from the National Social Life, Health, and Aging Project (NSHAP), we found that changes in the quality of marital and nonmarital relations moderate the effect of disability on loneliness in unexpected ways. Increases in negative marital quality buffer the effect of physical disability, while increases in nonmarital support exacerbate it. Although not predicted by existing theory, these findings are consistent with some prior work suggesting that health-related stressors, like physical disability, condition the meaning of changes in social relations. We find, however, that negative social relations ameliorate loneliness only among disabled married men; disabled married women experience increased loneliness under similar circumstances. These differences have not been previously identified. We conclude by discussing the gendered nature of the social context of disablement.

Keywords

disability, marital quality, social support, loneliness, gender differences

As more than one-third of adults over age 65 have mobility limitations (Brault 2012), disablement is a significant chronic stressor for older adults. Older adults with physical disabilities report more depressive symptoms (Bierman and Statland 2010), lower self-esteem (Reitzes and Mutran 2006), lower positive affect, and higher negative affect (Caputo and Simon 2013). This lower psychosocial well-being may reflect unmet social needs as functional limitations restrict the abilities of older adults to perform desired social roles (Verbrugge and Jette 1994) and spur changes in the quality of social relations that lead to less perceived social support (Taylor and Lynch 2004). Indeed, older adults in poor health, those with more health problems, and those with more physical limitations appraise their social relations as less satisfying and report greater loneliness (e.g., Korporaal, van Groenou, and van Tilburg 2008; Stevens and Westerhof 2006). Yet, the manner in which disablement leads to loneliness likely depends on the quality of one's social relations as such ties can serve as important resources that provide coping assistance, rendering stressors less threatening (Thoits 1995).

Although prior studies examining the social context of disablement have suggested that the social resources embedded in longstanding relationships have the potential to ameliorate loneliness among older adults with physical disabilities, the role of social relations in the association between functional limitations and changes in loneliness remains ambiguous given the cross-sectional nature

of studies to date (e.g., Warner and Adams 2012; Warner and Kelley-Moore 2012). If the quality of social relations deteriorates with functional limitations, for example, then such changes could indirectly increase feelings of loneliness and would be less able to serve as coping resources to mitigate the effects of functional limitations. Resolving this ambiguity is paramount given that loneliness predicts subsequent declines in self-rated health, worsening cognitive abilities, health services use, institutionalization (Cacioppo, Hawkley, and Berntson 2003; Hughes et al. 2004), and even mortality (Holt-Lunstad et al. 2015). To address this need, we used longitudinal data from the National Social Life, Health, and Aging Project (NSHAP) to examine whether changing social relations—in terms of both marital quality and support from non-spouse family and friends—affect the link between functional limitations and increased loneliness. Drawing on the stress process perspective (Pearlin and Bierman 2013; Pearlin et al. 1981), we tested whether changing social relations mediate the association between functional limitations and loneliness and/or whether changing social relations moderate the effect of functional limitations. Given that social relations occur within a gendered cultural framework with different expectations for the content and organization of men's and women's social ties (Carr and Moorman 2011; Moen 2001), we were attuned to the fact that changes in marital quality and nonmarital support from non-spouse family and friends may be implicated in loneliness in different ways for disabled married older men and women. Indeed, in contrast to prior cross-sectional work on loneliness, we find that changes in social relations affect loneliness in distinctive ways for married older men and women with functional limitations.

Background

Older adults are embedded in a constellation of social relations that provide emotional and instrumental support (Antonucci and Akiyama 1987; Antonucci, Birditt, and Akiyama 2009). The stress process perspective (Pearlin and Bierman 2013; Pearlin et al. 1981), however, draws our attention to the fact that chronic stressors such as disablement may undermine social relations and such changes may limit their ability to serve as resources for coping with health-related stressors. How changing social relations may be implicated in the association between health-related stressors and psychosocial well-being, broadly defined, is captured by two hypotheses. The stress deterioration hypothesis predicts that physical disability may hinder desired social interaction and produce changes in social relations, rendering them less supportive and/or more prone to strain. The stress buffering hypothesis predicts that access to supportive, high-quality social relations can ameliorate the effects of disability on psychosocial well-being; conversely, the presence of negative or strained social relations can exacerbate the deleterious effects of illness and disability (Cohen 2004). As they take place in a larger cultural context that defines different obligations and role expectations for spouses, family, and friends (Antonucci et al. 2009; Messeri, Silverstein, and Litwak 1993), the extent to which older adults' social relations are vulnerable to deterioration and/or able to serve as buffers depends on the relation in question—whether it is with a spouse (Bookwala and Franks 2005; Mancini and Bonanno 2006) or with non-spouse family and friends (Taylor and Lynch 2004; Warner and Adams 2012).

Disability and the Consequences of Marital Quality for Loneliness

Among current cohorts of older adults, most persons are married until very advanced ages (Cooney and Dunne 2001; U.S. Bureau of the Census 2014), and consequently, the spouse is central to connecting married persons to others (Kalmijn 2003), typically serving as one's most significant source of companionship and support (Antonucci and Akiyama 1987; Cutrona 1996). Indeed, perceived social support from a spouse is linked to better mental health (Hawkley et al. 2008; Umberson et al. 1996). By contrast, having an unsupportive spouse or a marital relationship marked by negative interaction predicts worse health (e.g., Choi and Marks 2008; Hawkins and Booth 2005). Of particular relevance to the current study, supportive marital relations are associated with feeling less lonely among older adults (Gierveld et al. 2009; Stevens and Westerhof 2006). These existing studies, however, have not considered how changes in marital quality affect coping with functional impairment.

Spouses have the potential to be even more central in the social lives of physically disabled older adults, given the preference to receive support from a spouse before others (Carr and Moorman

2011). Health-related stressors may undermine the marital relationship, however, as older adults in poor health have lower positive and higher negative marital quality (Galinsky and Waite 2014). Nevertheless, as marital quality appears to be a relatively stable property of long-term marriages (Kamp Dush, Taylor, and Kroeger 2008), there is little evidence to support the stress deterioration hypothesis among disabled older adults (Bookwala and Franks 2005; Warner and Kelley-Moore 2012). It is true, however, that some long-term marriages do experience changes in positive and negative marital quality (Galinsky and Waite 2014; Kamp Dush et al. 2008). Given that prior studies have been cross-sectional, it is unknown whether when such changes in marital quality occur they mediate feelings of loneliness among disabled older adults.

Rather than deteriorating, however, the commitment, close proximity, mutual investments, and routinized social interactions inherent in a marital relationship—especially one of long duration—make it well suited to moderate the psychosocial consequences of physical disability, consistent with the stress buffering hypothesis (Cutrona 1996; Messeri et al. 1993). For example, Warner and Kelley-Moore (2012) found a buffering effect of positive marital quality as disabled older adults in marriages characterized by high levels of positive marital quality exhibited levels of loneliness similar to non-disabled married older adults. Negative marital quality was associated with greater feelings of loneliness similarly across levels of disability. Bookwala and Franks (2005), however, found that negative marital quality exacerbated depressive symptoms among those with physical disabilities. Positive marital quality, though associated with depression, did not buffer the association between physical limitations and depression (but see Mancini and Bonanno 2006). These different findings are consistent with the fact that positive and negative aspects of social relations have independent health consequences (Kiecolt-Glaser and Newton 2001) that differ across psychosocial outcomes (Aneshensel 1992). Given prior studies and stress process theory, we expect changes in marital quality will moderate the effect of functional limitations on loneliness, with increases in positive marital quality buffering and increases in negative marital quality exacerbating the effect. We do not anticipate support for the stress deterioration hypothesis.

Disability, Changing Nonmarital Relations, and Loneliness

In addition to one's spouse, married individuals move through life with various others, and non-marital relations characterized by strong ties (e.g., non-spouse family and close friends) are where meaningful support exchanges occur (Antonucci et al. 2009).² By late midlife, patterns of exchange with non-spouse family and friends are well established (Liebler and Sandefur 2002) as individuals selectively maintain a few high-quality, emotionally close relationships with age (Carstensen 1992), and these ties, especially with friends, are important for psychological well-being (Huxhold, Miche, and Schultz 2014). As such, nonmarital relations may provide social resources to older adults that can aid coping with disablement and thereby reduce loneliness.

