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Dynamics of Family Economic Hardship and the Progression of Health Problems of Husbands and Wives during the Middle Years: A Perspective from Rural Mid-West

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Abstract

Objectives—The objective of this study was to investigate the influence of theoretically important dimensions of stability and change in economic hardship during early middle years on decade-long health problems of husbands and wives.

Method—The study used prospective data collected from 360 middle-aged husbands and wives during a 12-year period. The variables included self-reported economic hardship (22 items), mental and physical health, and physical impairment.

Results—The results supported the hypothesis that the dynamics of family economic hardship (in terms of stability and change) during the early middle years contribute to subsequent onset of health problems of middle-aged husbands and wives. These health problems, in turn, progress as an interrelated process through intra-health-domain continuities, cross-health-domain proliferations and dyadic associations as they pass through midlife.

Discussion—A better understanding these processes may aid in the formation and effective implementation of mental and physical health promotion programs for middle-aged husbands and wives.

Keywords

Economic hardship; midlife; health

Although midlife is generally considered a time of relatively good health (Lachman & James, 1997), previous studies have suggested that midlife is a sensitive developmental period. During midlife the incidence of chronic diseases (Siegler, 1997) and physical impairment (Martikainen, Stansfeld, Hemingway, and Marmot, 1999), as well as inter-individual differences in health status, increase thus leading to health disparities into later life (Lorenz, Wickrama, Conger, & Elder 2006; McDonough & Berglund, 2003). Increasing incidence of and inter-individual differences in health status may be partly attributed to the fact that men and women who have experienced more stressful life difficulties than others become

increasingly susceptible to both mental and physical health problems during this period of life (Robert & House 1996; Wickrama et al., 2001; 2006; Lorenz et al., 2006).

The association between economic hardship and health problems such as poor physical health, poor mental health, and physical impairment is well documented (McDonough & Berglund, 2003; Lorenz et al., 2000; Lynch et al., 1997). This association seems to operate not only through material deprivation but also through social, behavioral, and psychological problems generated by experiences with economic hardship (Ahnquist, Fredlund, & Wamala, 2007; Lynch et al. 1997). However, most previous studies have (a) conceptualized and analyzed both economic hardship and health outcomes in static terms rather than as dynamic temporal processes (McDonough & Berglund, 2003) and (b) often focused on single or limited health outcomes (Aneshensel, 2005). Specifically, little is known about the influence of the dynamics of family economic hardship on the progression of multiple health problems of husbands and wives over the middle years. This study addresses this gap in current research by examining stability and change in economic hardship (i.e., chronically high, consistently low, increasing, and decreasing) in relation to the progression of inter-related health problems.

In the present study we draw on stress-process theory (Pearlin 1989; Pearlin & Skaff, 1996) within the life course perspective (Elder et al. 1996) as a theoretical guide for predicting the dynamic temporal association between family economic hardship and health outcomes (Pearlin, Schieman, Fazio & Meersman, 2005). The life course perspective (Elder et al. 1996) suggests that increasing heterogeneity in individual trajectories of economic-hardship promotes heterogeneity in health/developmental consequences over the life course. The stress-process theory (Pearlin & Skaff, 1996) elaborates stress-health causal mechanisms; particularly how different forms of stressful experiences contribute to different health consequences. Consistent with the 'proliferation' principle of stress-process theory (Pearlin et al., 2005), we further contend that not only stressors but also health problems proliferate across different health domains such as mental health, physical health and physical functioning (Taylor & Lynch, 2004).

THE PRESENT STUDY

Drawing on these conceptual and methodological advances and using prospective data collected from 360 middle-aged husbands and wives during a 12-year period, the present study investigates family economic dynamics in the early middle years and their subsequent health consequences for husbands and wives, after taking dyadic associations between husbands and wives into account. Our analysis addresses two specific questions.

First, as shown in Figure 1, we investigate the influence of theoretically important dimensions of stability and change in economic hardship during early middle years (the aftermath of rural farm crisis in late 80's and early 90's) on decade-long health problems of husbands and wives. Second, also as shown in Figure 1, we investigate how these decade-long health problems are mediated by more immediate health consequences of dynamics of family economic hardship forming an inter-related dyadic health process over the middle years. Figure 1 presents the progression of health problems for husbands and wives over the middle years. Within the limitations of the available data, we identify the best fitting temporal order of the variables to test our directional hypotheses. We discuss these hypothesized associations in the following paragraphs.

