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The Decade-Long Effect of Work Insecurity on Husbands' and Wives' Midlife Health Mediated by Anxiety: A Dyadic Analysis

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Abstract

Although the detrimental physical health effects of work insecurity have been noted in previous research, less is known about the mediating processes, such as anxiety symptoms, that link work insecurity to physical health. Even less research has explored these effects at specific life stages and how these effects may impact significant others, even though the impact of this stress may vary across the life course and the mutual influences between married partners may cause dyadic effects stemming from one partner's work insecurity. To fill these gaps, the current study incorporates theories that emphasize the stress-work connection, such as stress appraisal theory (Lazarus, 1999) and resource conservation theory (Hobfoll, 1989) into a neurobiological stress-health perspective. This study uses a sample of 330 consistently married, dual-earner husbands and wives who provided data at multiple time points over a ten-year period from 1991 to 2001. Results from a model including growth curves of work insecurity and anxiety symptoms when respondents were in their early middle years and reports of physical illness in their later middle years generally supported the hypothesized model. Both the level and rate of change in work insecurity were related to the change in anxiety symptoms over time. Similarly, the level and rate of change in anxiety symptoms from 1991 to 1994 were linked to subsequent illness years later in 2001. There was only partial support for the existence of partner effects. Findings are discussed as they relate to previous research as well as policy and clinical implications.

Keywords

middle age; growth curve; illness; Work stress; Mental Health

Most adults experience relatively stable work conditions during their middle years, which are defined as the period between approximately 40 and 60 years of age (Staudinger & Bluck, 2001). Still, a sizable number of middle-aged adults experience feelings of work

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insecurity (Fan, Blumenthal, Watkins, Sherwood, & 2015). A sense of insecurity surrounding one's work life often stems from socioeconomic and personal characteristics of the individual, but insecurity may also be due to the historical context of the cohort of which one belongs. Indeed, the historical context of the baby boom cohort includes tough competition for high-quality jobs, organizational restructuring of the workplace, and corporate downsizing (Elder & O'Rand, 1994; Fan et al., 2015; Moen & Wethington, 1999). Additionally, farm families from this cohort faced insecurity stemming from the "farm crisis" of the 1980s including the continuing low prices of agricultural products since then, which has contributed to the displacement of many individuals from farms in rural areas of the United States (Elder & O'Rand, 1994). During this period, without other work skills, workers were at risk of losing their jobs, along with their occupational stability, as similar jobs were likely not available (Lorenz, Elder, Bao, Wickrama, & Conger, 2000). This historical context combined with the socioeconomic climate may have contributed to an increasing sense of work insecurity for middle-aged adults in a rural setting, whom we focus on in the current study.

In line with our study population, we conceptualize work broadly as encompassing both paid work as an employee and self-employment, including farming. In line with our broad conceptualization of work (i.e., including salaried jobs and self-employment), we use the term work insecurity rather than job insecurity, which has largely been applied in relation to paid employment in the previous research. We define work insecurity as concerns about possible future termination or disruption of work and the associated threats and uncertainties (Fan et al., 2015; Nella, Panagopoulou, Galanis, Montgomery, & Benos, 2014; Vander Elst, Näswall, Bernhard-Oettel, De Witte, & Sverke, 2016;). The detrimental physical health effects of work insecurity have been noted in numerous studies (De Witte, Piennar & De Cuyper, 2016) including links to mental and physical health complaints (Vander Elst et al., 2016), self-reported overall health, hypertension, coronary heart disease, and myocardial death (Lee, Colditz, Berkman, & Kawachi, 2004; Levenstein, Smith, & Kaplan, 2001; Virtanen, Janlert, & Hammarstrom, 2011). However, only a handful of studies have investigated the *mediating* processes that link work insecurity to health, particularly to physical illnesses (De Witte et al., 2016).

Additionally, research is also needed assessing the impact of work insecurity at specific life stages, as the magnitude of damage stemming from work insecurity may vary depending on the life stage and associated contextual factors (Ferrie, Shipley, Marmot, Stanfeld, & Smith, 1995). For instance, the stress related to the potential loss of resources and the threatening nature of work insecurity (Vander Elst et al., 2016) may be more salient for middle-aged individuals because the early years of middle adulthood are typified by increasing family responsibilities and a number of important life events (Lorenz et al., 2000). This stress combined with adults' increasing biological vulnerability over the middle years may make them more susceptible to the detrimental health impact of work insecurity (Lachman & James, 1997; Wickrama, Kwag, Lorenz, Conger, & Surjadi, 2010). In particular, as previously discussed, we contend that the historical context of economic uncertainty for the study respondents (i.e., baby boomers who also experienced the farm crisis in the rural mid-west) may contribute to above average perceptions of work insecurity as well as increased sensitivity to uncertainty and threat associated with this insecurity.

While the previous research is evidence for the impact of chronically high work insecurity (i.e., the level), *changes* in work insecurity may also be important for explaining its cumulative health effects. We expect that these different growth dimensions (i.e., the level, or severity, and change in work insecurity over time) may differentially and uniquely contribute to subsequent health outcomes (Wickrama, Lee, O'Neal, & Lorenz, 2016). Thus, an examination of work insecurity in a longitudinal context modeling individual trajectories of work insecurity (intra-individual change) is appropriate because it can capture both of these growth dimensions (i.e., level and change). Such an examination is important because it can facilitate a deeper understanding of the health effects of work insecurity (Wickrama, Surjadi, Lorenz, & Elder, 2008). To our knowledge, studies have not investigated the association between different growth dimensions (or trajectories) of work insecurity and subsequent physical health outcomes, although research does indicate that at least a portion of the increasing health heterogeneity in middle adulthood may be explained by differential exposure to work insecurity over the life course (Lovallo, 2005; Nella et al., 2014; Vander Elst et al., 2016).

