The Importance of Gender in the Relationship between Type of Chronic Conditions and Spouse's Depressive Symptoms

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ABSTRACT

Chronic conditions of one spouse negatively impact the mental health of the other spouse, and there is some evidence that chronic conditions harm wife's mental health more than husband's. Yet little is known regarding how different types of conditions influence spouse's depressive symptoms nor whether this depends on gender. In this study, I examine how the association between a person's chronic condition and his or her spouse's depressive symptoms at one point in time and the trajectory of change in those depressive symptoms over time differs by type of chronic condition, paying attention to the importance of gender throughout the analysis. I analyze multiple waves of the Health and Retirement Study (HRS) using Actor-Partner Interdependence Models—specifically dyadic growth curve models. I find that lung disease and stroke are the most detrimental for the spouse's mental health, while arthritis, cancer, and high blood pressure are not related to spouse's depressive symptoms. Lung disease, heart disease, and diabetes impact spouse's depressive symptoms similarly regardless of whether the husband or wife has the condition. But a husband's stroke increases his spouse's depressive symptoms initially whereas a wife's stroke increases her spouse's depressive symptoms over time. While marriage has been understood as an important resource for the chronically ill, this study demonstrates the cost of chronic conditions for the spouse and that this cost is higher for some chronic conditions than others. By identifying key contexts where chronic conditions are connected to spousal depressive symptoms, this study identifies important areas of vulnerability and thus potential areas for intervention.

There are multiple types of chronic conditions-- disorders that affect a person's ability to function and are characterized by long duration-- with a wide diversity of symptoms and characteristics [1]. Studies find that chronic conditions harm mental health as indicated by depressive symptoms [2-5]. Depressive symptoms are an important dimension of well-being referring to a range of behaviors and feelings including restless sleep, sadness, and loneliness [6]. The type of chronic condition encountered may be associated with different trajectories of depressive symptoms, reflecting epidemiologic differences in who gets each condition, how severe each condition is, and the lifestyle changes and health care related to each condition. A diagnosis of heart disease may be more depressing than a diagnosis of arthritis as heart disease may lead to more worry about death. But daily life with arthritis may be more disruptive than some types of heart disease that do not require lifestyle changes. Depressive symptoms from a chronic condition occur both for the person with the chronic condition [2-5], as well as her or his spouse [7]. Some conditions may have greater negative psychological impact on spouses than others, requiring more care or promoting more worry. Yet most studies of chronic conditions and spouse's depressive symptoms either do not distinguish between type of condition or only consider one type of condition, not comparing spouse's depressive symptoms across types of conditions [7-11]. Examining multiple types of chronic conditions separately but within the same study enables the consideration of the unique character of each condition and its implications for the depressive symptom dynamics within marriage.

Chronic conditions are not randomly distributed, but rather some types of conditions are more common and/or serious among men and others among women. This occurs for biological, social, and psychological reasons [12]. Consequently, the impact of different types of chronic conditions, both for the person with the condition and their spouse, likely differs according to the

gender of the person with the condition and the type of condition considered. Less common conditions for certain genders may actually be more distressing for those marriages due to these conditions being less normative. Additionally, different chronic conditions disrupt daily lives in gendered ways (e.g., different severity by gender, different timing by gender) and consequently may have different consequences for men and women. One key pathway which I will test involves the disabilities associated with the chronic condition. Women provide more caregiving than men and are more depressed from that caregiving than men [13]; thus for women, having a spouse with a chronic condition with high levels of associated disabilities may be more depressing than it is for men. Alternatively, women's disabilities associated with certain types of chronic conditions may be more disruptive to a marriage than men's due to the greater amount of unpaid work women do in the home [14], and thus men may experience more depressive symptoms from being married to a spouse with these types of chronic conditions than women. A second possible pathway involves depressive symptoms of the chronically ill spouse. Women may also be more sensitive to the depressive symptoms of their spouses than men [15], and thus chronic conditions which contribute to more depressive symptoms for the chronically ill person may be more detrimental for wives than husbands.

In this present study, I analyze how depressive symptoms are influenced by a spouse's chronic conditions (specifically high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, and arthritis) and how these depressive symptoms unfold over time. I specifically look at how different types of chronic conditions influence spouse's depressive symptom trajectories, considering the gender of the chronically ill person. I use Actor-Partner Interdependence Model (APIM) techniques [16]—specifically couple-level latent growth curve models-- to explore unfolding linkages between chronic conditions and psychological distress of husbands and wives

(N = 8,690 couples) in the Health and Retirement Study (HRS), a nationally representative sample of older adults. I address three specific questions:

(1) How does the association between a person's chronic condition and his or her spouse's depressive symptoms at one point in time and the trajectory of change in those depressive symptoms over time differ by type of chronic conditions?

(2) Do these patterns depend on the gender of the chronically ill spouse?

(3) Are these patterns mediated by the chronically ill spouse's depressive symptoms and/or disabilities?

TYPES OF CONDITIONS

In this study, I consider seven different types of chronic conditions: high blood pressure, diabetes, cancer, lung disease, heart disease, arthritis, and stroke. Below I outline how I expect each to be associated with spouse's depressive symptoms and why this might be gendered.

High Blood Pressure

High blood pressure, or hypertension, is a chronic condition in which the blood pressure in the arteries is elevated, putting strain on the heart [17]. About 34 percent of American adults have high blood pressure, making it the most common chronic condition in the U.S. [18]. Health behavior changes, especially healthier diets, less alcohol consumption, and blood pressure medications, can decrease the risk of these health conditions [17]. High blood pressure has few symptoms, though some report headaches and light-headedness [17]. People with high blood pressure have more depressive symptoms than those without high blood pressure, though most studies posit that depressive symptoms cause high blood pressure rather than the other way around [19]. From ages 45 to 64, the percentages of men and women with hypertension is

similar, but for those 65 and older, more women than men have hypertension [18]. Further, the risk of death is higher for women with high blood pressure than men [18].

Studies on spouses of people with hypertension find that being married to someone with high blood pressure gives someone twice the risk of high blood pressure than having a spouse without high blood pressure [20]. This is especially true for men, for whom having a hypertensive spouse increases their own risk of hypertension more so than age, BMI, or having diabetes [20]. However, there are no studies of whether spouses of people with high blood pressure have increased depressive symptoms. High blood pressure does require health behavior changes for treatment, and because health behavior changes within marriage are often orchestrated by wives rather than husbands [21, 22], I anticipate that having a spouse with high blood pressure will be more depressing for women than men.

