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Examining the Interplay Between Spousal and Non-Spousal Social Support and Strain on Trajectories of Functional Limitations among Married Older Adults

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EXAMINING THE INTERPLAY BETWEEN SPOUSAL AND NON-SPOUSAL SOCIAL SUPPORT AND STRAIN ON TRAJECTORIES OF FUNCTIONAL LIMITATIONS AMONG MARRIED OLDER ADULTS

By

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EXAMINING THE INTERPLAY BETWEEN SPOUSAL AND NON-SPOUSAL SOCIAL SUPPORT AND STRAIN ON TRAJECTORIES OF FUNCTIONAL LIMITATIONS AMONG MARRIED OLDER ADULTS

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Marriage is a key social status related to the distribution of later life disablement. One factor within the marital relationship thought to be consequential for disablement is social support from the spouse. Nonetheless, marriage is not inherently supportive and may also be a source of chronic strain. According to the social support/stress model spousal social support is expected to result in better functional health outcomes while spousal strain is hypothesized to produce poorer functional health in later life. Beyond spousal support and strain, marriage is also embedded in a broader web of emotionally close non-spousal ties that are also likely to serve as contexts for meaningful exchanges of support and strain. However, less is known about the importance of the contingencies between spousal and non-spousal support and strain for the disablement process. Using nationally representative data from a sample of older adults from the 2006-2012 waves of the Health and Retirement Study this dissertation examines the importance of spousal and non-spousal social support and strain for trajectories of functional limitations among older married men and women. Specifically, I analyzed the independent effects of social support and strain across spousal and non-spousal social domains, the interactive effects

of domain-specific social support and strain, and the effects of cross-domain interactions between spousal support/strain and non-spousal support and strain. This research further considered whether the independent and interactive effects of social support and strain vary by gender. The results highlight that spousal and non-spousal support/strain are likely to have consequences for the disablement process, though the effects of social support and strain on functional limitations depend on the relationship domain in question and, in some instances, gender. Moreover, in some cases the effects of social support and strain were counterintuitive given the expectations of the social support/stress model.

Table of Contents

List of Tables and Figures

Chapter 1

INTRODUCTION

Marriage is a social status that is key for the distribution of later-life disablement as married individuals are likely to have better functional health outcomes than their non-married counterparts (Hughes and Waite 2009; Kail 2016; Pienta, Hayward, and Jenkins 2000; Schoenborn 2004; Verbrugge 1979). The life course perspective offers further insight into the linkages between marriage and functional health by drawing attention to the idea that social statuses such as marriage often affect individuals' lived experiences by shaping opportunities for the development and maintenance of interpersonal relationships (Elder, Johnson, and Crosnoe 2003). In turn, connectedness to social ties determines access to health-promoting resources such as social support (Uchino 2004)—defined here as the satisfaction of fundamental social and emotional needs (House, Umberson, and Landis 1988). Indeed, by being a coresidential relationship and important emotional bond in adulthood marriage provides access to a stable and emotionally meaningful source of support in the spouse (Ross 1995; Waite and Gallagher 2000). Even more, as the central social relationship in the lives of married older adults (Antonucci and Akiyama 1987; Antonucci, Akiyama, and Takahashi 2004) marriage also plays an important role in structuring relationships with other emotionally close and potentially supportive ties, such family and friends (Antonucci et al. 2004; Kalmijn 2003; Kalmijn and van Groenou 2005).

Of course, the presence of a relationship does not mean that said relationship is automatically supportive. Even emotionally close relationships can be persistent sources of strain—that is, stress-inducing interactions (Rook 1990a)—which are generally hypothesized to have detrimental effects on physical health (Rook 1990b). However, social support and strain are distinct theoretical constructs rather than opposing qualities of the same construct (Fincham and Linfield 1997; Okun and Keith 1998). This independence of support and strain implies that the effects of social support and strain within and across spousal and non-spousal domains on functional health may be contingent on each other rather than independent from each other (Okun and Keith 1998). Given that interpersonal relationship structures and processes are gendered phenomena across the life course (Moen 2001) it is possible, however, that the importance of spousal and non-spousal social support and strain for later life disability is different for men and women, which may help explain gender disparities in disabling health conditions in later life (Crimmins, Kim, and Hagedorn 2002; Laditka and Laditka 2002).

Unfortunately, our knowledge of the independent and interactive effects of social support and strain from spousal and non-spousal sources on functional health among older married men and women is limited by a lack of empirical evidence. Using nationally representative data on older adults from the Health and Retirement Study I address this gap by addressing four specific aims.

1. Establish the main effects of spousal and non-spousal support on baseline functional limitations and age-based changes in functional limitations.

2. Test whether the effects of social support within different emotionally close social domains (i.e., spouse, children, extended family, and friends) established in Aim 1 are moderated by social strain within the same domain.
3. Test whether the effects of spousal support and strain discussed in Aim 1 are moderated by non-spousal support and strain from different emotionally close social domains (i.e., spouse, children, extended family, and friends).
4. Test whether the main and moderating effects discussed in Aims 1-3 vary by gender.

By considering these aims this research contributes to growing body of literature concerning the importance of the quality of social relationships for physical health in later life.

SIGNIFICANCE

The *stress/social support* model of marriage (Burman and Margolin 1992; Kiecolt-Glaser and Newton 2001) posits that spousal support is an important psychosocial resource within marriage that can lessen the damaging physiological effects of stress and, in doing so, protect individual from the onset and progression of disability. This model also conceptualizes spousal strain as a chronic stressor that produces adverse psychological and physiological phenomena, which may then increase one's risk for disabling health conditions over time. In accord with the expectations derived from the stress/social support model, prior studies provide evidence that individuals in mid- to later-life who report emotionally positive marriages also tend to experience better

psychological (Bookwala and Jacobs 2004; Walen and Lachman 2000; Warner and Kelley-Moore 2012) and physical health outcomes (for a review see Robles et al. 2014). Conversely, those who report higher levels of emotionally negative marital experiences tend to have poorer mental and physical health profiles (Bookwala 2005; Choi and Marks 2008; Umberson et al. 2006; Warner and Kelley-Moore 2012).

Though the stress/social support model recognizes that the pathways between spousal support/strain and health outcomes are situated in a broader social context that includes non-spousal family relationships (Burman and Margolin 1992), relatively little research on marriage and health has focused explicitly on the idea that the marital relationship is embedded in a broader network of informal social relationships that are potentially important for the health of married older adults. Specifically, support and strain from non-spousal relationships may be important for older married adults' functional health in three different ways that are central for the current research. First, support and strain from each non-spousal social domain may have effects on functional health that are independent of each other and independent of support and strain from other social domains (both spousal and non-spousal). Second, the effects of support and strain within a given social domain may be contingent on each other, though independent of social support and strain from the spousal domain and other non-spousal domains. This is consistent with the *within-domain buffering* model, which posits that the adverse effects of social strain in one domain can be ameliorated by heightened social support within the same domain (Okun and Keith 1998; Schuster, Kessler, and Aseltine 1990). Third, the effects of spousal support and strain on functional health may depend on social support and strain from non-spousal sources, consistent with the *cross-domain buffering*

model. Here, the cross-domain buffering model frames social support from other social relationship domains as psychosocial resources that are important in buffering the damaging effects of social strain from another domain (Lepore 1992).

When considering the significance of marital and non-marital ties with respect to older adults' functional health it is important to account for the gendered nature of interpersonal relationships in the adult life course. That is, men tend to have smaller social networks than women (Haines and Hurlbert 1992; Kalmijn 2003) and rely more heavily on their spouses to provide social integration, support, and health-monitoring functions (Cooney and Dunne 2001; Kalmijn 2003; Spitze and Ward 2000; Umberson 1992; Umberson et al. 1996). Accordingly, women are more likely to have a wider variety of informal social resources than men, but at the same time stronger emotional investment in relationships and heightened expectations to perform informal caregiving tasks (Brody 2003; Cherlin 2009; Hagestad 1986; Hochschild 1989) means that women are also more vulnerable to relationship distress both within and outside of marriage (Turner 1994; Umberson and Williams 2005). Nonetheless, the current body of literature provides mixed findings concerning gender differences in the effects of relationship quality from different sources on health and well-being (Bookwala 2005; Umberson and Williams 2005; Walen and Lachman 2000; Warner and Adams 2012; 2016; Williams 2003), which indicates that a more thorough investigation of the effects of domain-specific support and strain on distinct health outcomes for men and women is warranted.

INNOVATION

The links between social support and health are well-established (Holt-Lunstad, Smith, and Layton 2010; Thoits 2011; Uchino 2004, 2006), but relatively little is known

about the relationship between domain-specific social support/strain and the disablement process in later life. This is a notable limitation because the consequences of support and strain from one social domain may be very different from support and strain from another domain (Okun and Keith 1998; Thoits 1995; Walen and Lachman 2000). For example, normative expectations of caring behaviors from one's spouse (Spitze and Ward 2000; Umberson 1992) or filial obligations from one's children (Gans and Silverstein 2006; Silverstein, Gans, and Yang 2006) may make support deficits, and/or strain, from such domains more damaging than support deficits and/or strain from other ties such as more distant family ties and friends.

In addition to the importance of examining the functional health effects of support and strain from different domains concurrently, it is important to note that our knowledge of the interconnections between emotional support and strain from marriage and non-marital social domains on functional health disability in later life remains limited. Existing studies on the interactions between emotionally positive and negative relationship facets within or across social domains have tended to focus on mental health outcomes (Lepore 1992; Okun and Keith 1998; Schuster et al. 1990; Warner and Adams 2012). Furthermore, to the best of my knowledge, no studies have empirically examined the within- or cross-domain interaction effects of spousal and non-spousal support/strain on functional health among married older adults.

OVERVIEW OF PROCEEDING CHAPTERS

This dissertation examines the importance of social support and strain across spousal and non-spousal domains for trajectories of functional limitations for older married adults throughout the next five chapters. Chapter 2 outlines the data and methods

used the address this study's specific aims. In Chapter 3 I examine theoretical and empirical issues surrounding domain-specific social support/strain and present the results of the effects of social support and strain in spousal, children, extended family, and friend domain on baseline levels of functional limitations as well as age-based changes in functional limitations. Chapter 4 and 5 then consider the interactive effects of social support and strain on functional limitations. Specifically, Chapter 4 examines the rationale for treating the effects of social support and strain within specific domains as contingent on each other and then tests the within-domain interactions between social support and strain in the four social domains of interest and their effects on functional limitations. Chapter 5 addresses the potential dependencies between social support and strain across different social domains and then discusses my own findings regarding cross-domain interaction effects between spousal support/strain and support/strain from each of the three non-spousal domains. Finally, Chapter 6 discusses the broader implications of the findings from the three analytic chapters (i.e., Chapters 3-5) with a specific emphasis on future research directions.

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Chapter 2

DATA

Data came from the 2006 to 2012 waves of the Health and Retirement Study (HRS), a nationally representative panel study of noninstitutionalized adults over the age of 50. Respondents and their spouses, if married, are interviewed every other year in the HRS on average and the data are comprised of multiple cohorts. The initial HRS cohort was first interviewed in 1992 and includes individuals born between 1931 and 1941. The Assets and Health Dynamics of the Oldest Old (AHEAD) began as a complementary study to the HRS based on data from individuals born between 1890-1923. Respondents in the Children of the Depression Era (CODA) cohort were born between 1924-1930 and the War Babies (WB) cohort includes those born between 1942-1947. In 2004 the Early Baby Boomers (EBB) cohort, which comprises individuals born from 1948-1953, was added to the HRS. In the current study data from all cohorts was pooled to represent the population of community-dwelling adults over the age of 52. As of the 2012 wave of data, the entire HRS panel comprised 38,008 respondents. Analyses in this study was restricted to the 2006-2012 waves because detailed measures of social support are only available in the psychosocial leave-behind questionnaire (LBQ) that was officially incorporated into the HRS beginning in 2006.

It is important to note that the 2006 LBQ was administered to a randomly selected half of the HRS panel, with the remaining half of the panel scheduled to complete their first LBQ in 2008. Respondents who were assigned to the LBQ in 2006 were also

scheduled to complete their next LBQ in 2010, with subsequent LBQs scheduled every other wave (e.g., 2014, 2018). Likewise, respondents assigned to complete their first LBQ in 2008 could not complete another LBQ until 2012 and every other wave thereafter.

Most measures used in this study came from the raw HRS data files maintained by the University of Michigan Institute for Social Research. However, time-varying measures of income, assets, and marital history came from the RAND data file, a cleaned and streamlined version of the HRS. The RAND data were used for these measures because these data include imputed values for missing case on income and assets as well as measures of marital history that account for respondent's prior reports of marital status and number of marriages at prior waves.

ANALYTIC SAMPLE

Several initial restrictions were made to the analytic sample in this study. First, I analyzed data only from those respondents who did not exit the sample prior to 2006 and who had an initial core interview by 2012. This exclusion resulted in a loss of 8,463 (22.27%) cases and the exclusion of respondents who did not have a core interview by 2012 resulted in an additional 383 (1.30%) lost cases. Second, I also excluded respondents who were not originally-sampled. The HRS automatically interviews respondents' cohabiting partners/spouses and both individuals are eligible for reinterview. If a respondent becomes partnered to a new individual after his/her initial interview this new partner/spouse is also interviewed. A total of 1,331 (4.56%) respondents who were not originally sampled were excluded from the analyses. Third, measures of social support and strain are only included as part of the HRS' psychosocial

leave-behind questionnaire (LBQ). 14,982 (53.84%) respondents who were not eligible for a baseline LBQ (in 2006 or 2008) or who were eligible but did not complete and return the LBQ were excluded from analyses.

At this point, the analytic sample comprised 12,847 individuals, 6,981 of whom completed their baseline LBQ in 2006 and 5,866 who completed the baseline LBQ in 2008. To make use of the longitudinal structure of these data the final analytic data file was transformed from a wide-format file, in which each row of data corresponds to information from an individual respondent, to a long-format file in which each row corresponds to an observation point (i.e., 2006, 2008, 2010, 2012) for a given respondent. Individuals who were eligible to participate in the 2006 LBQ could contribute a total of four observations, while those eligible for the 2008 LBQ could provide a maximum of 3 observations. Since the multilevel regression models used in this research do not require a balanced panel—in which respondents participate at every possible observation point—the final exclusions to the analytic sample were made to observations nested within respondents, rather than respondents. After the data file was transformed, the analytic sample comprised 45,522 observations nested within 12,847 individuals.

3,362 observations (7.39%) that did not provide another core interview at a subsequent wave past the initial LBQ wave were lost. In the multivariable analyses I adjusted for panel participation rates and mortality using a pattern mixture approach (see more details in the *Additional controls* subsection of the Measures section) to account for differential patterns of attrition. After excluding observations due to attrition, 1,942 (4.61%) more observations were removed due to having a sampling weight with a value of zero. Because this study is focused on married or partnered older adults, I further

limited the analytic sample to married/partnered observations—resulting in a loss of additional 15,084 observations (37.51%) that were not married or in a cohabiting marriage-like relationship at the respective observation point resulting in a loss of 436 (1.73%) observations. After this restriction the analytic sample was composed of 24,698 observations.

The analytic sample was then restricted to observations with valid information on the study variables. 632 observations (2.56%) were excluded on account of missing data on the functional limitations dependent variable. Another 3,591 observations (14.92%) were lost due to missing data on at least one independent variable. It is important to note here that the quantity of missing data on any given independent variable did not exceed 5% of the total analytic sample. After making these exclusions the final analytic sample comprised 20,475 observations nested within 7,144 individual respondents (a net loss of 4,223 observations (17.1%) from the 24,698 observations available prior to removing cases missing on study variables).

MEASURES

Dependent Variable

The dependent variable, functional limitations, is the sum of 12 binary indicators for any difficulty (=1) with various functional tasks (KR20= 0.84). These functional task items include: difficulty "walking several blocks," "walking one block," "walking across the room," "sitting for two hours," "getting up from a chair," "climbing several flights of stairs," "climbing one flight of stairs," "stooping/kneeling/crouching," "racing arms above shoulder level," "pulling/pushing large objects," "lifting weights over 10 pounds," and "picking up a dime form a table." Because these items measure relatively severe

functional difficulties (Katz 1983) respondents who reported that they "can't do" or "don't do" a specific task were coded as "1" on the respective item.

Focal Independent Variables

Age is a continuous measure of the respondent's exact age determined by the difference between the respondent's birth and interview dates. The main social support/strain predictors are summated rating scales of social support and strain from four different social domains: spouse, children, non-nuclear family, and friends. The measures of social support for each social domain were composed of three items assessing respondents' perceived availability of support from the respective domain. These indicators of support are based on the following questions in the LBQ: (1) "how much do (spouse/children/family/friends) really understand the way you feel?" (2) "how much can you rely on (spouse/children/family/friends) if you have a serious problem?" and (3) "how much can you open up to (spouse/children/family/friends) if you need to talk about your worries?" Response categories were coded as 0 = "not at all", 1 = "some", 2 = "a little", and 3 = "a lot." The measures of social strain for each social domain are composed of four items intended to measure respondents' perceptions of strain associated with each domain. Indicators of strain are based on the following questions in the LBQ: (1) "how often do (spouse/children/family/friends) make too many demands on you?" (2) "how much do (spouse/children/family/friends) criticize you?" (3) "how much do (spouse/children/family/friends) let you down?" and (4) "how much do (spouse/children/family/friends) get on your nerves?" Response categories were coded as 0 = "not at all", 1 = "some", 2 = "a little", and 3 = "a lot." In the multivariable models I also controlled for binary indicators for no children (= 1; 0 = "other"), no family (= 1; 0 =

"other"), and no friends (= 1; 0 = "other") to account for the fact that those with no children/family/friends were coded as 0 on the respective summated rating scales.

Prior to creating these summated rating scales the support and strain items for each social domain were subjected to confirmatory factor analyses (CFA) as tests of convergent and divergent validity. The results from the CFA models are presented in Tables 2.1-2.4. The specified support/strain models provided acceptable fit to the data in each domain. Following the CFA the internal consistency of the social support and strain scales was assessed using Cronbach's alpha (Cronbach 1951). The summated social support (α spouse = 0.79, children = 0.86, family = 0.88, friends = 0.89) and social strain scales (α spouse = 0.78, children = 0.78, family = 0.79, friends = 0.76) from each domain demonstrated acceptable internal consistency.

[INSERT TABLES 2.1-2.4 HERE]

Control Variables

Socioeconomic status

Socioeconomic status has been shown to predict relationship quality (Choi and Marks 2013; Conger, Conger, and Martin 2010; Stringhini et al. 2012) and is also referred to as a "fundamental cause" of health disparities (Link and Phelan 1995). Accordingly, accounting for the influence of socioeconomic factors on functional limitations is important for establishing non-spuriousness in this study. Measures of socioeconomic status include income, assets, and education. Time-varying measures of income and assets came from the RAND data file, a cleaned and streamlined version of the HRS, which imputes on missing cases for income and wealth. The raw measure of income included all sources of household income received in the last calendar year,

including income from individual earning, private pensions, Social Security, and unemployment benefits. The raw measure of assets included all sources of wealth—excluding houses—minus total debt. Measures of income and assets are reported in thousands of dollars and were adjusted for household size by dividing by the square-root of the household size. To adjust for the right-skew of the income and assets measures, the natural logarithm (ln) of the household adjusted income and wealth measures was used in the multivariable models. Education was measured by dummy variables for the highest level of education achieved and include less than high school (= 1; "other" = 0)—the reference category—, high school (= 1; "other" = 0) and college (= 1; "other" = 0).

Health insurance status

Health insurance status is a specific socioeconomic resource that helps establish access to health services, which makes insurance status an important confounder. Health insurance status was measured with a set of non-mutually exclusive time-varying binary variables indicating health insurance status [1]. These include measures of government (govt.) health insurance (1= "Medicare, Medicaid, and/or insurance from the Veteran's Administration," 0 = "other"), employer health insurance (1 = "insurance from a current or former employer," 0 = "other"), and other insurance (1= "insurance from some other source of insurance than those listed above, including insurance benefits received through one's spouse," 0 = "other").

Health risk behaviors

Those with deficient social supports may be more likely to engage in behaviors that can adversely affect functional health (Berkman et al. 2000; Umberson 1992; Umberson et al. 1996). To better separate the effects of social support/strain from other

risky health lifestyle factors the analyses accounted for several notable time-varying health risks that have been shown to be predictors of disabling health conditions and disability in prior studies (Ferraro et al. 2002; LaCroix et al. 1993; Reynolds et al. 2003). These health risks include a measure for being a heavy drinker (1 = "drinks 3+ alcoholic drinks per day"; "other" = 0), dummy variables for smoking status—currently smokes (= 1; 0 = "other"), previously smoked (= 1; 0 = "other") and never smoked (= 1; "other" = 0)—and a continuous measure of body mass index (BMI).

Depressive symptomatology (CESD)

Depression is associated with both social support (Lin and Dean 1984; Schuster, Kessler, and Aseltine 1990; Umberson et al. 1996; Walen and Lachman 2000) and disability (Greenglass, Fiksenbaum, and Eaton 2006; Kail 2016; Penninx et al. 1999; Travis et al. 2004). Considering the strong correlations between social support/strain and depression, Kiecolt-Glaser and Newton (2001) even argue that conclusion from results of studies on social support (and/or strain) and physical health that do not control for depression should be made with caution. Heeding this advice, I included a time-varying control for depressive symptomatology in the multivariable analyses. The depression variable was measured by a sum score (ordinal $\alpha = 0.92$) of nine dichotomous items (1= "yes" 0 = "no") from the Center for Epidemiologic Studies Depression Scale (CESD; Radloff 1977). These items ask respondents whether, in the past week, they felt "depressed," "everything was an effort," "sleep was restless," "happy," "lonely," "they enjoyed life," "sad," "unmotivated," and "full of energy." Emotionally positive items ("happy" and "enjoyed life") were reverse coded to be consistent with the other items.

Demographic controls

As social support systems and disability are often distributed unevenly across distinct demographic groups in the population (Antonucci, Fuhrer, and Jackson 1990; Brown and Warner 2008; Kalmijn and Vermut 2007; Warner and Brown 2011), it is also necessary to ensure that any relationships between social support/strain and functional limitations are not reflecting the effects of various demographic characteristics. Several standard demographic control variables were included in the analyses. Female (= 1; "male" = 0) is a binary variable representing the respondent's gender. Mutually exclusive binary indicators for race/ethnicity originally included (non-Hispanic) white (= 1; "other" = 0), (non-Hispanic) black (= 1; "other" = 0), Hispanic (= 1; "other" = 0), and other (race/ethnicity) (= 1; "other" = 0). Preliminary results showed that even though certain racial/ethnic categories were significantly different from the white category with respect to functional limitations, the non-white categories were not significantly different from each other. For the sake of parsimony race/ethnicity was specified as (non-Hispanic) white (=1) vs. non-white (=0) in the final models. Cohabiting (= 1; "married" = 0)—a time-varying indicator of whether or not the respondent is in a co-residential marriage-like relationship—was used as an additional control variable in the analyses since the analytic sample includes respondents who are legally married or in a stable cohabiting relationship. I also controlled for respondents' marital histories at each respondent's baseline using a series of dummy variables for married less than 2 times (=1; "other" = 0), 2 or more times (= 1; "other" = 0), and number of marriages missing (=1; "other" = 0). Information on the marital history of the respondents came from the RAND file, at each respondent's baseline in the analytic sample. The RAND data were used here since

the marital history variables in the RAND file account for respondents' marital histories across the previous waves of HRS.