In this study, we draw from several theories related to work-stress including stress appraisal theory (Lazarus, 1999) and resource conservation theory (Hobfoll, 1989). We also incorporate a neurobiological stress-health perspective (Cohen, Kessler, & Gordon, 1997; Ganzel, Morris, & Wethington, 2010; McEwen & Gianaros, 2010). While stress appraisal theory and resource conservation theory explain how work insecurity acts as a stimulus to generate negative feelings, such as fear and worry, leading to increases in psychological symptoms and complaints, neurobiological studies provide evidence linking these psychological symptoms to disease risk through neurophysiological (i.e., hormonal) mechanisms.

Furthermore, consistent with the crossover hypothesis (Westman, 2001; Bakker, Demerouti, & Dollard, 2008), we expect that spouses' stressful experiences and the consequences of this stress also affect their partners' well-being (i.e., *inter-individual* transmission). That is, a spouse's work insecurity and the spouse's response to work insecurity may influence their partner and, consequently, have health consequences for both partners (Westman, 2001). This dyadic contention is well-aligned with the actor-partner interdependence model (APIM; Kenny, Kashy, & Cook, 2006) discussed in more detail in a later section. To our knowledge, no study has investigated the potential dyadic mediating processes involving spouses' work insecurity, anxiety symptoms, and long-term physical health problems over the middle years, although existing research has shown that husbands' and wives' health co-vary over time (Wickrama et al., 2010a). Thus, using prospective data collected from middle-aged dual-earning couples who were parents of early adolescents in 1991 (9th graders, to be specific), this study traces the decade-long (1991–2001) effects of work insecurity on physical health problems and elucidates dyadic mediating processes that are at least partially responsible for this association.

Work Insecurity and the Development of Psychological Complaints: Anxiety Symptoms

Work insecurity is considered one of the most psychologically harmful aspects of work. Its negative effects likely stem from the uncertainty and unpredictability it is associated with as well as the sense of powerlessness and helplessness that it often causes (De Witte, 2005; Nella et al., 2014). Stress appraisal theory (Lazarus, 1999) contends that when an individual is exposed to a stressor, he/she subjectively appraises the threat and stressfulness of the stressor and assesses available resources to manage the stressor. Accordingly, individuals who perceive their work as being insecure and anticipate a disruption in, or termination of, their work appraise the stressfulness and potential threat of work insecurity. In particular, this appraisal generally focuses on threats related to a loss of benefits and other work-related functions. This intra-individual process often leads to negative feelings, such as fear and worry. Also, resource conservation theory (Hobfoll, 1989) suggests that the uncertainty associated with work insecurity discourages individuals from investing resources (both materials and social) in an attempt to resolve the stressor (i.e., work insecurity). Instead, individuals strive to conserve scarce resources to minimize future losses. This struggle between the desire to invest resources while attempting to minimize future losses often results in negative feelings, such as worry and fear. Excessive worry and fear due to chronic or increasing work insecurity can lead to above average levels of psychological symptoms, such as negative emotions and anxiety symptoms.

This is consistent with the spillover hypothesis (Bakker et al., 2008; Bolger, DeLongis, Kessler, & Wethington, 1989; Grzywacz & Marks, 2000; Stevens, Kiger, & Riley, 2006), which emphasizes that stress in one role undermines an individual's ability to meet obligations in other crucial roles, resulting in failed role performances and dissatisfaction while also generating negative feelings (Ford, Heinen, & Langkamer, 2007; Hughes, Galinsky, & Morris, 1992; Repetti, Taylor, & Seeman, 2002). Although, in the present study we do not test these potential mediating family processes directly, we expect this spillover from perceived work insecurity to the multiple roles of middle-aged married parents may also contribute to the elevation of psychological symptoms.

Anxiety Symptoms and Development of Physical Illness

The present study focuses on anxiety symptoms as the proximal psychological risk resulting from work insecurity. Elevated levels of anxiety symptoms have been implicated in a host of chronic health conditions, such as heart disease, respiratory disorders, and gastrointestinal conditions (Culpepper, 2009). As such, it is modeled as a mediator linking work insecurity and subsequent physical illness. Thus, as shown in Figure 1, we expect that work insecurity trajectories will exert a persistent influence on physical illness through its association with trajectories of anxiety symptoms over time.

Furthermore, consistent with the neurobiological stress-response perspective (Ganzel et al., 2010; McEwen, 1998), anxiety reactions invoked by a stressor generally cue physiological responses. The stress reaction leads to the activation of regulatory systems within the body; namely, the brain directs neurotransmitters to carry impulses to the sympathetic nervous

system and activate subsequent hormonal responses. These physiological responses are the body's way of adapting as it works to maintain “stability through change” (i.e., allostasis). However, the excessive activation of regulatory systems can lead to physiological dysregulation of multiple systems in the body (Ganzel et al., 2010; Geronimus, Hicken, Keene, & Bound, 2006; McEwen, 1998). Accordingly, chronic work insecurity leads to excessive activation of physiological regulatory systems and, in turn, wear and tear on multiple physiological systems, which contributes to long-term disease risk and is likely to persist long after the dissolution of work insecurity (Burgard, Kalousova, & Seefeldt, 2012).

Couple Dependency and Crossover Influences

Individuals exist, and their experiences occur, in a context of mutual influences and mutual interactions (Larson, Wilson, & Beley, 1994; Whitchurch & Constantine, 1993) forming mutual dependencies and crossover influences (actor-partner interdependence). Accordingly, in the present study, we expect work insecurity and anxiety symptoms are dependent between husband and wife. This dependency results in parallel, or inter-locking, trajectories of work insecurity and anxiety symptoms between husbands and wives, which can be modeled as a contemporaneous association between individuals' trajectories of both work insecurity (the level and change) and anxiety symptoms and the trajectories of their partners' work insecurity and anxiety symptoms.