Diabetes

Diabetes is characterized by high blood glucose concentrations and a deficiency of insulin, the hormone which regulates blood glucose [23]. About 8 percent of Americans have type II diabetes, the most common type of diabetes [23]. Diabetes often requires health behavior changes, such as healthy diets and exercise, and vigilant and sustained adherence to a treatment regimen, such as taking insulin [23, 24]. This adherence often proves difficult and stressful [24]. Diabetes is associated with increased disabilities, some caused indirectly by increased weight and others due to vascular issues related to excess glucose (e.g., loss of sensation in limbs, amputation, eye problems) [23]. Further, studies find that people with diabetes have more depressive symptoms than people without diabetes [25, 26].Though a similar percentage of men and women are diagnosed with type II diabetes, men's diabetes contributes to greater weight gain and is correlated with lower physical activity than women's [27] and women's diabetes

contributes to more heart disease and deaths than men's [28]. Differences between men and women are due to sex differences in insulin sensitivity and where fat is stored, disparities in how men and women are treated by doctors, and differences in men and women's health behaviors [27, 28].

Several studies have considered how diabetes in one spouse influences the other spouse, demonstrating that diabetes increases financial strain within a marriage, leads to increased worrying, and promotes relationship strain [26, 29]. Thus not surprisingly, studies find that spouses of diabetes patients have elevated levels of depressive symptoms compared to community levels, though these studies do not directly compare spouses of diabetic people to spouses of non-diabetic people [26, 30]. Diabetes is associated with health behavior changes for both partners [31, 32], and higher involvement with a diabetic spouse's health behaviors increases one's own depressive symptom levels [25, 31]. Though most studies that consider how diabetes impacts a spouse do not consider gender differences [32, 33], one study demonstrated that spouses' depressive symptoms are greater for women with a diabetic spouse than men with a diabetic spouse [26] and another study found no difference by gender [30]. Both studies had small sample sizes and did not have a comparison group of couples without diabetes. Because research finds that wives exert more effort into improving their spouse's health behaviors and alleviate their spouse's depressive symptoms than husbands [21, 22], I hypothesize that having a spouse with diabetes influences women more so than men.

Cancer

Cancer is a category of chronic conditions characterized by unregulated cell growth wherein cells divide and grow, forming tumors [34]. Cancer is the second leading cause of death in the U.S. [35]. Treatment of cancer relies mostly on medical procedures, such as

chemotherapy, radiation treatment, and surgeries [34]. People with cancer often have disabilities, both because of the cancer itself and its treatment, though the extent of these disabilities depend on the type and severity of the cancer [36]. People with cancer have more depressive symptoms than people without cancer [37] and with increases in depressive symptoms over time due to disease severity and progression [37]. People with cancer generally have less control over their disease progression than people with diabetes or high blood pressure, and this lack of perceived control may contribute to more depressive symptoms for cancer patients than diabetic or hypertensive patients [7]. The association between cancer and gender is complex, as different types of cancer are more common and more severe in men while others are more common and more severe in women. Some of the differences between men and women in cancer are due to biological sex differences, whereas others are due to health behaviors and lifestyles [34].

In general, studies find that being married to a person with cancer increases one's own depressive symptoms [10, 38]. Many of these studies focus on either prostate cancer or breast cancer and thus rarely consider men and women with cancer in the same study [39, 40]. The association between one spouse's cancer and the other spouse's depressive symptoms is partially mediated by the cancer patient's depressive symptoms and disabilities [38]. A meta-analysis found that only women, not men, experience increased depressive symptoms when their spouse has cancer, though the authors suggest that this difference may reflect community-level differences in men's and women's depressive symptoms, not the cancer itself, as few studies include a comparison group [41]. I hypothesize that, due to the large variety of cancers likely present in my sample, there will be no gender differences in how men and women's depressive symptoms relate to having a spouse with cancer.

Lung Disease

Chronic lung disease are conditions which primarily affect the lungs and negatively impact airways, air sacs, the interstitium, blood vessels, the pleura, and/or the chest wall [42]. Lung disease is currently the third leading cause of death in the U.S. [35]. Symptoms include chronic coughs, shortness of breath, and chronic chest pain [42] which can contribute to disabilities [43]. People with lung disease have more depressive symptoms than those without [44, 45], even adjusting for sociodemographic, clinical, and lifestyle factors [46].

Lung disease is more common and more serious among men than women-- this reflects sex differences in incidence, prevalence, severity, and mortality of lung disease [47, 48], which themselves reflect rates of smoking [49], occupational exposures [50], and biological propensities including hormones and lung development [47, 48]. Gender differences in prevalence and severity can lead to gender bias in diagnosis and treatment. One study found that physicians are less likely to diagnose women with lung disease compared to men, even when presented with identical symptoms [51]. This is despite the fact that the number of women with lung disease is rapidly increasing [52]. Controlling for severity of condition, women with lung disease have more disabilities than men with lung disease [53]. Regarding depressive symptoms, one study found that lung disease is associated with a greater increase in depressive symptoms among women than men [54].

Having a spouse with lung disease contributes to more depressive symptoms than having a spouse without lung disease [45]. These increased depressive symptoms are partially explained by the depressive symptoms of the spouse with lung disease and the amount of caregiving provided [45, 55]. Past studies have not considered how having a spouse with lung disease may impact men and women's depressive symptoms differently. As the amount of caregiving provided is associated with increased depressive symptoms [55] and women provide more

caregiving in general than men [56], I expect women married to spouses with lung disease to have more depressive symptoms than men. As an alternative hypothesis, women experience more depressive symptoms and disabilities from lung disease than men [53, 54], and this could lead to more depressive symptoms for men married to women with lung disease than women married to men with lung disease.

Heart Disease

Heart disease is a class of conditions that affect the cardiovascular system [57]. Heart disease is the leading cause of death in the U.S. [35]. In addition to medication, physicians often also recommend health behavior changes, like healthier diets, reduced smoking and alcohol consumption, and moderate exercise, in order to cope with heart disease [58]. Symptoms of chronic heart disease vary depending on type of disease, but in general they include shortness of breath, low energy, chest discomfort, and swelling [57]. Heart disease is also associated with increased disabilities [59] and increased depressive symptoms [60].