However, physical disability may produce changes in relations with non-spouse family and friends to the extent that challenges to routine functioning and autonomy (Korporaal et al. 2008; Verbrugge and Jette 1994) make maintaining such relationships more difficult and less satisfying, characterized by less support and/or greater strain. This may especially be the case for friendships, which are voluntary and based primarily on emotional exchange (Blieszner and Adams 1992; Carr and Moorman 2011). Indeed, physically disabled older adults report lower social support than their non-disabled counterparts (e.g., Taylor and Lynch 2004). Thus, the deterioration of nonmarital relations (in terms of becoming less supportive and more strained) may mediate the link between physical disability and changes in loneliness among older adults.

To the extent that they do not deteriorate, however, supportive nonmarital relations may buffer the effects of physical disability, whereas the lack of support or explicitly negative interactions (i.e., strain) may exacerbate the negative psychosocial effects (Cohen 2004). Enduring relations with non-spouse family and friends in the face of disablement are likely, given that the selective investment begins relatively early in the life span (Carstensen 1992). By late life, there are few peripheral relationships, and thus those that remain are important, emotionally close (Carstensen, Fung, and Charles 2003), and less dependent on explicit exchanges (Adams and Blieszner 1995). Accordingly,

older adults' networks are fairly stable in terms of size and emotional support (e.g., van Tilburg 1998). These studies thus suggest that support from non-spouse family and friends may buffer the effect of functional impairment on loneliness.

Prior studies on other psychosocial outcomes— although not synonymous with loneliness— suggest, however, that increased nonmarital support may actually exacerbate loneliness among the disabled. For example, receipt of instrumental support from network members was associated with greater depression among older adults with severe vision impairment (Reinhardt, Boerner, and Horowitz 2006) and diabetes (Penninx et al. 1998). Consistent with these findings, other studies have found that the receipt of highly visible and explicit forms of support can amplify the effects of a stressor (Bolger and Amarel 2007; Bolger, Zuckerman, and Kessler 2000). While it is true that instrumental and emotional support are not identical (Berkman et al. 2000), these studies suggest that it matters how provisions of support are perceived. When disabled and chronically ill older adults perceive that family and friends are offering overt support in overprotective ways that limit autonomy, this is associated with adverse outcomes, including lower levels of mastery (Cimarolli, Reinhardt, and Horowitz 2006) and more depressive symptoms (Thompson and Sobolew-Shubin 1993).

Nevertheless, because prior studies of loneliness among older adults with physical disabilities have been largely cross-sectional and/or treated social relations as static, it remains unclear whether functional impairment spurs changes in nonmarital social relations and/or whether such changes buffer (or exacerbate) feelings of loneliness. Although network size and support is stable on average, for some older individuals, the quality of social relations may change (van Tilburg 1998). Whether (and in what direction) such changes occur may affect the ability of older adults to cope with functional impairment and thus feelings of loneliness.

Gender Contingencies in the Consequences of Changing Social Relations

A stress process perspective posits that the effect of chronic stressors is often contingent on core social statuses (Pearlin and Bierman 2013). Such contingencies exist to the extent that the larger structural and cultural contexts that define social groups render members more or less vulnerable to a potential stressor (Aneshensel 1992) because, for example, they systematically possess more or less effective social resources or because the meaning of a stressor varies by group membership (Thoits 1995). Given that marital role expectations—and the structure and content of social relations more broadly— differ for men and women (Moen 2001), gender is a core social status that may frame the associations between physical disability, changing social relations, and loneliness and lead to different experiences of stress deterioration and stress buffering for men and women.

A longstanding body of work has argued that men and women experience marriage differently due to gendered expectations of one's spouse (Bernard 1972; Boerner et al. 2014; Thomeer, Umberson, and Pudrovska 2013). Among current cohorts of older adults, marital role expectations developed within a broader set of masculine norms of self-reliance and feminine norms of caregiving (Ridgeway 2011). Men tend to rely more heavily on marriage to provide emotional support, companionship, and caregiving (Cutrona 1996; Spitze and Ward 2000; Umberson 1992). Indeed, compared to women, men are more likely to rely exclusively on their spouses for support (Antonucci and Akiyama 1987; Umberson et al. 1996) and report they would be less likely to rely on non-kin if ill (Fischer and Beresford 2015). The expectation that wives near exclusively provide instrumental and emotional support to their husbands, but not husbands to their wives (Spitze and Ward 2000), results in men being less effective caregivers when called to do so (Thomeer et al. 2013; Thomeer, Reczek, and Umberson 2015). Given this asymmetry, it is not surprising that men report more positive assessments of their marriages than women (Boerner et al. 2014) while women are more attuned to negative marital functioning (Kiecolt-Glaser and Newton 2001).

Gendered expectations about caring also have implications for nonmarital relations. While men's social worlds revolve tightly around their wives, women have larger social networks and more ties independent of their husbands (Cooney and Dunne 2001; Kalmijn 2003). Women also invest more in maintaining nonmarital relations, especially with kin (Hagestad 1986; Salari and Zhang 2006). Even among close friends there are gendered relations, as "older women's friendships involve

more intimate self-disclosure whereas men's friendships are more often based on shared activities" (Carr and Moorman 2011:152) and shared early life experiences (Blieszner and Adams 1992). Overall, women report more contact with non-spouse family and friends, more confidants, and more emotional exchange (Liebler and Sandefur 2002). Of course, their greater nonmarital ties also expose women to more negative interactions (Turner 1994), and women appear to be more adversely affected by nonmarital strain (Walen and Lachman 2000).

Taken together, these prior findings lead to the general expectation that positive marital quality would be a more important resource for preventing loneliness among disabled older men, whereas disabled older women would be more vulnerable to exacerbating effects of negative marital quality. At the same time, because women have and invest more in nonmarital relations, increased support from non-spouse family and friends would be a more important resource for buffering loneliness among older women with functional limitations. Increased strain in nonmarital relations, in contrast, may exacerbate loneliness for disabled older women. Changes in disabled men's nonmarital relations, even as they are grounded in shared activities that might make them more prone to deterioration, are unlikely to be as consequential for loneliness given that fulfillment of older married men's social needs is tied so exclusively to marriage.

Current Study

Our study has three primary aims. First, we test the stress deterioration hypothesis by examining whether changes in older adults' social resources (i.e., positive and negative marital quality, nonmarital support and strain) mediate the association between functional limitations and changes in loneliness. Second, we test the stress buffering hypothesis by assessing whether changes in social resources moderate the association between functional limitations and changes in loneliness, where positive social relations (i.e., positive marital quality, nonmarital support) may buffer physical disability and negative social relations (i.e., negative marital quality, nonmarital strain) may exacerbate physical disability. Third, we evaluate the extent to which the associations identified between functional limitations, changes in social relations, and changes in loneliness differ for married men and women.

Method

Data

We used data from Waves 1 and 2 of the National, Social Life, Health, and Aging Project, a nationally representative sample of 3,005 communitydwelling persons ages 57 to 85 in the contiguous United States (Waite et al. 2014). Respondents were first interviewed in 2005-2006 and reinterviewed in 2010-2011. Approximately 75 percent of Wave 1 respondents provided a Wave 2 interview (N = 2,261). NSHAP collected data on a variety of domains related to health and social relations during a two-hour in-home interview. NSHAP also used a modularized questionnaire design with some questions included in a Leave behind Questionnaire (LBQ) for a randomly selected subset of respondents; the return rates for the LBQ were 84 and 88 percent at Waves 1 and 2, respectively. NSHAP is well suited for the current study as it includes longitudinal data on the quality of older adults' marital and nonmarital relations.