The crossover hypothesis contends that one person's experiences affect their partner's well-being through *inter-individual* transmission of stress experiences and stress responses (Bakker et al., 2008; Westman, 2001). Accordingly, we expect that a spouse's anxiety may also operate as a physical health risk for their partner (Westman, 2001). That is, anxiety responses may impact not only their own well-being (i.e., intra-individual, or actor, effects) but also the well-being of their partner (i.e., inter-individual, or partner, effects) (Goldenberg & Goldenberg, 2012). This contention is well-aligned with the actor-partner interdependence model (APIM; Kenny et al., 2006).

We also expect that each individual's work insecurity may influence the anxiety symptoms of their spouse. Some research suggests that these partner effects may vary in magnitude depending on the spouse's gender, with stronger effects noted for partner effects between wives' insecurity and husbands' well-being (Crossfield, Kinman, & Jones, 2005). These non-equivalent partner effects may be due to several reasons. First, because husbands are traditionally viewed as the spouse more responsible for the family's economic situation (Bem, 1993), the potential threat of their wife's work insecurity may lead husbands to experience increased fear and worry related to the loss of family economic benefits. Second, the impaired marital role performance of wives due to their work insecurity (i.e., a spillover effect) may have stronger consequences for husbands' well-being. Thus, as shown in Figure 1, we will test a dyadic model assessing both couple dependency related to work insecurity and anxiety symptoms trajectories, as well as actor and partner effects involving anxiety symptoms and physical illness.

The Conceptual Model

As depicted in Figure 1, we begin with estimating individual trajectories of work insecurity when respondents were in their early middle years (average age of husbands and wives was 40 and 42, respectively). These trajectories are characterized by the level of work insecurity and change in work security over time (from 1991-1994). Our essential thesis is that work insecurity trajectories in the early middle years contribute to physical illness in the later middle years (measured in 2001) at least in part because of the association with trajectories of anxiety symptoms during the early middle years (1991-1994). As discussed in greater detail in the analysis section, we utilize latent growth curve modeling to capture individual changes (the level and change parameters) in work insecurity and anxiety symptoms.

An examination of trajectories using a latent growth curve approach allows for the determination of the sample's average initial level of work insecurity and the average slope (i.e., change) in work insecurity over time (1991-1994). Additionally, such an examination estimates the inter-individual variability around these sample averages. For example, at the first measurement occasion (1991), we expect that individuals differed in their level of work insecurity. Furthermore, work insecurity may have decreased for some and increased for others, creating inter-individual variability in the change in work insecurity over time. Similarly, we expect that anxiety symptoms have individual trajectories with the same type of growth parameters (i.e., initial level and rate of change).

Regarding anxiety symptoms, it is important to understand variations in the course of symptoms over time. For example, the developmental course of an already anxious individual who experiences a sharp increase in symptoms from “moderate” to “very high” is qualitatively different from the developmental course of a mentally healthy individual who experiences the same amount of increase from “zero” to “moderate” over the same period of time. Although these individual trajectories of anxiety symptoms have the same amount of change they have important differences, specifically the differing symptom levels. These two courses may have different physical health consequences, which is consistent with existing research documenting the complex physiological process leading disease risk. That is, physical illness may not correspond simply to chronically high levels of work insecurity and anxiety symptoms (i.e., severity), which can be approximated by the initial trajectory levels; instead, physical illness may also be related to change (i.e., nature and the amount of growth/decline) in work insecurity and anxiety symptoms (Wickrama, Beiser, & Kaspar, 2002). It is important to understand relative contributions of different growth parameters to the subsequent disease risk (Rueter, Scaramella, Wallace, & Conger, 1999; Wickrama, Conger, Wallace, & Elder, 2003). Traditional analytical methods are not sensitive enough to distinguish between unique contributions of different growth dimensions (i.e., level and rate of change) of work insecurity and anxiety symptoms to subsequent disease risk.

Similarly, we expect work insecurity is also a time-varying attribute, which may be contemporaneously associated with anxiety symptoms. Thus, a proper analysis of work insecurity and anxiety symptom trajectories must relate growth aspects of work insecurity and anxiety symptoms by modeling associations between the levels of both work insecurity

and anxiety symptoms and similar associations between the rate of change for growth curves of both work insecurity and anxiety symptoms.

We hypothesize the following:

1. For couples in their early middle years (i.e., early 40s), the initial level and rate of change for work insecurity (1991- 1994) will positively influence the initial level and rate of change for anxiety symptoms (1991- 1994) (i.e., parallel trajectories). That is, individuals with a higher the level of work insecurity will report a higher level of anxiety, and those with a steeper slope of work insecurity steeper will report a steeper slope of anxiety over time).
2. Over middle adulthood, the initial level and rate of change in anxiety symptoms (1991-1994) will mediate the influences of the initial level and rate of change for work insecurity (1991-1994) on subsequent physical illness in later middle years (2001).
3. The growth factors (i.e., level and rate of change) for husbands' and wives' anxiety symptoms (which are expected to be influenced by both spouses' work insecurity) will be correlated contemporaneously (i.e., transactional association).

By accounting for both spouses' initial levels of physical illness in early middle adulthood (1991), we minimized the likelihood of an alternative selection hypothesis; that is, we mitigated the possibility that healthy men and women possessed lower levels of work insecurity and anxiety symptoms.

Method

Participants and Procedures

The data used in the current study are from the Iowa Midlife Transition Project (MTP). These men and women participated in the Iowa Youth and Families Project (IYFP) in 1989, 1990, 1991, 1992, and 1994 and then continued on to participate in the MTP in 2001. All procedures were reviewed and approved by the university Institutional Review Board. For both projects, trained field interviewers visited the families in their homes. During the visit, a trained interviewer asked each family member to complete a detailed questionnaire about their family life, work, finances, friends, and mental and physical health. Family members completed the questionnaires independently so that they could not see one another's answers. The IYFP involved 451 families from eight counties in Iowa (see Conger & Elder, 1994).