More men experience heart disease than women until women begin menopause, at which point the gender difference lessens [18]. Experiences of heart disease look different for woman than men, with women developing heart disease later in life, women more likely to die after their first heart attack, and men and women developing different symptoms and responding differently to tests like EKGs [61]. Research finds important disparities in how physicians treat men with heart disease compared to women [62]; for instance, physicians are less likely to order tests and medications appropriate for an urgent cardiac condition when experienced by women than men [63], and women report worse quality of care for heart disease than men [64].

Compared to other conditions considered in this study, few studies consider the effects of having a spouse with heart disease, with most studies focusing only on the patient. Those that do

consider spouses tend to exclude comparison groups, analyze small samples, and use cross-sectional data, but do find that having a spouse with heart disease is associated with higher levels of depressive symptoms [65, 66]. A study of 20 spouses of patients with heart disease found that spouses are stressed because of the burden of performing household tasks, managing patient behaviors, and as a result, their emotional and financial well-being, time for social activities, and general health are negatively impacted [65]. Further, the more serious the heart disease is, measured by physical signs and symptoms and psychological well-being, the more depressive symptoms the spouse experiences [67]. Most studies find no gender differences-- men and women are both negatively affected by having a spouse with heart disease [67, 68], and I expect that I will replicate this no difference finding using nationally-representative data.

Stroke

A stroke is the rapid loss of brain function due to disturbance in the brain's blood supply [69], and it is the fourth leading cause of death in the U.S. [70] and a leading cause of disability [18]. Though stroke is an acute event, it has chronic consequences including muscle weakness, numbness, speech loss, vision loss, pain, incontinence, cognitive impairments, and difficulty doing daily activities; thus, it often requires intensive physical therapy and caregiving [69]. Stroke also contributes to psychological and emotional difficulties, including anxiety, panic attacks, irritability, depression, and overall distress [69]. In general, stroke is more common among men, and women experience stroke at older ages than men [71]. When women experience stroke, it tends to be more severe than when men experience stroke and more often results in fatality [71]. Further, post-stroke depressive symptoms are more common in women than men [72], perhaps reflecting the greater stroke severity experienced by women.

Stroke introduces stress into a marriage, especially when the stroke contributes to disabilities and communication difficulties [73]. Spouses of stroke patients have more depressive symptoms than other married adults [74-76], and longitudinal studies find that initial levels of depressive symptoms and change in depressive symptoms over time is associated with stroke severity and patient's condition (e.g., speech and memory difficulties, disabilities, patient's own distress) [74, 76]. There is mixed evidence on whether this depends on gender, with one study finding that depressive symptoms are greater for wives than husbands [75] and another finding no gender differences [76]. In general, gender is rarely considered. As stroke is associated with disabilities and women are more negatively affected by a spouse's disabilities than men [77, 78], I expect wives of stroke patients to be more negatively affected than husbands. Alternatively, because women are more negatively affected by stroke themselves in terms of depressive symptoms [72], this may in turn contribute to more depressive symptoms among husbands with spouses with stroke than wives.

Arthritis

Arthritis, a joint disorder that involves inflammation of one or more joints or elsewhere in the musculoskeletal system, is the most common cause of disabilities in the United States and often leads to inability to use one's hands, tiredness, poor sleep, muscle aches and pains, and difficulty moving the affected joint [79]. One in five U.S. adults report doctor-diagnosed arthritis, a number that is expected to rise sharply with the aging of the population [79]. In addition, adults with arthritis report more depressive symptoms than adults without arthritis [80]. Arthritis is more prevalent in women than men at all age groups, and this gender gap grows with age [81, 82]. Further, arthritis is more severe among women than men. Women with arthritis report more joint pain and higher activity and work limitations than men with arthritis [82, 83].

An analysis of the National Health Interview Survey found that women with arthritis are 70 percent more likely to experience depression than men with arthritis [80, see also 82], though other studies find no gender difference [84, 85]. Some research links women's greater prevalence and severity of arthritis to genetic inclinations, hormonal changes around pregnancy and menopause, and low levels of testosterone [83, 86]. Perhaps because of the gender gap in arthritis diagnosis and symptoms, as well as the cultural construction of arthritis as a "woman's disorder," most studies of arthritis use samples composed only of women [see 86, 87]. Consequently, men's experiences with arthritis may be largely invisible and minimized.

Several studies of arthritis and depressive symptoms within marriage examine women with arthritis and their husbands, but do not include men with arthritis [88, 89]. Just as the experiences of men with arthritis are largely ignored, the experiences of women married to men with arthritis are similarly overlooked, and any conclusions about the importance of gender are conflated with patient- or spouse-role. Studies that do include married women and men with arthritis do not consider gender differences in spousal depressive symptoms [90, 91]. I expect that husbands of women with arthritis will have more depressive symptoms than wives of men with arthritis, as women's arthritis is more severe [82, 83] and thus likely more negatively impacts the marriage.

Summary

In summary, while many studies have considered how specific types of chronic conditions influence a spouse's depressive symptoms, with a few exceptions, these studies do not compare across types of conditions, consider how this may unfold over time using longitudinal data, compare marriages in which the husband has the condition to marriages in which the wife has the condition, or include a comparison group of couples without these conditions. I address

these gaps in this study, thus expanding our understanding of the consequences of chronic conditions within marriage by highlighting what chronic conditions are more detrimental to spouses' mental health and whether this depends on gender.

METHODS

Data

In this study, I assess patterns of gender, chronic conditions, and depressive symptoms within marriage using multiple waves (1994-2010) of the Health and Retirement Study (HRS), a nationally representative sample of primary respondents aged 51 to 61 years in 1992 and their spouse (any age). I use the RAND HRS data, provided by the RAND Center for the Study of Aging, which merges the HRS data with the Assets and Health Dynamics Among the Oldest Old (AHEAD) data [92]. AHEAD consists of adults born in 1923 or before, along with their spouses. For both samples, response rates across waves range from 80 to 90 percent.

The HRS is well-suited for this study because it is a large, nationally representative, longitudinal, and dyadic data set. The HRS uses a multi-stage, clustered area probability frame in order to generate a representative sample. Most prior studies of chronic conditions and depressive symptoms within marriage depend on very small sample sizes, rarely including more than 100 couples, and are often restricted to a specific geographic location, a specific type of chronic disease, or other non-representative samples (see Berg & Upchurch 2007 for overview). With a large nationally representative data set, I am able to consider stratified samples and test models across and within groups, asking questions about gender and types of conditions-- possibilities that are limited with smaller samples. Because respondents are re-interviewed approximately every two years [93], I am able to address key research questions regarding how psychological distress processes unfold over time and will unfold differently for different types

of chronic conditions. Finally, the HRS uniquely allows me to analyze respondents and their spouses. This point is critical, as my analysis hinges on examining the lived experiences of husbands and wives within marriage, requiring data that includes both perspectives.