Analytic Sample

Our analytic sample was restricted in several ways. First, we limited our sample to respondents who participated at both waves, resulting in a loss of 744 (24.76 percent) respondents who were too sick to be reinterviewed (n = 139, 4.63 percent), had died (n = 430, 14.31 percent), or had otherwise attrited (n = 175, 5.82 percent). Second, we excluded 970 (42.81 percent) respondents who were not married/partnered at both waves (most of whom were married at neither wave). Third, we excluded 345 respondents missing information on our measure of loneliness at either wave, including 234 respondents (18.10 percent) who did not return the LBQ and 111 (10.50 percent) respondents missing at least one loneliness item at either wave. Finally, we excluded 32 (3.38 percent) respondents due to incomplete information on one or more predictors. Our final analytic sample contained 914 mar-

ried/partnered adults. Compared to all married persons in Wave 1, our sample showed the expected deviations – they were younger, slightly better educated, less likely to be black, and had slightly less negative marital and nonmarital relations at baseline. We explored the implications of non-random attrition using inverse probability weighting, calculating an adjusted study weight based on the conditional probabilities of providing a Wave 2 interview, remaining married, and returning the LBQ (see Hawkley et al. 2014). Models with the adjusted weight did not differ substantively from those using the original weight reported in the following. Furthermore, missingness on the positive and negative marital quality and nonmarital support and strain measures (described in the following) was not significantly associated with loneliness, indicating that our regression estimates are not biased and the use of listwise deletion is appropriate (Allison 2002).

Measures

Our dependent variable was loneliness measured with the UCLA Short Loneliness Scale (Hughes et al. 2004). Respondents were asked how often they felt “isolated,” they “lack[ed] companionship,” and were “left out.” Responses were hardly ever (or never) = 0, sometimes = 1, and often = 2. At Wave 2, the coding scheme was altered to never, hardly ever, sometimes, and often. For longitudinal consistency, we collapsed the never and hardly ever categories at Wave 2 into a single category and then coded each item from 0 to 2. We created a summated rating scale of loneliness at each wave (range from 0-6). The scales showed acceptable internal reliability (W1 $\alpha = .92$, W2 $\alpha = .88$).

Our main independent variables were measures of physical disability, positive and negative marital quality, and nonmarital social support and strain. We measured physical disability with a count of functional limitations. Respondents were asked whether, because of a condition expected to last at least three months, they had difficulty (no difficulty = 0 to unable to do = 3) with seven Activities of Daily Living (ADL): walking one block, walking across a room, dressing, eating, bathing or showering, getting in and out of bed, and using the toilet. As ADL limitations are fairly severe impairments, we summed seven dichotomous indicators reflecting any difficulty. Given the very low prevalence of persons reporting difficulty with (nearly) all tasks, we coded the range of functional limitations to be zero to five or more. Approximately 70 percent of respondents reported no change in functional limitations between waves, and we consequently included only Wave 1 functional limitations in our model. Our decision to specify functional limitations as time invariant was supported by preliminary models that indicated changes in functional limitations – regardless of specification – were not significantly associated with changes in loneliness. Similarly, preliminary analyses showed that loneliness at Wave 1 was also not significantly associated with changes in functional limitations.

We used six indicators asked at both waves to measure the positive and negative dimensions of the marital relationship. Two items assessed support by asking respondents about the frequency with which they could “open up to [their spouse] to talk about . . . worries” and whether they could “rely on [their spouse] if [they] have problems.” Two items assessed strain by asking respondents whether their spouse made “too many demands” and whether their spouse “criticize[d]” them. Responses for all four items were 1 = hardly ever (or never), 2 = some of the time, and 3 = often. The response options at Wave 2 were changed to separate never and hardly ever, so we recoded the Wave 2 items to match the Wave 1 three-point scale for longitudinal consistency. A fifth item asked respondents if they “spend free time doing things together or doing things separately” with their spouses. We coded the responses so higher scores indicated more time spent together: 1 = different/separate things; 2 = some together, some different; and 3 = together. The sixth item was a standard global assessment of marital happiness with responses ranging from 1 = very unhappy to 7 = very happy, which we reverse coded and collapsed into a three-level measure of relationship unhappiness where 1 = very happy (7), 2 = happy (5, 6), and 3 = unhappy (1, 2, 3, 4).

NSHAP also assessed the positive (support) and negative (strain) aspects of respondents’ relationships with non-spouse family and with friends at both waves. For both types of nonmarital relations, respondents were asked two support and two strain items parallel to those for spouses. Again, we recoded the Wave 2 responses for longitudinal consistency. Prior work demonstrates that

although conceptually different, assessments of relations with non-spouse family and with friends are not different from one another (Warner and Adams 2012), and this was confirmed in the current study. To retain respondents who reported having no non-spouse family and/or friends, we coded these respondents as the lowest value (1 = hardly ever [or never]) on each item. Supplemental analyses revealed our results were substantively similar regardless of whether or not we included respondents with no family or friends.

We subjected the marital and nonmarital indicators to confirmatory factor analysis (CFA), testing the hypothesized structure (Warner and Adams 2012; Warner and Kelley-Moore 2012) of four latent constructs at both waves: positive marital quality (W1 α = .75, W2 α = .76), negative marital quality (W1 α = .71, W2 α = .68), nonmarital support (W1 α = .76, W2 α = .75), and nonmarital strain (W1 α = .75, W2 α = .66). The hypothesized structure fit the data well (root mean square error of approximation [RMSEA] = .025, Comparative Fit Index [CFI] = .925). Additional tests demonstrated configural (i.e., same structure) and at least weak (i.e., statistically similar factor loadings) factorial invariance for all constructs between waves (Meredith 1993). The CFA results for each wave are available in Appendix Tables A1 and A2, respectively.

We estimated a separate measurement model for each construct at each wave and outputted the factor scores. To assess changes in the positive/negative marital quality and nonmarital support/strain factor scores, we regressed the effect of each Wave 2 factor score on its Wave 1 counterpart and saved the residual from each regression to create residualized change scores that we used in our multivariate analyses. The advantage of this approach over raw change scores is that residualized change scores are less affected by regression to the mean among extreme values at baseline. Given that the means of the estimated factor scores were set to zero, the residualized change scores are interpreted in reference to the average change. Thus, for example, a value of zero on the residualized change score for nonmarital support indicates average change, while positive (negative) scores indicate above (below) average change in nonmarital support relative to others.

We included several Wave 1 measures associated with functional limitations, the quality of social relations, and/or loneliness as controls based on prior research. Demographic characteristics included age (range = 57-85), female, and dummy variables for race/ethnicity (black, Hispanic, other race, with white the reference) due to well-known differences in functional limitations across groups (Brault 2012) and because loneliness also differs across some of these same groups, being higher among younger persons, women, and racial/ethnic minorities (Hawkey et al. 2008). We also included a measure of the number of times previously married (0, 1, 2+), given that remarried persons report fewer friendships (Kalmijn 2003) and worse mental health, including higher loneliness (Gierveld et al. 2009). We controlled for socioeconomic status with a dummy variable for having less than a high school education and dummy variables for household income (<\$50,000, income missing, with \geq \$50,000 the reference). Education and income are inversely associated with disability (Brault 2012), lack of supportive interpersonal relations (Fischer and Beresford 2015; Kalmijn 2003), and loneliness (Hawkey et al. 2008). Preliminary analyses included household assets rather than income, but the results did not substantively differ, and thus we excluded this from the final models. Finally, we controlled for self-rated mental health (0 = poor to 4 = excellent), which correlates with other mental health measures (Fleishman and Zuvekas 2007), to account for potential contamination of appraisals of social relations and loneliness.

In preliminary analyses, we considered several other potentially confounding measures, including respondent's physical health (i.e., self-rated health, chronic conditions), respondent's rating of partner's physical health, various indicators of social integration (i.e., number of sons, number of daughters, number of close relatives, network size, religious attendance, working for pay, socializing with neighbors), and whether respondents were married or cohabiting. None of these measures—either at Wave 1 or in terms of change between waves, as appropriate—significantly affected our findings (see also Cornwell and Waite 2009), and thus we excluded them from the final analyses in the interest of parsimony.