Study and consent procedures were approved in accordance with The University of Georgia Institutional Review Board and the Iowa State University Institutional Review Board.

The site for the research was determined by our interest in rural economic stress (i.e., the farm crisis) and well-being. Because many of the outcomes and processes considered in the overall study were concerned with children's development, families selected to participate had at least two children. Eligible families were identified through contacts with the public and private schools within the eight counties. Of the eligible families, 78% agreed to participate. At the first wave of IYFP data collection in 1989, about 96% of the husbands

and 78% of the wives were employed. The median yearly family income in 1989 was \$33,240 (ranged from \$0 to \$259,000). In terms of occupational status, the men in this sample included craftsmen, foremen, and farmers (38.4%); professionals, managers, owners, and officials (23.8%); operatives and kindred workers (16.6%); sales workers, clerical, service workers, private household workers, and military service (14.4%); laborers (3.3%); and other types of employees (3.5%). Nineteen percent of the wives were homemakers. The employed women included sales workers, clerical, service workers, and private household workers (46.1%); professionals, managers, owners, and officials (23.7%); operatives and kindred workers (4.2%); craftsmen, foremen, and farmers (2.9%); laborers (0.7%); and other (3.4%).

In 1991, spouses were in their early middle years; the average ages of husbands and wives were 42 and 40 years, respectively, and their ages ranged from 33 to 59 for husbands and 31 to 55 for wives. On average, the couples had been married for 19 years and had three children from their marriage together. The median age of the youngest child was 12. In 1989, the average number of years of education for husbands and wives was 13.68 and 13.54 years, respectively. Because there are very few minorities in the rural area studied, all participating families were White.

Most of the original IYFP husbands and wives ($N=390$) were interviewed again in the early months of 2001 as part of the MTP. The attrition rate was 11% from 1989 to 2001. From these 390 families with data in 2001, we further limited our sample to consistently married, dual-earner husbands and wives ($N=330$).

Measures

Work Insecurity—Two items assessed respondents' sense of security with their current employment in 1991, 1992, and 1994 (corresponding to Waves 3, 4, and 6 of the larger IYFP). On a 5-point scale ranging from “strongly agree” (1) to “strongly disagree” (5), participants rated agreement to the items: “This job provides good job security” and “I am always concerned that I might lose this job” (reverse scored). The two items were summed with higher values indicating greater work insecurity. At all three waves, the correlations between these two items were statistically significant for both husbands and wives (r 's ranged from .20 to .30).

Anxiety Symptoms—At Waves 3, 4, and 6 of the IYFP (corresponding to 1991 corresponding to 1992, and 1994), both husbands and wives indicated how much discomfort they experienced from ten anxiety symptoms in the preceding week using the Symptom Checklist (SCL-90-R; Derogatis & Melisaratos, 1983). Responses were given on a 5-point scale from “not at all” (1) to “extremely” (5). Sample items include, “nervousness or shakiness inside,” “feeling tense of keyed up,” and “feeling fearful.” For each wave, a mean score was computed with higher values indicating more anxiety symptoms. Cronbach's alpha indicated that the measure had good internal reliability (across the three waves α 's ranged from .80 to .85 for husbands and wives).

Physical Illness—In 2001 (for the MTP), respondents indicated if they had experienced any symptoms or diseases included in a list of 48 physical health ailments in the previous

two years. Sample items include, “common cold,” “stroke,” “high blood pressure,” and “peptic ulcer.” Items were coded as “yes” = 1 and “no” = 0. A sum score was computed representing the total number of illnesses the individual experienced from the 48 listed conditions in the previous two years (Wickrama et al., 1997; 2010a). A similar illness measure from 1991 was included in our analyses as a predictor of the initial levels and rate of changes in anxiety and work insecurity from 1991-1994 as well as a determinant of illness ten years later in 2001.

Analyses

Using three repeated measures (1991, 1992, and 1994), we examined linear trajectories of individuals' work insecurity and anxiety symptoms by estimating latent growth curves (LGCs) in a structural equation modeling (SEM) framework with latent constructs capturing the initial level and slope (i.e., rate of change) (Wickrama et al., 2016). Although the trajectories for each individual vary in initial level and rate of change, these can be aggregated to create mean and variance values for the initial level and slope. A significant variance in a change parameter implies different rates of change among individuals in the sample. In the present study, for instance, significant variance in the slope parameters for work insecurity and anxiety symptoms suggests that some individuals showed greater increases or decreases in work insecurity and anxiety symptoms from 1991 to 1994 (a period of three years) compared to others in the sample. Consequently, we examine the influence of the initial level and rate of change of work insecurity trajectories on the initial level and rate of change of anxiety symptoms trajectories, respectively. Husband-wife contemporaneous associations between these growth parameters were also examined. Importantly, we examined the influence of the level and rate of change of anxiety symptoms on disease risk (2001) *after* controlling for the lagged effect of physical illness in 1991. We tested these models using Mplus (Version 7.4) (Muthen & Muthen, 2012).

Based on our hypothesized model shown in Figure 1, a dyadic comprehensive model was fit including contemporaneous and longitudinal dyadic associations and transactional associations between husbands and wives. We carefully identified the temporal order of variables based on the theories guiding the current study while taking the availability of data into consideration.

Out of the sample of 330 couples, some cases were unavailable for a specific wave of data collection (nearly 9% of the data). Full information maximum likelihood (FIML) was utilized to test the hypotheses with all available data. We further tested the model with and without the inclusion of the 9% missing cases to rule out changes in the results due to the use of FIML and found no significant differences in the results. Consequently, we proceeded with the analyses employing FIML for our sample of 330 couples.