Family Economic Hardship during the Middle Years—Family economic hardship arises when families lack the financial resources required to fulfill family needs for food, clothing, housing, utilities, and medical care. According to Mirowsky and Ross (1999), direct measures of family economic hardship combine bio-economic assessment of family income (adequacy of family income to meet absolute material needs such as food; official poverty

criteria) with subjective satisfaction with family income (adequacy of family income in terms of personal contentment). Several researchers suggest that reports of family economic hardship are more immediately relevant measures of family economic difficulties than measures based on family income (McDonough & Berglund, 2003; Mirowsky & Ross, 1999).

Although previous studies show that, on average, economic hardship declines and the levels of wealth increase successively in older age groups up to late middle age (Mirowsky & Ross, 1999; 2001; U. S. Bureau of the Census, 1995), there may exist inter-household differences or heterogeneity in economic hardship trajectories (Lorenz et al. 2000). There may be increases and decreases in economic hardship, and consistently low and chronically high economic hardship (McDonough et al., 2005; Yuan, 2008). Indeed, the current middle-aged baby boom cohort, in particular, individuals from high and middle income groups, has experienced a significant downfall in their work and economic conditions. This is particularly true for farmers during the farm crisis in the late 80's and early 90's (Lorenz et al., 2000).

In contrast, empirical evidence also suggests that a relatively small fraction of individuals experiencing economic hardship may acquire new and alternative sources of income and even escape from economic hardship (Lorenz et al., 2000; McDonough et al., 2005; Mirowsky & Ross, 1999). Finally, consistent with the traditional view of economic disadvantage, individuals who are at the bottom of the income distribution are structurally trapped and unable to escape the chronic state of economic hardship (McLeod & Shanahan 1996). However, when economic hardship is assessed at an aggregate level, potential heterogeneity in economic hardship trajectories may be averaged away and not evident (McDonough & Berglund, 2003). We propose that these differences in economic hardship will have significant influences on later health and well-being.

The Dynamics of Economic Hardship and Health Outcomes—In the present study, we expected that different trajectories of economic hardship would represent different dimensions of life stress. For example, husbands and wives who have experienced chronically high, increasing, or decreasing economic hardship have a history of family economic stress at different points in time. These experiences contrast sharply with the histories of couples who demonstrate no evidence of economic hardship during the same time period (McDonough et al., 2005; Yuan 2008). Thus, we hypothesize that experiencing these temporarily different forms of economic hardship will be positively related to poor mental health, physical illness, and physical impairment and they will be experienced in distinct ways, when compared to the consistently low group.

Further support for these predictions comes from laboratory-based and medical stress research which has shown that stressful conditions influence physical health directly by causing deleterious effects through an interconnected set of physiological mechanisms (e.g., cardiovascular, hormonal, neurological, and immunological) (Lavallo, 2005). When the source of stress is chronic, these processes may have a sustained impact on physical health (Fremont & Bird 2000; Wickrama et al., 2001). Moreover, chronic economic hardship produces a cumulative “dose-response” effect (Singh-Manoux, Ferrie, Chandola & Marmot, 2004) on physiological indicators of chronic stress exposure and the subsequent physical health of an individual (Pearlin et al. 2005). Thus, the detrimental health effect of chronic economic hardship is stronger than that of intermittent economic hardship (McLeod & Shanahan, 1996). Experiences with chronic economic hardship may also directly contribute to poor mental health by producing depressive feelings directly and indirectly through erosion of one's self concept (Lever et al., 2005). The influence of chronic economic hardship on health is also consistent with the notion of ‘weathering’, the accumulated consequences of exposure to socioeconomic adversity (Geronimus et al., 2006).

In contrast to chronic economic hardship, economic stress may be acute or transient (Mirowsky & Ross, 2001). For many, these instances of economic stress may be considered less problematic, short-term and manageable. Because of their short term nature, these hardship experiences may be successfully resolved (Yuan, 2008) and less detrimental for physical and mental health (Aneshensel, 1999). Contrary to this expectation, however, recent research suggests that acute instances of economic hardship (e.g., sharp increases) are equally as detrimental for the health of family members as is chronic economic hardship due to the stress of managing a decline in the family economy (Yuan, 2008). These effects may precipitate health problems over time.