Analytic Strategy

We estimated Tobit regression models to account for the restricted measurement of our dependent variable (Long 1997), as 66 percent and 59 percent of respondents scored zero on loneliness at Waves 1 and 2, respectively. The Tobit model provides maximum likelihood estimates of the theoretically continuous and normally distributed underlying loneliness construct (y_i), where the observed loneliness measure (y_i^*) is censored at zero (t):

$$y_i = \begin{cases} y_i^* = \mathbf{x}_i \boldsymbol{\beta} + \varepsilon_i & y_i^* > \tau \\ \tau_y & y_i^* \leq \tau \end{cases} \quad (1)$$

For cases above zero, the Tobit model estimates the effect of our predictors on the observed loneliness measure using a standard linear model. For cases at or below the censoring value, the probability of being censored is estimated, which is then included in the likelihood equation. We used the regressor variable method to assess change in loneliness, modeling loneliness at Wave 2 as the dependent variable while controlling for loneliness at Wave 1.

Our multivariate analysis proceeded in four steps. First, we estimated the baseline effect of functional limitations, positive and negative marital quality, and nonmarital support and strain at Wave 1 on changes in loneliness. Second, we tested if changes in marital quality and/or changes in nonmarital relations mediated the effect of functional limitations on changes in loneliness, in accordance with the stress deterioration hypothesis; we assessed the statistical significance of the mediating effects using a series of Sobel tests. Third, we specified interaction terms to examine if changes in marital quality and/or changes in nonmarital relations moderated the effect of functional limitations on changes in loneliness, as predicted by the stress buffering hypothesis. Fourth, we re-estimated the previous models, specifying interactions with our focal variables to test if the effects varied by gender. All estimates were weighted and adjusted for the complex survey design.

Results

Married older adults reported a modest increase in loneliness between waves (Table 1), and this increase was significantly larger for those with functional limitations. Respondents were more likely to be male, white, and better educated; to have higher incomes; be in long-term first marriages; and to have “very good” mental health. Compared to those with none, older adults with at least one functional limitation were older and less educated, had lower incomes, and rated their mental health worse.

Supplemental analyses comparing changes in social relations for the full sample, based on summated rating scales rather than the mean-centered estimated factor scores (not shown), indicated that married older adults saw few average changes in their social relations—and where there was change, it was an improvement. Positive marital quality and nonmarital support were relatively stable, while negative marital quality and nonmarital strain slightly decreased. The average stability in social relations belied substantial offsetting changes within each domain, however, where approximately equal numbers of respondents experienced improvements as experienced deterioration. Changes in either marital quality or nonmarital relations did not differ significantly by disability status.

Although not shown in the table, there were gender differences in our focal variables. Consistent with prior studies, men generally reported higher levels of both positive and negative marital quality than women did, while women reported more nonmarital support. Men and women did not differ in their reported levels of nonmarital strain at either wave. Between waves, both women’s positive marital quality and men’s nonmarital support decreased—differences that while relatively modest were statistically significant. There were few differences between married men and women on our controls—although men did report higher incomes.

Table 1. Univariate Statistics for Total Sample and Stratified by Functional Limitations.^a

	Total		No Limitations		≥ One Limitation		F ^b
	Mean	SE	Mean	SE	Mean	SE	
Loneliness (W1)	.68	.05	.66	.06	.72	.07	.42
Loneliness (W2)	.85	.05	.78	.06	1.03	.09	7.21**
Functional limitations	.56	.05	—	—	—	—	—
Social relations							
Positive marital quality (W1) ^{c,d}	.00	.03	.02	.04	-.06	.04	2.52
Positive marital quality (W2) ^{c,d}	.00	.03	.02	.03	-.05	.07	.78
Negative marital quality (W1) ^{c,d}	.00	.03	-.01	.03	.03	.04	.88
Negative marital quality (W2) ^{c,d}	.00	.03	-.01	.04	.03	.05	.86
Nonmarital support (W1) ^{c,d}	.00	.03	.03	.04	-.08	.06	2.21
Nonmarital support (W2) ^{c,d}	.00	.03	.02	.04	-.05	.07	.66
Nonmarital strain (W1) ^{c,d}	.00	.03	-.03	.04	.08	.06	2.08
Nonmarital strain (W2) ^{c,d}	.00	.03	-.01	.03	.03	.05	.82
Age ^e	65.87	.28	65.32	.30	67.39	.60	10.33**
Female	.44	.02	.43	.02	.47	.04	.85
Race/ethnicity							
White ^f	.87	.01	.87	.01	.89	.02	1.61
Black	.05	.01	.05	.01	.04	.01	1.12
Hispanic	.05	.01	.05	.01	.06	.02	.02
Other race	.02	.00	.02	.01	.01	.00	4.11*
Higher order marriages	.40	.03	.40	.03	.41	.06	.07
Less than high school	.10	.01	.08	.01	.15	.02	14.48***
Income							
Income <\$50,000	.36	.02	.33	.02	.45	.04	7.11*
Income ≥\$50,000 ^f	.56	.02	.59	.03	.47	.04	5.02*
Income missing	.08	.01	.09	.02	.08	.02	.29
Mental health	2.97	.04	3.04	.04	2.77	.08	9.92**
N	914		666		248		

Source. National Social Life, Health, and Aging Project (NSHAP), Waves 1 and 2.

^aEstimates weighted and variances adjusted for stratification and clustering.

^bWald F tests the null hypothesis that the difference in the means between the non-disabled and disabled subgroups is zero.

^cEstimated factor score.

^dMean-centered.

^eMean-centered in the multivariate analyses.

^fServes as the reference group in the multivariate analyses.

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

Examining the Stress Deterioration Hypothesis

To examine whether changes in older adults’ social relations mediated the association between functional limitations and changes in loneliness, we turn to Table 2. Model 1 presents the baseline Tobit regression results for the change in loneliness and shows that net of our controls, functional limitations were associated with increased loneliness. Model 2 adds Wave 1 measures of social relations to demonstrate the baseline effects and shows that married older adults with above average levels of positive marital quality at Wave 1 saw significant improvements in loneliness. By contrast, those with nonmarital relations characterized by above average strain at Wave 1 were lonelier by Wave 2. Initial levels of negative marital quality and nonmarital support were not associated with changes in loneliness. Model 3 adds residualized change in social relations to assess the stress deterioration hypothesis. Consistent with Model 2, Model 3 indicates that only above average increases in positive marital quality were associated with decreased loneliness, as the effects for changes in negative marital quality, nonmarital support, and nonmarital strain were not statistically significant.

Despite the association between the quality of social relations and loneliness generally, the

evidence in Table 2 is not consistent with the stress deterioration hypothesis as the estimated coefficients for functional limitations are nearly identical across Models 1 through 3. The absence of mediation was confirmed by Sobel tests of the indirect effects (not shown). The lack of evidence for the stress deterioration hypothesis was further supported by ancillary analyses regressing each Wave 2 social relation measure on its Wave 1 measure, loneliness, functional limitations, and the controls: We found no indication that functional limitations was associated with average changes in marital quality or nonmarital relations (not shown) in the pooled sample.³

Table 2. Effects of Social Relation Quality and Functional Limitations on Loneliness at Wave 2, Tobit Regression Estimates (N = 914).^a

	Model 1	Model 2	Model 3
<i>Wave 1 independent variables</i>			
Loneliness	.99***	.77***	.95***
Functional limitations	.28*	.26**	.29*
Positive marital quality ^{b,c}		-.68***	
Negative marital quality ^{b,c}		.09	
Social support ^{b,c}		-.13	
Social strain ^{b,c}		.30**	
Δ Social relations			
Δ Positive marital quality			-.35*
Δ Negative marital quality			.08
Δ Nonmarital support			-.12
Δ Nonmarital strain			.29
<i>Control variables</i>			
Age ^c	.02	.02	.02
Female	.16	.16	.13
Race/ethnicity ^d			
Black	.31	.20	.21
Hispanic	-.97**	-.96**	-1.01**
Other	-.16	.02	-.33
Higher order marriages	-.24	-.29*	-.20
Less than high school	-.07	.05	-.12
Income ^e			
Income <\$50,000	.06	.02	.04
Income missing	-.21	-.11	-.21
Mental health	-.27**	-.19*	-.24*
Intercept	-.35	-.38	-.37
Sigma	2.06***	2.00***	2.03***
F ^f	49.273***	13.71***	2.05
df	12, 39	4, 47	4, 47

Source. National Social Life, Health, and Aging Project (NSHAP), Waves 1 and 2.