We used a range of indices to evaluate model fit including the chi-square statistic. The chi-square test statistic divided by degrees of freedom can provide a preliminary and approximate guideline for overall fit. When the chi-square statistic divided by the degrees of freedom is below 3.0, the model fits the data well (Carmines & McIver, 1981).

Results

Descriptive statistics and bivariate correlations among study variables are shown in Table 1. Before estimating our conceptual model, four univariate linear growth curve were estimated using data from 1991, 1992, and 1994. These four univariate growth curves assessed: (1) husbands' work insecurity, (2) husbands' anxiety symptoms, (3) wives' work insecurity, and (4) wives' anxiety symptoms. The results are summarized in Table 2. Overall, respondents were relatively neutral on items assessing their level of work insecurity with a mean of approximately 3 on a 5-point scale. They generally reported a low level of anxiety symptoms (mean levels were 1.11 and 1.22 for husbands and wives, respectively). Across the sample, there was a general increase in work insecurity and anxiety symptoms for wives over time (mean slope of .10 and .02, respectively). Notably, with the exception of wives' anxiety symptoms, there was significant variability in the initial level and rate of change in husbands' and wives' work insecurity and anxiety symptoms trajectories, indicating sufficient variability for estimating our conceptual model.

Next, we estimated the model shown in Figure 1. We sought to determine if the initial level and rate of change for work insecurity was related to the concurrent initial level and rate of change for anxiety symptoms (Hypothesis 1). We also addressed the role of anxiety symptoms as a mechanism linking the severity and rate of change in work insecurity to individuals' subsequent experiences of illness (Hypothesis 2) and the presence of transactional effects related to anxiety and physical illness between spouses (Hypothesis 3).

As shown in Figure 2, regarding Hypothesis 1, the initial level of wives' work insecurity in 1991 was related to the severity (i.e., level) of their contemporaneous anxiety symptoms ($b = .06$) such that wives with more work insecurity also generally reported more anxiety symptoms. Across the sample, for both husbands and wives, the rate of change in work insecurity from 1991 to 1994 explained variation in their anxiety symptom trajectories ($b = .46$ and $.10$, respectively). Thus, participants who reported an increase in work insecurity over time reported a trend of increasing anxiety symptoms as well.

Furthermore, the model results supported the mediating role of anxiety symptoms as work insecurity was linked to subsequent illness (Hypothesis 2). The initial level and rate of change in anxiety symptoms was generally of consequence for husbands' and wives' experience of illness ten years later in 2001. More specifically, the severity of wives' anxiety symptoms in 1991 was linked to the number of illnesses they reported in 2001 ($b = .78$). The rate of change in anxiety symptoms was also linked to subsequent reports of illness, and this association was statistically significant for both husbands and wives with increasing rates of anxiety symptoms being implicated in more illness ($b = 2.59$ and 1.94 , respectively).

There was also some evidence of contemporaneous and transactional associations between spouses (Hypothesis 3). For instance, husbands' and wives' levels of work insecurity in 1991 were positively related ($r = .19$) as were their anxiety symptoms ($r = .05$) suggesting a similar rank order between spouses for their work insecurity and anxiety symptoms in 1991. The rates of change in their work insecurity were negatively related to each other, such that when one spouse's work insecurity increased over time the other spouse's work insecurity

tended to decrease over time ($r = -.02$). Although this path was statistically significant, the small magnitude of this coefficient suggests that changes in husbands' and wives' work insecurity from 1991 to 1994 were generally not parallel. The univariate growth curves (see Table 2) revealed that, on average, work insecurity increased for husbands over this period, but not for wives. Thus, husbands' work insecurity probably increased at faster rate than that of wives. The rate of change for husbands' anxiety symptoms was not significantly correlated with the rate of change for wives' anxiety symptoms, suggesting a lack of dependency between spouses.

We also tested gender differences between husbands and wives by imposing equality constraints to each path individually and assessing the change in the chi-square statistic (for 1 df). The path between work insecurity level and anxiety level was stronger for wives (change in chi-square was 12.65), suggesting a contemporaneous rank-order association. In contrast, the path between the slope of work insecurity and the slope of anxiety symptoms was stronger for husbands (change in chi-square was 9.68), suggesting that husbands were more sensitive to changes in work insecurity. There was also a significant difference for the path from the level of anxiety symptoms to physical illness (change in chi-square was 66.10), which reflects a stronger cumulative health effect of the level of work insecurity for wives over time. Lastly, a gender difference was also noted for one crossover effect with the level of wives' work insecurity exerting a stronger influence on husbands' level of anxiety symptoms compared to the influence of husbands' work insecurity level on wives' anxiety level (change in chi-square was 10.65).

The statistical significance of mediating, or indirect, effects within the model was analyzed. In Mplus, the statistical significance of indirect effects are assessed using the delta method, which generally coincides with the Sobel test (Taylor, MacKinnon, & Tein, 2008). Results indicated three statistically significant indirect effects. Wives' initial level of work insecurity was indirectly related to their reports of physical illness through their initial level of anxiety ($b = .05$; 95% confidence interval [CI] = .01, 5.11). Furthermore, for both husbands and wives, the rate of change of their work insecurity over time was indirectly related to their own reports of physical illness through the change in their anxiety symptoms over time (husbands' $b = 1.19$, 95% CI = .31, 5.10; wives' $b = .19$, 95% CI = .04, .49).