Previous experiences with economic problems, although they were resolved, would have persistent health effects through several pathways. According to 'latency models' (Meaney et al., 1996), the effects of early adverse experiences (early health damages) may manifest years after the exposure. Also, early economic hardship may result in lack of medical check-ups, care, and treatments during critical periods in the life course (Singh-Manoux et al., 2004).

Interrelated Processes of Different Health Domains—As shown in Figure 1, we expect that families who experience economic hardship in the early middle years will manifest greater levels of depressive symptoms, physical illnesses, and physical impairments. In turn, these health problems, especially chronic illnesses (e.g., cancer, cardiovascular disease, hypertension, and arthritis) and physical impairments are predicted to continue over time. Also important, the incidence and prevalence of these health problems are expected to increase with advancing age (Taylor & Lynch, 2004).

As shown in Figure 1, and as previously noted, these health problems progress as an inter-related health process with cross-domain proliferation over the middle years and into later years. Earlier research provides evidence for this expected bi-directional association between physical illness and poor mental health. Biological research has shown that poor mental health can contribute to physical illnesses through a number of mechanisms including the activation of the hypothalamic-pituitary-adrenocortical (HPA) axis and sympathetic-adrenal-medullary (SAM) system, immune function effects, and behavioral changes (Kubzansky & Kawachi, 2000). Also important, previous studies suggest that physical illness may contribute to mental health problems through (a) unhappiness about having to deal with the ailment, (b) physical illness itself or the bodily pain or limitations, (c) changes in physical appearance (Lewinsohn et al., 1996), and a limited socioeconomic success attainment (Wickrama, Conger & Abraham, 2005).

Furthermore, studies have shown that poor mental health, in particular depressed mood or depressive disorders, has a strong influence on physical impairment (Steptoe & Marmot, 2003). At the same time, physical impairment is a documented risk factor for mental health problems (Lewinsohn et al., 1996). Finally, physical impairment may contribute to poor physical health due to several related conditions, including a sedentary lifestyle, lack of exercise, hypertension, and obesity. At the same time, physical illness such as arthritis and cardiovascular disease (CVD) may directly increase the degree of physical impairment.

Husband and Wife Correlations, Cross-Over Influences and Gender Differences

—Husbands' and wives' health problems may be contemporaneously associated with each other (correlations) both within and across health domains. For example, one person's depressed mood is contemporaneously associated with another's depressed mood (O'Brien, 2005). Similarly, one persons' poor physical health and physical impairment may be contemporaneously associated with another's depressed mood. In addition, one person's health problems may influence another's health problems over time (longitudinal transactional

influences). Thus, the present study will investigate these contemporaneous and longitudinal dyadic associations (dependencies) between husbands and wives.

As previously note, the association between economic hardship and health seems to operate not only through material deprivation but also through social, behavioral, and psychological problems generated by experiences with economic hardship (Ahnquist, Fredlund, & Wamala, 2007; Lynch et al. 1997). Previous research has shown that men and women in rural areas are more likely to be committed to traditional gender roles/activities - - women (mothers) primarily to family management and child rearing while men (fathers) primarily to economic activities (Wickrama et al., 1995). For wives, family economic problems may mainly disrupt their family management and child rearing role whereas, for husbands, chronic economic failures may mainly disrupt their 'bread winner' identity. Thus, family economic hardship may be equally stressful for both husbands and wives resulting in negative health outcomes. However, less is known about potential husband-wife differences (or similarities) in the expected associations between family economic dynamics and health problems. In the present study, we will also explore potential gender moderations.

Method

PARTICIPANTS AND PROCEDURES

The data used to evaluate our theoretical model are from the Iowa Midlife Transition Project (MTP), a study of 360 husbands and wives. These men and women were originally participating in the Iowa Youth and Families Project (IYFP) in 1989, 1990, 1991, 1992 and 1994 and then continuing on to participate in the Midlife Transitions Project (MTP) in 2001. For both projects, trained field interviewers visited the families in their homes. During the visit, a professional interviewer asked each family member to complete a detailed questionnaire about family life, work, finances, friends, and mental and physical health status, including health behaviors. Family members independently completed the questionnaires so that they could not see one another's answers.