^aEstimates weighted and variances adjusted for stratification and clustering.

^bEstimated factor score.

^cMean-centered.

^dWhite is reference.

^eIncome \geq \$50,000 is reference.

^fWald F tests the null hypothesis that variables added to the model are jointly equal to zero.

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

Table 3. Moderating Effects of Changes in Social Relation Quality on the Association between Functional Limitations and Loneliness at Wave 2 (Tobit Regression Estimates).^{a,b}

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>Wave 1 independent variables</i>						
Loneliness	.86***	.78***	.78***	.80***	.97***	.78***
Functional limitations	.26*	.25**	.21**	.27**	.23**	.21**
Positive marital quality ^{c,d}		-.72***	-.70***	-.67***		-.74***
Negative marital quality ^{c,d}	.34*		.11	.11		
Social support ^{c,d}	-.21	-.13		-.12		
Social strain ^{c,d}	.27*	.28**	.25*			.25*
Δ Social relations						
Δ Positive marital quality	-.37 ⁺				-.29	
Δ Negative marital quality		.43**			.24	.40*
Δ Nonmarital support			-.35**		-.30*	-.31*
Δ Nonmarital strain				.47*	.41 ⁺	
<i>Functional limitations \times</i>						
Δ social relations						
Functional limitations \times Δ positive marital quality	.00				-.08	
Functional limitations \times Δ negative marital quality		-.28**			-.22*	-.22*
Functional limitations \times Δ nonmarital support			.26*		.22*	.22*
Functional limitations \times Δ nonmarital strain				-.25 ⁺	-.13	
Intercept	-.49	-.43	-.43	-.40	-.34	-.39
Sigma	2.02***	1.98***	1.98***	1.99***	2.01***	1.97***
F ^e	2.77 ⁺	4.29*	4.43*	3.80*	4.73**	4.06**
df	2, 49	2, 49	2, 49	2, 49	8, 43	4, 47

Source. National Social Life, Health, and Aging Project (NSHAP), Waves 1 and 2.

^aEstimates weighted and variances adjusted for stratification and clustering.

^bModels also control for all other variables included in Model 4 of Table 2 (not shown).

^cEstimated factor score.

^dMean-centered.

^eWald F tests the null hypothesis that variables added to the model—relative to Model 2 in Table 2—are jointly equal to zero.

⁺p < .10. *p < .05. **p < .01. ***p < .001.

Examining the Stress Buffering Hypothesis

Table 3 presents the results testing whether changes in social relations moderate the association between functional limitations and changes in loneliness. Models 1 through 4 show the moderating effect for each measure of social relations individually, controlling for the Wave 1 values of the other measures of social relations. Model 5 presents all the moderating effects simultaneously, and Model 6 is the reduced form model retaining only the statistically significant interactions between functional limitations and changes in social relations.

Models 1 through 4 show that when considered individually, each dimension of change in social relations (except positive marital quality) moderates the effect of functional limitations on changes in loneliness. However, when modeled simultaneously, only changes in negative marital quality and nonmarital support interact with functional limitations (Models 5 and 6).

To facilitate the interpretation of these effects, we used the parameter estimates in Model 6 to calculate the predicted change in the effect of functional limitations on Wave 2 loneliness for three groups of respondents: those with below average change, those with average change, and those with above average change in a social relation. The other covariates in the model were held constant at

zero. The predicted interaction effects are presented in Figure 1.

Rather than exacerbating the effect of functional limitations, increased negative marital quality had an ameliorative effect, as disabled older adults with above average increases did not experience a significant additional increase in loneliness, all else being equal (see Figure 1a). It is older adults with average or above average declines in the negative aspects of their marriages – principally reductions in demanding, and to a lesser extent criticizing, behaviors (supplemental analyses not shown) – for whom the effect of functional limitations on changes in loneliness was more pronounced. Conversely, rather than ameliorating changes in loneliness, average to above average increases in nonmarital support were associated with increased loneliness for those with functional limitations. Disabled older adults who experienced a one standard deviation decrease in nonmarital support – an ostensibly problematic change – did not experience any significant additional increase in loneliness, all else being equal (see Figure 1b).

That increased negative marital quality ameliorates and increased nonmarital support exacerbates loneliness among the disabled is counter to the stress buffering hypothesis predictions. Nonetheless, we call attention to the fact that the main effects for these measures show that for married older adults without functional impairments, increases in negative marital quality predict increased loneliness and more nonmarital support predicts reduced loneliness. As we elaborate in the discussion, the importance of changes in social relations for loneliness is complex and depends on the presence or absence of another stressor – that is, disablement.

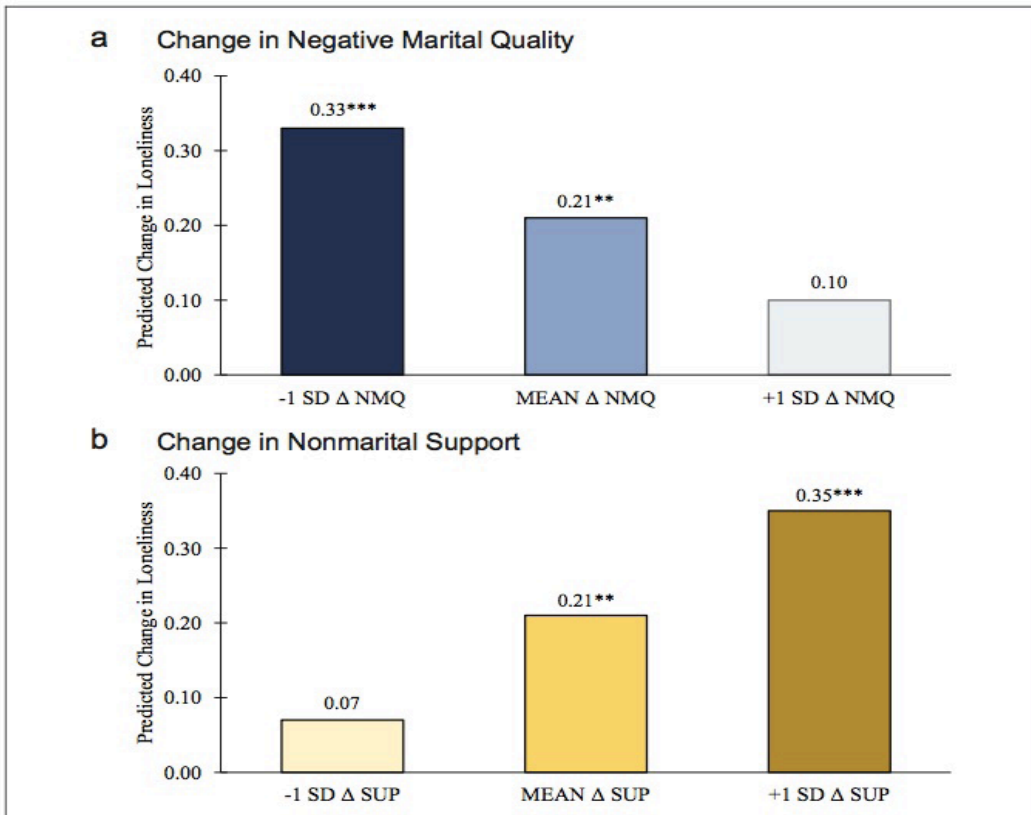


Figure 1. The moderating effects of changes in (a) negative marital quality and (b) nonmarital support on the association between functional limitations and changes in loneliness.

Note. The predicted change in the effect of functional limitations on Wave 2 loneliness was calculated for a 1 standard deviation change below (–1 SD Δ) and above (+1 SD Δ) the average level of change (MEAN Δ) in social relations based on the estimated coefficients of Table 3, Model 6. The values for all other variables in the model were held constant at zero. NMQ = negative marital quality; SUP = nonmarital support.