Recall that these effects existed after accounting for the prevalence of illness among participants at the first wave of data collection (1991) in order to minimize the likelihood of an alternative selection hypothesis. Indeed, illness during the early years of middle adulthood was related to several variables within the model. As expected, there was a relatively high degree of stability between reports of illness in 1991 and 2001 for both husbands and wives ($b = .40$ and $.43$, respectively). Furthermore, on average, when husbands reported more illnesses in 1991, their wives reported a higher initial level of work insecurity ($b = .10$) (not shown in Figure 2), but husbands' sense of work insecurity was unaffected by either partner's illness in 1991. High illness rates by both husbands and wives during their early middle years were negatively related to the rate of change in work insecurity over time for wives ($b = -.03$ and $-.03$, respectively), which may represent a selection effect. In regards to anxiety symptoms, husbands with more illness in 1991 averaged higher initial levels of anxiety ($b = .08$), and a similar association was noted between wives' illness in 1991 and

their anxiety ($b = .08$). Overall, the model shown in Figure 2 fit the data reasonably well (CFI = .92, RMSEA = .07, and $\chi^2(72) = 217.98$). The model explained 13% and 27% of the variance in husbands' and wives' illness, respectively, in 2001.

We also tested a fully recursive model by expanding on the model shown in Figure 2 to incorporate direct effects of work insecurity on physical illness (both actor and partner direct effects) and partner effects related to work insecurity and anxiety symptoms. This fully recursive alternative model did not show an improvement in model fit ($\chi^2(62) = 218.94$), which suggests that work insecurity does not have a direct influence on either spouse's illness.

Discussion

The farm crisis and uncertain economic climate during late 1980s and early 1990s may have elevated insecure feelings related to work for middle-aged adults in the rural setting we focused on for this study. Although the detrimental physical health effects of work insecurity have been documented, previous research has not adequately investigated its *long-term* physical health effects. Furthermore, although elevated anxiety symptoms have been identified as a proximal psychological consequences of work insecurity, less is known about the long-term mediating effect of anxiety symptoms in the work insecurity-physical health association. More importantly, studies have not investigated these associations for long-term married husbands and wives utilizing a dyadic analytical framework to take their dependency and transactional influences into account. Thus, in order to address these gaps in the literature, an APIM within a latent growth curve approach was utilized to examine the decade-long independent effects of the level and rate of change of work insecurity on husbands' and wives' physical illness in middle adulthood while also assessing anxiety symptoms as a dyadic mediating process. The essential thesis was that trajectories of work insecurity in the early middle years (1991-1994) would contribute to physical illness (2001) in the later middle years through trajectories of anxiety symptoms. We also expected to find evidence of a dyadic process between husbands and wives over their middle years.

The univariate growth curve analysis showed that there were significant inter-individual variations in the initial level (1991) and rate of change (1991-994) in work insecurity and anxiety symptoms for both husbands and wives. Moreover, for both husbands and wives, there was evidence that work insecurity trajectories exist parallel to trajectories of anxiety symptoms, which provides evidence for the strong intra-individual contemporaneous association between work insecurity and anxiety symptoms over time. These parallel trajectories are consistent with the life course notion of “inter-locking” trajectories for individuals' social and health attributes (Elder, 1995).

The present study advances work-health research by investigating the unique involvements of different growth dimensions (e.g., the initial level and rate of change) of work insecurity and anxiety symptoms in explaining subsequent physical health consequences. Most previous survey studies on work insecurity and health have examined the associations between the level or severity of work insecurity and health outcomes (De Witte et al., 2016). These studies provide important findings about the rank order associations between work

insecurity and health outcomes. However, in addition to these rank-order associations, *changes* in work insecurity and associated psychological complaints may have physical health consequences. Particularly, the influence of change in anxiety symptoms on the development of disease risk may correspond to an increase in experiences in anxiety symptoms over time. Because the development of physical illnesses is a complex process, including the repeated activation and prolongation of multiple regulatory systems (e.g., neuroendrine functions) and subsequent dysregulation of multiple bodily systems (e.g., metabolic, cardiovascular and immune) (McEwen & Gianaros, 2010; Geronimus et al., 2006), it is reasonable to expect that both the level and rate of change in work insecurity and anxiety symptoms may play important roles in the development of physical illness. Future work-health research should extend this line of investigation.

Recall that for wives there was a statistically significant association between the initial level of anxiety symptoms and physical illness in later midlife. This decade-long influence of the level of anxiety symptoms on subsequent disease risk may correspond to a cumulative effect over time. That is, the severity of anxiety symptoms has a physical health effect, and this effect increase with time. This may be attributed to the duration of experience of severe anxiety (a “dose effect”) and/or to the proliferation of adverse psychophysiological conditions, such as depression, which we have not investigated in the present study.

For both spouses, the rate of change in anxiety symptoms was related to their illness in later middle adulthood (2001). Moreover, for wives, both the level and change in anxiety symptoms contributed to physical illness over a decade later in 2001. Thus, the development of physical health problems may not correspond simply to experiencing a high level of anxiety symptoms (i.e., symptom severity), which can be approximated by the initial trajectory level. Rather, physical health problems corresponded to his or her rate of change (incline or decline) in anxiety symptoms; for wives, these findings suggest that *both* the severity and the deterioration, or recovery, of anxiety symptoms uniquely contribute to the development of physical illness over time (Wickrama et al., 2002). Furthermore, the results showed that the physical health effect of work insecurity operates through more proximal psychological problems, such as anxiety.

The present study also advances work-health research by investigating husband-wife interdependencies, which have rarely been examined in previous studies (De Witte et al., 2016). This dyadic model revealed husband-wife contemporaneous dependencies in terms of work insecurity and anxiety symptoms as well as differences in the association between anxiety and subsequent physical illness. The differences in the health effect of anxiety trajectories for husbands and wives are notable findings from the current study. It appears that for wives both the severity (i.e., the level) and change in one's own anxiety symptoms have physical health consequences. However, for husbands, only the *change* over time in their own anxiety trajectories explained variation in their subsequent physical illnesses, which suggests that wives, but not husbands, are generally sensitive to the level (severity) of anxiety symptoms trajectories. Thus, in reference to physical health damages, husbands may more easily recover from damages caused by high levels of anxiety symptoms, whereas for wives, a high level of anxiety symptoms may exert a more persistent health influence over the middle years. These gender differences warrant further investigation in future research.