The IYFP involved 451 families from eight counties in Iowa (see Conger and Elder 1994). The site for the research was determined by our interest in rural economic stress and wellbeing. Because many of the outcomes and processes considered in the overall study were concerned with children's development, families selected to participate had to have 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, 97% of the husbands were employed. About 97% of the employed husbands were full-time workers. In terms of occupational status, the men in this sample included farmers (22%), professionals and managers (28%), technicians and skilled workers including sales workers (40%), office workers (3%), and unskilled workers (7%). The median yearly income in 1989 was \$22,000. The average occupational prestige scores for the men in our sample, on a scale of 1 to 100, were 43 (Nakao & Treas, 1990). In 1989, both husbands and wives were in their early middle years; the average ages of husbands and wives were 40 and 38 years, respectively. The median number of years of education was 13.

Because there are very few minorities in the rural area studied, all families in the combined sample were white. Adult participants ($N=416$) were interviewed again in the early months of 2001 as part of the MTP. The attrition rate for the combined sample was 14% across the 12-year period. We tested our theoretical model with a sample of 360 consistently married husbands and wives who provided complete data for all assessments in 2001. Out of the 360 complete cases in 2001, some cases were unavailable for a specific wave of data collection

(nearly 9% of the data). This study used full information maximum likelihood (FIML), available in AMOS software, to test the hypotheses using all available data in the analysis. FIML provides more efficient and less biased parameter estimates from incomplete data (Enders 2001). We further tested the model with and without the inclusion of the 9% missing cases and found no significant differences in the results.

MEASURES

Depressed mood—Depressed mood was measured by the 13-item depressive symptomology subscale of the SCL-90-R (Derogatis and Melisaratos 1983) in 1994 and 2001. Respondents were asked to indicate on 5-point scale ranging from not at all (1) to extremely (5), how much in the past week they were bothered by symptoms of depressed mood, such as crying easily, feeling lonely, feeling blue, feeling worthless, and feeling hopeless about the future. Responses for all 13 items were averaged to create a depressive symptoms subscale which could potentially range from 1 to 5. Cronbach's alpha for depression in 1994 was .91 for both husbands and wives and Cronbach's alpha for depression in 2001 was .89 for both husbands and wives.

Physical Illnesses—Respondents were presented with a list of 46 health conditions in 1994 and asked whether they “had any problems with any of the symptoms or diseases listed” during the past 12 months. In 2001, 30 age-appropriate illnesses were added to the original list. The illnesses ranged from relatively minor conditions such as the common cold and sore throats to more severe diseases such as heart conditions, diabetes, and cancer. The number of illnesses measure was created by the counts of reported illnesses. Because the counts of illnesses was skewed, the measure was transformed logarithmically.

Physical Impairment—The degree of physical impairment was measured by the 10-item physical impairment scale of the Rand Health Science Program in Health Survey 1.0 (1986) in 1994 and 2001. Respondents were asked to indicate on a 3-point scale -ranging from no, not limited at all (1) to yes, limited a lot (3) - how much they were limited by physical impairments such as vigorous activities (e.g., running or lifting heavy objects), moderate activities (e.g., moving a table, pushing a vacuum cleaner, lifting or carrying groceries). Responses were averaged to create physical impairment scale which could potentially range from 1 to 3.. Cronbach's alpha for physical impairment in 1994 was .84 for husbands and .88 for wives and Cronbach's alpha for physical impairment in 2001 was .89 for husbands and .91 for wives.

Family Economic Hardship: The lists of economic problems were adapted from Dohrenwend, Krasnoff, Askenasy, and Dohrenwend (1978). The measure of family economic hardship (one measure per family) was created by summing the wives's and husband's “yes” responses to each of 22 items in 1989, 1990, 1991, and 1992 that indicate economic problems experienced by the family (1=yes, 0=no). The list of economic problems included items such as “received government assistance,” “borrowed money to help pay bills,” “sold possessions or cashed in life insurance,” “changed residence to save money,” “reduced or eliminated medical insurance,” “changed food shopping or eating habits to save money,” “postponed or delayed paying property tax,” and “sold property to raise money”.