Gender Contingencies in the Stress Buffering Effects

We replicated the analysis in Table 3 by specifying interaction terms between our focal independent variables and gender. Given the complexity of these models, our modest sample size provided limited statistical power to detect significant threeway interactions (e.g., functional limitations 3 nonmarital support 3 female), and we were only able to estimate the effect of changing social relations individually (analogous to Models 1-4 in Table 3). Thus, these results should be interpreted with some caution. Overall, we detected only very limited evidence of gendered differences in changes in nonmarital support (see note 3).

We find evidence that the moderating effects of changing social resources operate differently for women and men (table not shown). While the exacerbating effect of increased nonmarital support identified in Table 3 appears to hold for disabled men and women similarly, increased negative marital quality offers ameliorative effects only for disabled men. Similarly, we find that nonmarital strain appears to ameliorate the effect of functional limitation on changes in loneliness for disabled men.⁴ Thus, although increased negative marital quality and nonmarital strain were associated with increases in loneliness among men without functional limitations as expected, we see offsetting ameliorative effects of such changes among those with functional impairment: Older disabled men whose negative marital quality (Figure 2a) or nonmarital strain (Figure 2b) increased did not experience a significant change in loneliness. Men with functional impairments who experienced the largest declines in negative marital quality and nonmarital strain had substantial increases in loneliness. Even men with functional limitations who experienced average changes in negative social relations (and recall that the average change was a slight decline) were significantly lonelier. For men with functional limitations, it is increases in demanding and criticizing behaviors from their wives, and perhaps from non-spouse family and friends, that buffer the tendency toward increased loneliness with functional limitations. Men without functional limitations and women— independent of functional status—experience greater loneliness over time when they report that their spouses or non-spouse family and friends are engaging in more negative interpersonal behaviors (see also Models 2 and 6 in Table 3).

Discussion

Older adults with functional limitations are at risk of loneliness, which is an important indicator of psychosocial health given that it predicts declines in self-rated health, worsening cognitive abilities, use of health services and institutionalization, and mortality (Cacioppo et al. 2003; Holt-Lunstad et al. 2015; Hughes et al. 2004). In the current study, we focused on the role of changes in the quality of marital and nonmarital relations for understanding the link between functional limitations and increases in loneliness using nationally representative, longitudinal data on married older adults. We considered two alternative stress process hypotheses about the role of changing social relations among physically disabled older adults (stress deterioration and stress buffering), with attention to how the identified roles of social relations within marriage were contingent on gender.

Three main findings emerged from our analysis. First, neither changes in marital nor nonmarital relations mediate the link between functional limitations and increased loneliness. Second, increased support from non-spouse family and friends exacerbates the effect of functional limitations leading to greater loneliness. Third, increased negative marital quality and nonmarital strain buffer the effect of functional limitations on changes in loneliness for men; these same changes lead to increased loneliness among men without functional limitations and women regardless of functional status. Although these moderating effects are surprising, they are not unheard of within the larger body of work on coping with health-related chronic stressors. We now elaborate on our key findings, situating them within the extant literature, and discuss the implications for understanding the social context of disablement.

Limited Evidence of Deterioration in Social Relations

We did not find evidence for the stress deterioration hypothesis that changes in the quality of social relations mediate the effect of physical disability on changes in loneliness. Although we show that

marital quality generally does not change directly in response to functional limitations (Bookwala and Franks 2005; Warner and Kelley-Moore 2012), functional limitations do result in increased nonmarital support for older men and a slight decline in nonmarital support for older women. The shifting nonmarital support experienced with physical disability does not explain the increases in loneliness, however. Although physical disability does not uniformly lead to changes in the quality of marital or nonmarital relations, it is clear that some persons do experience fluctuations in the positive and negative aspects of their social relations. The nature of those changes matters for the effect of disablement on loneliness.

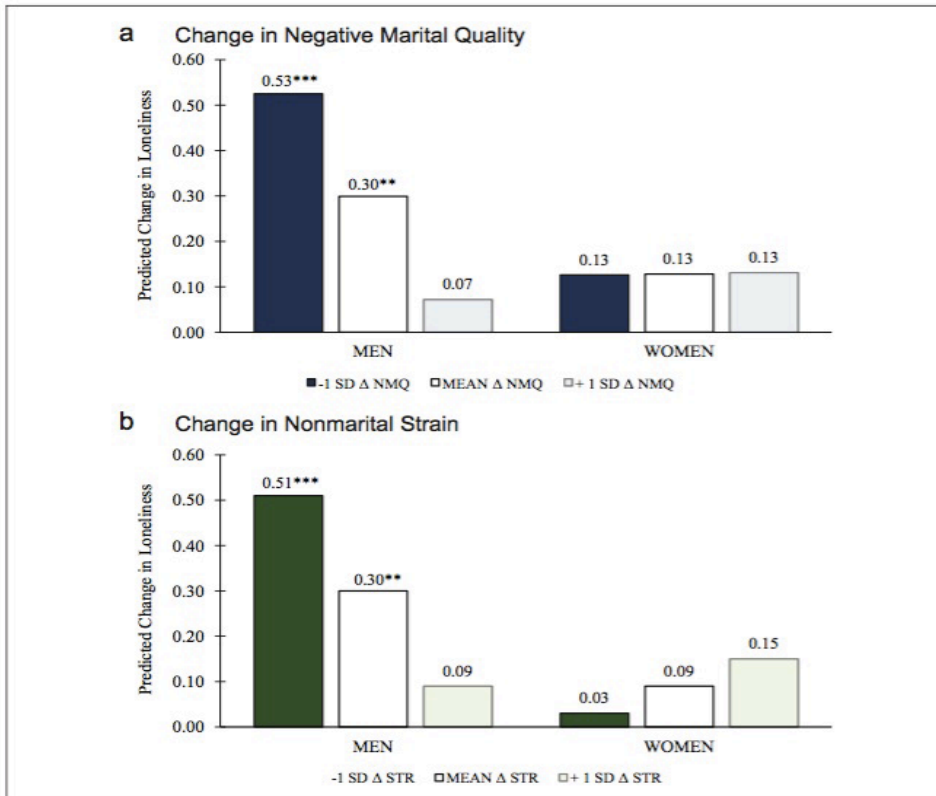


Figure 2. Gender differences in the moderating effect of changes in (a) negative marital quality and (b) nonmarital strain on the association between functional limitations and changes in loneliness.

Note. The predicted change in the effect of functional limitations on Wave 2 loneliness was calculated separately for men and women for a 1 standard deviation change below (-1 SD Δ) and above ($+1$ SD Δ) the average level of change (MEAN Δ) in social relations based on the estimated coefficients from models including an interaction for functional limitations \times Δ social relation \times female (not shown). The values for all other variables in the model were held constant at zero. NMQ = negative marital quality; STR = nonmarital strain.

The Exacerbating Effects of Increased Nonmarital Support

Increases in nonmarital support exacerbate, rather than ameliorate, the adverse effects of functional limitations on loneliness for both men and women. This finding is in line with other studies of older adults with chronic health problems, which show that social support can actually be associated with greater depression (Penninx et al. 1998; Reinhard et al. 2006). Increased nonmarital support may therefore evoke and/or amplify feelings of isolation and dependency among disabled older adults (Thoits 2011) that are implicated in loneliness. Such support may lead to an incongruence between one's socioemotional needs (e.g., companionship and autonomy) and the behaviors of non-spouse family and friends.

Although we do not know what specific behaviors non-spouse family and friends may be engaging in given the measurement of support (i.e., whether one can rely on or open up to others), this interpretation is consistent with prior studies. Perceptions of support based primarily on subtle but meaningful displays of care are likely to be advantageous, whereas highly visible and unsolicited forms of aid are more likely to lead the individual to feel dependent and over-rewarded (Bolger et al. 2000; Thoits 2011), especially if the individual is unable to reciprocate (Gleason et al. 2008). Thus, when non-spouse family and friends offer disabled older adults explicit support (Bolger and Amarel 2007), perhaps in ways that seems overprotective (Cimarolli et al. 2006; Thompson and Sobolew-Shubin 1993), this may increase loneliness by making such behaviors appear to be provided out of obligation rather than a desire for companionship.