I construct three analytic samples. All samples are limited to married couples in which both spouses are interviewed in at least three waves, with wave 2 (i.e., 1994) being the first eligible wave. I restrict the sample to couples interviewed for at least three waves as this is the minimal number of waves required for latent growth curve analysis. I restrict the sample to wave 2 and later because the depressive symptoms questions in wave 1 differs from the questions in later years. The primary analytic sample is composed of couples in which both spouses are interviewed for at least three waves ($n = 8{,}690$). Baseline for each couple is defined as the first wave in which both spouses are interviewed. I construct two other analytic samples in order to test for robustness of results. One of these analytic samples is composed of couples in which the husband has only one chronic condition or zero chronic conditions at baseline, and the other analytic sample is composed of couples in which the wife has only one chronic condition or zero chronic conditions at baseline. In analysis of these supplementary samples, a person's depressive symptoms when married to a spouse with only one chronic condition is compared to a person's depressive symptoms when married to a spouse with no chronic conditions-- respondents with spouses with two or more chronic conditions are excluded. Results for these two analytic samples are similar to results from the primary analytic sample and thus not discussed.

Measures

Types of Chronic Conditions

Respondents and their spouses are asked at baseline: "Has the doctor ever told you that you have (1) high blood pressure or hypertension; (2) diabetes or high blood sugar; (3) cancer or

a malignant tumor of any kind except skin cancer; (4) chronic lung disease except asthma such as chronic bronchitis or emphysema; (5) heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems; (6) stroke or transient ischemic attack (TIA); and (7) arthritis or rheumatism?" In subsequent interviews, they are asked, "Since we last talked to you, that is since [last interview date], has a doctor told you that have have…?" followed by the same list of conditions. Chronic conditions are treated categorically (1= high blood pressure; 2= diabetes; 3= cancer; 4= chronic lung disease; 5= heart disease; 6= stroke; and 7= arthritis), and these categories are not mutually exclusive. Respondents are also asked about psychological disorders, but I exclude psychological disorders as this is collinear with depressive symptoms.

Depressive Symptoms

Depressive symptoms are measured using the eight items from the Center for Epidemiologic Studies Depression (CES-D) scale provided by the HRS [94]. These items measure whether the respondent experiences the following all or most of the time: feels depressed, feels everything is an effort, has restless sleep, feels alone, feels sad, cannot get going, feels happy, and enjoys life. The items are coded so that higher values reflect more depressive symptoms, and responses range from 0-8. This short form of the CES-D scale has predictive accuracy when compared to the full-length version and strong correlation with poor mental health, as well as good internal consistency with a Cronbach's alpha of 0.78 [95, 96].

Gender

Gender is self-reported as male or female. For ease of discussion, I use male interchangeably with man and husband and female interchangeably with woman and wife.

Disabilities

I propose that respondent's disabilities are a key pathway linking the chronic conditions of the respondent to the spouse's depressive symptoms. Disabilities are measured using self-reported activity of daily living (ADL) difficulties and instrumental activity of daily living (I-ADL) difficulties. The ADL difficulty score refers to the number of ADLs the respondent reports having some difficulties with, namely bathing, eating, dressing, walking across a room, and getting in or out of bed. This is a scale from 0 to 5. The I-ADL score is the number of I-ADLs the respondent reports having some difficulties with, specifically using a telephone, taking medication, and handling money. This is a scale from 0 to 3. I combine these measures into one ADL/I-ADL index, which is less biased by age than each index separately [97].

Covariates

Covariates include age of respondents (in years, calculated using birth year and year of interview), length of current marital duration at each wave (in years), number of years of educational attainment, race/ethnicity (dummy variables with four mutually exclusive categories: non-Hispanic White, non-Hispanic Black, Hispanic, and other), number of living children, and log of household income. Each is included as a covariate because past research shows that each is associated with depressive symptoms and chronic health conditions [98, 99].

Analysis

I use Actor-Partner Interdependence Models (APIM)-- specifically dyadic latent growth curve models-- to estimate the relationships between each type of chronic condition of one spouse and initial level and change in the depressive symptoms of the other spouse over time and whether these associations differ by gender [100]. APIM accounts for the non-independence of husband's and wife's chronic conditions and depressive symptoms, estimating these effects simultaneously [16]. George and Lynch [101] argue that growth curve models are the ideal

method to examine the initial impact of these stressful life events and subsequent psychological distress trajectories. Growth curve models distinguish within-individual heterogeneity from between-individual heterogeneity in estimating depressive symptom changes shaped by other variables [16, 100].

Using my primary analytic sample, I examine how each type of chronic condition is related to the initial levels and change our time of spouse's depressive symptoms, net of each other type of chronic condition and number of chronic conditions. I control for both spouse's other conditions (number and type) along with the other covariates. In other words, all chronic conditions are entered into the model at the same time. In one model, the focus is the husband's depressive symptoms, controlling for wife's type of conditions (as well as husband's type of conditions, husband's and wife's number of conditions, and other covariates), whereas in the other model, the focus is wife's depressive symptoms with the same controls. As an additional test of these associations, I fit separate models for each condition, not controlling for other types of conditions but still controlling for number of conditions for both husbands and wives. For instance, in one model I consider how one spouse's diabetes is related to the other spouse's depressive symptoms compared to not having diabetes. As with the earlier models, in one model the focus is husband's depressive symptoms and wife's type of condition and in the other model the focus is wife's depressive symptoms and husband's type of condition. I conduct similar analysis using the subsample of couples in which the husband has only zero or one condition and the subsample of couples in which the wife has only zero or one condition. These models confirm the results in the previous models and thus are not presented or discussed.

To test for mediation in these models (specifically whether disabilities and depressive symptoms of the chronically ill spouse help to understand associations between one spouse's

chronic condition and the other spouse's depressive symptoms), I use a latent growth curve mediation model [102], estimating the latent growth curve and predictors from the original models (respondent's type of condition and spouse's distress) as well as a growth curve with the hypothesized mediator (the respondent's depressive symptoms or the respondent's disabilities). I compare model coefficients using the Sobel-Goodman mediation test to test for significance of mediation effects [103].