Additional controls

An additional set of controls were included to account for potential effects of non-random attrition, using a pattern-mixture approach, whereby different patterns and reasons for non-response are explicitly controlled to model heterogeneous patterns of incomplete data (Hedeker and Gibbons 2006; Little 1993). The approach used in this study uses a control for the proportion of core interviews, a continuous measure ranging from zero to one calculated by the number of core interviews each respondent provided between 1992 and 2012 and the maximum possible number of eligible core interviews the respondent could have given. Because respondents belonging to different panel cohorts in the HRS are eligible for different numbers of core interviews between 1992 and 2012, indicators of cohort assignment were included as controls. Measures of respondent's cohort assignment include the original Health and Retirement Study (HRS)cohort (=1; "other" = 0), the Asset and Health Dynamics of the Oldest Old (AHEAD) cohort (=1; "other = 0; the reference category in multivariable analyses), The Children of the Depression Era (CODA) cohort (=1; "other" = 0), the War Babies (WB) cohort (=1; "other" = 0), and the Early Baby Boomers (EBB) cohort (=1; "other" = 0). This study also accounted for whether the respondent died between 2006-2012 (1= "Died"; 0 = "Alive"). Finally, because half of the HRS panel at 2006 was randomly selected to complete their first LBQ in 2006 while the other half were assigned to complete their first LBQ in 2008, a control for sample status was included. Here, 2008

LBQ Sample (=1; “2006” = 0) is a binary indicator for the year in which respondents completed their first leave-behind questionnaire.

ANALYTIC PLAN

Latent Growth Curve Modelling

Latent growth curve (LGC) modeling was used as the primary analytic technique in the multivariable analyses, given this study’s focus on longitudinal trajectories of functional limitations. The LGC models in this study were specified as a multilevel regression models in which observations at specific measurement occasions (level-1 units) were treated as being nested within individual respondents (level-2 units). LGC is well-suited for the aims of this research because LGC modelling permits the effects of the functional limitations intercept and age slope to be treated as random, rather than fixed, across respondents, which accomplishes two important goals. First, allowing the intercept to be a random variable accounts for dependency among observations clustered within respondents, preventing standard errors from being underestimated. Second, specifying the intercept and age-slope effects as random permits said effects to be analyzed as two separated outcomes: initial functional limitations (intercept) and age-based changes in functional limitations (slope).

To avoid age convergence in the modelling of functional limitations, whereby the effect of growing older is assumed to be constant regardless of respondent’s age at their initial measurement occasion, the original age measure was decomposed into two measures representing the within-person (i.e., time-varying) and between-person (i.e., time-invariant) variance in age (Hoffman 2015). The within-person measure of age was baseline-centered by subtracting each respondent's age at his/her first interview between

2006-2012 with valid data from his/her age at time *t*—which will be referred to from this point on as the baseline interview. In this way, the within-person measure of age represents each respondent's deviation from his/her initial age value in the analytic sample and can thus be interpreted as the effect of change in age—from baseline—on functional limitations. The between-person measure of age was then calculated as each respondent's age at his/her baseline interview, centered at the observed minimum of 52.25 years.

Time-varying control variables were also decomposed into their within- and between-person components to account for potential differences in the within- and between-person effects of these variables on the outcome (Curran and Bauer 2011; Hoffman 2015). The within-person component for these time-varying controls was given by time-varying measure itself, while the between-person component was given by each respondent's mean on the respective variable across all his/her measurement occasions in the analytic sample. As a result of including the time-varying measure itself, rather than the difference between the time-varying measure's value at time *t* and the respective average for each individual, the effects of the person-specific means for the time-varying controls are appropriately interpreted as the difference between the time-varying within-person effect and baseline between-person effect, also referred to as a *contextual effect* (Hoffman and Stawski 2009). A statistically significant contextual effect indicates that the within- and between-person effects are significantly different. The actual between-person effect itself for the time-varying controls is simply given by taking the sum of the within-person and contextual effects [1]. Here, the within-person effect can be interpreted

[1] The indicator for "never smoked" is theoretically time-varying but only contained between-person variance. Since "never smoked" was treated as the omitted reference category in the multi`variable models

as the average effect of being higher or lower than usual on the variable of interest while the between-person effect may be interpreted as the average effect of one's usual level on the respective variable (or propensity to be in a category for binary variables).

Multilevel Models

The model estimated in this study is composed of a level-1 equation for individual observations and two level-2 equations: one for the random intercept and another for the random age-slope. The main form of the level-1 equation for functional limitations (Y) at time *t* for respondent *i* is given by:

$$Y_{ti} = \beta_{0i} + \beta_{1i}(Age_{ti} - Age[T1]_i) + \sum_{j=1}^{J} \beta_j\,(X_{jti}) + \epsilon_{ti}$$

This equation specifies functional limitations at level-1 as a function of a random intercept, β_{0i}, a random age-slope, β_{1i}, a vector of 12 parameters for the within-person effects of the time-varying controls (X), plus the level-1 residual ϵ_{ti}. The residual can be interpreted as the deviation of each respondent's time-specific functional limitations value at time *t* from their predicted functional limitations value at the same time.

At level-2 each individual's functional limitation intercept was specified as follows:

$$\beta_{0i} = \delta_{00} + \delta_{01}(Age[T1]_i - 52.25) + \sum_{k=2}^{9} \delta_{0k}\,(Sup/Str_{ki}\,) + \sum_{l=10}^{25} \delta_{0l}\,(Z_{li})$$

$$+ \sum_{m=26}^{36} \delta_{0m}\,(\overline{X}_{mi}) + \delta_{037}(*) + \xi_{0i}$$

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the time-varying effects of "currently smokes" and "previously smoked" can be interpreted in reference to those who never smoked. However, in the random intercept equation only the person-specific mean for "currently smokes" was included since the inclusion of "currently smokes" and "previously smoked" together would result in a linear dependency.

The intercept for individual *i* is a function of the mean functional limitations at each respondent's baseline interview in the analytic sample, δ_{00} , plus the effect of the respondent's age at baseline, $\delta_{01}(Age[T1]_i - 52.25)$, and a vector of eight parameters for the spousal and non-spousal social support and strain scales, $\delta_{0k}(Sup/Str_{ki})$. Controls for confounding effects are given by vectors of parameters for time-invariant covariates (Z) and the person-specific means of the time-varying covariates (X). The term $\delta_{037}(*)$ represents the within- or cross-domain interaction effects. (*) is simply a placeholder for the specific multiplicative term in the model of interest. For example, in the model testing the within-domain interactions between spousal support and strain this placeholder was replaced with "Spousal Support *x* Spousal Strain." In the model testing the cross-domain interaction between spousal support and children support (*) was replaced with "Spousal Support *x* Children Support." Lastly, ξ_{0i} is the random intercept error term, which represents the deviation of each individual respondent's intercept from the mean intercept.

The level-2 equation for the random age-slope is given by:

$$\beta_{1i} = \delta_{10} + \sum_{i=1}^{8} \delta_{1k}(Sup/Str_{ki}) + \sum_{l=9}^{24} \delta_{1l}(Z_{li}) + \delta_{125}(*) + \xi_{1i}$$

The form of this equation parallels the form of the level-2 random intercept equation with the exception that the age-slope model excludes any parameters for the person-specific means for the time-varying covariates (X). This was done to facilitate an unambiguous interpretation of the person-specific means as representing the between-person effects of their respective time-varying measures, following the recommendation of Curran and Baurer (2011). Similar to the random intercept error term, the residual term

in the age-slope equation, ξ_{1i} , represents each individual age-slope's deviation from the mean age-slope.

Analytic Steps

Preliminary analyses and main effects

The multilevel analyses itself proceed in several stages. The results presented in Chapter 3 are based on a set of preliminary analyses and main effect models (i.e., models with no within- or cross-domain interactions). First, an unconditional model was estimated on functional limitations with a random intercept, and no predictors, to test the fit of a random intercept and estimate the intraclass correlation (ICC), which measures the percentage of variance in the functional limitations outcome that is between-persons. The results indicated that the addition of the random intercept variance significantly improved model fit. ($p < 0.001$, a one-tailed test was used to test the inclusion of the variance parameter since variances cannot take on negative values). The ICC of 0.791 can be interpreted to mean that 79% of the variance in functional limitations is between-persons, and 21% is within-persons. Next, the fixed and random effects for the age slope were tested. This step also tested nonlinear age effects and whether the within- and between-person (i.e., each respondent's age at his/her baselines) effects of age were different from each other. Both the fixed and random effects of age significantly improved model fit. ($p < 0.001$). The addition of each respondent's age at his/her baseline also improved model fit, providing support for the disaggregation of age effects into between- and within-person components.

Next, a series of *main effects* models were estimated using the multilevel equation written above, but excluding the interaction terms $\delta_{37}(*)$ and $\delta_{125}(*)$. The main effect

models proceeded from a baseline model that included only age and included additional variables in subsequent models to permit incremental testing of model fit associated with additional blocks of variables. The final main effect model included all the independent and control variables described in the equations above.

Within-domain interactions

The results presented in Chapter 4 are based on a series of models testing social support and strain interactions within each of the four social domains examined in this study (spousal, children, non-nuclear family, and friends). Within each social domain two separate within-domain interaction models were estimated. The first model only included the interaction between domain-specific support and strain in the random intercept equation to test whether the domain-specific effects of support and strain on baseline functional limitations are contingent on each other. The second model then added the domain-specific support and strain interaction term to the random age-slope equation to test whether the domain-specific effects of support and strain on age-based changes in functional limitations are dependent on each other. Note that in this second model the support/strain interaction term in the random-intercept equation was retained, the reason being that in the multilevel model framework the effect of a given predictor on a random age-slope is estimated by interacting the predictor and level-1 age variable together. This interaction between support and strain in the random intercept equation can be thought of as a lower-order term in a three-way interaction (i.e., support *x* strain *x* age). To keep the models from becoming overly complex, when estimating the within-domain interaction effects for a given social domain the social support and strain interactions for other domains were excluded. For example, a model including interaction terms between

children support and strain does not include interactions between spousal support and strain in either the random intercept or age-slope equations.

Cross-domain interactions

Chapter 5 provides the results of the cross-domain interaction models, which tested the interactions between spousal support/strain and support/strain in each of the three non-spousal domains on baseline functional limitations and changes in functional limitations. Like the within-domain interactions described above, the cross-domain interaction effects were not estimated simultaneously. For instance, for the spousal and children cross-domain interaction models the interaction between spousal support and children support was included in the intercept and age-slope equations for the first model. Next, the spousal support *x* children support interaction terms in the intercept and slope equations were removed and replaced by spousal support *x* children strain interactions in the second model, which were then replaced by spousal strain *x* children support interaction terms in the third mode and spousal strain *x* children strain interactions in the fourth and final model. This process was repeated for family and friend domains. Including only one cross-domain interaction in the intercept and slope equations helps keep the models simpler and, thus, facilitates interpretation.

Gender moderation effects

At each of the main analytic stages described above (main effects, within-domain interactions, and cross-domain interactions) the moderating effects of gender on the main and interactive effects of social support and strain were tested. Specifically, in the main effects model I tested for significant gender differences in the effects of social support and strain on the random functional limitations intercept and age-slope across the four social domains of interest (spousal, children, non-nuclear family, and friends) by adding support/strain x gender interaction terms, created by taking the product of each social support/strain measure and gender, to the final main effects model. The gender *x* social support/strain interaction terms were added sequentially within relationship domain for parsimony. This means that for any given social domain the gender interaction terms for other social domains were excluded. For example, interactions between spousal support/strain and gender were excluded in the models testing for gender differences in the effects of children support/strain. The use of interaction terms was preferred over the estimation of gender-stratified models because the main hypotheses concerning gender as a moderator pertain only to social support and strain, not the control variables.

The within-domain interaction models were re-estimated with a social support *x* social strain *x* gender interaction term in the random intercept and age-slope equations to assess whether the effects of the domain-specific interactions between social support and strain vary by gender. Each within-domain gender interaction models also included interactions between gender and each lower-order term (i.e., social support *x* gender, social strain *x* gender). The basic form of the gender moderation effects in the cross-domain interaction models parallel the gender moderation effects in the within-domain

interaction models. That is, each cross-domain interaction and associated lower order terms in the random intercept and age-slope equations were interacted with gender.

Complex Survey Data Adjustments

All results were weighted to account for unequal probabilities of selection and sampling variance estimates were adjusted to account for clustering and stratification. Regarding the use of weights, the multilevel regression analyses were conducted with two sets of weights. First, the level-1 weight was a time-varying probability weight that takes a unique value within respondents at each different wave between 2006 and 2012. For observations at baseline LBQ (i.e., 2006 or 2008) the level-1 weight used was an LBQ-specific weight adjusted for unequal probabilities of response to the LBQ instrument. The level-1 weights were rescaled to sum to the sample size of individual respondents (7,144) to prevent overestimation of the between-person variance (Rabe-Hesketh and Skrondal 2006). The second set of weights used were time-invariant level-2 weights, which are simply the sampling weights at each respondent's first eligible core interview between 1992 and 2006. Without the use of this second weight the analyses would be conducted assuming that all respondents had equal probabilities of selection into the HRS panel (see Heeringa, West, and Berglund 2010).

DESCRIPTIVE RESULTS

Descriptive statistics for all study variables, measured at the respondent's first observation between 2006 and 2012 with complete data are presented in Table 2.5 [2]. Means and standard errors (SE) for the full analytic sample are presented in the first two columns, respectively. All gender differences discussed in the text below are statistically

[2] Here, the first possible observation between 2006 and 2012 is 2006 for those who completed their baseline LBQ in 2006 and 2008 for those who completed their baseline LBQ in 2008.

significant at the 5% level of significance unless noted otherwise. On average, respondents reported between two and three functional limitations (mean = 2.697) and an average age of 68, with men reporting fewer functional limitations (mean = 2.333) and slightly younger ages (mean = 68.837) than women (mean functional limitations = 3.098; mean age = 67.214). Respondents also report fairly high levels of spousal support (mean = 7.462) and relatively low levels of spousal strain (mean = 3.959). The pattern of high support and low strain similarly characterizes reports of support and strain from children, non-nuclear family, and friend domains. Most older adults were socially integrated to some extent, as indicated by low percentages reporting no children (4%), no close family (5%), and no friends (6%). As anticipated, men reported higher levels of spousal support (mean = 7.756) and lower levels of spousal strain (mean = 3.739) than women (mean spousal support = 7.137; mean spousal strain = 4.203). Compared to women, men also reported lower levels of support and strain from all non-spousal sources with the exception of strain from friendships (mean for men = 1.534; for women = 1.476) and were also more likely to lack social integration from non-spousal sources.

In terms of other characteristics, respondents tended to be fairly advantaged socioeconomically, which is to be expected among a pool of married older adults. Respondents reported a median household income of about $52,000 per year (results not shown), a median non-house net-worth of $130,000 (results not shown) [3], and 47% of the sample reported at least some college education. Roughly 80% of the sample report some form of health insurance (results not shown), with about 66% receiving government-

[3] The distributions of income and assets are heavily right-skewed, which inflates the means, so the medians are discussed in the text while the means are presented in table 1 for consistency with the other statistics. The household income and non-house asset variables are log-transformed in the multivariable analyses to adjust for the right-skew.

sponsored insurance, 34% reporting receipt of some form of employer-sponsored health coverage, and 16% reporting insurance form some other source. Relatively few respondents currently smoke (11%) or drink heavily (3%) and the average BMI of 28 is slightly above the standard upper-threshold for normal weight of 25 (National Institutes of Health 2000). With regard to mental health, the sample reported few depressive symptoms (mean = 1.550). In terms of demographic characteristics, the sample was predominately male (52%), white (80%), and did not report a history of multiple marriages (72%). Furthermore, the respondents in the analytic sample completed 96% of their eligible core interviews.

[INSERT TABLE 2.5 HERE]

The descriptive results discussed above provide a picture of the sample's composition. With this picture established I turn to examine the effects of the main independent and control variables shown in Table 2.5 and the functional limitations intercept and age-slope in Chapters 3-5 using the descriptive results to facilitate the interpretation of the effects in the proceeding multivariable models.

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Chapter 3

INTRODUCTION

One of the most consistent and robust findings from the literature on social relationships and health is that the married, relative to the unmarried, are more likely to report better health overall (Pienta, Hayward, and Jenkins 2000; Schoenborn 2004) and fewer functional limitations, specifically (Hughes and Waite 2009; Kail 2016; Pienta et al. 2000; Verbrugge 1979). Among the plausible explanations for this association between marriage and functional health one of the most intriguing and least understood posits that the perceived availability of social support—behaviors aimed toward the satisfaction of an individual's salient social needs (House, Umberson, and Landis 1988)—from the spouse is instrumental in protecting married individuals from disability (Burman and Margolin 1992; Kiecolt-Glaser and Newton 2001; Waite and Gallagher 2000). At the same time, however, marriage is not synonymous with social support, as some relationships between spouses may be more straining than supportive (Amato et al. 2007; Fincham and Linfield 1997; Hawkins and Booth 2005; Okun and Keith 1998). In turn, the stress experienced from a straining marriage is hypothesized to have damaging effects on physiological processes underlying disablement, and health status more broadly (Burman and Margolin 1992; Robles and Kiecolt-Glaser 2003).

Alongside the spouse, married older adults are also connected to other emotionally close ties such as adult children, other family, and friends, who may also shape the disablement process through social support and strain (Antonucci, Birditt, and Akiyama 2009; Kahn and Antonucci 1980). However, relatively few studies have

examined the supportive and straining features of spousal and non-spousal ties, together, as they affect functional health in later life. Acknowledging the importance of psychosocial factors both within and outside of marriage for disablement among older married adults, this study examined the associations between social support and strain from spousal and non-spousal social domains on age-based trajectories of functional limitations among married older adults in the U.S.

BACKGROUND

Spousal Support/Strain and the Disablement Process

Norms of companionship and emotional fulfillment coupled with the coresidential nature of the marital relationship (Cherlin 2009) make marriage especially well-suited to serve as a source of perceived social support (Cutrona 1996; Kahn 1994). Here, perceived social support is conceptualizes as one's belief that support is readily available from social ties if needed (Wills and Shinar 2000). Said perceptions of support are theorized to be important for health and well-being because an individual's perceptions of the supportiveness of other social ties are generally shaped through habitual displays of assistance, esteem, and other caring behaviors (Hobfoll 2009). The accumulation of these more subtle and largely invisible provisions of support (Bolger and Amarel 2007) are thought to promote a number of positive psychological and behavioral orientations that are important for maintaining health (Thoits 2011; Umberson 1992) without spurring feelings of helplessness and/or indebtedness to the support provider, as is more common with more overt displays of support (Bolger and Amarel 2007; Forster and Stoller 1992; Gleason et al. 2008). Accordingly, prior studies show that stronger perceptions of social support predict better health outcomes, particularly with regard to cardiovascular disease

and mortality (for reviews see Holt-Lunstad, Smith, and Layton 2010; Uchino 2004). Moreover, as Krause has shown, perceived support is also associated with a stronger sense of meaning in life (Krause 2007), which, in turn, predicts better health on outcomes that are correlated with disability, such as self-rated health status (Krause 2004) and longevity (Krause 2009). These findings concerning the interplay between social support, meaning in life, and health suggest a tendency for individuals to take their own health more seriously when they feel that their lives matter for another person (Thoits 2011).

These ideas concerning perceived social support and health are consistent with the social support/stress model of marriage, which posits that perceptions of support from the spouse promote better physical health through various psychological, behavioral, and coping mechanisms (Burman and Margolin 1992; Kiecolt-Glaser and Newton 2001). However, the social support/stress model of marriage and health also emphasizes that marriage is not guaranteed to be a supportive relationship and in some instances, the spouse can be a chronic source of strain. In addition, this model conceptualizes spousal support and strain as independent constructs that affect health status in different ways. More specifically, while social support is hypothesized to promote health by fostering positive affective states, healthy behaviors, and a sense of meaning in life strain, is hypothesized to lead to psychological sequelae. In addition, persistent exposure to elevated levels of stress-hormones such as glucocorticoids is likely to exert damaging physical effects such as immune suppression and cardiovascular disease (Robles and Kiecolt-Glaser 2003; Sapolsky et al. 2004; Uchino, Cacioppo, and Kiecolt-Glaser 1996). Stress-theories of aging further add that these damaging physiological effects of stress-hormone exposure are also likely to be more evident in later life, when the body becomes

more vulnerable to the physiological effects of stress (Finch and Seeman 1999). For instance, Umberson and colleagues (Umberson et al. 2006) found that negative spousal behaviors predicted steeper declines in self-rated health among older, rather than younger, adults, in line with the expectations of stress-theories of aging.

Studies based on global measures of marital quality have found evidence that those in more positive marriages tend to report better health overall (Ganong and Coleman 1991; Holt-Lunstad, Birmingham, and Jones 2008; Prigerson, Maciejewski, and Rosenheck 1999; Robles et al. 2014; Wickrama et al. 1997). However, a handful of studies that have looked at spousal support and strain separately, or similar measures such as positive and negative marital quality, generally found that the damaging effects of negative spousal exchanges were more consequential for physical health than the hypothesized protective effects of positive spousal exchanges (Birditt and Antonucci 2008; Bookwala 2005; Umberson et al. 2006; Walen and Lachman 2000). These findings are also consistent with work from Choi and Marks (2008), which found that marital conflict predicted increases in functional impairment over a five-year period. While none of these findings described above explicitly examined longitudinal trajectories of functional health they do lend support for the negativity effect model, which hypothesizes that emotionally negative social exchanges have stronger effects on health and well-being than positive social exchanges (Ingersoll-Dayton, Morgan, and Antonucci 1997; Rook 1990). As such, we might expect social strain within marriage to be more consequential for functional health in later life than social support.

It is also worth mentioning the possibility that spousal support and strain could have effects that are contrary to the hypothesized effects based on the social

support/stress model. If behaviors from the spouse intended to be supportive are interpreted by the individual to be too solicitous and over protective, it is possible for spousal support to be associated with poorer functional health. Indeed, prior studies have found highly solicitous forms of support to predict poorer functional health (Hanley et al. 2004; Jensen et al. 2011; Turk, Kerns, and Rosenberg 1992) and related outcomes such as heightened perceptions of pain (Flor et al. 1995; Kerns et al. 1990; Lousberg, Schmidt, and Groenman 1992) and less physical exercise (Lousberg et al. 1992). Likewise, it is possible that spousal strain could have protective, rather than deleterious effects, on functional health. Indeed, said studies have found negative marital quality (conceptually and operationally similar to spousal strain) to predict lower risks for mortality (Birditt and Antonucci 2008), lower blood pressure (Birditt, Newton, and Hope 2014), and lower levels of loneliness (Warner and Adams 2016) under certain conditions. These findings, in particular, are consistent with the idea that "nagging" can be a form of care intended to motivate compliance with normative health behaviors (Tapp 2004; Waite and Gallagher 2000).

Aside from being a source of social support itself, marriage acts as a social resource by bridging spouses to shared non-spousal networks. Indeed, close non-spousal relationships are conceptualized as forms of marital capital, that is, social resources that could be disrupted in the event of separation or divorce (Kalmijn 2003; Kalmijn and van Groenou 2005). Thus, while the spouse tends to be the central social tie in the lives of older married adults (Antonucci and Akiyama 1987a; Antonucci, Akiyama, and Takahashi 2004), the social lives of married older adults consist of a broader social convoy—a web of strong ties that accompany an individual as he/she moves through the

life course (Kahn and Antonucci 1980). Research on convoy composition indicates that older adults' convoys are likely to be comprised of adult children, other extended family members such as siblings, and friends (Antonucci et al. 2004). Like marriage, these relationships tend to act as structures where meaningful exchanges of support and strain occur (Ikkink and Tilburg 1999; Kahn 1994; Rook 1990; Umberson, Pudrovska, and Reczek 2010; Walen and Lachman 2000), which may be consequential for patterns of functional health in later life given the broader linkages between social support/strain and health status (Thoits 2011; Uchino 2004).