Analyses

IDENTIFYING FAMILY ECONOMIC HARDSHIP GROUPS

As a first step in the analyses we used observed measures (husbands' and wives' reports) of family economic hardship to identify theoretically important temporal forms of stability and change in family economic hardship from 1989 to 1992. We selected four groups from the sample in the following order (without replacement). First, we selected the *consistently low*

economic hardship group as follows; families whose initial score on economic hardship was equal to or less than the mean initial level of economic hardship (4.65) and changed from 1989 to 1992 only between +1 or -1 (half a standard deviation of change) OR If the change is more than 1 and the final score in 1992 was also less than the mean score. Second, from the remaining families, we selected the chronically high *economic hardship group* as follows; families whose initial level was more than 4.65 and changed only between +1 or -1 OR If change is less than -1 and the final score in 1992 was also more than the mean score. Third, from the remaining families, we selected the *increasing economic hardship group* as follows; families whose initial score on economic hardship was less than 4.65 and an increase in economic hardship was more than 1. Finally, we selected the *decreasing economic hardship group* as follows; families whose initial score on economic hardship was more than 4.65 and a decrease in economic hardship was more than 1. These criteria accommodated all the families in the sample.

We used the initial (1989) and final (1992) scores for this classification under the assumption that change in economic hardship is linear. In order to test this assumption, we estimated growth curves for each economic hardship group, all groups showed respectable fit with linear growth with non-significant quadratic terms except for the decreasing economic hardship group. Moreover, the average group trajectories in Figure 2 indicate that the data from all four waves (1990, 1991, 1992 and 1994) follow the identified pattern of trajectories. This theoretically based approach has been used by previous studies (e.g., Clipp, Pavalko, & Elder, 1992). Also, these directly identified four groups are consistent with four latent classes of poverty identified by McDonough and colleagues (2005). This approach to classification served our purposes by creating distinctive groups that accommodate all families and also created groups with large enough group sizes (figure 2) to yield stable estimates of means and slopes. Also, group analysis (Intra Class Correlations) showed that between-group differences in the initial level and in change in economic hardship were statistically significant providing evidence for the heterogeneity and validity of identified four groups. Figure 2 presents mean trajectories of economic hardship groups along with mean values and group sizes.

TESTING MODELS

The hypothesized longitudinal path models were tested within a Structural Equation Modeling (SEM) framework (AMOS version 7). Given the comprehensiveness of the hypothesized model, and the sample size and data limitations, we tested three incremental models (M1, M2 and M3). *First*, we predicted multiple health outcomes in 2001 between health domains using family economic hardship groups for husbands and wives separately (M1s). These models included contemporaneous correlations between health domains. *Second*, in order to examine the health progression of husbands and wives over middle years, we extended M1 models by adding health outcomes in 1994 as mediators. *Finally*, in order to take dyadic processes into account, we tested a comprehensive dyadic 'cross-lagged' model (M3) by combining husbands' and wives' models (M2s), including (a) within person 'cross-lagged' paths from 1994 to 2001, (b) 'cross-lagged' paths between husband and wife from 1994 to 2001 (transactional paths), and (c) contemporaneous correlations of health problems in 1994 and 2001 across domains and husbands and wives as well.

We used a range of indices to evaluate model fit. Each index evaluates fit differently and has certain strengths and limitations; we used chi-square statistics, CFI, NFI and RMSEA to evaluate our theoretical model. A chi-square, degree of freedom ratio below about 3.0 indicates an acceptable model-fit (Carmines and McIver 1981). The Comparative Fit Index (CFI) and the Root Mean Squared Error of Approximation (RMSEA) were also used to evaluate the study models. A CFI value of more than .95 and RMSEA of less than .05 indicate that the model fits the data well (Hu & Bentler, 1999).

TESTING GENDER DIFFERENCES

The dyadic model also allowed us to compare husbands' paths with corresponding wives' paths using equality constraint tests (Wickrama, Conger, Lorenz & Matthews, 1995). In these tests, the two theoretically relevant paths are constrained to be equal in the model to determine whether this procedure would significantly reduce the model fit. The change in chi-square for one degree of freedom for each paired comparison is used to test whether two paths are significantly different.