The Buffering Effect of Increased Negative Social Relations for Disabled Men

Although stress process theory posits that negative aspects of social relations exacerbate the effects of chronic stressors, we found that increases in negative marital quality and nonmarital strain actually had an ameliorating effect among those with functional limitations. However, the buffering role of increased negative social relations is gendered— as it was only observed among men. Among men without functional limitations and women regardless of functional status, increases in negative aspects of social relations lead to greater loneliness. The gendered implications of increased negative marital quality and nonmarital strain for coping with functional impairment were not identified in cross-sectional prior work on loneliness (Warner and Adams 2012; Warner and Kelley-Moore 2012). That increases in negative social relations would buffer the effect of disablement on loneliness among men is initially counterintuitive but less so when considered in the context of existing studies.

Ostensibly negative spousal behaviors, as long as they are interpreted as evidence of caring (Tapp 2004), may be beneficial when they are offered in response to a stressor. For example, spousal demands and criticisms are associated with lower blood pressure among older adults who report greater stress (Birditt, Newton, and Hope 2014) and associated with lower mortality risks among those with chronic conditions (Birditt and Antonucci 2008). Heightened demands may promote well-being to the extent that they are indicative of relations where overprotection and overbearing provisions of aid are minimized (see Hagedoorn et al. 2000; Schokker et al. 2010). Thus, increases in negative marital quality among those with functional limitations may act as a type of “invisible support” (Bolger and Amarel 2007; Bolger et al. 2000) and be interpreted in a way that helps foster feelings of independence and reduces loneliness.

That we observe the buffering effect of negative marital quality only among men suggests that interpretations of these behaviors reflect gendered marital role expectations (Bernard 1972; Moen 2001) that are prominent among current cohorts of older adults (Boerner et al. 2014). Specifically, we speculate that disabled older married men who report higher than expected levels of negative marital interactions may not view these behaviors as psychologically threatening, overbearing, or isolating because they are consistent with their expectations of their wives to care for them and manage their health (Ridgeway 2011; Umberson 1992). Thus, increases in negative marital quality— especially demanding and criticizing behavior— are seen as indicative of wives’ concern for their husbands’ well-being. Indeed, others have argued that such “nagging” can be a form of caring (Tapp 2004; Waite and Gallagher 2000). That disabled older men would interpret increased demands and criticisms from wives as evidence of caring is especially likely given that wives consistently engage in emotion work when making health-related demands or offering health-related criticisms that help to preserve traditional masculine notions of autonomy and control (Sandberg et al. 2006; Thomeer et al. 2015). As such, for disabled men, negative marital quality is actually a resource that renders functional impairment less threatening. In fact, it is perhaps because older men often expect their wives to make such demands (Boerner et al. 2014) that we find declines in negative marital quality to be so problematic, exacerbating the effect of functional limitations on loneliness.

Even as they are buffering for disabled married men, increases in negative marital quality lead to greater loneliness among married women regardless of functional status. Although we do not know the specific nature or context of the increased demands and critical behaviors (that is, what is being demanded, the reason for criticism, or the manner in which either are conveyed), it may be that

such behaviors invert women's marital roles and are thus isolating. For example, because men engage in emotional work less consistently when their wives are ill (Thomeer et al. 2015), using direct/authoritative (rather than accommodating) language centered around specific tasks (Sandberg et al. 2006), demanding and critical behavior from husbands may emphasize women's receipt of care and thus inability to fulfill the feminine caregiver role. Men's increased demands or criticism may also concern domestic tasks, caregiving, or sexual activity (Allen 1994; Galinsky and Waite 2014), and repeated demands for such traditionally feminine marital behaviors may reinforce disabled women's reduced ability to meet these expectations. Thus, it may be that changes in negative marital quality are protective for disabled men because they reinforce gendered marital role expectations, but such changes are deleterious for disabled women because they challenge fulfillment of gendered marital roles, and this leads to declines in psychosocial well-being (Thomeer et al. 2013).

Among disabled men, we also observed a similar buffering effect for increased nonmarital strain. Given that relations with non-spouse family and friends are less central to the emotional well-being of men (Antonucci and Akiyama 1987; Spitze and Ward 2000), this effect is all the more surprising. Recall that we were not able to estimate a model that included interactions between gender, functional limitations, and both types of negative social relations due to limited sample size, and thus we must view this finding with some caution. There is limited prior evidence, however, that seemingly negative behaviors from older adults' nonmarital ties may promote better health practices (Krause et al. 1993; Rook and Ituarte 1999) and lower mortality among those with chronic illnesses (Birditt and Antonucci 2008). Thus, we speculate that increases in nonmarital strain for disabled older men serve a gendered social control function that is unlikely to lead to feelings of overprotection or indebtedness (Hagedoorn et al. 2000; Thompson and Sobolew-Shubin 1993). Women's greater investment in and emotional exchange with nonmarital ties (Blieszner and Adams 1992; Hagestad 1986; Salari and Zhang 2006) means that they experience negative interactions with nonmarital ties more frequently than men (Turner 1994). Accordingly, straining behaviors may feel routine to older women, doing little to amplify or buffer the effect of disablement on loneliness.

Increased demands and criticism from men's non-spouse family and friends may also reflect social control practices given both the centrality of wives to men's social network and the content of relations. Wives serve as a bridge to men's nonmarital ties (Cooney and Dunne 2001; Kalmijn 2003) and are key to maintaining men's social participation (Gierveld et al. 2009). Thus, the extent to which wives are engaged in increased critical and demanding behaviors may elicit similar behaviors among non-spouse family and friends. Indeed, our data show that increases in negative marital quality and nonmarital strain are positively correlated. This could mean that the buffering effects of nonmarital strain for men represent active coordination between wives and nonmarital ties to, for example, help men remain socially engaged despite disabling health conditions and thus protect against loneliness. Coordination between wives and other family members, especially children, is likely, given norms of obligation (Silverstein, Gans, and Yang 2006). Indeed, Birditt and Antonucci (2008) found that increased demands from children—but not other relatives or friends—was associated with reduced mortality among those with chronic illnesses. However, friends may also be important for maintaining disabled men's social engagement and preventing loneliness given that friends are important for keeping older adults engaged in activities outside the home (Adams and Blieszner 1995), an effect that appears to increase with age (Huxhold et al. 2014), and older men's friendships in particular are based on shared activities (Carr and Moorman 2011). Thus, increased demanding and critical behaviors from disabled men's friends—which are close rather than peripheral relations by later life (Carstensen et al. 2003)—may represent encouragement to maintain social activities, perhaps also operating as a type of "invisible support" (Bolger et al. 2000). Unfortunately, we are unable to examine these possibilities with the current data.

Limitations and Future Directions

We focused on the role of changing social relations in the link between physical disability and loneliness using nationally representative longitudinal data on married older adults. We included a rich set of measures on both positive and negative dimensions of marital and nonmarital relations and were attuned to the gendered context within which these changes are experienced. Indeed, our find-

ings concerning the degree to which the social context of disablement is gendered have not been previously demonstrated. Nevertheless, several limitations to our study merit attention in future research.

First, the older adults in our study are somewhat advantaged in that they remained married over the five-year period between waves and, because of differential LBQ return, had less negative social relations compared to the full sample. Moreover, NSHAP is a sample of community-dwelling older adults—which is perhaps why functional limitations remained largely stable across waves. Thus, our findings apply to a relatively healthy and socially privileged group of older adults. How changes in negative marital quality, for example, would affect loneliness in a more functionally impaired sample deserves further attention.

Second, our study is of married individuals but not couples, and thus we focused on assessments from just one member of the marital dyad. Given that marital quality is something that emerges within patterns of routinized behavior within the couple and the tendency for married couples to have shared network ties (Kalmijn 2003), investigations of how social support processes operate within dyads—including when one's spouse is ill (Galinsky and Waite 2014; Thomeer et al. 2015)—seem especially important.