Children

The importance of the parent-child relationship in later life is underscored by the notion that parenthood is generally a lifelong status that is far more difficult to sever than other relationships (Umberson et al. 2010). Even more, the bond between parent and child is unique even in comparison to other involuntary kinship ties in that the parent-child relationship is a nuclear family bond. By virtue of being a nuclear family relationship, the parent-adult child relationship is likely to be marked by greater emotional investment and stronger norms of obligation among both parties to maintain social contact and provide various forms of assistance to each other if necessary (Gans and Silverstein 2006; Silverstein, Gans, and Yang 2006; Silverstein, Parrott, and Bengtson 1995). Accordingly, adult children are likely to be the closest non-spousal ties among couples with children (Antonucci et al. 2004; Umberson et al. 2010; Van Tilburg 1998).

There is some indication that older adults' relationships with their adult children can influence the ways in which the disablement process unfolds. For example, Seeman

and colleagues (Seeman, Bruce, and McAvay 1996) found that older women who reported more close ties with their adult children were less likely to become disabled. While this study did not find associations between social support or strain and disablement, the focus on close ties suggests that having relationships with adult children marked by emotional quality is important for functional health. Counterintuitively, this same study showed that men with more close ties to their children were more likely to become disabled, though the authors caution that there is a strong possibility that this effect is due to a few cases of disabled men in their sample that report many close ties to their children.

Nonetheless, the salience of parenthood and strong expectations for children to be emotionally close sources of assistance in later life also suggests that non-supportive and actively straining relationships with adult children are likely to be especially devastating for older adults. Thoits' (1991) juxtaposition of identity theory and the stress-process posits that salient social statuses/roles are expected to have strong-felt psychosocial consequences, largely because such statuses/roles are likely to be so central to one's identity. Krause (2004), for example, found that stress associated with highly valued roles predicts poorer overall health status, especially among those with emotional support deficits, and a depreciated sense of meaning in life is one of the main mechanisms through which role stress is related to health. As such, it is plausible that the emotional quality of one's relationship with adult children may serve as an indicator of the individual's overall success in performing his/her role as a parent and, thus, influence various physiological and psychological process underlying the disablement process.

Similar to the spousal relationship, it is also important to be mindful of the possibility that support and strain from children shape functional health among older married adults in paradoxical ways. For example, if adult children engage in intended supportive exchanges with their parents that infantilize their parents, such displays of support could conceivably diminish self-esteem and/or foster a sense of dependency on the adult children (Phelan 2011; Salari and Rich 2001). Furthermore, Birditt and Antonucci (2008) found that critical behaviors from the spouse and children, but not extended family and friends, predicted lower risks of mortality among older adults suffering from chronic health conditions.

Extended family and friends

Compared to younger adults, older adults tend to have smaller social networks and interact with network members less frequently (Antonucci and Akiyama 1987b; Lang and Carstensen 1994; Marsden 1987; Van Tilburg 1995). Extended family ties and friendships are also more likely to be peripheral networks compared to adult children (Antonucci and Akiyama 1987b; Antonucci et al. 2004; Van Tilburg 1995). Such changes in older adults' extended family relationships can have important implications for the disablement process since having more close and emotionally supportive extended family ties predicts better functional health among older adults (also see Demange et al. 2004; Penninx et al. 1999; Seeman et al. 1996). Nonetheless, perceptions of support availability from family and friends tend to be remarkably consistent in later life (Antonucci and Akiyama 1987b; Field and Minkler 1988; Gurung, Taylor, and Seeman 2003). Thus, even though one's broader social network will likely contract with age, the individual may ultimately be left with a more emotionally positive extended family network (Carstensen

1992; Ikkink and Tilburg 1999; Kahn and Antonucci 1980; Lang and Carstensen 1994). This proposition is consistent with multiple theoretical perspectives on social relationships and aging including social exchange theory (Gouldner 1960; Ikkink and Tilburg 1999), the convoy model (Kahn and Antonucci 1980) and socioemotional selectivity theory (Carstensen 1992), all of which posit the diminished salience of emotionally damaging relationships in older adults' social lives.

However, Shaw et al. (2007) found that while the receipt of emotional support is relatively stable among older adults, satisfaction with support and the anticipation of support tends to diminish. These findings suggest the possibility that the emotional supportiveness of family and friends may become less consequential for health and well-being in later life insofar as the perceived quality of emotional support influence health status above and beyond the receipt of support (Holt-Lunstad et al. 2010; Uchino 2004; Wethington and Kessler 1986). Yet, if individuals do in fact prune their networks to keep positive relationships and reduce or cease contact with negative social ties it is also possible that individuals' social networks will be less straining overall. To the extent that individuals tend to experience heightened reactivity to stress in old age (Finch and Seeman 1999) the selection of more positive relationships outside of the nuclear family may thus prove beneficial for one's functional health status in the long run even if the protective effects of emotional support from family and friends do wane.

Thus far, extended family relationships and friendships have been considered together. However, it is necessary to emphasize an important difference between the extended family and friend domains related to emotional support and strain. Friendships may be inherently more vulnerable to dissolution than family ties on account of the fact

that friendships are voluntary relationships (Antonucci and Akiyama 1987b; Antonucci et al. 2004; Field and Minkler 1988), but the fact that friendships are chosen rather than given suggests that the continuation of genuine friendships are based on mutual interest in each other's companionship. Conversely, norms of obligation are far more prominent in family relationships (Cantor 1979; Gouldner 1960; Ikkink and Tilburg 1999). This distinction means that that norms of reciprocity are likely to be more central to friendships than family relationships and, as a result, expectations of balanced exchanges of social support are more crucial to the continuation of friendships than family relationships (Antonucci, Fuhrer, and Jackson 1990; Cantor 1979; Gouldner 1960).

Ikkink and van Tilburg's (1999) study of Dutch older adults' social networks aptly illustrates this point concerning the consequences of imbalance in friendships, as the authors found that emotional over- and under-benefiting among friendships predicted the termination of said friendships. No effects were observed with respect to over- and under-benefiting among family members in this study, however. Another study of patients undergoing cardiac surgery found that only perceived adequacy of social support from friends, predicted favorable outcomes in disablement over time (Oxman and Hull 1997). This finding parallels other research showing more benefits of the supportiveness of friendships, relative to family relationships, on outcomes such self-rated health (DuPertuis, Aldwin, and Bosse 2001) and adaptation to health-related stressors, such as vision loss (Reinhardt 1996). Accordingly, these research findings indicate that the emotional support of friendships is uniquely meaningful and, as such, is more likely than family support to be protective against functional decline and maladaptive responses to health-related disruptions to daily activities. Nevertheless, more nationally representative

research on both friend support and strain, alongside support and strain from other close relationships domains such as marriage and family domains, among older adults is needed to better understand the importance of friendships for functional health in later life.

Gender, Social Support/Strain, and Disablement

In accord with a gendered life course perspective, which calls attention to the systemic stratification of family roles for men and women (Moen 2001), patterns of social exchanges in later life tend to vary by gender. Most contemporary cohorts of older adults transitioned to adulthood when the male-breadwinner/female homemaker model of marriage and family was especially dominant, establishing strong expectations for women to perform domestic emotion-work roles and attain economic security through marriage (Cherlin 2009). Thus, older married women are likely to have stronger investments in non-spousal family and friend networks while older married men are likely to rely more exclusively on the spouse for social integration and support (Cooney and Dunne 2001; Kalmijn 2003; Shaw et al. 2007; Spitze and Ward 2000; Umberson 1992; Umberson et al. 1996). Nonetheless, it is well-established that men tend to perceive their marriages to be more supportive and emotionally positive while women report higher levels of marital stress on average (Neff and Karney 2005; Umberson et al. 1996, 2005; VanLaningham, Johnson, and Amato 2001), in line with the historically subordinate status of women within the marital dyad (Wanic and Kulik 2011).

Given these gendered patterns of social relationships, I expect spousal support to be more consequential for men's functional health and spousal strain to be more influential for functional health among women. However, empirical evidence of gender

differences in the actual associations between the quality of the marital relationship and physical health is generally lacking, which may partially reflect the fact that relatively few studies have explicitly examined the physical health effects of marital quality (or spousal support and strain, more specifically) separately for men and women (Robles et al. 2014). Even less is known about gender differences in the associations between marital quality and disability. One exception is Bookwala's (2005) research, which nonetheless found no evidence of gender differences in the effects of positive or negative spousal behaviors on functional limitations. Conversely, Umberson and colleagues' research on trajectories of self-rated health shows that even as spousal strain predicts declines in self-rated health over time in a similar fashion for adult men and women (Umberson et al. 2006), among older adults (aged 70 +) higher initial levels of spousal strain reported by women results in a sustained pattern of poorer self-rated health over time compared to men (Umberson and Williams 2005). Though self-rated health is not interchangeable with disability, they are related concepts and longitudinal studies have the potential to shed light on nuanced patterns in the interrelationship between psychosocial resources and stressors within marriage, disability, and gender that may go undetected in cross-sectional studies.

With respect to non-spousal relationships, few studies have looked at the effects of relationship quality from different social domains on physical health and gender differences in these associations. Walen and Lachman provide arguably the most thorough examination of domain specific support and strain on physical health outcomes of self-rated health and health conditions, but only found one effect that varied between men and women. Here, higher levels of family strain predicted more health problems but

only among women, which the authors interpreted as being indicative of a stronger caregiving orientation among women that makes them more vulnerable than men to stress from family relationships. However, that non-spousal networks generally serve as more salient social resources for married women than men, we might also expect non-spousal support to be more influential for the disablement process among women than men. In any case, the mixed findings such as those described above point to the need for more empirical research on domain specific relationship quality and physical health outcomes, such as disablement, among older men and women. To that end, this study addresses a series of hypotheses (stated in the next section) developed from the body of theoretical work and empirical findings described throughout.

HYPOTHESES

Motivated by prior theoretical and empirical work on the importance of close social relationships for health and well-being across the life course, I address five broad hypotheses focused on the effects of spousal and non-spousal support and strain on baseline levels of functional limitations and age-based changes in functional limitations.

1. Higher levels of spousal and non-spousal support will predict:
    - **a.** fewer baseline functional limitations,
    - **b.** slower rates of increase in functional limitations over time.
2. Higher levels of spousal and non-spousal strain will predict:
    - **a.** More baseline functional limitations,
    - **b.** Faster rates of increase in functional limitations over time.
3. Within each social domain, social strain will have a stronger effect than social support on baseline functional limitations and changes in functional limitations.

4. Social support and strain from the spouse will have the strongest effects on baseline functional limitations and changes in functional limitations, followed support and strain from children, friends, and extended family.
5. The protective effects of spousal support will be stronger for men than women.
6. The deleterious effects of spousal strain as well as the protective and deleterious effects of non-spousal support and strain, respectively, will be stronger among women.

RESULTS

Main Effects

Results from the latent growth curve models predicting functional limitations are presented in Table 3.1. Model 1 shows the effect of age, decomposed into within- and between-person components in the Level-1 Fixed Effects and Level-2 Fixed Effects: Intercept portions of the table, respectively. Here the within-person component is interpreted as the number of exact years that have passed since each respondent's initial baseline interview in the analytic sample and the between-person component is each respondent's age at his/her baseline in the analytic sample, centered at the observed minimum of 52.25 years. As expected, within-person growth in age was associated with more functional limitations ($b = 0.063$, $p < 0.001$) and respondents who were older at baseline started the observation window with more functional limitations ($b = 0.062$, $p < 0.001$). In the Random Effects portion, the negative estimated covariance (-0.157, $p < 0.001$) between the random intercept and age slope indicates that individuals who have more limitations at baseline have slower rates of increase in functional limitations. This suggests an age-as-leveler process (House et al. 1994), in which functional health

trajectories tends to become more similar with age for those with varying levels functional difficulty at baseline.

Model 2 added the attrition controls as well as the cohort and LBQ sample indicators to the equations for the random intercept and age slope. Completing a higher proportion of eligible interviews in the HRS panel was not significantly related to baseline functional limitations and changes in functional limitations, but those who died during the 2006-2012 observation window were likely to have almost 2 more functional limitations at baseline compared to those who were alive as of 2012 ($b = 1.748$, $p < 0.001$). Mortality was, however, unrelated to change in functional limitations with age ($b = 0.069$, $p = 0.336$). With the exception of the CODA cohort (representing those born between 1924-1930) cohorts representing later-born adults had, on average, more baseline limitations and faster rates of increase in functional limitations compared to those in the AHEAD cohort, which comprised respondents born before 1924. Unsurprisingly, LBQ sample assignment was not a significant predictor of baseline levels of ($b = 0.090$, $p = 0.179$), or changes in functional limitations ($b <0.001$, $p = 0.990$).

[INSERT TABLE 3.1 HERE]

Spousal support and strain were added in Model 3. The results in the Level-2 Fixed Effects: Intercept part of the table illustrate that higher levels of spousal support at baseline were protective against initial levels of functional limitations ($b = -0.136$, $p < 0.001$) while higher levels of spousal strain predicted poorer initial functional health ($b = 0.051$, $p = 0.005$), in accord with the first and second hypotheses. The positive coefficient for spousal support in the Level-2 Fixed Effects: Age Slope portion ($b = 0.008$, $p = 0.025$) indicates that the protective effect of spousal support diminishes as individuals

grow older, contrary to the initial hypothesized effect, while the marginally significant positive effect of spousal strain in the age slope equation (b = 0.004, p = 0.075) suggests that higher levels of spousal strain exacerbates functional decline with age.

Social support and strain from non-spousal domains were included in Model 4. Among all three non-spousal relationship domains social strain, but not support, from each non-spousal domain had a statistically meaningful and positive effect on baseline functional limitations, while neither support nor strain from any non-spousal domain significantly predicted changes in functional limitations. This finding contradicts the first hypothesis given the lack of significant effects of non-spousal support, but lends partial support to the second hypothesis predicting a positive association between social strain and baseline functional limitations. Given the statistically significant effects of non-spousal strain and non-significant effects of non-spousal support, it is not surprising that the effect of spousal support on the random intercept and age-slope remained significant while the effects of spousal strain on the intercept and slope became non-significant. Additional supplemental analyses (not shown) testing the addition of social strain from each domain one at a time show that including any given source of strain results in the loss of significance for the effect of spousal strain on the functional limitations random intercept.

With the addition of the control variables in Model 5, the coefficients for spousal support and strain showed markedly different patterns relative to the previous models. Notably, the effects of spousal support on both initial levels (b = 0.024, p = 0.310) and age-based changes) in functional limitations (b = 0.003, p = 0.496) were no longer significant once the controls were added. Supplemental analyses in which controls were

added one at a time revealed that the changes in the effect of spousal support on the random intercept was due to the inclusion of the between-person CESD measure, indicating that the initially observed effects of spousal support on functional limitations could be spurious effects that were actually reflecting the adverse effect of depression on baseline functional limitations. In the random age slope equation it was the inclusion of gender that explained away the negative relationship between spousal support and changes in functional limitations. This is phenomena is discussed in greater in the next subsection on the moderating effects of gender.

Unlike spousal support, the effect of spousal strain on baseline functional limitations became both statistically significant and changed direction from positive to negative ($b = -0.050$, $p = 0.003$), which can be interpreted to mean that higher levels of spousal strain are likely to protect older married adults from poor functional health. This change in the direction of the effect of spousal strain in the random intercept equation was also driven by the inclusion of the depressive symptoms to the model, though additional analyses revealed that it was not depression on its own that resulted in a significant and negative spousal strain coefficient but the combination of depression and at least one source of non-spousal strain. This finding indicates that non-spousal strain and depression were acting as distorter variables with regard to the effect of spousal stain on baseline limitations, such that the exclusion of these variables masked the true direction of the effect of spousal strain. To illustrate, spousal strain, non-spousal strain, and depression were all positively correlated with one another and each of these variables on its own predicted more initial functional limitations. After examining the joint effects of these variables in the random intercept model it became apparent that the initially

observed effect of spousal strain on baseline functional limitations was capturing the deleterious effects of non-spousal strain and depression. Thus, after accounting for the effects of depression and non-spousal strain that are intertwined with spousal strain, higher levels of spousal strain predicted fewer baseline functional limitations. In contrast to the effect of spousal strain on baseline functional limitations, heightened spousal strain predicted a faster rate of increase in functional limitations with age in the final main effects model—though this effect did not achieve statistical significance ($b = 0.005$, $p = 0.105$).

Once accounting for additional controls the effects of family and friend strain on the age-slope showed marginally significant effects. Supplemental analyses suggested that the omission of several measures including depression, gender, income, and health-risk behaviors was suppressing the effects of family and friend strain on the age slope. As initially hypothesized, heightened strain from extended family predicted accelerated increases in functional limitations with age ($b = 0.006$, $p = 0.069$). Conversely, and contrary to initial expectations, higher levels of friend strain predicted slower rates of increase in functional limitations with age ($b = -0.008$, $p = 0.061$). The effects of non-spousal strain on functional limitations in the final main effects model can, thus, be summarized as follows. Heightened strain from children predicted more functional limitations at baseline, but was not associated with changes in functional limitations. Strain from extended family had no effect on baseline levels of functional limitations but did predict accelerated increases in functional limitations with age. Strain from friends predicted more functional limitations at baseline but slower rates of growth in functional limitations with age.

With regard to baseline functional limitations, the absolute sizes of all the statistically significant social strain effects (i.e., spousal, children, and friend strain) were significantly larger than the effects of social support from the respective domains ($p < 0.05$). This provides some support for the third hypothesis, establishing expectations of stronger effects for strain compared to support, and the negativity effect model (Ingersoll-Dayton et al. 1997; Rook 1990). For the age-slope equation the accelerating effect of family strain was not significantly different from the effect of family support ($p = 0.287$). However, while the third hypothesis was not formally supported with regard to family support and strain on the age-slope, the fact that the effect of family support on the age-slope was not significantly different from zero ($\chi2 = 1.14$, $p = 0.588$) while family strain had a marginally significant ($p = 0.069$) positive effect on age-based changes in functional limitations provides at least some indication that family strain is more consequential than family support for changes in functional limitations. The difference in the effects of friend support and friend strain on the age-slope was barely significant at marginal levels ($\chi2 = 2.77$, $p = 0.096$), but the fact that friend strain predicted slower, as opposed to accelerated, rates of functional limitations contrasts the third hypothesis.

The fourth hypothesis, which proposed that the effects of support and strain from the spousal domain would have the strongest effects on both initial levels and changes in functional limitations, followed by children, friends, and extended family, generally could not be supported by these results as none of the effects of the social support measures were significantly different from zero in the final random intercept and age-slope equations. Furthermore, the sign of the spousal strain coefficient in the random intercept equation was negative, whereas the signs for children, family, and friend strain

were positive. The absolute sizes of the spousal and non-spousal strain coefficients were also not significantly different from each other in the random intercept ($\chi 2 = 4.08$, df = 3, $p = 0.253$) or age-slope ($\chi 2 = 2.44$, df = 3, $p = 0.487$) models.

The other controls performed as expected in general. That is, respondents in higher socioeconomic strata, those with fewer health risk factors, and those reporting lower levels of depressive symptomatology generally reported better functional health. These results also illustrate the importance of gender for functional limitations. As anticipated, women tended to start with more functional limitations than men ($b = 0.776$, $p < 0.001$), but also experience slightly slower rates of growth in limitations with age relative to men ($b = - 0.055$, $p < 0.001$). The importance of gender is explored in greater detail in the next subsection, which considers the moderating role of gender in the relationship between social support/strain and functional limitations.

Gender Moderation Effects

The only notable finding to emerge from the set of analyses examining the moderating effect of gender on the relationships between social support/strain and functional limitations was a significant gender difference in the effect of spousal support on the age slope ($b = 0.014$, $p = 0.057$). Recall that once gender was added to the random age slope equation the effect of spousal support on the age slope became non-significant. It appears that the reason for this change in the effect of spousal support on changes in functional limitations is that the relationship between spousal support and changes in functional limitations is contingent on gender. When the simple slopes for spousal support in the age slope model were estimated, the effect of spousal support was not statistically meaningful among men ($b = -0.005$, $p = 0.359$) and marginally significant for

women (b = 0.008, p = 0.087). As with other results that were marginally significant, this result should also be interpreted with caution. Nonetheless, this finding at least suggests that perceptions that one's spouse is supportive may be associated with a slightly accelerated increase in functional limitations among women, contrary to the initially hypothesized associations. Equally intriguing was the absence of any gender difference in the effects of spousal strain on the intercept, which indicates that the influence of spousal strain on functional health operates in a similar manner for men and women. All other interactions between non-spousal support/strain and gender on both the random intercept and age slope were non-significant (p > 0.10). Interestingly, in the model described above the effect of spousal strain on the age slope, which was specified to be constant by gender, did achieve marginal significance (b = 0.005, p = 0.089). The relationship between spousal strain and changes in functional limitations provides additional evidence, above and beyond the non-significant effect in the main effects model, that spousal strain predicts steeper rates of growth in functional limitations with age, despite being protective for baseline functional limitations.

DISCUSSION

Spousal Support/Strain and Trajectories of Functional Limitations

In accord with the stress/social support framework's conceptualization of spousal social support as a particularly salient health-protective resource within marriage (Burman and Margolin 1992; Kiecolt-Glaser and Newton 2001), the results presented initially showed that married older adults who perceive their spouses to be highly supportive also tend to report better functional health. However, the protective effect of spousal support on initial levels of functional limitations was explained away by

depressive symptoms, which suggests that the effect of spousal support was spurious. Individuals who perceive higher levels of spousal support were less likely to be depressed, and individuals who were less depressed were also less likely to report fewer functional limitations (van Gool et al. 2005; Greenglass, Fiksenbaum, and Eaton 2006; Steffens, Hays, and Krishnan 1999). This finding lends credence to Kiecolt-Glaser and Newton's (2001) argument on the importance of depression as a control variable in models examining the effects of spousal support/marital quality and health on account of the close relationship between psychosocial relationship quality and mental health (Lin and Dean 1984; Umberson et al. 1996; Walen and Lachman 2000). Though it is outside the scope of this study, future research would do well to formally test whether depression actually mediates the relationship between spousal support and functional limitations, which, if true, would indicate that the effect of spousal support on functional limitations is not spurious but rather operates through depression.

Regarding the relationship between spousal support and changes in functional limitations, the gender-moderation results showed that even after controlling for other factors, women who reported higher levels of spousal support had, on average, slightly steeper increases in functional limitations with age relative to women with lower levels of spousal support. On the other hand, spousal support had no effect on changes in functional limitations among men. It is possible that women are more likely to interpret their supportive husbands as overly-solicitous, which would be consistent with normative masculine styles of communication that have historically emphasized directness and agency (Lakoff 1990). In turn, studies have indeed found overly solicitous displays of support to predict worse functional health (Hanley et al. 2004; Jensen et al. 2011; Turk et

al. 1992) and other adverse outcomes related to poor functional health such as less exercise (Lousberg et al. 1992), heightened stress-reactivity (Bolger and Amarel 2007), and enhanced pain severity (Flor et al. 1995; Kerns et al. 1990; Lousberg et al. 1992). Collectively, these findings cited suggest that overly-solicitous supportive behaviors are likely to be most detrimental when one has experience with one or more health conditions that result in some form of pain, which is highly probable in later life. When a close tie such as a spouse is overbearing in their support this support may promote more avoidance of activities out of fear of pain and stronger perceptions of pain. It is also worth considering other findings showing that men are more likely than women to respond to their spouse's stress with a combination of supportive and straining reactions (Neff and Karney 2005). This begs the question—that will be addressed in more detail in the next chapter—as to whether the effect of perceived spousal support on changes in functional limitations among women is dependent on perceptions of social strain co-occurring with perceptions of support.

Spousal strain initially predicted more baseline functional limitations, but once accounting for both non-spousal strain and depressive symptomatology spousal strain was shown to be protective against baseline functional limitations. Though counterintuitive, this result actually parallels findings from other studies showing that negative spousal exchanges can in fact predict better outcomes on different measures of health and well-being (Birditt and Antonucci 2008; Birditt, Newton, and Hope 2014; Warner and Adams 2016). As marriage is a co-residential relationship largely influenced by norms of mutual care, the spouse is likely to be an individual's primary source of informal care, even more so than other close ties, including adult children (Cantor 1979).