Results

Table 1 provides descriptive statistics for all of the health variables. The mean values of family economic hardship are 4.65, 4.28, 4.38, and 4.43 from 1989, 1990, 1991, to 1992, respectively. For the total sample, the mean values of physical illness, depressive symptoms of husbands, and physical impairment suggest that the sample is fairly healthy, health problems increased from 1994 to 2001. Although the physical illness lists in 1994 and 2001 were not the same, individual illness analysis (not presented in the table 1) showed that some chronic illnesses including diabetes, cancer, hypertension and heart attacks increased from 1994 to 2001 for both husbands and wives. These descriptive data suggest that, in aggregate, there was a decline in health during the seven-year period from 1994 to 2001.

As shown in table 1, the levels and changes in health problems were different for different economic hardship groups. The consistently low economic hardship group had the lowest initial level (1994) and smallest increase in all the health problems from 1994 to 2001 of all the groups. For husbands, the chronically high economic hardship group showed the highest mean levels in health problems in 1994 and 2001 (except for illness in 2001). For wives, the decreasing economic hardship group showed the highest mean levels in 1994 and 2001 (except for depression in 2001) suggesting that early high levels of economic hardship may have caused lasting health damage over time.

As shown in Figure 3, the levels of physical impairment, depressive symptoms and physical illness in 2001 were regressed together on dummy variables representing economic hardship groups [decreasing, increasing, and chronically high (1989–1992) with consistently low as the omitted category] and educational level (as a control variable) after taking the correlation between different health problems into account (M1). Results for husbands showed that experiences of chronically high economic hardship significantly influenced physical impairment ($\beta=.17$, $t=2.75$) and depressive symptoms ($\beta=.15$, $t=2.41$); and experiences of increasing economic hardship ($\beta=.10$, $t=1.69$) and chronically high economic hardship ($\beta=.11$, $t=1.86$) marginally influenced physical illness in 2001, compared to the consistently low economic hardship group. For husbands, experiences of decreasing economic hardship did not predict physical health problems in 2001, compared to experiences of consistently low economic hardship. Results for wives showed experiences of decreasing economic hardship significantly predicted physical impairment ($\beta=.19$, $t=3.22$), depressive symptoms ($\beta=.12$, $t=2.19$), and physical illness ($\beta=.12$, $t=3.08$); and experiences of chronically high economic hardship significantly influenced depressive symptoms ($\beta=.15$, $t=2.58$) in 2001 (with reference to the consistently low group). Residual errors of contemporaneous health constructs were significantly correlated across 3 health domains. For both husbands and wives, education was not significantly correlated with any economic hardship groups or health problems in 2001.

Figures 4 presents the comprehensive model for husbands and wives by adding the interrelated health processes from 1994 to 2001. All the direct influences of economic hardship on decade-long health outcomes in 2001 shown in the previous model (M1) were diminished, implying that direct influences are largely mediated by the intra-domain continuities and cross-domain proliferation of health problems. The results for husbands showed that the experiences of

chronically-high significantly influenced physical impairment ($\beta=.17, t=2.81$), depressive symptoms ($\beta=.20, t=3.35$) and physical illness ($\beta=.19, t=3.20$) in 1994 (with reference to the consistently low group). The results of equality constraint tests using the dyadic model (M3) (Wickrama, Conger, Lorenz, & Matthews, 1995) showed that the influences of chronically-high economic hardship on physical illness was significantly different for husbands and wives (change in Ch-square for 1 df = 5.40, $p < .05$).

The results for wives showed that the decreasing economic hardship group had significantly higher physical impairment ($\beta=.21, t=3.82$), depressive symptoms ($\beta=.12, t=2.23$), and physical illness ($\beta=.12, t=2.11$) and the chronically high group had significantly higher depressive symptoms ($\beta=.20, t=3.47$) compared to the consistently low economic hardship group. The increasing economic hardship group had marginally higher physical illness ($\beta=.10, t=1.85$) and marginally higher depressive symptoms ($\beta=.10, t=1.88$) compared to consistently low group. The results of equality constraint tests using the dyadic model (M3) showed that the influences of decreasing economic hardship on physical impairment and depressive symptoms were significantly different for husbands and wives (change in Ch-square for 1 df = 6.30, $p < .05$ and 3.90, $p < .05$, respectively). For both husbands and wives, education was not significantly correlated with any economic hardship groups or health problems in 1994 and 2001.