Third, our indicators of changes in nonmarital relations combine assessments from both nonspouse family and friends. Although our confirmatory factor analyses justified this approach (see also Warner and Adams 2012), future research should consider whether changes in relations with non-spouse family, particularly children (Birditt and Antonucci 2008; Silverstein et al. 2006), have different consequences than do changes with friends. Unfortunately, in NSHAP, only two support and two strain indicators were assessed for each domain at both waves, and support from children was not asked about separately from that provided by other relatives.

Finally, given our focus on married older adults, our findings cannot speak to how the quality of social relations with family and friends affects loneliness among disabled unmarried older adults. Compared to the married persons, unmarried persons have more non-kin ties (Kalmijn 2012) and higher levels of exchange with these ties (Fischer and Beresford 2015; Liebler and Sandefur 2002), suggesting that they could resources when confronted although there are notable unmarried men and women. adults in current cohorts are Dunne 2001; U.S Bureau of the Census 2014), expected growth in the number of divorced older adults indicates the need to examine the social context of disablement among the unmarried.

Despite these limitations, our findings advance our understanding of the social context of disablement by demonstrating that changes in marital and nonmarital social relations have the potential to both mitigate and intensify the increased feelings of loneliness that accompany functional limitations. Importantly, we show that—contrary to the expectations derived from the stress process perspective, although consistent with a small body of prior research (e.g., Birditt and Antonucci 2008; Cutrona 1996; Thompson and SobolewShubin 1993)—positive aspects of (nonmarital) social relations exacerbate and negative aspects of social relations ameliorate the effect of functional limitations for older married adults. However, only disabled married men benefit from increases in the “negative” aspects of their marital and nonmarital relations. These findings reinforce the fact that the marital institution is central for the provision (and perhaps coordination) of social support to disabled older men. Practitioners serving disabled older adults should thus bear in mind that support is offered and perceived within a cultural context that defines different expectations for married men and women (Moen 2001; Ridgeway 2011). However, although we speculate that the different effects for men and women reflect the gendered marital role expectations among current cohorts of older adults, further research is needed into the dynamics of marital support to identify why the same spousal behaviors have such different consequences for changes in loneliness among disabled married men and women.

APPENDIX: CONFIRMATORY FACTOR ANALYSIS RESULTS

Table A1. Results from Confirmatory Factor Analysis Models for Wave 1 Social Relations (Unweighted N = 914).^a

Questionnaire Items	Positive MQ ^b	Negative MQ ^b	Social Support	Social Strain
<i>Partner/spouse items</i>				
"How often can you open up to [partner] if you need to talk about your worries?" ^c	.80***			
"How often can you rely on [partner] for help if you have a problem?" ^c	.80***			
"Some couples like to spend their free time doing things together, while others like to do different things in their free time. . . . Do you [and partner] like to spend free time doing things together or doing things separately?" ^d				
"Taking all things together, how would you describe your [marriage/relationship] with [partner] on a scale from 1 to 7 with 1 being very unhappy and 7 being very happy?" ^e	-.62***	.53***		
"How often does [partner] make too many demands on you?" ^c		.73***		
"How often does [partner] criticize you?" ^c		.77***		
<i>Family/friend items</i>				
"How often can you rely on [family] for help if you have a problem?" ^c			.74***	
"How often can you open up to [family] if you need to talk about your worries?" ^c			.69***	
"How often can you rely on [friends] for help if you have a problem?" ^c			.63***	
"How often can you open up to [friends] if you need to talk about your worries?" ^c			.73***	
"How often do [family] make too many demands on you?" ^c				.53***
"How often do [family] criticize you?" ^c				.75***
"How often do [friends] make too many demands on you?" ^c				.66***
"How often do [friends] criticize you?" ^c				.71***
Model fit indices				
Root mean square error of approximation (RMSEA)	.00	.00	.24	.09
Comparative Fit Index (CFI)	1.00	1.00	.90	.95

Source. National Social Life, Health, and Aging Project (NSHAP), Wave 1.

^aAll latent variables were estimated from separate confirmatory factor analysis models.

^bMQ = marital quality.

^c1 = hardly ever (or never), 2 = some of the time, and 3 = often.

^dResponses were: 1 = together; 2 = some together, some different; and 3 = different/separate things—reverse coded so higher scores indicate greater time spent together.

^eItem was recoded into 1 = unhappy (1, 2, 3, 4), 2 = happy (5, 6), and 3 = very happy (7).

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

Table A2. Results from Confirmatory Factor Analysis Models for Wave 2 Social Relations (Unweighted N = 914).²

Questionnaire Items	Positive MQ ^b	Negative MQ ^b	Social Support	Social Strain
<i>Partner/spouse items</i>				
"How often can you open up to [partner] if you need to talk about your worries?" ^c	.75***			
"How often can you rely on [partner] for help if you have a problem?" ^c	.72***			
"Some couples like to spend their free time doing things together, while others like to do different things in their free time. . . . Do you [and partner] like to spend free time doing things together, or doing things separately?" ^d	.49***			
"Taking all things together, how would you describe your [marriage/relationship] with [partner] on a scale from 1 to 7 with 1 being very unhappy and 7 being very happy?" ^e	-.70***	.44***		
"How often does [partner] make too many demands on you?" ^c		.71***		
"How often does [partner] criticize you?" ^c		.82***		
<i>Family/friend items</i>				
"How often can you rely on [family] for help if you have a problem?" ^c			.59***	
"How often can you open up to [family] if you need to talk about your worries?" ^c			.63***	
"How often can you rely on [friends] for help if you have a problem?" ^c			.73***	
"How often can you open up to [friends] if you need to talk about your worries?" ^c			.77***	
"How often do [family] make too many demands on you?" ^c				.50***
"How often do [family] criticize you?" ^c				.75***
"How often do [friends] make too many demands on you?" ^c				.52***
"How often do [friends] criticize you?" ^c				.54***
Model fit indices				
Root mean square error of approximation (RMSEA)	.00	.00	.24	.12
Comparative Fit Index (CFI)	1.00	1.00	.89	.81

Source: National Social Life, Health, and Aging Project (NSHAP), Wave 2.

²All latent variables were estimated from separate confirmatory factor analysis models.

^bMQ = marital quality.

^c1 = hardly ever (or never), 2 = some of the time, and 3 = often.

^dResponses were: 1 = together; 2 = some together, some different; and 3 = different/separate things—reverse coded so higher scores indicate greater time spent together.

^eItem was recoded into 1 = unhappy (1, 2, 3, 4), 2 = happy (5, 6), and 3 = very happy (7).

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

Author's Note

Preliminary portions of these findings were presented at the NSHAP Wave 2 Early Results Workshop, September 11-12, 2013, Chicago, IL, and the 67th Annual Meeting of the Gerontological Society of America, November 59, 2014, Washington, D.C.

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Notes

1. Loneliness is a subjective assessment of the inadequacy of one's social environment to meet one's desired social needs and is relatively independent of actual instances of social contact or network size (see Cacioppo, Hawkey, and Berntson 2003; Cornwell and Waite 2009).
2. Throughout the text, we generally refer to relations with non-spouse family and friends as non-marital for conciseness. Moreover, although support and strain from non-spouse family and friends may have different effects on well-being (Berkman et al. 2000), prior analyses with the National Social Life, Health, and Aging Project (NSHAP) data (Warner and Adams 2012) and our own confirmatory factor analyses indicate that measures combining assessments of relations with non-spouse family and friends are warranted, and thus we do not measure relations with non-spouse family and friends separately.
3. These additional analyses did reveal, however, that gender conditioned the effect of functional limitations on changes in nonmarital relations (not shown). Functional limitations are associated with gains in men's nonmarital support ($b = .114, p = .003$) but marginally significant slight declines in women's nonmarital support ($b = -.049, p = .068$).
4. This exacerbating effect of nonmarital strain was partially suppressed in the pooled analyses where the larger nonsignificant effect for disabled women was in the opposite direction. Again, we caution that we were unable to estimate the moderating effects of social relations simultaneously due to the lack of statistical power. Given that nonmarital strain tends to covary with negative marital quality, changes in the negative aspects of men's marital relationships may also be partially driving similar changes in their nonmarital relationships.

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