To test for significant differences between models considering wife's conditions and models considering husband's conditions, I do two tests. First, I construct interactions between gender and each type of condition and examine the significance of these interactions in both the intercept and slope for predicting the other spouse's depressive symptoms. Second, I compare models using multiple-group analysis. I analyze a model where the relationship between one spouse's conditions and the other spouse's depressive symptom score is constrained to be equal across gender groups and a model where the effects are estimated freely for each group. A significant improvement in the chi-square statistic from the restricted to the unrestricted model indicates significant differences across the groups. This multiple group analysis supports the results from the interactions. I also evaluate goodness of fit measures with the Akaike information criterion (AIC) and the Bayesian information criterion (BIC).

RESULTS

Tables 1 (for women) and 2 (for men) present descriptive statistics of variables from the primary analytic sample used in this study. Each column describes descriptive statistics (means and standard deviations) for respondents with each chronic condition at baseline; columns are not mutually exclusive as respondents can have multiple chronic conditions at baseline. In general, women have more depressive symptoms than men, regardless of chronic conditions. Women with stroke have significantly more depressive symptoms than women with other

conditions, whereas among men, men with lung disease have the most depressive symptoms. There are few significant differences between husbands of women by chronic condition. Among men, husbands married to women with lung disease, heart disease, or stroke have the most depressive symptoms, and among women, wives of men with stroke have the most depressive symptoms. Men and women with stroke also have the most disabilities and the most other conditions, whereas men and women with high blood pressure, caner, and arthritis have the fewest disabilities and depressive symptoms.

In the following sections, I discuss each type of chronic condition separately, comparing how husband's conditions relate to wife's depressive symptoms and how wife's conditions relate to husband's depressive symptoms. In the analysis for Table 3 all chronic conditions are included in the models, each as distinct categories, considering how each is related to spouse's depressive symptoms net of other chronic conditions (number and type). Table 3 shows the baseline model (Model 1), interaction models (gender*each chronic condition) (Model 2), and the two mediation models (chronically ill spouse's disabilities in Model 3 and depressive symptoms in Model 4). I do not discuss hypertension or cancer, as there was no relationship between one spouse's hypertension or cancer and the other spouse's depressive symptoms in any of the models, though these two conditions are shown in Table 3.

Diabetes

When one spouse has diabetes, the other spouse's initial depressive symptoms are about 0.12 units higher than when that spouse does not have diabetes (Model 1). Model 2 indicates that this is similar for men and women. Analysis (not shown) indicates that, when a spouse has diabetes, his or her own depressive symptoms are about 0.31 units more ($p<.001$) than when he or she does not have diabetes, and he or she has about 0.20 more disabilities ($p<.001$). Sobel tests

show that about 50 percent of the association between one spouse's diabetes and the other spouse's initial levels of depressive symptoms are explained by the diabetic spouse's depressive symptoms ($p<.001$; Model 4) and about 45 percent by the diabetic spouse's disabilities ($p<.001$; Model 3).

Lung Disease

When one spouse has lung disease, the other spouse's distress is about 0.34 units higher than when that spouse does not have lung disease (Model 1). The interaction term demonstrates that this does not depend on gender of the spouse (Model 2). Analysis (not shown)indicates that, when a person has lung disease, that person's depressive symptoms are about 0.69 units higher ($p<.001$) than when he or she does not have lung disease and that person has about 0.29 more disabilities ($p<.001$). Sobel tests show that about 34 percent of the association between one spouse's lung disease and the other spouse's initial levels of depressive symptoms are explained by the spouse with lung disease's depressive symptoms ($p<.001$; Model 4) and 15 percent by disabilities ($p<.001$; Model 3).

Heart Disease

Regarding heart disease, when one spouse has heart disease, the other spouse's initial depressive symptoms are about 0.12 units higher than when that spouse does not have heart disease (Model 1). Over time, though, the other spouse's depressive symptoms decrease at a rate faster than if his or her spouse did not have heart disease, about 0.03 units per unit of time. There is no significant difference between husbands and wives (Model 2). Analysis (not shown) indicates that when one spouse has heart disease, that spouse's disabilities are 0.17 units higher initially ($p<.001$) and increase at a rate of about 0.02 units per unit of time faster ($p<.01$) than when he or she does not have heart disease, though that spouse's heart disease is not related to

the rate of change of his or her disabilities. Further, when one spouse has heart disease, her or his own depressive symptoms are 0.41 units higher than when she or he does not have heart disease ($p<.001$), but that spouse's heart disease is not related to the rate of change of her or his depressive symptoms. Sobel tests demonstrate that, regarding one spouse's heart disease and the other spouse's initial depressive symptoms, about 69 percent is explained by the disabilities of the spouse with heart disease ($p<.001$; Model 3) and 33 percent by the depressive symptoms of the spouse with heart disease ($p<.001$; Model 3). Regarding one spouse's heart disease and the other spouse's change in depressive symptoms over times, only about 3 percent is explained by the change in disabilities of the spouse with heart disease ($p<.01$; Model 3), and the coefficient remains significant and negative even when controlling for disabilities.

Stroke

When one spouse has a stroke, the other spouse's depressive symptoms are about 0.28 units higher than when the other spouse does not have a stroke (Model 1). There is a statistically significant difference in spousal depressive symptoms when the wife has a stroke compared to when the husband has a stroke (Model 2). When the wife has a stroke, the husband's depressive symptoms increase at a faster rate (about 0.06 units per unit of time) than when the wife has not had a stroke. When the husband has a stroke, his wife's initial depressive symptoms are about 0.36 units higher than when the husband has not had a stroke. Neither wife's disabilities nor depressive symptoms mitigate the depressive symptoms slope of her husband. However, supplementary analysis demonstrates that husband's stroke increases husband's disabilities about 0.98 units initially ($p<.001$) and husband's depressive symptoms about 0.30 units initially ($p<01$). Sobel test demonstrates that the relationship between husband's stroke and wife's initial

depressive symptoms are mediated about 58 percent by husband's disabilities ($p<.001$; Model 3) and 11 percent by husband's depressive symptoms ($p<.05$; Model 4).

Arthritis

When one spouse has arthritis, over time, the other spouse's initial depressive symptoms decrease about 0.01 units per time point compared to when the first spouse does not have arthritis ($p<.05$). This is similar for men and women, and the Sobel test indicates that this is not mediated by disabilities or depressive symptoms of the arthritic spouse. This is, however, a substantively small decrease in depressive symptoms over time.