It is thus plausible that in some instances straining behaviors from the spouse represent, at least in part, attempts to regulate the health behaviors of the other spouse in order to promote health and functional independence (Tapp 2004; Waite and Gallagher 2000). Beyond the focus on one's own health it is similarly possible that spousal strain may motivate the individual to engage in self-care behaviors in order to avoid placing caregiving stress on his/her partner. Spousal strain was also associated with increased rate of increase in functional limitations with age, though this effect only achieved statistical significance (at marginal levels) when spousal support was interacted with gender in the intercept and age-slope equations. The relationship between spousal strain and age-based changes in functional limitations may nonetheless indicate that exposure to a straining marriage does take a toll on the body over time, a conclusion reached by Umberson and colleagues (2006) in their study of the effects of negative marital behaviors on trajectories of self-rated health, but more research over a longer time-frame is needed to better understand the associations between spousal strain and functional decline.

Non-Spousal Support/Strain and Trajectories of Functional Limitations

Higher levels of strain from children and friends were directly associated with more limitations at baseline. Conversely, support from non-spousal domains had no statistically meaningful effects on baseline limitations. Taken together, these findings are indicative of a negativity effect, in which the negative social exchanges are more strongly felt and have more pronounced consequences on health and well-being relative to positive exchanges (Ingersoll-Dayton et al. 1997; Rook 1990). Here, the frequency-salience explanation offers a useful rationale for interpreting the pattern of effects from non-spousal support and strain. This explanation argues that negative exchanges are often

more consequential than positive exchange because positive interactions are expected to be the norm and, thus, elicit neutral emotional reactions, whereas negative interactions defy the expectation of positive exchanges and become more salient (Rook 1990). As to why strain from children and friends were associated with poorer baseline functional health while strain from the spouse was associated with better baseline functional health, it is reasonable to suspect that some degree of strain is more tolerable and more likely to be anticipated in marriage relative to non-spousal relationships. Given the co-residential nature of the marital relationship tensions, are almost certain to arise from time-to-time. In addition, some straining behaviors from one's spouse may be accepted as simply being part of the spouse's personality and/or the spouse's normative health-monitoring role.

After accounting for other controls strain from extended family and friendships were associated with changes in functional limitations, but in opposing directions. Though family strain was unrelated to baseline functional limitations, those reporting higher levels of family strain were also more likely to report accelerated growth in functional limitations with age. In and of itself, the effect of family strain on changes in limitations is not especially surprising since this effect aligns with the initially hypothesized effect of family strain. However, it is intriguing that family strain predicted growth in functional limitations while strain from children was only associated with more functional limitations at baseline. It is plausible that strain from children and family become interpreted differently as individuals enter advanced old age. Adult children are likely to be influenced a stronger sense of obligation to provide care for aging parents (Gans and Silverstein 2006; Silverstein et al. 2006) and children who are predisposed to straining interactions with their parents may direct these behaviors toward encouraging

health-promoting behaviors as their parents age and experience more health problems. Indeed, Birditt and Antonucci (2008) found demanding behaviors from the spouse and one's children, but not other family members, to predict longevity among older adults suffering from chronic health conditions. Accordingly, it is possible that the stress and health-protecting benefits of children strain together result in a net null effect on functional decline with age.

In contrast to the pattern of functional limitations associated with family strain, individuals who perceived heightened strain from friends reported more baseline functional limitations but slower rates of growth in functional limitations, indicating that trajectories of functional limitations across varying perceptions of friend strain tend to converge over time. This finding is intriguing and merits more attention to friendship and functional decline in future research. Nevertheless, one possibility as to why this pattern was observed with friends, but not other relationships, is that friendships tend to become less central in one's social network as one approaches the end of the life-span (Antonucci et al. 2004; Shaw et al. 2007). Thus, strain from one's friends could become less salient over time, resulting in some recovery from the initial damaging effects of friend strain. An alternative explanation is that straining behaviors from friends are aimed toward motivating behaviors that promote sustained functional independence. In earlier old age before the onset of severe health issues these straining behaviors from friends could be interpreted as inconsistent with the norms of support and reciprocity inherent in the friendship role. As individuals age and become more vulnerable to health conditions that keep them from social engagement said friend strain may become interpreted as a sign of concern and care. In any case, the findings on friend strain and functional health

presented in this study raise the question as to whether friend strain is protective against functional decline regardless of perceptions of friend support or whether friend strain is only associated with slower rates of functional decline in friendships that are simultaneously perceived to be highly supportive. This question will be addressed in further detail in the next chapter.

CONCLUSION

The disablement process model (Verbrugge and Jette 1994) emphasizes the importance of social influences in the progression from illness to disability. This argument is clearly affirmed by a wide-body of research demonstrating the benefits of being married for functional health and other physical and mental health problems that are closely linked to disablement. Motivated by this body of research and the contributions of different theoretical perspectives on the health consequences of social support and marital quality, this research sought to elucidate the importance of the psychosocial resources and stressors in the closest circles of married older adults' social lives. In general, the findings produced from this research suggest that in most cases, the stressful, or straining, aspects of married older adults' close relationships are likely to be the most consequential for their functional health. Nonetheless, the ways in which these straining aspects of social relationships influence older adults trajectories of functional limitations varies across social domains, exemplifying the importance of considering the source-specific measures of social support and strain when trying to build a greater understanding of the roles of social support and strain, as well as other measures of relationship quality, in the disablement process.

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Chapter 4

INTRODUCTION

Marriage is an important facet of social integration for older adults not only because of the connection between spouses but also because married individuals often have access to long-standing shared social capital not available to non-married older adults (Cooney and Dunne 2001; Kalmijn 2003; Kalmijn and van Groenou 2005; Waite and Gallagher 2000). To the extent that the older married adults' emotionally close ties are perceived to be supportive the social capital linked to the marital relationship may ultimately prove to be a resource that helps delay the onset and progression of disablement, but if one's ties are perceived to be highly straining these social relationships there is reason to believe that the stress of these relationships can exacerbate age-related functional decline. Indeed, the negativity effect hypothesis (Ingersoll-Dayton, Morgan, and Antonucci 1997) posits that social strain from emotionally close relationship domains are likely to have damaging consequences for health and well-being and, even more, strain is expected to be more consequential for health outcomes in later life than social support from the same social domain according to this hypothesis. On the other hand, the stress-buffering model of social support emphasizes that social support, unlike social strain, may ameliorate the harmful health effects of salient social stressors (Cohen and Wills 1985). Thus, even if it is true that social strain within a specific social domain

is more strongly related to functional health relative to social support this does not negate the importance of social support in the same domain as a potential buffer against said social strain. Other scholars have examined the possibility of "within-domain buffering" effects on outcomes such as depression (Schuster, Kessler, and Aseltine 1990), self-rated health, and chronic conditions (Walen and Lachman 2000), but evidence concerning the interplay of domain-specific social support and social strain on later-life disablement is lacking. Using national representative data from the 2006-2012 waves of the Health and Retirement Study this research examined the within-domain buffering effects of social support and strain, from spousal and non-spousal social domains, on trajectories of functional limitations among older married men and women.

BACKGROUND

Within-Domain Interactions

The potential for social support to buffer the effects of social strain within social domains is predicated on the idea that the constructs of social support and strain are unique and independent as opposed to different sides of a single construct (Fincham and Linfield 1997; Okun and Keith 1998; Schuster et al. 1990). This characteristic of social support and strain establishes the possibility that a relationship or set of relationships can be perceived to be supportive and straining simultaneously since support and strain are not mutually exclusive. Importantly, treating emotionally positive and negative exchanges as distinct and mutually exclusive phenomenon implies that within a relationship domain the presence of interpersonal stress does not lead the individual to

perceive that support within the same domain as unavailable, and vice versa (Rook 1984). In this way, social support and strain may interactively shape the disablement process above and beyond their respective additive effects.

As is the case with more general buffering effects of social support, the handful of existing studies that have examined within-domain buffering effects have tended to focus on mental health outcomes and provide mixed findings. In their seminal work on within-domain interactions between social support and stress Schuster et al. (1990) examined how interactions between supportive and negative behaviors within domains of marriage, family, and friends affect depression among married adults. The authors found evidence of within-domain buffering effects of support on negative exchanges from relatives, but not among one's spouse or friends. Other studies following Schuster and colleague's research indicate that within-domain interactions are also likely contingent on the outcome in question. Lepore's (1992) research on support and conflict in the context of roommate relationships and friendships among college students found no evidence of within-domain interactions between support and conflict. Focusing on the interplay of positive and negative exchanges across age groups, Okun and Keith (1998) showed positive exchanges from one's spouse to be an effective buffer against heightened levels of depression associated with negative spousal exchanges, but only among younger adults. This finding parallels those from a more recent study of Australian older adults (Fiori et al. 2013) which showed that higher levels of positive interpersonal exchanges from one's social network ameliorate the adverse mental effects of negative interpersonal

exchanges among the young-old (ages 55-63), but not older-old adults (ages 64-94). However, Walen and Lachman (2000) found friend support to be a buffer against the adverse effects of friend strain on self-rated health among older adults only. This study from Walen and Lachman is especially notable in that it is the only study to date to find a within-domain buffering effect on a physical health outcome in later life and, as such, serves as a motivation for considering within-domain synergistic effects of support and strain on disablement. Moreover, that this study found within-domain buffering effect on a physical outcome among older adults whereas other studies found within-domain buffering effects on mental health outcomes among younger adults suggests that the physical health consequences of within-domain interactions may not emerge until later life, providing motivation for considering within-domain buffering effects on later life disablement.

The studies reviewed in the previous paragraph also highlight that the within-domain buffering phenomenon depends on the relationship domain in question. Yet, given the mixed findings across a small pool of studies it is difficult to hypothesize which domains are likely to provide the strongest evidence of within-domain buffering effects on trajectories of functional limitations. Family relationships are involuntary, difficult to sever, and influenced by norms to provide assistance regardless of reciprocity (Cantor 1991; Gans and Silverstein 2006; Spitze and Ward 2000). Conversely, friendships are voluntary and governed by strong norms of reciprocity between individuals involved in the friendship (Adams, Blieszner, and de Vries 2000). Friendships are thus more readily

dissolved when there is a perceived imbalance in the costs and benefits of the relationship and given the expectation from socioemotional selectivity theory (Carstensen 1992) and the convoy model (Antonucci, Birditt, and Akiyama 2009; Kahn and Antonucci 1980) that individuals are more willing to prune relationships that are not emotionally beneficial in later life, it is reasonable to anticipate friend strain to be less prevalent in friendships compared to family ties. Therefore, it is reasonable to expect the buffering effects of friend support on friend strain to be less pronounced than within-domain buffering in family domains because there is likely less of a need for buffering among friendships in later life. However, in Walen and Lachman's (2000) extensive study of health outcomes associated with the interactions between social support and strain across several emotionally close social domains the buffering effect of friend support on the relationship between friend strain and self-rated health (among older adults) was the only within-domain buffering effect observed for a physical health outcome. In addition to variation across social domains, the life course perspective provides reason to expect the association between disablement and within-domain interactions between socials support and strain to be contingent on gender, given that configurations of social relations and their associated costs and benefits are structured according to gender (Antonucci and Akiyama 1987; Moen 2001; Umberson and Williams 2005**)**.

Within-Domain Interactions and Gender

Throughout the twentieth century, and especially prior to the 1970s, the predominant cultural model of marriage and family in the United States emphasized a

strict division of labor in which men were expected to earn wages through labor outside of the home while women—often prohibited from meaningful wage-labor—were expected to secure financial security through marriage and perform the bulk of the emotion-work in the domestic sphere (Cherlin 2009; Hochschild 1989). The gendered structure of the public and private spheres of life alongside cultural scripts for masculinity and femininity that have emphasized independence and interdependence, respectively, has encouraged men to be less emotionally invested in diffuse social relationships than women. The result is that in later life men tend to be more dependent on the satisfaction of their socioemotional needs through marriage while women have access to a wider net of psychosocial resources in various non-spousal domains. However, women's enhanced emotional investment in non-spousal relationships also means that women are more vulnerable to conflict and relationship stress in these relationships (Turner 1994). Perhaps because men are more typically the recipients' of their spouse's emotion-work while the feminine role in marriage prescribes the performance of said emotion work, men are more likely than women to perceive their marriages as emotionally beneficial (Neff and Karney 2005; Umberson and Williams 2005; VanLaningham, Johnson, and Amato 2001). In some contexts, even the emotionally negative behaviors from the wife may be manifestations of emotion-work and, thus, benefit the health and well-being of men (Birditt and Antonucci 2008; Umberson 1992; Waite and Gallagher 2000; Warner and Adams 2016).

Consequently, the within-domain buffering phenomenon may be more pronounced among women than men because women's spousal and non-spousal relationships are expected to be marked by more of a mix of support and strain. To date, the research on within-domain buffering and physical health is scant, especially with respect to gender and disablement. However, several findings provide important insights for further inquiry into how the joint role of social support and strain may shape the disablement process differently for older married men and women. Looking at global (i.e., not domain specific) assessments of positive and negative social exchanges, Fiori and colleagues (2013) found that positive exchanges buffer the adverse effects of negative exchanges on mental health among later-life adults for women only. This finding is consistent with other studies showing that family support ameliorates the harmful mental health effects of family strain among women (Schuster et al. 1990; Walen and Lachman 2000). Walen and Lachman's (2000) research is unique in that it explicitly examined the within-domain interactive effects of support and strain on physical health outcomes by gender. The authors found evidence of within-domain buffering effects among friendships for self-rated health status, as discussed in the previous section, but this effect was statistically similar for men and women. Thus, it is possible that the interplay between domain-specific support and strain operate differently by gender for mental health, but not physical health. Yet given the lack of empirical research on within-domain interactions between social support/strain and physical health in later life among men and women such conclusion remains tenuous at best. To better understand the

importance of the interactions between social support and strain in spousal and non-spousal social domains for trajectories of functional limitations among men and women the current study analyzed a nationally representative sample of older adults to test a set of four broad hypotheses concerning the interrelated effects of social support, strain, and gender on functional limitations. These hypotheses are detailed in the proceeding section.

HYPOTHESES

This research tested two broad hypotheses based on findings and arguments established in the extant literature.

1. Within each domain of spouse, children, extended family, and friends, social support will:
    - **a** buffer the adverse effects of social strain on baseline functional limitations,
    - **b** buffer the adverse effects of social strain on changes in functional limitations.
2. The within-domain buffering effects of spousal support on spousal strain will be stronger among women than men.
3. The within-domain buffering effects of non-spousal support on non-spousal strain will be stronger among women than men.

RESULTS

Main Effects

The main effects (shown in Table 3.1) suggest that social strain is more consequential for disablement in later life than social support, consistent with the "negativity effect" argument (Ingersoll-Dayton et al. 1997; Rook 1990). However, the exact nature of the association between strain and functional limitations depends on the source of strain. Stronger perceptions of strain from one's spouse predicted fewer initial functional limitations ($b = -0.050$, $p = 0.003$), but perceptions of strain from children ($b = 0.033$, $p = 0.041$) and friends ($b = 0.044$, $p = 0.020$) predicted more functional limitations at baseline. Furthermore, family and friend strain showed marginally significant associations with changes in functional limitations, but in opposite directions. Higher levels of family strain predicted faster rates of increase in functional limitations with age ($b = 0.006$, $p = 0.069$) while heightened friend strain predicted slower rates of increases ($b = -0.008$, $p = 0.061$).

The results discussed above are based on the assumption that the effects of social support and strain within each social domain are additive and, thus, not contingent on each other. Yet, given that social support and strain are conceptualized as distinct constructs (Burman and Margolin 1992; Fincham and Linfield 1997; Ingersoll-Dayton et al. 1997; Rook 1997) it is possible that, at least in some relationship domains, the effects of social support and strain are in fact interactive. To this end the results from the within-domain support and strain interactions are discussed below separately for each social

domain. Both the pooled and gender-moderation results are presented for each social domain.

Within-Domain Interactions

Spouse

The results from the within-domain spousal support and strain interactions are provided in Table 4.1. Model 1 tested the interaction between spousal support and strain on the random intercept and provided no evidence that the effects of spousal support and strain are contingent on each other with regard to baseline functional limitations (b = 0.007, p = 0.223). Similarly, the results in Model 2 gave no indication that the effects of spousal support and strain on changes in functional limitations are dependent on each other (b <0.000, p = 0.708). The non-significant Spousal Support *x* Spousal Strain *x* Female interaction terms in the Intercept portion of Model 3 (b = -0.011, p = 0.186) and Age portion of Model 4 (b = -0.003, p = 0.247) also indicates that the interactions effects between spousal support and strain on baseline and age-based changes in functional limitations, respectively, are statistically similar for men and women. The absence of gender interactions in the spousal domain is interesting for two reasons. First, for men and women alike, spousal strain predicted fewer baseline functional limitations and the lack of any significant interaction between spousal support and strain in the random intercept model mean that this counterintuitive protective effect of spousal strain is not dependent on the supportiveness of the marriage. Second, heightened spousal support—independent of social strain—predicted a slight increase in the value of the functional

limitations slope for women (b = 0.009, p = 0.087), as discussed in the previous chapter. Thus, it appears that spousal support may be deleterious, at least to a small extent, for women's functional health over time regardless of perceptions of spousal strain, which is consistent with the damaging functional health effects of highly solicitous supportive behaviors (Hanley et al. 2004; Jensen et al. 2011; Turk, Kerns, and Rosenberg 1992).

[INSERT TABLE 4.1 HERE]

Children

Similar to the spousal support and strain results described above, in Models 1 and 2 of Table 4.2 no statistically significant interactions between children support and strain were observed in the random intercept (b = -0.007, p = 0.187) or age-slope models (b < -0.000, p = 0.919). The data also provided no statistically reliable evidence that the interactions between children support and strain are contingent on gender for baseline functional limitations (b < -0.001, p = 0.919) or changes in functional limitations (b = -0.004, p = 0.105). In light of the main effects the lack of an interaction between children support and strain on the random intercept can be interpreted to mean that the damaging effects of children strain on baseline functional limitations is not buffered by concurrent perceptions of social support from one's children, in contrast to the initially hypothesized expectations.

[INSERT TABLE 4.2 HERE]

Extended family

Results for the family domain are shown in Table 4.3. The statistically significant and negative effect of the Family Support *x* Family Strain interaction term in the Intercept portion of Model 1 (b = -0.011, p = 0.012) suggests that higher perceived levels of social support from extended family members buffers the effect of family strain on baseline functional limitations (b = 0.055, p = 0.029). Nonetheless, a similar buffering effect was not initially observed with respect to changes in functional limitations, as shown by the non-significant Family Support *x* Family Strain coefficient in the Age portion of Model 2 (b -0.001, p = 0.572).

[INSERT TABLE 4.3 HERE]

The gender moderation results in Models 3 and 4 illustrate a more complex pattern of associations between family support/strain, and functional limitations for older married men and women. In Model 3 the non-significant effect for the Family Support *x* Family Strain *x* Female interaction term means that the Family Support *x* Family Strain interaction effect on baseline functional limitations does not statistically vary by gender (b = -0.007, p = 0.380). Yet, it is worth noting that in this model the family support/strain interaction effect on the random intercept model was statistically meaningful for women (b = -0.014, p = 0.013), but not men (b = -0.007, p = 0.254).

Model 4 provides further evidence of the importance of family relationships for functional health among older married women. Here, the statistically significant Family Support *x* Family Strain *x* Female interaction in the Age portion (b = - 0.004, p = 0.038)

indicates that the effect of the interplay between support and strain from extended family members on trajectories of functional limitations is statistically different for men and women. Specifically, the effects of family support and strain on changes in functional limitations were contingent on each other for women (b = -0.002, p = 0.052), not men (b = 0.001, p = 0.412) in these analyses. This provides support for the third hypothesis, which proposed that the within-buffering effect among extended family would be stronger for women than men. However, it is worth emphasizing that after accounting for the interaction between family support and strain on changes in functional limitations, family support and strain exhibited no synergistic effects on baseline functional limitations for men (b = -0.001, p = 0.162) or women (b = -0.001, p - 0.121). This could be due to a lack of statistical power to detect such complex interactions of may reflect likely real effect whereby the cross-sectional effect of family strain does not vary by family support until even later in life, on average. In any case, the final results in Model 4 mean that the first hypothesis, which proposed a within-domain buffering effect on initial levels of functional limitations, could only be tenuously supported for the family domain.

To better comprehend the buffering effect of family support on the relationship between family strain and changes in functional limitations among women, the predicted effect of each one-unit increase in family strain on the functional limitations age-slope is presented at different values of family support among women in Table 4.4 The results in this table show that in the perceived absence of family support (=0) family strain was predicted to have the strongest positive effect on changes in functional limitations (b =

0.017, p = 0.025). For each unit increase in family support the effect of family strain on the age-slope was reduced by a value of 0.002. When family support was held constant at a value of four (4) the effect of family strain was only borderline significant (b = 0.007, p = 0.092) and at family support values of five (5) and above family strain had non-significant effects on changes in functional limitations for women (p >0.10).

[INSERT TABLE 4.4 HERE]

The effect of family strain on trajectories of functional limitations is visualized in Figure 4.1. Here, family support was held constant at values of zero (0) and three (3; the minimum and maximum values at which the effect of family strain was statistically significant at the 5% level). At both levels of family support predicted functional limitations trajectories were plotted at the minimum (=0), mean (= 2.265) and maximum (=12) value of family strain. The left-hand pane shows that in the perceived absence of family support women who reported highly straining (=12) family ties were likely to experience faster rates of growth in functional limitations compared to their counterparts who reported average levels of family strain. With slightly elevated perceptions of family support, as shown in the right-hand pane, the difference in the plotted slopes for women with maximum and average levels of perceived family strain is less stark relative to the left-hand panel. At both values of family support no significant patterns of age-based changes in functional limitations were detected at the minimum value of family strain (=0). This specific null finding likely reflects a lack of statistical power as most women

had extended family members and few reported a perceived deficit of both support and strain from said family members.

[INSERT FIGURE 4.1 HERE]

Friends

The only reliable within-domain interaction to note for the friend domain in Table 4.5 is the interaction between friend support and strain on the age slope for older married men. The three-way interaction between friend support, strain, and gender in the Age portion of Model 4 in Table 4.5 illustrates a meaningful gender difference in the effect of Friend Support *x* Friend Strain on changes in functional limitations (b = 0.008, p = 0.010). This interaction was statistically significant among men (b = -0.005, p = 0.027), but not women (b = 0.004, p = 0.175).

[INSERT TABLE 4.5 HERE]

Table 4.6 presents the friend strain coefficients for the age-slope model among men at different levels of friend support. These results show that the effect of friend strain on changes in functional limitations was not significantly different from zero at lower levels of friend support (values 0 to 5). However, at higher levels of friend support (values of 6 and above) friend strain had a significant (at the 5% level or lower) and negative effect on age-based changes in functional limitations. This means that, on average, increases in friend strain were associated with a slower rate of growth in functional limitations among older married men who perceived their friends to be supportive. In addition, with higher levels of perceived friend support the ameliorative

effect of friend strain became stronger. This overall pattern of findings contrasts hypothesis 1b, which predicted that friend support would buffer the effect of friend strain on changes in functional limitations, as well as the fourth hypothesis, which predicted that said buffering effect would be stronger among women than men.