In our examination of the decade-long health consequences of anxiety symptoms, the results revealed a general absence of partner effects. It appears that the impact of anxiety symptoms on physical illness is primarily intra-individual (i.e., actor effects). That is, there was no evidence of the expected cross-over effects involving anxiety symptoms and physical health from one individual to his/her partner. However, the initial level of wives' work insecurity was related to husbands' anxiety symptoms, which were of relevance for husbands' reports of physical illness. In this fashion, one spouse's work insecurity (particularly wives) may be of consequence for both spouses' physical illnesses later in life (Bolger et al., 1989; Kiecolt-Glaser & Newton, 2001). These results suggest that mediating dyadic processes linking external stressful experiences and health outcomes are more complex than expected.

This decade-long health effect suggests that chronic work insecurity in the early middle years may lead to the establishment of physical illnesses that are likely to persist over the life course, even after the dissolution of work insecurity. This may also be attributed to the fact that work insecurity may cause permanent health damages or initiate detrimental health pathways or behaviors (e.g., the initiation and maintenance of health risk behaviors even after work insecurity is resolved) that manifest over later years. Furthermore, psychological research suggests psychological problems often continue over the life course (Keenan, Feng, Hipwell, & Klostermann, 2009). In addition, this long-term health effect may operate through material and social pathways. Specifically, external socioeconomic stressors, such as adverse work and community conditions, have been implicated in the health of husbands and wives through negative marital relationships (Wickrama, Bryant, & Wickrama, 2010; Wickrama et al., 1997). However, these pathways were not investigated in the present study. Future research should incorporate these direct and indirect pathways.

There are several limitations to the current study that should be noted. First, the sample was comprised only of White individuals living in rural Iowa. Studies testing similar models with a more diverse population are needed. For instance, future samples should include multiple ethnicities, greater variation in length of marriage, and other geographic locations. Second, the historical and economic environment (i.e., the farm crisis) in which the respondents lived represents a rather unique context. Thus, future studies should investigate the study hypotheses involving work insecurity and health with respondents who have experienced less extreme or qualitatively different economic downturns. Third, the work insecurity measure was constructed as the sum of two items, which were only moderately correlated; as such, the reliability of this measure would be stronger if a more extensive measure were utilized. Fourth, study constructs were self-reported and, consequently, self-report biases are a possibility. Future studies should utilize more clinical and objective measures, such as diagnosed mental health disorders (e.g., DSM-V) and diseases as well as bio-marker health outcomes (e.g., systolic and diastolic blood pressure, lipid-profile measures, blood glucose, and inflammatory measures such as C-reactive protein). "Objective" work insecurity may be captured by measures of short-term contracts, frequency of non-working days, work disruptions experienced by self and colleagues, and the absence of long-term benefits. However, it should also be noted that while there are limitations of self-report measures, there are also strengths as well. More specifically, consistent with the stress appraisal theory (Lazarus, 1999) and family stress theory (Boss, Mancini, & Bryant, 2017), such subjective measures assess individuals' perceptions and their own "way of viewing the world," which is

often a central determinant of the response elicited by an event or stressor. Finally, because genetic research suggests that health influences of stressful experiences are moderated by individuals' genetic make-up, future studies should investigate potential genetic moderations of the observed associations.

Despite these limitations, the present study contributes to existing knowledge about the long-term influences of work insecurity in dual-earner couples and associated dyadic health influences between husbands and wives. The results suggest that work insecurity trajectories in the early years of middle adulthood can have implications for physical illness in the later middle years through couples' parallel anxiety symptoms trajectories. Thus, national and state level policies and labor regulations aimed at improving the security adults' work conditions may have beneficial mental and physical effects. In addition, the findings provide support for the potential benefits of mental health services focused specifically focus on anxiety problems in adults who experience work insecurity. Furthermore, these results highlight the importance of transactional influences contributing to husbands' and wives' physical health. Findings of transactional influences between husbands and wives are particularly important for family interventions and for counselors as they consider protective factors that can buffer individuals from the negative mental health consequences of work insecurity. Lastly, these findings provide insight into the long-term health consequences of work insecurity as variation in physical illness among later middle adults was explained in part by their experiences of work insecurity a decade prior. Consequently, clinical and prevention efforts to improve physical health must carefully consider detrimental effects that can be put in motion years prior to disease onset.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Prior Dissemination Statement: The data used in the current study are from the Iowa Youth and Families Project (IYFP) and the Iowa Midlife Transition Project (MTP). Although economic and job conditions have been previously studied with this sample because of the unique context of these families (i.e., they experienced the “farm crisis” of the 1980s in Iowa), previous studies have not addressed the work context, anxiety, and physical health simultaneously. The findings presented here have not been disseminated previously.

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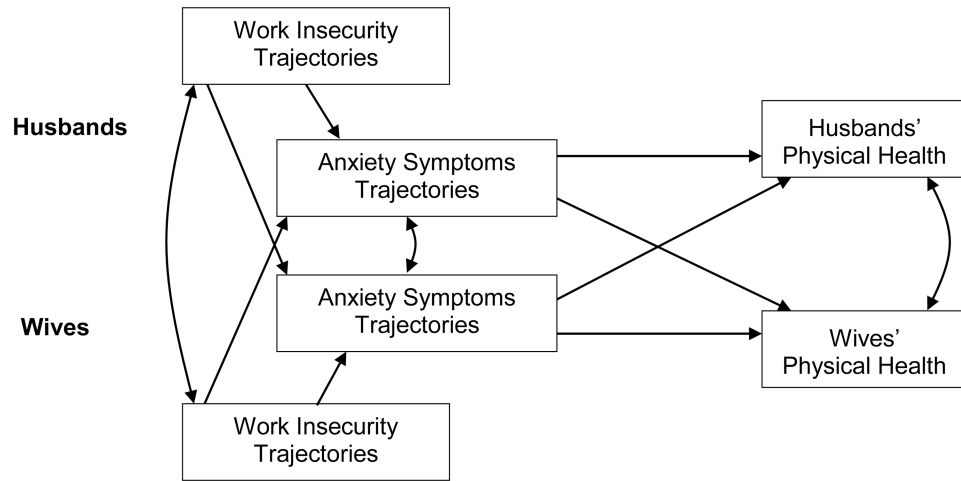


Figure 1.
A Conceptual Dyadic Model Linking Work Insecurity to Husbands' and Wives' Subsequent Illness in Middle Adulthood.