DISCUSSION

Past studies demonstrate that having a spouse with chronic conditions increases one's own depressive symptoms, with some studies looking separately at different types of conditions (e.g., cancer, diabetes) and other studies not differentiating between types of conditions [7-11, 30]. But studies have not compared across types of conditions within the same sample. Different types of chronic conditions may influence a spouse's depressive symptoms in different ways, reflecting epidemiologic differences in who gets these conditions, how severe these conditions are, and the lifestyle changes and health care related to these conditions. Thus some conditions may have more mental health impact on spouses than others and may affect husbands differently than wives. In this study, I examined chronic conditions separately but within the same models in order to compare how each condition may uniquely impact the spouse and how this may further depend on the gender of the spouse with the condition. This approach acknowledges differences across types of chronic conditions as well as the possibility of multimorbidity of conditions. I also considered whether respondent's own depressive symptoms and disabilities mediate the association between respondent's type of condition and spouse's distress. I used longitudinal

data, anticipating that these depressive symptom processes unfold over time. This study advances knowledge of how depressive symptoms are distributed within marriages, by gender, and across different types of chronic conditions, moving beyond a dichotomous understanding of either having chronic conditions or not having chronic conditions and beyond an individualistic perspective of chronic conditions only influencing the person with the chronic condition.

Of the conditions which did have an impact on spouse's depressive symptoms, lung disease was the most consequential, followed by stroke. Heart disease and diabetes were the least impactful. Regarding lung disease, about one-third of the association was explained by the spouse with lung disease's own depressive symptoms. This means that most of the association between lung disease and spouse's depressive symptoms is unexplained. There may also be important moderators in the relationship between lung disease and spousal depressive symptoms which are not accounted for in this analysis. For instance, spousal depressive symptoms may depend on cause of lung disease (e.g., smoking or other environmental factors) as well as responses to the lung disease (e.g., quit smoking or continue smoking). Both men and women have higher levels of depressive symptoms when their spouse has lung disease than when their spouse does not. This is interesting, given that more men than women are diagnosed with lung disease every year [47, 48]. Yet the impact of lung disease goes beyond just men to negatively impact their wives as well and similarly spreads from women with lung disease to their husband. This is also the case for heart disease, which, like lung disease, is often overlooked and understudied among women.

Stroke is the second most impactful condition. Also interestingly, stroke is the only condition in which gender served as a moderator. A spouse's stroke impacts husbands and wives differently, with husband's stroke increasing wife's stress *initially* and wife's stroke increasing

husband's distress *over time*. This points to different processes around stroke for husbands and wives. The association between husband's stroke and wife's depressive symptoms is mostly explained by the husband's disabilities and husband's depressive symptoms, suggesting that when men have a stroke, their wives are negatively impacted by how depressed and disabled husbands are, perhaps through caregiving and worrying pathways. This depressive symptoms impact seems to stay consistent over time with little change. Wives' depressive symptoms and disabilities do not help in explaining the association between wives' stroke and husbands' depressive symptoms over time. Rather, the increase in husband's depressive symptoms over time as his wife's condition progresses may be due to unmeasured variables which build over time, such as daily burdens of medications or doctor visits. These gender differences point to important considerations when designing clinical interventions for spouses of stroke patients and may reflect differences in how stroke progresses for men and women. Women married to husbands with stroke may need more mental health support early during the stroke, whereas men married to wives with stroke may need more on-going support even if they do not seem impacted earlier in the disease progression. It is unclear whether these differences reflect differences in how men and women experience their own stroke or how men and women respond to their spouse's stroke.

Heart disease and diabetes both increase a spouse's depressive symptoms initially, with this association partially mitigated by depressive symptoms and disabilities of the spouse with these conditions. Gender was surprisingly not a significant moderator for either of these conditions. Further, the consequences for having a spouse with heart disease seem most pronounced early in the disease and dissipate over time, pointing to the importance of couple-level care for married adults with these conditions, especially in the initial stages of the disease.

These couple-level therapies could include both partners, or they may target improving the chronically ill spouse's mental and emotional health and targeting her or his disabilities with rehabilitation therapies as this study demonstrates that this should have an influence as well on their spouse's mental health.

Regarding why lung disease, heart disease, stroke, and diabetes are all more depressing for the spouse than high blood pressure, arthritis, and cancer, this may be in part because men and women with high blood pressure, arthritis, and cancer exhibit generally lower levels of depressive symptoms and fewer disabilities than respondents with the other four types of conditions. High blood pressure is very common within this sample, and as it is often managed easily with medication and has few symptoms which may affect a marriage, it makes sense that it does not increase spouses' depressive symptoms. At the same time, high blood pressure is an important risk factor for heart disease [57], thus continued study of spousal experiences of high blood pressure may be important for understanding depressive symptoms among couples with heart disease. Similarly, arthritis is almost as prevalent as high blood pressure in this sample and is associated with few disabilities and few depressive symptoms, perhaps suggesting that most respondents with arthritis in this sample have a very manageable form of arthritis. Additionally, many respondents with arthritis have other types of chronic conditions. Studies which have examined depressive symptoms from a spouse's arthritis have not controlled for other conditions and do not use nationally-representative samples [88, 89].

The lack of association between cancer and spousal depressive symptoms is more surprising. Multiple types of cancer were represented in this data. This diversity likely contributed to the lack of significant findings regarding the association between one spouse's cancer and the other spouse's depressive symptoms as well as even the weak association between

having cancer and one's own depressive symptoms. Cancer is likely more depressing when first diagnosed, and for some in this sample, the cancer may be in remission and thus less impactful for mental health. Future analysis should pay more attention to these time processes.

This study has several limitations. I could not distinguish between sub-categories of conditions. This was especially problematic when considering cancer, though likely also influenced the heart disease and lung disease results. Distinguishing between these sub-categories may have revealed important gender patterns, especially for cancer as many types of cancer are much more prominent among one gender than the other (e.g., breast cancer, prostate cancer) and treatments for and consequences of these conditions vary widely [34]. As an additional limitation and area for future research, it is likely that certain types of conditions group together; for instance, it may be that someone who had a stroke also has heart disease. I considered each condition separately, controlling for number and type of other conditions, but in future research will consider different latent classes of conditions. I do not include measures of severity or duration of conditions, but this is an important avenue for future study. In future studies, I will more carefully consider timing, including diagnosis of the condition, progression of the condition, and initiation and cessation of treatment.