[INSERT TABLE 4.6 HERE]

The interplay between friend support and strain on changes in functional limitations among older married men is illustrated more clearly in Figure 4.2. This figure plots the predicted trajectories of functional limitations at the minimum (=0), mean (=1.534), and maximum (=12) values of friend strain among men, holding friend support constant at six and nine (the minimum and maximum values at which friend strain had a statistically significant effect on the functional limitations age-slope for men). The general pattern shown in both plots is one whereby men with more straining friends tend to start with more functional limitations but then have slower rates of growth in limitations with age [4]. For both plots in Figure 4.2 the difference in the predicted age-slopes at the minimum and mean levels of friend strain are not very large and at the maximum level of friend strain the fixed age-slope was not significant. This overall pattern makes sense given that friendships are voluntary and can be more easily dissolved, relative to marital and kin relationships, if not emotionally beneficial. Thus,

[4] It should be noted that the effect of friend strain on the intercept is significant in the plot holding friend support constant at 6 (b=0.068, $p = 0.017$) but not 9 (b = 0.079, $p = 0.119$). Nonetheless, the average effect across family support values of 6-9 was statistically significant (b = 0.074, $p = 0.048$), suggesting that it may be reasonable to expect friend strain to have a positive effect on baseline functional limitations for men. At no levels of friend support did friend strain predict baseline functional limitations for women ($p > 0.10$).

few men were likely to report straining friendships and the data were even more sparse among men reporting highly supportive and straining friendships, which would account for a non-significant age-slope at the maximum level of friend strain in Figure 4.2. With respect to the statistically significant slopes plotted in this figure, the mean value of family strain (1.534) is relatively close to zero, meaning that the difference in the age trajectories for men at the minimum and mean levels of friend strain is essentially a comparison between men who perceived an absence of strain among friends and men who perceived their friends to be slightly straining. That older married men with supportive friendships that are also capable of strain accumulate functional limitations over time at a slightly slower rate than older married men who perceive their friends to be supportive and non-straining is consistent with other research suggesting that straining behaviors from meaningful social ties can motivate healthy habits in old age (Krause et al. 1993).

[INSERT FIGURE 4.2 HERE]

DISCUSSION

Using panel data from older married men and women, this study examined the importance of the interplay between social support and strain within social domains of marriage, adult children, extended family, and friends for trajectories of functional limitations. The results highlight that the likelihood that social support and strain produce synergistic effects on functional limitations is largely dependent on the social domain in

question and gender. The broader implications of the study findings are discussed by each social domain below.

Spouse

The results of this study suggest that the functional health profiles of older married adults who perceive their marriages to be highly straining tend to be characterized by fewer baseline functional limitations and, surprisingly, this pattern appears to be similar for those in supportive and non-supportive marriages. However, one possibility worth considering in future research is that the mechanisms through which spousal strain protects against functional limitations, at least prior to advanced old age, are different for those in supportive and non-supportive marriages. For example, it is conceivable that individuals in highly supportive and straining marriages may perceive straining behaviors against the backdrop of supportiveness as a sign of concern and "tough love" that ultimately promotes better self-care (Tapp 2004; Waite and Gallagher 2000; Warner and Adams 2016). Conversely, those in straining and non-supportive marriages may be motivated to engage in more activities outside of the home and away from the spouse, which may help maintain functional independence.

The absence of meaningful interactions between spousal support, strain, and gender also illustrates that accelerated functional decline associated with highly supportive marriages among older women is not likely to be contingent on perceptions of spousal strain. In turn, the absence of interactive effects between spousal support and strain among women strengthens the argument that this effect of spousal support could be

reflecting overly-solicitous supportive behaviors from husbands, which has been shown to have detrimental effects on functional independence (Hanley et al. 2004; Jensen et al. 2011; Turk et al. 1992). Indeed, the other possible explanation as to why spousal support would predict steeper increases in functional limitations for women is that women are more likely than men to experience straining behaviors alongside supportive behaviors (Neff and Karney 2005). However, if this were the case then we would expect the effect of spousal support on changes in functional limitations to be stronger for women in highly straining marriages, which was not demonstrated in these data.

Children

Like spousal support and strain, these data provided no evidence that support and strain from adult children have synergistic effects on functional limitations among married older adults. Therefore, older married adults who perceive heightened strain from their children are more likely to report more functional limitations (but not faster or slower rates of change in functional limitations) regardless of the supportiveness of one's children. This finding lends further support to the negativity effect hypothesis (Ingersoll-Dayton et al. 1997; Rook 1997) by suggesting that stronger perceptions of strain from within one's network of adult children are likely to be associated with poorer functional health (at least in earlier old age) and unlikely to be ameliorated by the availability of support from one's children. The robustness of the baseline functional health effects of children strain to children support does conform to Thoits' (1991) concept of "identity-relevant stressors," a concept which exemplifies the idea that stressors in the context of

social statuses that are integral to one's identity are likely to be more strongly felt than other stressors. There is also some evidence to suggest that stress associated with valued statuses diminishes one's sense of meaning in life and, in doing so, predicts poorer health status (Krause 2004). Given that the transition to parenthood is likely to be an important turning point and defining status for the entire adult life course it is not difficult to understand how a strained relationship with one's adult child(ren) could overshadow the potential psychosocial benefits linked to the supportive facets of the individual's relationship with his/her children.

Extended Family

The results provided support for the within-domain buffering hypothesis with respect to the extended family. Initial results showed that older married adults who perceived their extended family members to be more supportive were likely to be better protected from the effect of family strain on baseline functional health, though this effect did not persist after accounting for the contingent effects of family support and strain on changes in functional limitations separately for men and women. Yet family support did buffer the relationship between family strain and changes in functional limitations for women, but not men. This gender difference is consistent with the relegation of responsibility for emotion-work in the family to women moreso than men, in accord with the historical gendered division of labor in the marriage (Han and Moen 1999; Hochschild 1989; Moen 2001). In turn, the responsibility for tending to relationships within the extended family is likely to expose women to more intense benefits and

demands in these relationships (Turner 1994), which helps explain the within-domain buffering effects in the family domain for women's trajectories of functional limitations.

Though women are more likely than men to be exposed to family stress, the results of this study suggest that perceived family strain is unrelated to age-based functional decline among women who simultaneously perceive their extended family networks to be highly supportive. On the other hand, these data also indicate that women with emotionally poor family bonds (characterized by low support and high strain) are likely to experience heightened vulnerability for functional decline with age. This interpretation presents a notable challenge in the face of population aging in the U.S. as women are already expected to live longer with more disabling health problems than men (Crimmins, Kim, and Hagedorn 2002; Laditka and Laditka 2002) and now, as the current research suggests, women who lack high-quality informal family support systems are disadvantaged further because they are likely to accumulate more functional health problems with age at an accelerated rate. Moving forward, it is important for future studies to look more closely at the interrelations between extended family support, strain, and disablement since "family" is conceptualized rather broadly in the HRS to encompass grandchildren, siblings, parents, and any other kin relationships outside of the nuclear family. Accordingly, it is unclear whether the support and strain from different types of extended family relationships influence older married women's functional limitations trajectories in similar ways.

Friends

For men only, perceiving some strain from supportive friendships was associated with a reduction in the rate of increase of functional limitations with age, and this effect was amplified with stronger perceptions of friend support. This finding contradicted the hypothesized interaction effects between friend support and strain as well as the expectation that the interactions between friend support and strain would show stronger effects on women's functional health trajectories. Though this protective effect of friend strain was not especially strong regardless of perceptions of friend support, this finding provides at least some indication that the functional health of older married men with emotionally positive friendships may benefit in the long-run if such friends are willing to engage in straining behaviors every now and then. One possible explanation for the protective effect of friend strain on changes in functional limitations for men despite evidence that friend strain can be somewhat of a hazard for baseline functional limitations among men and women alike is that friends who have a propensity for straining behaviors direct their criticisms toward the individual's health as the individual grows older. The often extreme emphasis on independence linked to dominant masculine scripts often encourage behaviors that are antithetical to the maintenance of functional independence (Springer and Mouzon 2011). However, having friends that are comfortable providing criticism may encourage older men to rethink their adherence to such scripts, thus, helping to slow functional decline with age. The validity of this explanation would be better understood by future studies, especially studies using in-

depth qualitative interviews, focusing on the influence of friendships on men's sense of masculinity and health-related behaviors in earlier, middle, and later adulthood.

CONCLUSION

Regarding the nature of the relationships between social support, strain, and trajectories of functional limitations among older married adults the results of this study indicate that the nature of this interplay is contingent on the social domain in question, as well as gender. For the spousal relationship, the results suggest that the effects of spousal support and strain are independent of each other. Specifically, spousal strain protects older adults from poorer functional health early on regardless of perceived spousal support and older married women who perceive their spouses to be highly supportive are likely to experience an accelerated accumulation of functional limitations with age regardless of perceived spousal strain. Older married adults who reported strained relationships with their adult children also reported more initial functional limitations and this effect of child strain was not ameliorated by children support. Conversely, the results provided evidence that accelerated rate of growth in functional limitations associated with strain from extended family members among women is buffered by social support from family networks. Finally, older married men with supportive friendships have somewhat more favorable functional health outcomes with age when these friendship networks are also slightly straining. In sum, this study illustrates that the domain-specific effects of social support and strain on trajectories of functional limitations for older married adults is not uniform, but rather dependent on the structural and emotional

characteristics of the relationship domain in question as well as the gendered structure of marriage, family, and friendship.

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Chapter 5

INTRODUCTION

Recognizing that marriage can be a comfort or challenge, the social support/stress model of marriage and health establishes an expectation that the extent to which marriage acts as a resource or stressor is likely to have broader implications for the ways in which the disablement process unfolds in later life (Burman and Margolin 1992; Kiecolt-Glaser and Newton 2001). Nonetheless, even though the marital relationship tends to be a meaningful adult attachment (Ross 1995; Waite and Gallagher 2000) and the central relationship in the social lives of older married adults (Antonucci, Akiyama, and Takahashi 2004; Cooney and Dunne 2001; Kalmijn 2003) the functional health consequences of the marital relationship may also be shaped by the emotional quality of other emotionally close non-spousal relationships. Indeed, the cross-domain buffering hypothesis posits that social support in one social domain can be effective at buffering the deleterious effects of stressful exchanges in another domain (Lepore 1992; Okun and Keith 1998). The cross-domain buffering hypothesis points to an intriguing, yet under-utilized, way of approaching the study of marriage and disablement that focuses on the ways in which the effects of spousal support and strain on functional health are contingent on support and strain from non-spousal domains. Therefore, this study analyzed longitudinal data from the Health and Retirement Study to examine the potential cross-domain contingencies between spousal and non-spousal support/strain on trajectories of functional limitations among married/partnered older adults.

BACKGROUND

Cross-Domain Contingencies in the Disablement Process

The social support/stress model of marriage and health emphasizes that spousal support can be an important buffer against the damaging health effects of stress (Burman and Margolin 1992; Kiecolt-Glaser and Newton 2001), in accord with the broader stress-buffering model of social support (Cohen and Wills 1985). Studies grounded in the stress-buffering model of social support have examined the ways in which social support protects individuals from adverse outcomes associated with stressors such as financial strain (Krause 2006; Pearlin et al. 1981), discrimination (Gee et al. 2006), and stressful life events (Kornblith et al. 2001; Wethington and Kessler 1986). However, less focus has been placed on social support in one social domain, such as marriage, as against a buffer against relationship stress from other domains.

Lepore's (1992) study of the effects of support and conflict from friends and roommates on psychological distress among college students is the earliest study that explicitly focuses on social support as a buffer against stress from another domain, referred to as “cross-domain buffering.” In this study Lepore found roomate and friend support to be effective buffers of friend and roommate conflict, respectively, on changes in psychological distress between two time points. Perhaps the most important implication of Lepore’s findings for the current study is that negative interpersonal exchanges in one domain do not necessarily preclude individuals from perceiving the availability of support in another network domain. In turn, the support from another part of an individual's social network can be a strong protective psychosocial resource when relationships in another part of the network become marred by interpersonal stress.

Okun and Keith (1998) found further evidence of cross-domain buffering among older, but not younger, adults on depression. Specifically, the authors found that positive exchanges from children diminish the adverse effects of negative spousal exchanges, as well as negative relative/friend exchanges, on depression, while positive exchanges from non-child relatives/friends buffered the effects of negative exchanges from children. Consistent with Okun and Keith's finding on the cross-domain buffering of negative spousal exchanges Warner and Adams (2012) showed that non-spousal support (i.e., support from family, including children, and friends) protects non-disabled married older adults from elevated feelings of loneliness associated with heightened negative marital quality. In one of the most thorough examinations of cross-domain interactions in support and strain among adults, Walen and Lachman (2000) similarly found that the deleterious effects of strain from one's partner on life satisfaction and positive mood is buffered by social support from friends, but only for women. Taken together, these findings suggest that the psychosocial effects of negative exchanges within the marital relationship are able to be influenced by positive non-spousal exchanges. Yet, there is a dearth of empirical research addressing the ways in which non-spousal support shapes the influence of spousal strain on disablement in later life. To the extent that a strained marriage does not lead the individual to perceive that support is unavailable from his/her non-spousal ties, it is reasonable to suspect that non-spousal support can act as a buffer against any distress related to negative spousal exchanges.

It is also possible that strain from another non-spousal domain may neutralize any functional health benefits associated with spousal support (see Barrera, Chassin, and

Rogosch 1993). This phenomenon seems most likely to occur when one's role in a relationship, perceived to be straining, is important for one's social identity. Indeed, the application of identity theory to stress research establishes the expectation that stress arising from roles that are defining features of one's identity are likely to be strongly felt (Thoits 1991b). For instance, high level of strain from one's children may be an especially hard-felt stressor given the salience and permanence of the parenting role throughout the adult life course (Umberson, Pudrovska, and Reczek 2010). Such stress may be powerful enough to effectively negate the benefits of spousal support as the availability of support in and of itself may be inadequate in combating the disadvantages arising from experiences with certain stressors.

Thus far this discussion has focused on possible cross-domain contingencies between support and strain, but it is also necessary to consider contingencies between support in different domains, as well as cross-domain interactions between strain. To the extent that spousal support is a resource that is expected to promote better health it is reasonable to expect support from non-spousal domains to amplify the benefits of spousal support. Conversely, stress theories of aging emphasize that one's body is likely to become less resilient to the physiological effects of stress with advanced age (Finch and Seeman 1999). Therefore, compounding interpersonal stressors in the form of spousal and non-spousal strain can be expected to lead to the earlier onset of disablement and accelerated rates of functional decline in later life. On the other hand, there is also some evidence showing that what are commonly conceptualized as emotionally negative interpersonal exchanges can actually be advantageous, contrary to the negativity effect model. With regard to marriage in particular, previous research has shown emotionally

negative aspects of marriage to be protective against high blood pressure among distressed individuals (Birditt, Newton, and Hope 2014), a reduced risk of mortality among individuals with chronic conditions (Birditt and Antonucci 2008), and loneliness among functionally limited men (Warner and Adams 2016). However, in all of these examples negative exchanges were dependent on the experience of general distress (Birditt, Newton, and Hope 2014) or a health-related stressor (Birditt and Antonucci 2008; Warner and Adams 2016). It is thus unclear whether it is reasonable to explicitly hypothesize similar protective effects of spousal strain on functional limitations in the context of straining non-spousal relationships.

Cross-Domain Contingencies and Gender

The gendered life course perspective emphasizes that men and women enter later life through distinct pathways shaped by gendered social structural opportunities and constraints (Moen 2001). In particular, the normative male-breadwinner/female homemaker model of the nuclear family that was especially dominant as contemporary cohorts of older adults came of age in the U.S. specifies a distinct division of labor based on gender whereby men are expected to perform wage labor to provide economic security for the family and women are expected to engage in domestic emotional labor tasks (Cherlin 2009; Hochschild 1989). Furthermore, normative cultural scripts for masculinity generally place a heavy premium on independence whereas scripts for femininity emphasize interdependence (Calasanti and King 2005; Lakoff 1990; Thoits 1991a). As a consequence of different patterns of investment in social relationship in the adult life course men tend be more dependent on marriage for the satisfaction of socioemotional needs while women are generally more strongly connected to a wider net of potential

psychosocial resources in networks outside of the marital relationship (Haines and Hurlbert 1992; Kalmijn 2003; Shaw et al. 2007). With regard to perceptions of support and strain, men, being the recipients of the spouse's emotion-work, are more likely than women to perceive their marriages as emotionally beneficial (Neff and Karney 2005; Umberson and Williams 2005; Umberson et al. 1996; VanLaningham, Johnson, and Amato 2001). Furthermore, even though women are likely to have access to wider social support networks outside of the marriage, women's emotional investment in non-spousal relationships can also result in a heightened risk for conflict and relationship stress among non-spousal ties (Turner 1994).

The different expectations of emotional investment in spousal and non-spousal ties by gender means that it is reasonable to expect non-spousal support and strain to have a stronger effect on the associations between spousal support/strain and functional health for women than men. Yet, the body of research dedicated to this cross-domain interactions and gender is sparse and the findings are mixed. For example, Okun and Keith (1998) found no evidence that gender moderates cross-domain interaction effects (between positive and negative social exchanges) on depressive symptomatology. Conversely, Walen and Lachman (2000) found evidence that cross-domain support and strain do in fact interact to affect certain outcomes differently for men and women. The authors found that the negative effects of strain from one's partner on life satisfaction and positive mood was buffered by support from friendships, but only for women. Friend support also dampened the adverse effects of family strain on health problems for women, while the combination of heightened friend support with family strain among men produced a "reverse buffering effect", resulting in more health problems relative to

those men in straining family relationships and less supportive friendships. Thus, the extent to which the interplay between support and strain between social domains is contingent on gender appears to depend on the outcome and sources of support and strain in question. However, no studies have explicitly examined how friend support and other non-spousal supportive and straining exchanges influence the effects of spousal support and strain on disablement separately for men and women.

HYPOTHESES

Grounded in the social support/stress model of marriage and health (Burman and Margolin 1992; Kiecolt-Glaser and Newton 2001) and motivated by prior research on the interrelations between social support from different social domains this study addressed a set of broad hypotheses.

1. With regard to each domain of children, extended family, and friends, social support will:
    - **a.** amplify the protective effect of spousal support on baseline functional limitations,
    - **b.** amplify the protective effect of spousal support on changes in functional limitations,
    - **c.** buffer the adverse effect of spousal strain on baseline functional limitations,
    - **d.** buffer the adverse effect of spousal strain on changes in functional limitations.
2. With regard to each domain of children, extended family, and friends, social strain will:

a. dampen the protective effect of spousal support on baseline functional limitations,

b. dampen the protective effect of spousal support on changes in functional limitations,

c. amplify the adverse effect of spousal strain on baseline functional limitations,

d. amplify the adverse effect of spousal strain on changes in functional limitations.

3. The cross-domain interaction effects hypothesized above will be stronger for women than men.

RESULTS

Main Effects

Results from the initial main effects model (see Table 3.1), which omit any cross-domain interactions, suggest social strain is more consequential for disablement in later life than social support, consistent with the negativity effect argument (Rook 1990). However, the exact nature of the association between strain and functional limitations depends on the source of strain. Stronger perceptions of strain from one's spouse predicted fewer initial functional limitations ($b = -0.050$, $p = 0.003$), but perceptions of strain from children ($b = 0.033$, $p = 0.041$) and friends ($b = 0.044$, $p = 0.020$) predicted more functional limitations at baseline. Furthermore, higher levels of family strain predicted faster rates of increase in functional limitations with age ($b = 0.006$, $p = 0.069$), while friend strain predicted slower rates of increase in the accumulation of functional limitations with age ($b = -0.008$, $p = 0.061$). I now turn to consider whether the effects of

spousal support and/or strain on baseline functional limitations and age-based changes in functional limitations are contingent on support and/or strain from non-spousal domains.

Cross-Domain Interaction Effects

Children

Cross-domain interaction models for the spousal and children domains are presented in Table 5.1. Overall, the results in this table illustrate some evidence of cross-domain interactions with respect to baseline functional limitations, but not changes in functional limitations. Model 1 shows that the interaction between spousal support and children support on the functional limitations intercept in Model 1 ($b = -0.016$, $p = 0.022$). The positive sign of the spousal support main effect in the intercept equation of Model 1 ($b = 0.117$, $p = 0.007$) is interpreted to mean that higher levels of perceived spousal support predicted more baseline functional limitations among respondents with an observed value of zero on the children support scale. However, the negative sign of the Spousal Support x Children Support coefficient in the intercept equation signifies that the effect of spousal support on baseline functional limitations became weaker with each unit increase in children support (see Table 5.2 for a list of spousal support coefficients by levels of children support). Despite this statistically significant finding, the originally hypothesized interplay between spousal and children support on functional limitations was not supported by these data. The absence of significant cross-domain interactions in Model 2 also means that this study's hypotheses that the expected protective effects of spousal support on trajectories of functional limitations would be weakened by children strain was not supported by the data.

[INSERT TABLE 5.1 HERE]

The results in Model 3 suggest that the effects of spousal strain on baseline functional limitations may be contingent on perceptions of children support (b = 0.009, p = 0.082). In this model higher levels of spousal strain demonstrated a protective effect on functional limitations at baseline (b = -0.105, p = 0.007), which was then dampened by higher levels of children support (see Table 5.3), again, country to hypothesized associations. The results in Model 4 also indicate that spousal strain was associated with slightly fewer baseline functional limitations in the absence of children strain and that heightened children strain strengthened this effect (b = -0.007, p = 0.085; see Table 5.4). These last two sets of results need to be interpreted with a higher degree of caution given that the interactions described were only significant at the 10% level. However, the effects of the interplay between spousal strain and both children support and strain on the functional limitations intercept at least point to the possibility that heightened strain from one's immediate family (i.e., spouse and children) may protect functional health in later life to an extent, perhaps reflecting the influence of one's closest ties as meaningful sources of social control over health (Birditt and Antonucci 2008; Umberson 1987, 1992).

[INSERT TABLE 5.2 HERE]

[INSERT TABLE 5.3 HERE]

[INSERT TABLE 5.4 HERE]

Table 5.5 displays the gender-moderation results for the spouse/children cross-domain interactions. Only one significant gender interaction was found, that of the interaction between spousal strain, children strain, and gender on the age-slope in Model 4 (b = 0.003, p = 0.046). However, a closer examination of the predicted effect of the

spousal and children strain interaction on the age-slope revealed that said interaction effect was statistically non-significant for men (b = -0.002, p = 0.138) or women (b = 0.002, p = 0.227). Thus, none of this study's hypotheses concerning the moderating effect of gender on the interplay between spousal and children support/strain were supported.

[INSERT TABLE 5.5 HERE]

Extended Family

The results in Table 5.6 suggest that perceptions of strain from extended family members are interrelated with spousal support and strain, with regard to older adults' trajectories of functional limitations. The pattern of coefficients in the age-slope equation in Model 2 shows that in the perceived absence of family strain stronger perceptions of spousal support predicted faster rates of increase in functional limitations with age (b = 0.012, p = 0.032), while heightened family strain ameliorated this effect of spousal support (b = -0.004, p = 0.006). This pattern is contrary to the hypothesized associations between spousal support, family strain, and growth in functional limitations and also seems less plausible than the interpretation based on examining the effect of family strain on the age-slope while varying spousal support.

[INSERT TABLE 5.6 HERE]

Table 5.7 shows that when spousal support was held constant at zero family strain predicted a faster accumulation of functional limitations with age (b = 0.032, p < 0.001) and higher levels of spousal support buffered the damaging effect of family strain on functional decline (b = -0.004, p = 0.006), consistent with the stress-buffering model of social support (Cohen and Wills 1985). Indeed, at the highest reported levels of spousal support (=8, 9) heightened family strain demonstrated no statistically meaningful

relationships with age-based changes in functional limitations. Even though social support from close ties has been shown to backfire and promote poorer health and well-being (Bookwala 2011; Flor et al. 1995; Jensen et al. 2011; Turk, Kerns, and Rosenberg 1992) and emotionally negative behaviors have been associated with better health and well-being in prior studies (Birditt and Antonucci 2008; Krause et al. 1993; Warner and Adams 2016), the health benefits related to negative social exchanges are more likely to be derived from immediate family members (i.e., the spouse and children) (Birditt and Antonucci 2008; Tapp 2004; Umberson 1992; Warner and Adams 2016).