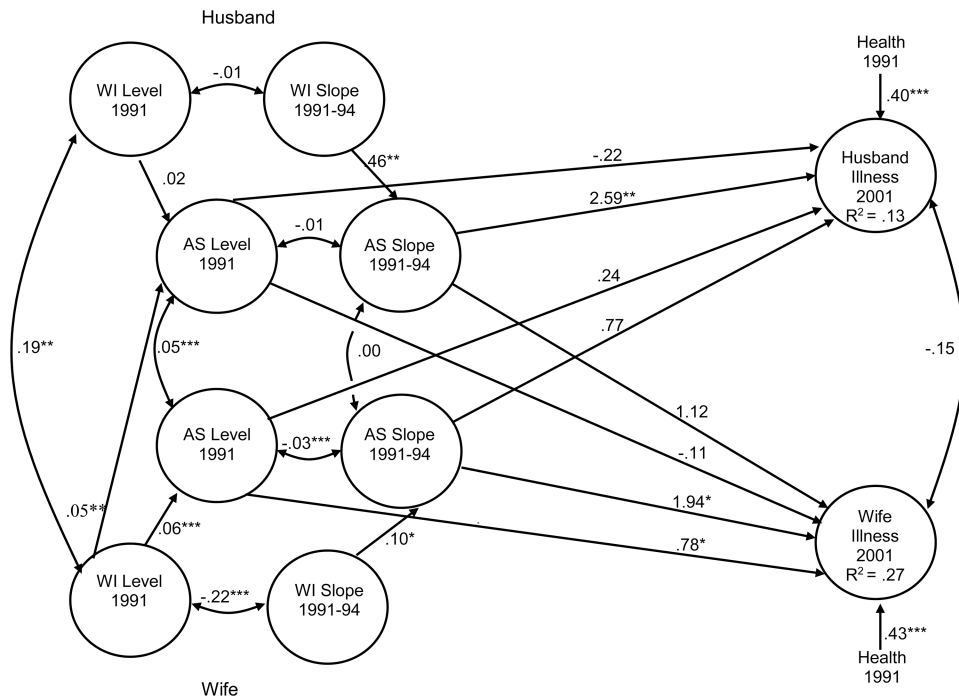


Figure 2. Results from a Dyadic Model of Work Insecurity Explaining Husbands' and Wives' Illness. Notes. WI = Work Insecurity. AS = Anxiety Symptoms. Unstandardized coefficients are shown. There was a statistically significant association between the rates of change in husbands' and wives' work insecurity ($r = -.02^*$). The paths between husbands' WI and wives' AS (level and slope), and path from the slope of wives' WI to husbands' AS slope were not statistically significant and are not shown in the figure. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 1

Descriptive statistics and correlations among study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Husbands' Work Insecurity</i>														
1. 1991	–													
2. 1992	.60***	–												
3. 1994	.46***	.55***	–											
<i>Wives' Work Insecurity</i>														
4. 1991	.26*	-.06	.17**	–										
5. 1992	.05	.15*	.03	.53***	–									
6. 1994	.03	-.01	.01	.47***	.50***	–								
<i>Husbands' Anxiety Symptoms</i>														
7. 1991	.15*	.06	.20**	-.04	-.12	-.12	–							
8. 1992	.22**	.36***	.20**	-.03	-.09	-.04	.52***	–						
9. 1994	.18**	.32***	.25***	.01	-.07	.02	.29***	.49***	–					
<i>Wives' Anxiety Symptoms</i>														
10. 1991	-.01	-.03	-.01	.09	.14*	.16*	.05	-.03	-.01	–				
11. 1992	.06	.08	-.01	.04	-.10	.14*	-.01	.18**	.16*	.60***	–			
12. 1994	-.04	-.05	-.09	.06	.09	.05	.13	-.03	-.02	.53***	.54***	–		
<i>Illness 2001</i>														
13. Husbands	.07	.04	.07	.07	.13	.10	.15*	.03	.12	.04	-.07	-.02	–	
14. Wives	-.03	-.04	-.04	-.01	.02	.04	-.04	-.03	.02	.31***	.28***	.26***	.08	–
<i>Mean</i>	3.56	3.53	3.60	3.66	3.55	3.69	1.17	1.17	1.17	1.17	1.25	1.27	2.62	2.83
<i>SD</i>	.75	.77	.77	.69	.72	.73	.35	.32	.31	.37	.39	.45	2.05	2.07

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2

Results from Univariate Linear Growth Curves.

Model	Initial Level			Slope			Fit Indices		
	Mean	Variance		Mean	Variance		χ^2 (df)	CFI	RMSEA
<i>H. Work Insecurity</i>	3.19 ***	.99 ***		-.02	.14 **		5.66 (1)	.98	.12
<i>W. Work Insecurity</i>	3.10 ***	1.19 ***		.10 ***	.12 **		2.87 (1)	.99	.07
<i>H. Anxiety Symptoms</i>	1.11 ***	.10 ***		-.01	.03 ***		10.81 (1)	.94	.17
<i>W. Anxiety Symptoms</i>	1.22 ***	.13 ***		.02 *	.01		15.37 (2)	.95	.14

Notes: H = Husbands, W = Wives.

* $p < .05$.

** $p < .01$.

*** $p < .001$.