In this analysis, I focused on how depressive symptoms, measured using a short-item CES-D index, was related to a spouse's chronic conditions. Past studies indicate that women in general have higher CES-D scores than men [6], and it may be that the mental health impact from having a spouse with chronic conditions is more reflected in women's CES-D scores than men's whereas mental health impacts for men are reflected in different outcomes, like substance use or worry [104]. There may also be gender differences when comparing how chronic conditions impact a spouse's physical compared to mental health. Valle and colleagues [105]

found that while a new incident of a chronic condition in spouses increased women's CES-D score, it did not affect men's CES-D score, but did worsen men's self-rated health. Thus future studies should consider how chronic conditions influence spouses across an array of outcomes, including worry, anger, anxiety, substance use, physical health, and even stress-related biomarkers like cortisol or blood pressure [106, 107].

This study demonstrates that different types of chronic conditions impact spouses' depressive symptoms differently and that, with the exception of stroke, this does not seem to depend on gender of the spouse with the chronic condition. My analysis points to two different pathways which help in understanding these associations, but also demonstrates the need for future research to explore other pathways which may be unique to specific conditions and gender experiences. For instance, worry and anxiety are likely important pathways for heart disease, which is often recurrent [26, 30]. Additionally, health behaviors may moderate the relationship between these conditions and spousal distress. Having a husband with heart disease who refuses to improve his diet may impact a wife differently than having a husband with heart disease who does improve his diet. This study, thus, points to important future research opportunities while also highlighting key ways in which type of condition matters, beyond just the presence or absence of any conditions. I suggest that it is important to introduce and support more couple-level therapies during chronic conditions [108]. Care of chronic conditions should include mental health care for both spouses rather than just focusing on physical health of one partner. My findings underscore that chronic conditions are not a problem for individuals only but have reverberations within marriages for spouses as well, depending on type of condition and gender.

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Table 1: Means and Standard Deviations of Variables (Wife's Conditions)

	High Blood Pressure	Diabetes	Cancer	Lung Disease	Heart Disease	Stroke	Arthritis
	n=2,832	n=722	n=654	n=363	n=858	n=496	n=2,614
CES-D (W[a])	1.70	2.13	1.53	2.29	2.10	2.43	1.77
	(2.12)	(2.27)	(1.97)	(2.37)	(2.28)	(2.37)	(2.14)
CES-D (H[b])	1.17	1.35	0.96	1.45	1.34	1.42	1.18
	(1.70)	(1.81)	(1.51)	(1.87)	(1.88)	(1.75)	(1.74)
Number of disabilities (W)	0.47	0.71	0.36	0.78	0.72	1.31	0.48
	(1.22)	(1.43)	(1.04)	(1.39)	(1.48)	(2.09)	(1.16)
Number of chronic conditions (W)	2.02	2.59	2.14	2.65	2.64	2.96	1.92
	(0.98)	(1.11)	(1.06)	(1.20)	(1.13)	(1.22)	(0.99)
Number of chronic conditions (H)	1.34	1.41	1.32	1.54	1.45	1.44	1.42
	(1.20)	(1.28)	(1.20)	(1.31)	(1.26)	(1.21)	(1.25)
Age (years) (W)	62.49	61.48	62.59	61.70	65.17	67.14	60.33
	(10.38)	(10.21)	(10.40)	(10.47)	(11.04)	(11.46)	(9.60)
Age (years) (H)	65.44	64.67	65.06	64.90	67.64	69.37	63.23
	(10.67)	(10.62)	(10.45)	(10.33)	(11.29)	(11.30)	(9.76)
Marital duration (years)	34.36	33.56	33.62	32.03	36.24	39.59	31.82
	(15.91)	(15.25)	(16.15)	(16.35)	(16.92)	(16.66)	(15.26)
Years of education (W)	11.43	10.44	12.29	11.43	11.28	10.96	11.74
	(3.76)	(4.09)	(3.39)	(3.52)	(3.59)	(3.85)	(3.63)
Number of living children	3.49	3.83	3.26	3.49	3.42	3.36	3.53
	(2.34)	(2.68)	(2.01)	(2.44)	(2.33)	(2.48)	(2.29)
Non-Hispanic White (W)	0.73	0.61	0.88	0.87	0.82	0.78	0.77
	(0.44)	(0.49)	(0.32)	(0.33)	(0.38)	(0.41)	(0.42)
Non-Hispanic Black (W)	0.18	0.23	0.06	0.08	0.12	0.15	0.14
	(0.38)	(0.42)	(0.24)	(0.27)	(0.32)	(0.36)	(0.34)
Hispanic (W)	0.08	0.14	0.05	0.04	0.05	0.06	0.08
	(0.27)	(0.35)	(0.21)	(0.18)	(0.21)	(0.23)	(0.27)
Other Race (W)	0.01	0.02	0.01	0.01	0.01	0.01	0.01
	(0.11)	(0.13)	(0.09)	(0.11)	(0.12)	(0.09)	(0.11)
Household income ($)	30,031	23,389	36,316	27,723	26,108	23,156	32,860
	(3.71)	(4.18)	(3.32)	(2.92)	(3.82)	(4.26)	(3.74)

Data: Health and Retirement Study. Note: Cells contain standard errors in parentheses. [a]W=Wife; [b]H=Husband

Table 2: Means and Standard Deviations of Variables (Husband's Conditions)