[INSERT TABLE 5.7 HERE]

The buffering effect of spousal support on the relationship between family strain and changes in functional limitations from the current study's results is presented graphically in Figure 5.1, where age-based changes in functional limitations are plotted at the minimum (=0), mean (=2.124) and maximum (=12) values of family strain across selected values of spousal support (= 0, 2, 4, 6) at which the effect of family strain on the age-slope was statistically significant. This figure clearly illustrates that in the absence of spousal support (=0) trajectories of functional limitations diverged quite notably across different levels of family strain, but with higher values of spousal support growth in functional limitations across levels of family strain became increasingly similar.

[INSERT FIGURE 5.1 HERE]

In line with this study's hypothesis concerning the effect of family strain on the relationship between spousal strain and changes in functional limitations, the age-slope equation in Model 4 shows that spousal strain had a null effect on the functional limitations age-slope when family strain was equal to zero ($b = -0.002$, $p = 0.657$), but the

significant and positive interaction between spousal and family strain on the age-slope means that heightened family strain amplified the effect of spousal strain (b = 0.003, p = 0.007). Further analysis of the effect of spousal strain on the age-slope by levels of family strain, displayed in Table 5.8, illustrate that spousal strain had a statistically significant ($p < 0.05$) and positive effect on changes in functional limitations at family strain values of three and higher. Figure 5.2 provides the predicted functional limitations age trajectories at the minimum (=0), mean (=3.959), and maximum (=12) values of spousal strain across selected values of family strain (=3, 6, 9, 12). Here, the increase in functional limitations with age is steeper with higher levels of spousal strain, but particularly so at the highest levels of family strain. Moreover, though the effect of spousal strain on the functional limitations intercept did not significantly vary by levels of family strain (b = -0.006, p = 0.180), spousal strain did predict fewer baseline limitations at all values of family strain shown in Figure 5.2 ($p < 0.05$).

[INSERT TABLE 5.8 HERE]

[INSERT FIGURE 5.2 HERE]

Table 5.9 shows one statistically meaningful gender moderation effect on the cross-domain interactions between spousal and family domains. The three-way interaction between spousal support, family support, and gender in the age equation of Model 1 provides evidence that the interaction between spousal support and family support on the age-slope varies by gender (b = 0.005, p = 0.036) . Nonetheless, a close examination of the cross-domain interaction on the age-slope in Model 1 revealed that the interaction between spousal and family support had non-significant effects on the rate of change in functional limitations for men (b = -0.003, p = 0.113) and women (b = 0.002, p

= 0.263). As such, the hypothesis that the effects of the cross-domain interactions on baseline and changes in functional limitations would be stronger among women than men could not be supported by these data.

[INSERT TABLE 5.9 HERE]

In sum, the cross-domain interaction results between the spousal and family domains highlight two important points. First, spousal strain may be initially protective for functional health in earlier old age, but over time a straining marriage is likely to result in a faster rate of functional decline. Second, spousal strain is unlikely to be associated with age-based functional decline in the absence of family strain, but at moderately-low to high levels of family strain spousal strain does appear to have an exacerbating effect on the accumulation of functional limitations with age. This highlights the importance of compounding interpersonal stressors for changes in functional health. It is also worth noting that the damaging effect of family strain on the age slope was similarly amplified by spousal strain, though family strain only had a statistically significant effect on the age-slope at spousal strain values of five and higher ($p < 0.05$; results not shown). This finding suggests that the effect of spousal strain on trajectories of functional limitations in later life is activated at lower levels of family strain, whereas the effect of family strain is more resistant to the influence of spousal strain. In any case though, the combination of heightened spousal and family strain appears to be a risk for a faster accumulation of functional difficulties over time.

Friends

The cross-domain interactions between spousal support/strain and friend support/strain are shown in Table 5.10. Across Models 1 through 4 none of the cross-

domain interactions exhibited statistically significant effects on the functional limitations intercept or age-slope ($p > 0.10$). The gender-moderation results in Table 5.11 provide one marginally significant three-way interaction between spousal strain, friend support, and gender in the intercept equation in Model 3 ($b = 0.016$, $p = 0.095$). However, the spousal strain and friend support interaction effect on the intercept was not statistically meaningful for men ($b = -0.006$, $p = 0.356$) or women ($b = 0.009$, $p = 0.182$). Accordingly, none of this study's hypotheses could be support for the spousal and friend cross-domain interactions.

[INSERT TABLE 5.10 HERE]

[INSERT TABLE 5.11 HERE]

DISCUSSION

Children

Heightened perceptions of spousal support were associated with more functional limitations at baseline when occurring along with a perceived absence of social support from adult children. However, this adverse effect of spousal support was diminished among older married adults who reported stronger perceptions of support from children. Negative health effects of social support are not unprecedented in the literature (Bookwala 2011; Flor et al. 1995; Jensen et al. 2011; Turk et al. 1992), but to the best of my knowledge this is the first study to demonstrate evidence of social support from one domain ameliorating the deleterious health effects of social support for another domain. A possible explanation for this finding is that spouses may overcompensate for the absence of support from adult children and the supportiveness of the spouse may come across as overprotectiveness. In turn, this overprotectiveness may help spur an earlier

onset of functional difficulties by hindering the individual from performing daily tasks for him/herself and fostering an unhealthy sense of dependency on the spouse (see Cutrona 1996). However, that the combination of high spousal support and low children support was not associated with changes in functional limitations suggests that the deleterious functional health effect of spousal support in the context of deficient children support reaches a threshold, perhaps because individuals tend to do more to prevent further functional decline in later life and/or that the support of the spouse becomes increasingly directed toward promoting behaviors that facilitate physical activity and functional independence.

Spousal strain predicted fewer baseline functional limitations, which was surprising but also congruent with several previous studies (Birditt and Antonucci 2008; Tapp 2004; Umberson 1992; Warner and Adams 2016). The results further suggest that the relationship between spousal strain and baseline limitations may depend on perceptions of children support and strain. Specifically, higher perceptions of children support dampened the protective effect of spousal strain on functional limitations at baseline, but more straining relationship with children amplified said benefits of spousal strain. To the extent that spousal strain is beneficial for functional health in earlier old age because straining behaviors are effective at motivating compliance with health-related norms (Umberson 1987, 1992), social support from children may undermine the social control efforts of the spouse while children strain may reinforce said social control. The cross-domain amplification effect of children strain also fits with previous findings from Birditt and Antonucci (2008), who found that emotionally negative behaviors from the spouse and children (but not friends/relatives) predicted better functional health among

older adults and protected older adults with chronic health conditions from mortality. Though Birditt and Antonucci's work did not consider the interactions between spousal and children strain their findings do help buttress the findings of the current study, which underscore the importance of strain from immediate family members in the disablement process.

Interestingly, the effects of the interrelations between spousal support/strain and children support/strain on functional limitations did not vary by gender. This was surprising given that the health of men, compared to women, is especially likely to benefit from spousal demands (Umberson 1992; Waite and Gallagher 2000; Warner and Adams 2016). It is, nonetheless, possible that the mechanisms through which the emotional quality of immediate family relationships influence the disablement process are different for men and women. While I can only speculate, men might benefit from the spouse acting as an agent of social control of health whereas women in straining marriages may be motivated to maintain higher levels of social engagement with non-spousal ties, thus promoting functional independence. On the other hand, others have questioned whether men and women are affected by the perceived emotional qualities of close ties in substantially different ways (Umberson et al. 1996; Williams 2003; but also see Umberson and Williams 2005). Thus, it may not be implausible that relationships with the spouse and adult children jointly affect older adults' functional health in similar ways for men and women.

Extended Family

Unlike the children domain, the quality of extended family relationships were more consequential for age-based changes in functional limitations. The data used in this

study indicated that spousal support serves as buffer against the effect of family strain on accelerated functional decline with age, in accord with the buffering model of social support (Cohen and Wills 1985) and, more specifically, in support of the cross-domain buffering hypothesis (Lepore 1992), which posits that support from one social domain can ameliorate the damaging effects of negative social exchanges in another domain. Even though heightened spousal support was associated with steeper rates of age-based increase in functional limitations when co-occuring with non-straining extended family relationships it appears that spousal support is likely to act as a resource in the context of distressing extended family relationships.

In the spouse/family cross-domain models spousal strain was protective for baseline functional limitations regardless of perceptions of family strain. This finding supports a small but growing body of research suggesting that negative spousal exchanges may confer benefits for health and well-being (Birditt and Antonucci 2008; Birditt, Newton, and Hope 2014; Warner and Adams 2016). This finding also fits with the argument that "nagging" behaviors from the spouse can benefit physical health by serving as a social control mechanism that motivates health maintenance (Tapp 2004; Umberson 1992; Waite and Gallagher 2000). At the same time, however, spousal strain did predict accelerated growth in functional limitations, and this effect was amplified by family strain, consistent with this study's hypothesis concerning the interplay between spousal and family strain on changes in functional limitations. That is, the accumulation of strain from spouse and family predicted even faster rates of functional decline compared to what was observed for those with high levels of spousal strain and weaker perceptions of family strain. In sum, the interplay between spousal and family strain on

trajectories of functional limitations suggests that even as spousal strain may be protective against the onset of functional health problems earlier on, there is still a stressful component associated with spousal strain that results in steeper rates of functional decline with age, exacerbated by straining extended family networks. This pattern fits with the expectation of stress theories of aging which posit that the physical toll of stress should become more apparent later in life when the body becomes more vulnerable to the physiological consequences of chronic stress (Finch and Seeman 1999).

Similar to the children domain results, this study provided no evidence that the interplay of the emotional quality of spousal and extended family relationships on changes in functional limitations are likely to depend on gender. This was also surprising given that women are more likely to report stronger perceptions of negative spousal behaviors (Neff and Karney 2005; Umberson et al. 1996; Umberson and Williams 2005) and are generally more invested in extended family relationships than men (Bracke et al. 2008; Brody 2003; Hagestad 1986) Assuming that the lack of gender moderation in the current results is not simply the result of a lack of statistical power, these results suggest that interrelations between spousal and extended family support/strain influence trajectories of functional limitations in similar ways for men and women.

Friends

Even though marriage is likely to be important for shaping the structural features of friendships (Kalmijn 2003) the current results suggest that the functional health effects associated with the emotional quality of marriage and friendships are independent of each other. This is consistent with Walen and Lachman's (2000) findings concerning the interactions between spousal support/strain and friend support/strain on self-rated health

and health conditions. A non-kin relationship domain such as friendship is unlikely to be intertwined with the marital relationship in the same way as children and extended family networks and, as such, may be less influential in altering the ways in which the supportive and straining aspects of one's marriage shape the individual's sense of meaning in life and health-related behaviors (e.g., heightened pain sensitivity, catastrophizing, and failure to comply with medical directions)—mechanisms through which social relationships are thought to affect physical health (Krause 2007; Lousberg, Schmidt, and Groenman 1992; Thoits 2011; Umberson 1992).

CONCLUSION

The results of this study lend credence to the argument that perceptions of support and strain from the spouse are indeed important factors in the disablement process among older married adults (Choi and Marks 2008; Hughes and Waite 2009; Kail 2016; Pienta, Hayward, and Jenkins 2000; Verbrugge 1979), in line with the expectations derived from the social support/stress model of marriage and health (Burman and Margolin 1992; Kiecolt-Glaser and Newton 2001). However, the current research also makes an important and new contribution to the existing body of knowledge on marriage and disability by showing that the effects of spousal support and strain on older adults' trajectories of functional limitations are likely to be contingent on support and strain from family members (but not friendships). In turn, these contingencies provide further support for the argument that consequences of social support and strain in one relationship domain can be contingent on social support and/or strain from another domain (Lepore 1992; Walen and Lachman 2000). This study's results thus point to an opportunity for revising the social support/stress model to place stronger emphasis on the idea that the

pathways between spousal support and stress are contingent on the emotional quality of one's broader family network. In terms of broader societal implications this research should be interpreted as a caution that initiatives focused on improving the quality of marriages as a means to help improve population health (at least with respect to disability) are unlikely to be successful without also accounting for the quality of the individual's relationships with other family members outside of marriage.

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Chapter 6

CONTRIBUTIONS OF THE FINDINGS

Analyzing nationally representative data on older adults from the 2006-2012 waves of the Health and Retirement Study (HRS), this research examined the roles of social support and strain from older married adults' spousal and non-spousal relationships in the disablement process. This research specifically addressed four specific aims. First, the independent effects (i.e., main effects) of spousal and non-spousal support and strain on trajectories of functional limitations in Chapter 3. Second, the interdependence between domain-specific support and strain on trajectories of functional limitations in Chapter 4. Third, the cross-domain moderating effects of non-spousal support and strain on the relationships between spousal support/strain and trajectories of functional limitations in Chapter 5. The fourth aim of this study focused on whether the main effects, within-domain interaction effects, and cross-domain interaction effects in chapters 3-5 varied by gender. In addressing the aforementioned aims the findings of this research make several contributions to the current state of knowledge on the importance of married older adults' spousal and close non-spousal relationships for the disablement process that are discussed in more detail below.

Linked Lives and the Disablement Process

The current findings reinforce the importance of the life course principle of *linked lives*, which emphasizes the interdependence of human lives and the centrality of said interdependence for lived experiences (Elder, Johnson, and Crosnoe 2003). Specifically, the results provide evidence that the progression of later-life disability is influenced by

the psychosocial resources and demands of the individual's closet social relationships. However, the results also highlight that the ways in which social support and strain affect functional health generally varies by the social domain in question. For instance, in the main effects models, spousal strain predicted fewer baseline functional limitations while strain from children and friends predicted more functional limitations at baseline.

In some cases the emotional qualities of social domains were even shown to have synergistic, rather than independent, effects on older adults' difficulties performing basic functional tasks. For example, the cross-domain interaction models revealed the effect of spousal support on baseline functional limitations to be contingent on support and strain from adult children. Spousal support was particularly damaging for baseline functional limitations among those reporting the absence of perceived social support from adult children. However, with stronger perceptions of support from children the adverse effect of spousal support on baseline functional limitations was diminished. Heightened perceptions of support from children also dampened the protective effect of spousal strain on baseline functional limitations while higher levels of children strain amplified this beneficial effect of spousal strain.

Implications for the Social Support/Stress Model

Burman and Margolin's (1992) original conceptualization of the social support/stress model posits that the pathways between marital factors and health status are subject to moderation by broader social contextual factors. Examples of contextual factors included in Burman and Margolin model include social class, employment, number of children, and neighborhood. While this list was not intended to be exhaustive it is somewhat vague and in light of the current study's results, the stress/social support

model could be revised to place stronger emphasis on the marital relationship embeddedness in emotionally close non-spousal relationships. More specifically, the stress/social support model could be refined to include non-spousal support and strain as moderators in the pathways between spousal support/strain and health status.

While the current research provided no evidence that the effects of spousal support and strain are contingent on each other, this null finding does not negate the importance of testing within-domain spousal support and strain interactions on disability, or other health outcomes, in future studies. However, potential within-domain interactions between spousal support and strain are not explicitly hypothesized in the social support/stress model. Though this model recognizes that spousal support and strain themselves may be dependent on each other (e.g., the strain of one's marriage helps determine the supportiveness of one's marriage) there is no indication that the actual pathways between spousal support/strain and health status are dependent on each other. In other words, Burman and Margolin's version of the stress/social support model acknowledges that appraisals of spousal support and strain may be linked together, but there is no indication that the effects of spousal strain differ across perceptions of spousal strain, and vice versa—at least for the development of functional limitations.

Implications for the Negativity Effect Debate

The negativity effect is a concept that embodies the potential for emotionally negative aspects of interpersonal relationships to exhibit more strongly felt consequences for health and well-being relative to emotionally positive aspects of interpersonal relationships (Rook 1990). The negativity effect has received considerable attention in the literature, though there is debate as to the circumstances in which negative exchanges

are more salient than positive exchanges (see Ingersoll-Dayton, Morgan, and Antonucci 1997). The current results provide some evidence in support of the negativity effect in that children and friend strain had damaging direct effects on baseline functional limitations or, in the case of family strain, changes in functional limitations. A plausible explanation for the negativity effects observed in my results is that negative exchanges are interpreted as non-normative, especially among relationships that do not reside with the individual, and thus appraised as more salient than positive exchanges (Rook 1990). Nonetheless, as discussed in next section concerning gendered effects, there are some caveats to negativity effects of non-spousal strain.

Gender, Social Support/Strain, and The Disablement Process

Overall, there was mixed evidence that functional health effects of social support and strain operate in different ways for men and women. In the main effects model the only gender-moderation effect observed was that spousal support predicted faster rates of growth in functional limitations for women, but had no effect on changes in growth in functional limitations for men. A plausible explanation for the damaging effect of spousal support among women is that women are more likely to perceive the support of their husbands as overly solicitous and perhaps even indicative of overprotectiveness (see Thompson and Sobolew-Shubin 1993). In turn, social support that is interpreted as being too solicitous has been shown to predict poorer functional health outcomes (Hanley et al. 2004; Jensen et al. 2011; Turk, Kerns, and Rosenberg 1992). Even though the adverse health effects of social support are more likely to occur with respect to tangible received support (Uchino 2004), if husbands are too direct and overbearing in their day-to-day attempts to portray themselves as supportive, wives' appraisals of the supportiveness of

their marriages could have unintended negative behavioral and psychosomatic consequences, such as less frequent exercise (Lousberg, Schmidt, and Groenman 1992) and heightened pain sensitivity (Flor et al. 1995; Kerns et al. 1990; Lousberg et al. 1992).

Aside from the gender-specific effects of spousal support on changes in functional limitations, there were only two additional gender-moderation effects found, both in the within-domain interaction models. First, for women only, heightened strain from extended family predicted an accelerated accumulation of functional limitations with age, particularly when extended family members were perceived to be simultaneously non-supportive. These findings bear some resemblance to Walen and Lachman's (2000) finding that family strain predicts more health conditions among women, but not men. Yet my findings also found that the adverse consequences of family strain for functional decline among women were ameliorated by stronger perceptions of support from extended family, indicative of a within-domain buffering effect. That these configurations of family support and strain were only observed among women is not entirely surprising as women are more likely than men to have stronger emotional investments in extended family relationships (Bracke et al. 2008; Brody 2003; Hagestad 1986; also see Shaw et al. 2007), which provides women with access to support from extended family while also exposing women to more intense conflicts within the extended family network (Turner 1994).

Second, configurations of friend support and strain were more important for functional health among men. Though men who reported more strain from friends were likely to have more functional limitations at baseline, slightly elevated levels of friend strain from otherwise supportive friends predicted modest reductions in the rate of

increase in functional limitations with age. This finding suggests that, for men, having friends who are reliable sources of support but will nonetheless engage in straining behaviors on occasion can be somewhat advantageous for functional health over time. Dominant norms of masculinity among birth cohorts considered here strongly emphasize the importance of independence, power, and invulnerability, all of which can motivate men to take unnecessary health risks that may compromise functional independence in the long-run (Springer and Mouzon 2011). Accordingly, friends who are not uncomfortable critiquing an individual's actions may direct their critiques toward addressing the individual's unhealthy habits as the onset of disabling health problems becomes increasingly probable with age. Conversely, highly supportive friends who are perceived to be entirely non-straining may enable poor health habits, either by actively supporting said habits or by not speaking out against the individual's unhealthy behavioral tendencies.

That more gender-moderation effects were not found warrants further consideration in future studies. In particular, it is surprising that the protective effect of spousal strain on baseline functional limitations was statistically similar for men and women. Men are expected to reap more emotional benefits from marriage than women and marriage is also likely to be an important mechanism of social control of men's health behaviors (Umberson 1992; Waite and Gallagher 2000; Wickrama, Conger, and Lorenz 1995). It is possible that spousal strain exhibits similar effects on functional health in early old-age for men and women, however, it also may be that there was a lack of statistical power to detect gender differences given the complexity of the models estimated.

LIMITATIONS

The findings from the current research need to be considered alongside the study's limitations. First, due to the fact that the HRS' LBQ instrument is administered to half of the sample every other wave there were not enough observation points available with multiple reports of social support and strain. As a result, it was not possible to examine any potential within-person effects of social support and strain on functional limitations. Fortunately, there is some evidence to suggests that the quality of social relationships is likely to be fairly stable as individuals age (Johnson, Amoloza, and Booth 1992; Martire et al. 1999), which mitigates this concern to an extent.

Second, the measures of functional limitations used in the analyses are subjective self-reports of difficulty with basic physical tasks such as getting up from a chair and picking up a dime. Individuals are likely to require a substantial level of functional impairment before responding that they have any difficulty with said tasks. Thus, there is likely some variability that in functional health that is not captured by the functional limitations measures used. Additionally, as the HRS is a sample of community-dwelling adults those with the most severe forms of disability are likely institutionalized and excluded from the panel.

Third, these analyses are based on a total of four time-points, and roughly half the sample that completed their first LBQ in 2008 could only contribute a maximum of three observations to the analyses. This is important to emphasize as the disablement process (Verbrugge and Jette 1994) unfolds gradually. Even more, psychosocial phenomena such as social support and strain are theorized to affect health status by influencing various cognitive processes that are likely to have behavioral and/or physiological implications

that are important for physical health in the long run (1992; Kiecolt-Glaser and Newton 2001; Uchino 2004). In other words, the psychological effects of social support and strain are likely to be felt more immediately than the physical health effects, which may help explain some of the null findings in this study despite hypothesized expectations. A longer observation window would therefore be more beneficial in understanding the importance of social relations for disablement.

Fourth, the interactive models estimated in this study were rather complex and computationally intensive. In examining within- and cross-domain social support and strain interactions this study essentially considered how different configurations of social support and strain related to trajectories of functional limitations among older adults. In the future, it is worth given more consideration to alternative methods that may be able to model configurations of variables more parsimoniously, such as latent class and latent profile analysis. Though these methods have their own complexities and limitations, they offer new research opportunities and permit more person-centered, rather than variable-centered, analyses that are apt at demonstrating groupings of individuals in the population according to various measures (Laursen and Hoff 2006).

Lastly, nationally representative survey data such as the HRS is well-suited for uncovering relationship between variables that are likely to be generalizable to the broader population, but a more in-depth understanding of how perceptions of support and strain are shaped and why such perceptions influence functional health calls for the use of qualitative interviews. For example, while social strain is typically conceptualized as a stressor, reflecting the idea that straining exchanges have a strong potential to spur negative emotional responses (Burman and Margolin 1992**;** Rook 1990), in certain

contexts social strain may be interpreted by the individual as informal social sanctions grounded in care, as opposed to attempts to directly undermine one's sense of self-worth. Similarly, it is also possible for an individual to appraise social support as overprotective, which in turn could impede one's sense of agency. The quantitative data analyzed in this research is well-suited for uncovering broader patterns in the population of interest. However, with such patterns established there is now a need focus more intently on older adults' lived experiences in their webs of social relations.

Despite these limitations, the available longitudinal data permitted a latent growth curve analysis that ultimately revealed important differences in the effects of social support and strain on initial levels versus age-related changes in functional limitations.

CONCLUSION

Using nationally representative data from a sample of older adults, I examined the independent and interactive effects of spousal and non-spousal social support and strain on trajectories of functional limitations among older married adults. The results emphasize the importance of the supportive and straining facets of older married adults emotionally close relationships, but also illustrates that the interrelations between spousal and non-spousal support and strain are complex, nuanced, and in some cases seemingly paradoxical given established hypotheses and theoretical models. In doing so this research highlights the importance of not only considering the roles of social support and strain in the disablement process among married older adults, but also the importance of treating social support and strain as distinct constructs whose effects vary based on relationship domains.

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Tables and Figures

Table 2.1. Confirmatory Factor Analysis Results for Spousal Support and Strain [a,b,c]

	Spousal Support	Spousal Strain
How much [does your spouse] really understand the way you feel about things?	0.848***	
How much can you rely on [your spouse] if you have a serious problem?	0.848***	
How much can you open up to [your spouse] if you need to talk about your worries?	0.869***	
How often [does your spouse] make too many demands on you?		0.689***
How much [does your spouse] criticize you?		0.682***
How much [does your spouse] let you down when you are counting on them?		0.827***
How much [does your spouse] get on your nerves?		0.810***
Model Fit: *RMSEA = 0.099, CFI = 0.969, TLI = 0.959*		

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification

b. Sample size is based on each LBQ respondent's first observation with complete data, N = 7,144

c. Weighted least squares mean and variance adjusted (WLSMV) used to account for ordinal scales of the indicators

*** p<0.001

Table 2.2. Confirmatory Factor Analysis Results for Children Support and Strain [a,b,c]

	Children Support	Children Strain
How much [do your children] really understand the way you feel about things?	0.839***	
How much can you rely on [your children] if you have a serious problem?	0.895***	
How much can you open up to [your children] if you need to talk about your worries?	0.896***	
How often [do your children] make too many demands on you?		0.705***
How much [do your children] criticize you?		0.670***
How much [do your children] let you down when you are counting on them?		0.842***
How much [do your children] get on your nerves?		0.807***
Model Fit: *RMSEA = 0.082, CFI = 0.983, TLI = 0.972*		

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification

b. Sample size is based on each LBQ respondent's first observation with complete data, N = 7,144

c. Weighted least squares mean and variance adjusted (WLSMV) used to account for ordinal scales of the indicators

*** p<0.001

Table 2.3. Confirmatory Factor Analysis Results for Family Support and Strain [a,b,c]

	Family Support	Family Strain
How much [does your family] really understand the way you feel about things?	0.854***	
How much can you rely on [your family] if you have a serious problem?	0.885***	
How much can you open up to [your family] if you need to talk about your worries?	0.939***	
How often [does your family] make too many demands on you?		0.712***
How much [does your family] criticize you?		0.783***
How much [does your family] let you down when you are counting on them?		0.801***
How much [does your family] get on your nerves?		0.826***
Model Fit: *RMSEA = 0.081, CFI = 0.989, TLI = 0.982*		

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification

b. Sample size is based on each LBQ respondent's first observation with complete data, N = 7,144

c. Weighted least squares mean and variance adjusted (WLSMV) used to account for ordinal scales of the indicators

*** p<0.001

Table 2.4. Confirmatory Factor Analysis Results for Friend Support and Strain [a,b,c]

	Friend Support	Friend Strain
How much [do your friends] really understand the way you feel about things?	0.872***	
How much can you rely on [your friends] if you have a serious problem?	0.875***	
How much can you open up to [your friends] if you need to talk about your worries?	0.934***	
How often [do your friends] make too many demands on you?		0.762***
How much [do your friends] criticize you?		0.792***
How much [do your friends] let you down when you are counting on them?		0.763***
How much [do your friends] get on your nerves?		0.787***
Model Fit: *RMSEA = 0.061, CFI = 0.993, TLI = 0.989*		

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Sample size is based on each LBQ respondent's first observation with complete data, N = 7,144.

c. Weighted least squares mean and variance adjusted (WLSMV) used to account for ordinal scales of the indicators

*** p<0.001

Table 2.5. Descriptive Statistics [a, b]

	Total		*Male*		*Female*		
	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}_{Male} - \bar{x}_{Female}$ [c]
Functional Limitations	2.697	0.06	2.333	0.07	3.098	0.07	***
Age	68.066	0.16	68.837	0.19	67.214	0.16	***
Spousal Support	7.462	0.03	7.756	0.03	7.137	0.03	***
Spousal Strain	3.959	0.04	3.739	0.05	4.203	0.06	***
Children Support	6.521	0.03	6.300	0.05	6.766	0.04	***
Children Strain	2.721	0.03	2.676	0.03	2.771	0.04	*
Family Support	5.270	0.04	4.917	0.05	5.660	0.05	***
Family Strain	2.124	0.03	1.995	0.04	2.265	0.04	***
Friend Support	5.569	0.04	5.042	0.05	6.151	0.05	***
Friend Strain	1.506	0.03	1.534	0.03	1.476	0.03	+
No Children	0.033	0.00	0.034	0.00	0.032	0.00	
No Family	0.050	0.00	0.059	0.00	0.039	0.00	***
No Friends	0.065	0.00	0.080	0.00	0.049	0.00	***
Income [d]	75.756	2.38	78.948	3.59	72.230	2.04	+
Assets [d]	403.052	15.57	395.140	16.38	411.793	19.45	
Education							
Less than High School	0.191	0.01	0.207	0.01	0.173	0.01	**
High School (ref.) [e]	0.343	0.01	0.303	0.01	0.387	0.01	***
College	0.467	0.01	0.490	0.01	0.440	0.01	***
Health Insurance							
Government	0.655	0.01	0.685	0.01	0.621	0.01	***
Employer	0.339	0.01	0.417	0.01	0.253	0.01	***
Other	0.162	0.01	0.147	0.01	0.178	0.01	***
Smoking Status							
Currently Smokes	0.110	0.01	0.119	0.01	0.099	0.01	**
Previously Smoked	0.465	0.01	0.567	0.01	0.354	0.01	***
Never Smoked (ref.) [e]	0.425	0.01	0.315	0.01	0.547	0.01	***
Heavy Drinker	0.023	0.00	0.037	0.00	0.006	0.00	***
BMI [f]	28.327	0.10	28.367	0.10	28.283	0.14	
CESD	1.550	0.04	1.431	0.05	1.681	0.05	***
Female	0.475	0.00	0.000	.	1.000	.	
White	0.792	0.01	0.788	0.02	0.797	0.01	

Table 2.5 Continues Below

Table 2.5 Descriptive Statistics (*Continued*) [a, b]

	Total		*Male*		*Female*		
	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}$	SE	$\bar{x}_{Male} - \bar{x}_{Female}$ [c]
Number of Marriages							
< 2 (ref.) [e]	0.716	0.01	0.700	0.01	0.735	0.01	***
2 +	0.282	0.01	0.298	0.01	0.264	0.01	***
Missing	0.002	0.00	0.002	0.00	0.001	0.00	
Cohabiting	0.027	0.00	0.027	0.00	0.026	0.00	
Proportion of Core Interviews	0.960	0.00	0.955	0.00	0.965	0.00	***
Cohort Membership							
HRS	0.556	0.01	0.542	0.01	0.571	0.01	***
AHEAD (ref.) [e]	0.063	0.00	0.057	0.00	0.069	0.01	**
CODA	0.072	0.01	0.067	0.01	0.077	0.01	***
War Babies	0.155	0.01	0.159	0.01	0.150	0.01	+
Early Baby Boomers	0.155	0.01	0.175	0.01	0.133	0.01	***
Died Between 2006-2012	0.113	0.01	0.144	0.01	0.079	0.01	***
2008 LBQ Sample	0.456	0.01	0.458	0.01	0.455	0.01	

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification. **b.** Estimates are based on LBQ respondents' first interview with complete data, N = 7,144. **c.** Statistical significance of difference in means between men and women. **d.** In 1000s, adjusted by the square-root of each respondent's household size. Measure is log-transformed in multivariable analyses **e.** (ref.) = Omitted reference category in multivariable analyses. **f.** In multivariable analyses the time-varying BMI measure was centered at the observed minimum of 12.

+ $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 3.1. Main Effects of Social Support and Strain on Trajectories of Functional Limitations [a, b, c, d]

	Model 1	Model 2	Model 3	Model 4	Model 5
	b	b	b	b	b
Level-1 Fixed Effects					
Age	0.063***	0.297*	0.223	0.233+	0.205
(ln) Income					-0.042+
(ln) Assets					0.005
Currently Smokes [d]					-0.079
Previously Smoked [d]					0.116*
Heavy Drinker					-0.163
BMI					0.042***
Government Health Insurance					0.050
Employer Health Insurance					-0.022
Other Health Insurance					-0.026
CESD					0.168***
Cohabiting					0.097
Intercept	1.601***	3.529***	3.976***	3.480***	1.931**
Level-2 Fixed Effects: Intercept					
Age (Baseline)	0.062***	0.007	0.014+	0.025**	0.013
Spousal Support			-0.136***	-0.144***	0.024
Spousal Strain			0.051**	-0.018	-0.050**
Children Support				-0.013	-0.008
Children Strain				0.092***	0.033*
Family Support				0.019	-0.000
Family Strain				0.084***	0.006
Friend Support				-0.002	-0.008
Friend Strain				0.064**	0.044*
No Children				-0.141	-0.085
No Family				0.281	0.005
No Friends				0.683**	0.093
(log) Income (Mean)					-0.302***
(log) Assets (Mean)					-0.245*
High School [e]					-0.284**
College [e]					-0.466***
Govt. Health Insurance (Mean)					1.221***
Employer Health Insurance (Mean)					-0.198*
Other Health Insurance (Mean)					-0.064
Currently Smokes (Mean)					0.407*
Heavy Drinker (Mean)					0.194
BMI (Mean)					0.059***
CESD (Mean)					0.438***
Female					0.776***
White					0.131
Number of Marriages: 2+ [f]					-0.016
Number of Marriages: Missing [f]					-0.756
Cohabiting (Mean)					-0.138
HRS Cohort [g]		-0.609***	-0.519**	-0.518**	-0.646***
CODA Cohort [g]		-0.223	-0.177	-0.203	-0.404*
War Babies Cohort [g]		-0.808***	-0.661**	-0.694***	-0.161
Early Baby Boomers Cohort [g]		-1.245***	-1.064***	-1.110***	-0.172
2008 LBQ Sample		0.090	0.075	0.104	-0.006
Proportion of Core Interviews		-0.661	-0.492	-0.377	-0.316
Died Between 2006-2012		1.748***	1.754***	1.702***	1.246***

Table 3.1 continues below

Table 3.1 Main Effects of Social Support and Strain on Trajectories of Functional Limitations (*Continued*) [a, b, c, d]

	Model 1	Model 2	Model 3	Model 4	Model 5
	b	b	b	b	b
Level-2 Fixed Effects: Age					
Spousal Support			0.008*	0.009*	0.003
Spousal Strain			0.004+	0.004	0.005
Children Support				-0.002	-0.001
Children Strain				0.000	0.000
Family Support				-0.001	0.002
Family Strain				0.004	0.006+
Friend Support				-0.001	0.001
Friend Strain				-0.007	-0.008+
No Children				-0.047	-0.037
No Family				0.089*	0.092*
No Friends				-0.042	-0.052
Female					-0.055***
HRS Cohort [g]		-0.133***	-0.135***	-0.133***	-0.135***
CODA Cohort [g]		-0.033	-0.034	-0.032	-0.032
War Babies Cohort [g]		-0.175***	-0.178***	-0.176***	-0.184***
Early Baby Boomers Cohort [g]		-0.187***	-0.189***	-0.187***	-0.184***
2008 LBQ Sample		0.000	0.001	0.001	0.002
Died Between 2006-2012		0.069	0.067	0.067	0.070
Proportion of Core Interviews		-0.078	-0.082	-0.070	-0.009
Random Effects					
σ^2(Age)	0.071***	0.070***	0.069***	0.069***	0.063***
σ^2(Intercept)	6.475***	6.212***	6.101***	5.938***	3.822***
cov(Age, Intercept)	-0.157***	-0.143***	-0.144***	-0.144***	-0.174***
σ^2(Residual)	1.186***	1.183***	1.182***	1.182***	1.166***
Wald χ^2 [h]	397.62***	365.96***	79.09***	268.19***	1987.64***
df	2	14	4	22	28

Source: 2006-2012 Health and Retirement Study

Notes:

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. (Mean) = Each respondent's average across his/her observations in the analytic sample.

d. 'Never Smoked' is the reference category.

e. 'Less Than High School' is the reference category.

f. 'Number of Marriages: < 2' is the reference category.

g. 'AHEAD Cohort' is the reference category.

h. Wald χ^2 tests improvement to model fit with the parameters added to the respective model

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001(two-tailed test)

Table 4.1. Effects of Spousal Support and Strain Interactions on Trajectories of Functional Limitations [a, b, c]

	Model 1	Model 2	Model 2	Model 4
	b	b	b	b
Level-1 Fixed Effects				
Age	0.207	0.226	0.207	0.355*
Level-2 Fixed Effects: Intercept				
Age (Baseline)	0.012	0.012	0.012	0.012
Spousal Support	-0.014	-0.010	-0.045	-0.014
Spousal Strain	-0.100*	-0.095*	-0.138**	-0.113*
Female	0.775***	0.775***	0.398	0.822
Spousal Support *x* Spousal Strain	0.007	0.006	0.013+	0.010
Spousal Support *x* Female			0.056	0.003
Spousal Strain *x* Female			0.065	0.025
Spousal Support *x* Spousal Strain *x* Female			-0.011	-0.006
Intercept	2.221***	2.192**	2.446***	2.207**
Level-2 Fixed Effects: Age				
Spousal Support	0.003	0.000	0.003	-0.016
Spousal Strain	0.005	0.002	0.005	-0.011
Female	-0.055***	-0.055***	-0.055***	-0.316**
Spousal Support *x* Spousal Strain		0.000		0.002
Spousal Support *x* Female				0.032*
Spousal Strain *x* Female				0.025
Spousal Support *x* Spousal Strain *x* Female				-0.003
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.063***
σ^2(Intercept)	3.821***	3.821***	3.821***	3.820***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.174***
σ^2(Residual)	1.166***	1.166***	1.166***	1.167***
Wald χ^2 [d]	1.48	0.14	2.58	5.83
df	1	1	3	3

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1).

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the final main effects model.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 4.2. Effects of Children Support and Strain Interactions on Trajectories of Functional Limitations [a, b, c]

	Model 1	Model 2	Model 3	Model 4
	b	b	b	b
Level-1 Fixed Effects				
Age	0.205	0.202	0.205	0.202
Level-2 Fixed Effects: Intercept				
Age (Baseline)	0.012	0.012	0.012	0.012
Children Support	0.018	0.018	0.015	0.017
Children Strain	0.074*	0.073*	0.072+	0.089*
Female	0.776***	0.776***	0.734***	0.748**
Children Support *x* Children Strain	-0.007	-0.007	-0.007	-0.010
Children Support *x* Female			0.007	0.004
Children Strain *x* Female			0.004	-0.032
Children Support *x* Children Strain *x* Female			-0.001	0.006
Intercept	1.762**	1.766**	1.775**	1.777**
Level-2 Fixed Effects: Age				
Children Support	-0.001	-0.000	-0.001	-0.002
Children Strain	0.000	0.001	0.000	-0.009
Female	-0.055***	-0.055***	-0.055***	-0.062
Children Support *x* Children Strain		-0.000		0.002
Children Support *x* Female				0.002
Children Strain *x* Female				0.020
Children Support *x* Children Strain *x* Female				-0.004
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.063***
σ^2(Intercept)	3.820***	3.820***	3.820***	3.819***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.174***
σ^2(Residual)	1.166***	1.166***	1.166***	1.166***
Wald χ^2 [d]	1.74	0.00	0.09	3.77
df	1	1	3	3

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1)

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the final main effects model.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 4.3. Effects of Family Support and Strain Interactions on Trajectories of Functional Limitations [a, b, c]

	Model 1	Model 2	Model 3	Model 4
	b	b	b	b
Level-1 Fixed Effects				
Age	0.205	0.196	0.206	0.209+
Level-2 Fixed Effects: Intercept				
Age (Baseline)	0.012	0.012	0.012	0.012
Family Support	0.026+	0.023	0.031+	0.035*
Family Strain	0.055*	0.050+	0.044	0.052
Female	0.779***	0.778***	0.887***	0.937***
Family Support *x* Family Strain	-0.011*	-0.010*	-0.007	-0.009
Family Support *x* Female			-0.014	-0.027
Family Strain *x* Female			0.018	-0.008
Family Support *x* Family Strain *x* Female			-0.007	-0.000
Intercept	1.790**	1.805**	1.752**	1.745**
Level-2 Fixed Effects: Age				
Family Support	0.002	0.003	0.002	-0.000
Family Strain	0.006+	0.009	0.006+	0.002
Female	-0.054***	-0.054***	-0.055***	-0.084*
Family Support *x* Family Strain		-0.001		0.001
Family Support *x* Female				0.007
Family Strain *x* Female				0.015
Family Support *x* Family Strain *x* Female				-0.004*
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.063***
σ^2(Intercept)	3.818***	3.817***	3.817***	3.816***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.174***
σ^2(Residual)	1.166***	1.166***	1.166***	1.167***
Wald χ^2 [d]	6.28*	0.32	2.46	4.44
df	1	1	3	3

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1)

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the final main effects model.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 4.4. Effects of Family Strain on Changes in Functional Limitations by Levels of Family Support for Women [a, b, c]

Family Support	b Family Strain
= 0	0.017*
= 1	0.014*
= 2	0.012*
= 3	0.009*
= 4	0.007+
= 5	0.005
= 6	0.002
= 7	-0.000
= 8	-0.003
= 9	-0.005

Source: 2006-2012 Health and Retirement Study
a. Estimates are weighted and standard errors are adjusted for clustering and stratification.
b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.
c. Estimates based on results from Model 4 in Table 4.3
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 4.5. Effects of Friend Support and Strain Interactions on Trajectories of Functional Limitations [a, b, c]

	Model 1	Model 2	Model 3	Model 4
	b	b	b	b
Level-1 Fixed Effects				
Age	0.205	0.198	0.206	0.164
Level-2 Fixed Effects: Intercept				
Age (Baseline)	0.013	0.013	0.013	0.013
Friend Support	0.001	-0.000	0.014	0.001
Friend Strain	0.082+	0.076	0.084	0.044
Female	0.775***	0.776***	1.021***	0.902***
Friend Support *x* Friend Strain	-0.007	-0.006	-0.004	0.004
Friend Support *x* Female			-0.032	-0.009
Friend Strain *x* Female			-0.020	0.056
Friend Support *x* Friend Strain *x* Female			-0.003	-0.017
Intercept	1.846**	1.857**	1.740**	1.816**
Level-2 Fixed Effects: Age				
Friend Support	0.001	0.002	0.001	0.009+
Friend Strain	-0.008+	-0.005	-0.008+	0.017
Female	-0.055***	-0.055***	-0.055***	0.016
Friend Support *x* Friend Strain		-0.001		-0.005*
Friend Support *x* Female				-0.013*
Friend Strain *x* Female				-0.046*
Friend Support *x* Friend Strain *x* Female				0.008**
Random Effects				
σ^2(Age)	0.063***	0.064***	0.064***	0.063***
σ^2(Intercept)	3.822***	3.822***	3.819***	3.818***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.173***
σ^2(Residual)	1.166***	1.166***	1.166***	1.166***
Wald χ^2 [d]	0.76	0.12	3.51	7.02+
df	1	1	3	3

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1).

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the final main effects model.

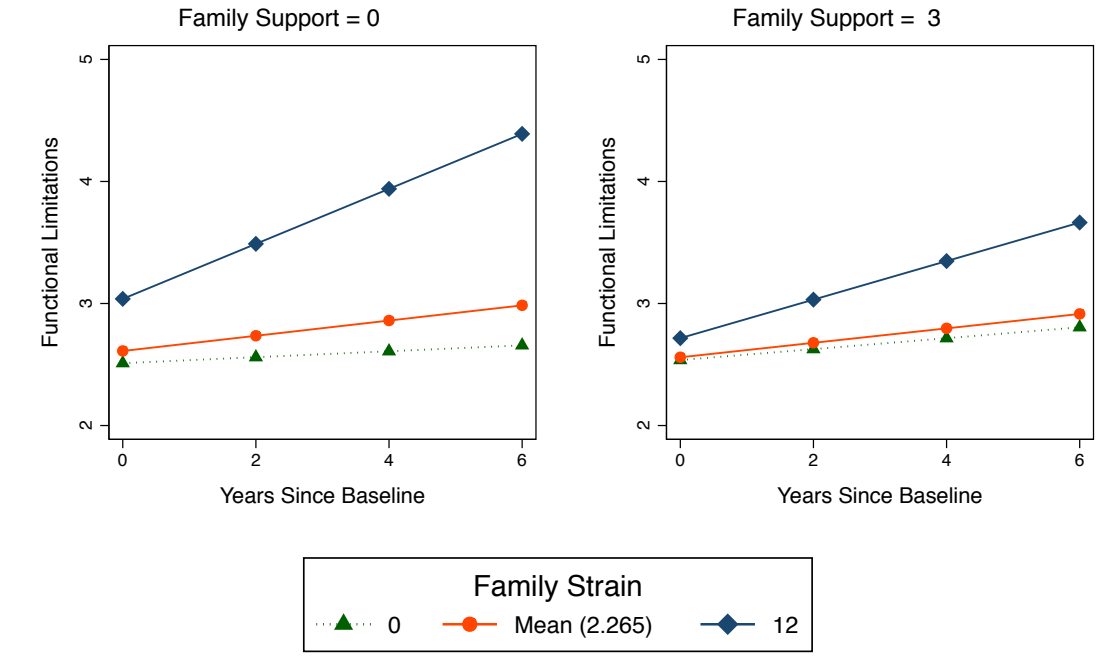
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 4.6. Effects of Friend Strain on Changes in Functional Limitations by Levels of Friend Support for Men [a, b, c]

Friend Support	b Friend Strain
= 0	0.017
= 1	0.012
= 2	0.007
= 3	0.003
= 4	-0.002
= 5	-0.007
= 6	-0.012*
= 7	-0.017*
= 8	-0.021*
= 9	-0.026**

Source: 2006-2012 Health and Retirement Study
a. Estimates are weighted and standard errors are adjusted for clustering and stratification.
b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.
c. Estimates based on results from Model 4 in Table 4.5
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

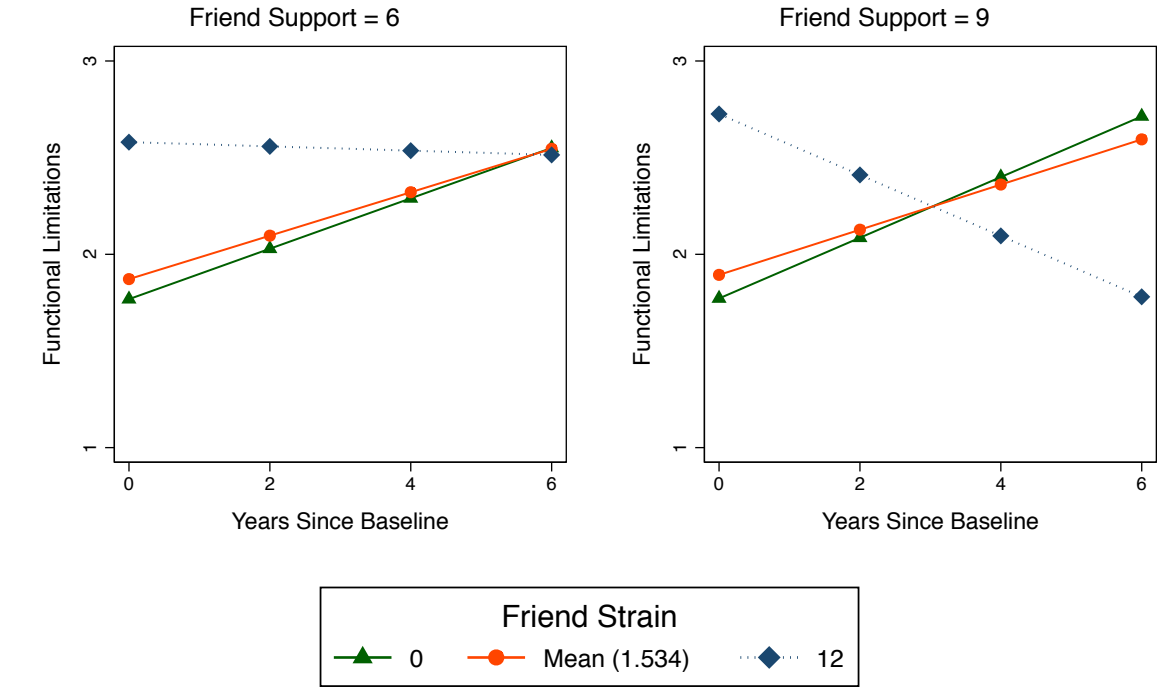
Figure 4.1. Trajectories of Functional Limitations for Women by Family Support/Strain [5]



Dotted lines represent slopes with p-values > 0.10

[5] For all plotted regression lines non-focal continuous variables were held constant at their means and all dichotomous variables were held constant at zero except for, HRS cohort membership, all health insurance indicators, white race/ethnicity, and high school educational attainment (which were held constant at a value of one).