	High Blood Pressure	Diabetes	Cancer	Lung Disease	Heart Disease	Stroke	Arthritis
	$n=3,422$	$n=1,146$	$n=630$	$n=567$	$n=1,775$	$n=241$	$n=2,864$
CES-D (H[a])	1.22	1.54	1.30	1.87	1.45	1.73	1.36
	(1.76)	(1.95)	(1.88)	(2.02)	(1.89)	(2.03)	(1.82)
CES-D (W[b])	1.45	1.62	1.28	1.78	1.53	1.92	1.54
	(1.99)	(2.07)	(1.83)	(2.19)	(2.04)	(2.18)	(2.03)
Number of disabilities (H)	0.44	0.63	0.51	0.78	0.63	1.43	0.53
	(1.22)	(1.42)	(1.31)	(1.58)	(1.47)	(2.32)	(1.27)
Number of chronic conditions (H)	2.09	2.60	2.45	2.67	2.49	2.96	2.14
	(1.06)	(1.17)	(1.23)	(1.33)	(1.16)	(1.23)	(1.10)
Number of chronic conditions (W)	1.16	1.21	1.23	1.40	1.28	1.45	1.27
	(1.10)	(1.13)	(1.15)	(1.16)	(1.14)	(1.20)	(1.14)
Age (years) (H)	64.11	64.55	70.25	67.67	67.73	69.50	63.45
	(9.89)	(9.63)	(9.86)	(9.66)	(10.12)	(9.98)	(9.19)
Age (years) (W)	60.31	60.67	66.05	63.32	63.61	65.52	59.23
	(10.41)	(10.36)	(10.89)	(10.73)	(10.94)	(11.05)	(9.64)
Marital duration (years)	32.23	32.85	36.67	34.72	35.62	37.37	30.79
	(15.74)	(15.68)	(17.77)	(16.59)	(16.65)	(17.17)	(15.32)
Years of education (H)	12.11	11.88	12.21	11.64	11.91	11.29	12.02
	(3.00)	(3.12)	(2.79)	(2.71)	(2.91)	(3.35)	(2.99)
Number of living children	3.45	3.61	3.42	3.67	3.41	3.73	3.53
	(2.28)	(2.37)	(2.24)	(2.42)	(2.26)	(2.71)	(2.36)
Non-Hispanic White (H)	0.73	0.61	0.88	0.87	0.82	0.78	0.77
	(0.44)	(0.49)	(0.32)	(0.33)	(0.38)	(0.41)	(0.42)
Non-Hispanic Black (H)	0.18	0.23	0.06	0.08	0.12	0.15	0.14
	(0.38)	(0.42)	(0.24)	(0.27)	(0.32)	(0.36)	(0.34)
Hispanic (H)	0.08	0.14	0.05	0.04	0.05	0.06	0.08
	(0.27)	(0.35)	(0.21)	(0.18)	(0.21)	(0.23)	(0.27)
Other Race (H)	0.01	0.02	0.01	0.01	0.01	0.01	0.01
	(0.11)	(0.13)	(0.09)	(0.11)	(0.12)	(0.09)	(0.11)
Household income ($)	30,031	23,389	36,316	27,723	26,108	23,156	32,860
	(3.71)	(4.18)	(3.32)	(2.92)	(3.82)	(4.26)	(3.74)

Data: Health and Retirement Study. Note: Cells contain standard errors in parentheses. [a]H=Husband; [b]W=Wife

Table 3: Couple-Level Growth Curve Models Predicting Influence of Spouse's Types of Chronic Conditions on Respondent's CES-D ($N = 8,690$)

	Model 1		Model 2		Model 3		Model 4	
	S[a]'s Condition on R[b]'s CES-D (Intercept)	S's Condition on R's CES-D (Slope)	S's Condition on R's CES-D (Intercept)	S's Condition on R's CES-D (Slope)	S's Condition on R's CES-D (Intercept)	S's Condition on R's CES-D (Slope)	S's Condition on R's CES-D (Intercept)	S's Condition on R's CES-D (Slope)
High blood pressure (S)	0.007	-0.004	-0.042	0.011	-0.022	-0.007	0.001	-0.005
	(0.026)	(0.007)	(0.039)	(0.010)	(0.026)	(0.278)	(0.026)	(0.007)
Diabetes (S)	0.119**	0.008	0.068	0.011	0.060	0.005	0.066	0.003
	(0.040)	(0.010)	(0.065)	(0.018)	(0.039)	(0.010)	(0.040)	(0.010)
Cancer (S)	-0.027	0.000	-0.058	0.025	-0.052	0.001	-0.025	0.000
	(0.046)	(0.012)	(0.065)	(0.017)	(0.046)	(0.012)	(0.046)	(0.012)
Lung disease (S)	0.344***	-0.013	0.412***	-0.032	0.228***	-0.012	0.291***	-0.010
	(0.054)	(0.014)	(0.087)	(0.024)	(0.053)	(0.014)	(0.054)	(0.014)
Heart disease (S)	0.116**	-0.030**	0.137*	-0.017	0.036	-0.032***	0.078*	-0.029**
	(0.035)	(0.009)	(0.061)	(0.017)	(0.035)	(0.009)	(0.035)	(0.009)
Stroke (S)	0.275***	0.005	0.013	0.070*	0.237***	0.006	0.078	0.013
	(0.061)	(0.016)	(0.107)	(0.029)	(0.060)	(0.016)	(0.061)	(0.016)
Arthritis (S)	0.046	-0.014*	0.021	-0.016	-0.027	-0.018**	0.001	-0.010
	(0.027)	(0.007)	(0.038)	(0.010)	(0.026)	(0.007)	(0.026)	(0.007)
High blood pressure* Female (S)	--	--	0.088	-0.026	--	--	--	--
			(0.052)	(0.013)				
Diabetes* Female (S)	--	--	0.081	-0.005	--	--	--	--
			(0.082)	(0.022)				
Cancer*Female (S)	--	--	0.053	-0.046	--	--	--	--
			(0.092)	(0.024)				
Lung disease*	--	--	-0.104	0.028	--	--	--	--

Female (S)			(0.111)	(0.029)				
Heart disease* Female (S)	--	--	-0.036 (0.074)	-0.017 (0.020)	--	--	--	--
Stroke*Female (S)	--	--	0.378** (0.130)	-0.090* (0.035)	--	--	--	--
Arthritis* Female (S)	--	--	0.052 (0.052)	0.003 (0.013)	--	--	--	--
Disabilities: Intercept (S)	--	--	--	--	0.301*** (0.012)	0.002 (0.003)	--	--
Disabilities: Slope (S)	--	--	--	--	--	0.462*** (0.036)	--	--
Distress: Intercept (S)	--	--	--	--	--	--	0.303*** (0.017)	-0.027*** (0.004)
Distress: Slope (S)	--	--	--	--	--	--	--	0.200*** (0.015)
Model Fit:								
χ^2 (df[c])	806.114 (143)		842.767 (178)		4506.216 (380)		6526.863 (380)	
AIC[d]	290689.541		290690.007		533347.216		483319.907	
BIC[e]	291155.322		291264.471		533933.312		483905.978	

Note: All models adjust for number of conditions, spouse's conditions (number and type), gender, both spouse's age, marital duration, educational attainment, race/ethnicity, number of living children, and log of household income. Statistically significant inter-spousal effects are denoted: ***$p < .001$, **$p<.01$, *$p<.05$

[a]S=Spouse; [b]R=Respondent; [c]df= Degrees of freedom; [d] AIC = Akaike Information Criterion; [e] BIC = Bayesian Information Criterion.