Figure 4.2. Trajectories of Functional Limitations for Men by Friend Support/Strain



Dotted lines represent slopes with p-values > 0.10

Table 5.1. Effects of Spousal Support and Children Support/Strain Interactions on Trajectories of Functional Limitations [a, b, c]

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Level-1 Fixed Effects				
Age	0.253+	0.221+	0.177	0.208
Level-2 Fixed Effects: Intercept				
Main Effects				
Age (Baseline)	0.013	0.013	0.013	0.013
Spousal Support	0.117**	0.006	0.024	0.023
Spousal Strain	-0.053**	-0.051**	-0.105**	-0.030+
Children Support	0.107+	-0.008	-0.042	-0.006
Children Strain	0.032*	-0.008	0.032*	0.067**
Cross-Domain Interactions				
Spousal Support *x* Children Support	-0.016*			
Spousal Support *x* Children Strain		0.006		
Spousal Strain *x* Children Support			0.009+	
Spousal Strain *x* Children Strain				-0.007+
Intercept	1.272+	2.066***	2.151***	1.851**
Level-2 Fixed Effects: Age				
Main Effects				
Spousal Support	-0.004	0.001	0.003	0.003
Spousal Strain	0.005+	0.005	0.011	0.005
Children Support	-0.010	-0.001	0.003	-0.001
Children Strain	0.000	-0.003	0.000	0.000
Cross-Domain Interactions				
Spousal Support *x* Children Support	0.001			
Spousal Support *x* Children Strain		0.000		
Spousal Strain *x* Children Support			-0.001	
Spousal Strain *x* Children Strain				0.000
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.064***
σ^2(Intercept)	3.818***	3.822***	3.819***	3.820***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.174***
σ^2(Residual)	1.166***	1.166***	1.166***	1.166***
Wald χ^2 [d]	5.23+	1.60	3.36	3.11
df	2	2	2	2

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1).

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the final main effects model.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.2. Effects of Spousal Support on Baseline Functional Limitations by Levels of Children Support [a, b, c]

Children Support	b Spousal Support
= 0	0.117**
= 1	0.102**
= 2	0.086**
= 3	0.070*
= 4	0.055*
= 5	0.039+
= 6	0.024
= 7	0.008
= 8	-0.008
= 9	-0.023

Source: 2006-2012 Health and Retirement Study
a. Estimates are weighted and standard errors are adjusted for clustering and stratification.
b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.
c. Estimates based on results from Model 1 in Table 5.1.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.3. Effects of Spousal Strain on Baseline Functional Limitations by Levels of Children Support [a, b, c]

Children Support	b Spousal Strain
= 0	-0.105**
= 1	-0.096**
= 2	-0.088**
= 3	-0.079**
= 4	-0.071**
= 5	-0.062**
= 6	-0.053**
= 7	-0.045**
= 8	-0.036*
= 9	-0.028

Source: 2006-2012 Health and Retirement Study
a. Estimates are weighted and standard errors are adjusted for clustering and stratification.
b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.
c. Estimates based on results from Model 3 in Table 5.1.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.4 Effects of Spousal Strain on Baseline Functional Limitations by Levels of Children Strain [a, b, c]

Children Strain	b Spousal Strain
= 0	-0.030+
= 1	-0.037*
= 2	-0.044**
= 3	-0.051**
= 4	-0.058**
= 5	-0.065**
= 6	-0.072**
= 7	-0.079**
= 8	-0.086**
= 9	-0.093**
= 10	-0.100**
= 11	-0.107**
= 12	-0.114**

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Estimates based on results from Model 4 in Table 5.1.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.5. Moderating Effects of Gender on Spouse/Child Cross-Domain Interaction Effects [a, b, c]

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Level-1 Fixed Effects				
Age	0.265	0.318*	0.171	0.186
Level-2 Fixed Effects: Intercept				
Age (Baseline)	0.012	0.013	0.013	0.013
Main Effects				
Spousal Support	0.106+	-0.007	0.022	0.022
Spousal Strain	-0.053***	-0.051**	-0.077*	-0.026
Children Support	0.092	-0.007	-0.035	-0.006
Children Strain	0.032*	-0.048	0.032*	0.063*
Female	0.593	0.628+	0.957**	0.809***
Cross-Domain Interactions				
Spousal Support *x* Children Support	-0.014			
Spousal Support *x* Children Strain		0.011		
Spousal Strain *x* Children Support			0.005	
Spousal Strain *x* Children Strain				-0.006
Gender Interactions				
Spousal Support *x* Female	0.019	0.022		
Spousal Strain *x* Female			-0.062	-0.009
Children Support *x* Female	0.025		-0.017	
Children Strain *x* Female		0.065		0.005
Cross-Domain Gender Interactions				
Spousal Support *x* Children Support *x* Female	-0.002			
Spousal Support *x* Children Strain *x* Female		-0.010		
Spousal Strain *x* Children Support *x* Female			0.007	
Spousal Strain *x* Children Strain *x* Female				-0.001
Intercept	1.370+	2.157**	2.077***	1.839**
Level-2 Fixed Effects: Age				
Main Effects				
Spousal Support	-0.009	-0.012	0.002	0.002
Spousal Strain	0.005+	0.005	0.009	0.012*
Female	-0.127	-0.228**	-0.012	-0.013
Children Support	0.002	-0.000	0.005	-0.001
Children Strain	0.000	-0.015	0.000	0.006
Cross-Domain Interactions				
Spousal Support *x* Children Support	0.000			
Spousal Support *x* Children Strain		0.002		
Spousal Strain *x* Children Support			-0.000	
Spousal Strain *x* Children Strain				-0.002

Table 5.5 Continued Below

Table 5.5 Continued

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Gender Interactions				
Spousal Support *x* Female	0.017	0.021*		
Spousal Strain *x* Female			0.001	-0.014*
Children Support *x* Female	-0.008		-0.005	
Children Strain *x* Female		0.018		-0.012
Cross-Domain Gender Interactions				
Spousal Support *x* Children Support *x* Female	-0.000			
Spousal Support *x* Children Strain *x* Female		-0.002		
Spousal Strain *x* Children Support *x* Female			-0.001	
Spousal Strain *x* Children Strain *x* Female				0.003*
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.063***
σ^2(Intercept)	3.818***	3.821***	3.819***	3.820***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.175***
σ^2(Residual)	1.166***	1.166***	1.166***	1.166***
Wald $\chi^{2\,d}$	6.06	7.93	3.48	6.20
df	6	6	6	6

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1).

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the corresponding model in Table 5.1

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.6. Effects of Spousal Support and Family Support/Strain Interactions on Trajectories of Functional Limitations [a, b, c]

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Level-1 Fixed Effects				
Age	0.218	0.129	0.185	0.227+
Level-2 Fixed Effects: Intercept				
Main Effects				
Age (Baseline)	0.013	0.012	0.013	0.012
Spousal Support	0.037	0.016	0.024	0.024
Spousal Strain	-0.051**	-0.051**	-0.067*	-0.037*
Family Support	0.019	-0.000	-0.013	0.001
Family Strain	0.006	-0.019	0.006	0.034
Cross-Domain Interactions				
Spousal Support *x* Family Support	-0.003			
Spousal Support *x* Family Strain		0.003		
Spousal Strain *x* Family Support			0.003	
Spousal Strain *x* Family Strain				-0.006
Intercept	1.836**	2.021**	1.994**	1.883**
Level-2 Fixed Effects: Age				
Main Effects				
Spousal Support	0.001	0.012*	0.003	0.003
Spousal Strain	0.005	0.005+	0.010+	-0.002
Family Support	-0.001	0.002	0.006	0.001
Family Strain	0.006+	0.032***	0.006+	-0.006
Cross-Domain Interactions				
Spousal Support *x* Family Support	0.000			
Spousal Support *x* Family Strain		-0.004**		
Spousal Strain *x* Family Support			-0.001	
Spousal Strain *x* Family Strain				0.003**
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.063***
σ^2(Intercept)	3.822***	3.822***	3.822***	3.821***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.173***
σ^2(Residual)	1.166***	1.166***	1.166***	1.166***
Wald χ^2 [d]	0.28	8.64*	1.63	7.52*
df	2	2	2	2

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1).

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the final main effects model.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.7. Effects of Family Strain on Changes in Functional Limitations by Levels of Spousal Support [a, b, c]

Spousal Support	b Family Strain
= 0	0.032***
= 1	0.029***
= 2	0.025***
= 3	0.022***
= 4	0.018***
= 5	0.014***
= 6	0.011**
= 7	0.007*
= 8	0.004
= 9	0.000

Source: 2006-2012 Health and Retirement Study
a. Estimates are weighted and standard errors are adjusted for clustering and stratification.
b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.
c. Estimates based on results from Model 2 in Table 5.6.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.8. Effects of Spousal Strain on Changes in Functional Limitations by Levels of Family Strain [a, b, c]

Family Strain	b Spousal Strain
= 0	-0.002
= 1	0.001
= 2	0.004
= 3	0.007*
= 4	0.009**
= 5	0.012**
= 6	0.015**
= 7	0.017**
= 8	0.020**
= 9	0.023**
= 10	0.026**
= 11	0.028**
= 12	0.031**

Source: 2006-2012 Health and Retirement Study
a. Estimates are weighted and standard errors are adjusted for clustering and stratification.
b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.
c. Estimates based on results from Model 4 in Table 5.6.
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.9. Moderating Effects of Gender on Spouse/Family Cross-Domain Interaction Effects [a, b, c]

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Level-1 Fixed Effects				
Age	0.164	0.199	0.192	0.228+
Level-2 Fixed Effects: Intercept				
Age (Baseline)	0.012	0.012	0.012	0.012
Main Effects				
Spousal Support	0.020	0.029	0.023	0.023
Spousal Strain	-0.051**	-0.051**	-0.047	-0.026
Family Support	0.004	-0.000	0.010	0.001
Family Strain	0.006	0.012	0.006	0.046
Female	0.602	0.959**	1.150***	0.866***
Cross-Domain Interactions				
Spousal Support *x* Family Support	0.001			
Spousal Support *x* Family Strain		-0.000		
Spousal Strain *x* Family Support			0.001	
Spousal Strain *x* Family Strain				-0.008
Gender Interactions				
Spousal Support *x* Female	0.045	-0.022		
Spousal Strain *x* Female			-0.051	-0.021
Family Support *x* Female	0.036		-0.056	
Family Strain *x* Female		-0.044		-0.024
Cross-Domain Gender Interactions				
Spousal Support *x* Family Support *x* Female	-0.009			
Spousal Support *x* Family Strain *x* Female		0.005		
Spousal Strain *x* Family Support *x* Female			0.006	
Spousal Strain *x* Family Strain *x* Female				0.004
Intercept	1.897*	1.913**	1.843**	1.838**
Level-2 Fixed Effects: Age				
Main Effects				
Spousal Support	0.007	0.002	0.003	0.003
Spousal Strain	0.005+	0.005+	0.010	-0.001
Family Support	0.026	0.002	0.005	0.001
Family Strain	0.006+	0.029	0.006+	-0.007
Female	0.004	-0.187*	-0.058	-0.045+
Cross-Domain Interactions				
Spousal Support *x* Family Support	-0.003			
Spousal Support *x* Family Strain		-0.003		
Spousal Strain *x* Family Support			-0.001	
Spousal Strain *x* Family Strain				0.003+

Table 5.9 Continued Below

Table 5.9 Continued

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Gender Interactions				
Spousal Support *x* Female	-0.007	0.018+		
Spousal Strain *x* Female			0.000	-0.001
Family Support *x* Female	-0.037*		0.002	
Family Strain *x* Female		0.008		0.001
Cross-Domain Gender Interactions				
Spousal Support *x* Family Support *x* Female	0.005*			
Spousal Support *x* Family Strain *x* Female		-0.002		
Spousal Strain *x* Family Support *x* Female			-0.000	
Spousal Strain *x* Family Strain *x* Female				-0.001
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.063***
σ^2(Intercept)	3.820***	3.822***	3.819***	3.820***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.174***
σ^2(Residual)	1.167***	1.167***	1.166***	1.166***
Wald χ^2 [d]	11.55	6.78	4.08	2.06
df	6	6	6	6

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1).

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the corresponding model in Table 5.6.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.10. Effects of Spousal Support and Friend Support/Strain Interactions on Trajectories of Functional Limitations [a, b, c]

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Level-1 Fixed Effects				
Age	0.257+	0.201	0.184	0.208
Level-2 Fixed Effects: Intercept				
Age (Baseline)	0.012	0.013	0.013	0.013
Main Effects				
Spousal Support	0.051	0.020	0.024	0.024
Spousal Strain	-0.051**	-0.051**	-0.054	-0.041*
Friend Support	0.029	-0.008	-0.011	-0.008
Friend Strain	0.043*	0.025	0.044*	0.074*
Cross-Domain Interactions				
Spousal Support *x* Friend Support	-0.005			
Spousal Support *x* Friend Strain		0.003		
Spousal Strain *x* Friend Support			0.001	
Spousal Strain *x* Friend Strain				-0.006
Intercept	1.744*	1.967**	1.947**	1.886**
Level-2 Fixed Effects: Age				
Main Effects				
Spousal Support	-0.005	0.003	0.003	0.003
Spousal Strain	0.005+	0.005	0.009	0.004
Friend Support	-0.010	0.001	0.004	0.001
Friend Strain	-0.008+	-0.006	-0.008+	-0.011
Cross-Domain Interactions				
Spousal Support *x* Friend Support	0.001			
Spousal Support *x* Friend Strain		-0.000		
Spousal Strain *x* Friend Support			-0.001	
Spousal Strain *x* Friend Strain				0.001
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.063***
σ^2(Intercept)	3.822***	3.822***	3.822***	3.821***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.174***
σ^2(Residual)	1.166***	1.166***	1.166***	1.166***
Wald χ^2 [d]	1.20	0.12	1.04	1.70
df	2	2	2	2

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1).

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the final main effects model.

+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Table 5.11. Moderating Effects of Gender on Spousal/Friend Cross-Domain Interaction Effects [a, b, c]

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Level-1 Fixed Effects				
Age	0.299+	0.280*	0.176	0.201
Level-2 Fixed Effects: Intercept				
Age (Baseline)	0.012	0.013	0.012	0.013
Main Effects				
Spousal Support	0.013	0.025	0.023	0.023
Spousal Strain	-0.051**	-0.051**	-0.012	-0.036
Friend Support	-0.013	-0.009	0.029	-0.009
Friend Strain	0.043*	0.040	0.043*	0.097*
Female	0.338	0.883*	1.390***	0.884***
Cross-Domain Interactions				
Spousal Support *x* Friend Support	0.002			
Spousal Support *x* Friend Strain		0.003		
Spousal Strain *x* Friend Support			-0.006	
Spousal Strain *x* Friend Strain				-0.007
Gender Interactions				
Spousal Support *x* Female	0.087	-0.004		
Spousal Strain *x* Female			-0.104+	-0.011
Friend Support *x* Female	0.079		-0.093*	
Friend Strain *x* Female		-0.011		-0.053
Cross-Domain Gender Interactions				
Spousal Support *x* Friend Support *x* Female	-0.015			
Spousal Support *x* Friend Strain *x* Female		-0.005		
Spousal Strain *x* Friend Support *x* Female			0.015+	
Spousal Strain *x* Friend Strain *x* Female				0.003
Intercept	1.964**	1.893**	1.719**	1.836**
Level-2 Fixed Effects: Age				
Main Effects				
Spousal Support	-0.011	-0.007	0.003	0.003
Spousal Strain	0.005+	0.005+	0.010	0.007
Friend Support	-0.006	0.001	0.006	0.001
Friend Strain	-0.008+	-0.017	-0.008+	-0.006
Female	-0.170	-0.188*	-0.014	-0.033
Cross-Domain Interactions				
Spousal Support *x* Friend Support	0.001			
Spousal Support *x* Friend Strain		0.001		
Spousal Strain *x* Friend Support			-0.001	
Spousal Strain *x* Friend Strain				-0.001

Table 5.11 Continued Below

Table 5.11 Continued

	Model 1 b	Model 2 b	Model 3 b	Model 4 b
Gender Interactions				
Spousal Support *x* Female	0.019	0.017+		
Spousal Strain *x* Female			-0.004	-0.006
Friend Support *x* Female	0.002		-0.005	
Friend Strain *x* Female		0.015		-0.009
Cross-Domain Gender Interactions				
Spousal Support *x* Friend Support *x* Female	-0.001			
Spousal Support *x* Friend Strain *x* Female		-0.002		
Spousal Strain *x* Friend Support *x* Female			0.000	
Spousal Strain *x* Friend Strain *x* Female				0.002
Random Effects				
σ^2(Age)	0.063***	0.063***	0.063***	0.063***
σ^2(Intercept)	3.819***	3.820***	3.818***	3.820***
cov(Age, Intercept)	-0.174***	-0.174***	-0.174***	-0.174***
σ^2(Residual)	1.166***	1.166***	1.166***	1.166***
Wald $\chi^{2\,d}$	10.35	6.91	7.97	4.37
df	6	6	6	6

Source: 2006-2012 Health and Retirement Study

a. Estimates are weighted and standard errors are adjusted for clustering and stratification.

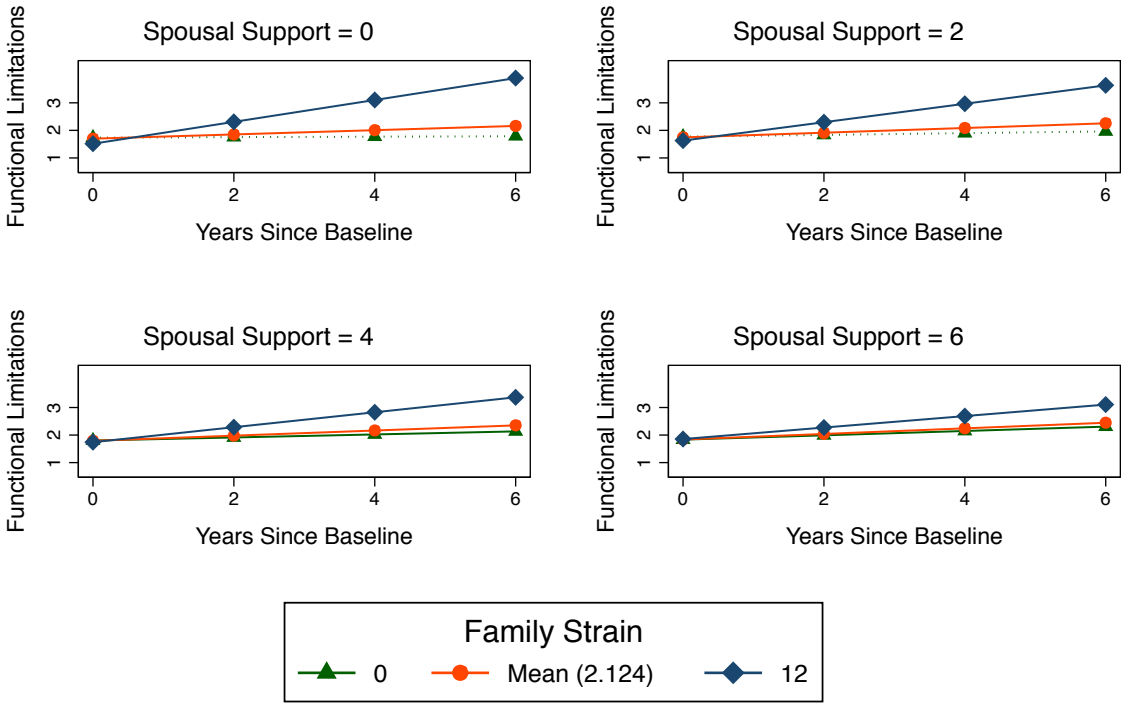
b. Analytic sample is comprised of 20,475 observations nested in 7,144 respondents.

c. Models include all other variables in the final main effects model (Model 5, Table 3.1).

d. Wald χ^2 tests improvement to model fit with the parameters added to the respective model, relative to the corresponding model in Table 5.10.

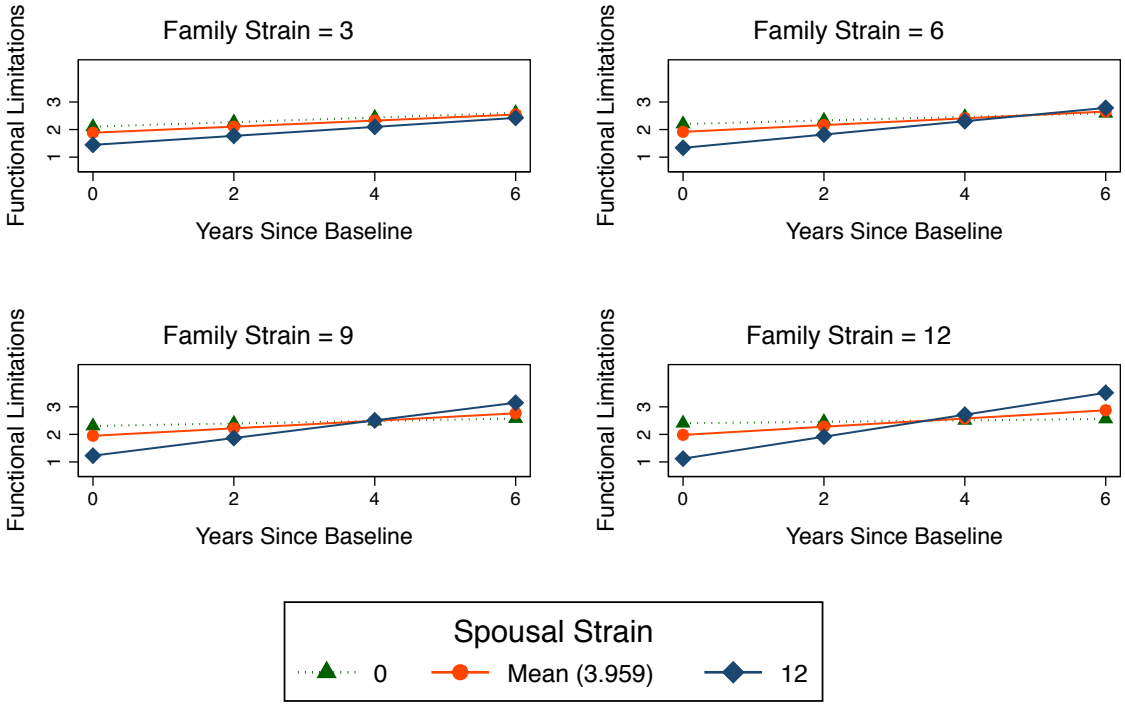
+ p<0.10, * p<0.05, ** p<0.01, *** p<0.001

Figure 5.1. Trajectories of Functional Limitations by Spousal Support and Family Strain



Dotted lines represent slopes with p-values > 0.10

Figure 5.2. Trajectories of Functional Limitations by Spousal Strain and Family Strain



Dotted lines represent slopes with p-values > 0.10