For husbands (Figure 4), physical impairment, depressive symptoms and physical illness showed moderate intra-domain stabilities from 1994 to 2001 ($\beta_s = .53, .50$ and $.41$, respectively). Importantly for husbands, all the cross-domain proliferation between physical impairment, depressive symptoms, and physical illness were significant, except for the influence of physical impairment on depressive symptoms. Physical impairment and depressive symptoms in 1994 contributed to an increase in physical illness from 1994 to 2001. Similarly, depressive symptoms and physical illness in 1994 contributed to an increase in physical impairment from 1994 to 2001. However, only physical illness in 1994 contributed to an increase in depressive symptoms from 1994 to 2001. Equality constraint tests using the dyadic model (M3) showed that only the effects of depressive symptoms (1994) to physical illness (2001), and depressive symptoms to physical impairment (2001) were significantly different for husbands and wives (changes in Chi-square for 1 df = 3.78 $p < .05$, and 4.20, $p < .05$, respectively).

Residual errors of contemporaneous health constructs were significantly correlated across 3 domains. The overall fit of the model was excellent, with a CFI of 1.0 and RMSEA of 0. The fully recursive model did not show a significant improvement over this model.

For wives (Figure 5), physical impairment, depressive symptoms, and physical illness showed moderate intra-domain stabilities from 1994 to 2001 ($\beta_s = .46, .47$, and $.53$, respectively). For wives, there was less evidence for cross-domain proliferation. Physical impairment in 1994 contributed to an increase in physical illness from 1994 to 2001; and physical illness in 1994 contributed to an increase in physical impairment from 1994 to 2001. For wives, neither physical impairment nor physical illness in 1994 contributed to an increase in wives' depressive symptoms from 1994 to 2001. Residual errors of contemporaneous health constructs were significantly correlated across 3 health domains. The overall fit of the model was excellent, with CFI of 1.0 and RMSEA of .03. The fully recursive model did not show a significant improvement over this model.

Table 2 presents the results of the *dyadic model* (M3) which combines husband model and wife models (M2s). Given the sample size limitations, we identified a parsimonious comprehensive dyadic model including only significant paths (except for within-domain transactional, 'cross-lagged' paths between husbands and wives) and significant contemporaneous correlations.

Since all paths from husbands' education and wives' education to health constructs were not significant, husbands' and wives' education were removed from the dyadic model.

Table 2 presents the results of the dyadic model (M3). The coefficients estimated in the dyadic model did not differ significantly from those in the two separate husband and wife models (M2s). However, the dyadic model (M3) provided evidence for one additional significant transactional influence and four significant contemporaneous correlations. Wives' depressive symptoms in 1994 significantly influenced husbands' depressive symptoms in 2001 ($\beta = .09$, $t = 1.97$). However, this influence is not significantly different from the influence of husbands' depressive symptoms in 1994 on wives' depressive symptoms in 2001. The correlations between husbands' depressive symptoms and wives' depressive symptoms, and husbands' physical illness and wives' physical illness in 1994 were significant ($r = .10$, $p < .05$; $r = .10$, $p < .05$, respectively). The correlation between husbands' physical impairment and wives' physical impairment, husbands' depressive symptoms and wives' depressive symptoms in 2001 were significant ($r = .12$, $p < .05$; $r = .10$, $p < .05$, respectively). The overall fit of the model was excellent, with a CFI of 1.0 and RMSEA of .00. The fully recursive model did not show a significant improvement over this model.

Discussion

The objectives of the present study were to investigate (a) the influence of stability and change in family economic hardship during the early middle years on subsequent levels of physical illness, depressive symptoms, and physical impairment of husbands and wives; and (b) how these health problems progress as a related process over the middle years. The results contribute to a deeper understanding about the dynamic association between family economic hardship and husbands' and wives' health outcomes.

Consistent with the stress-process theory within the life-course perspective (Elder et al., 1996; Pearlin et al., 2005), the present study was able to capture different health effects of chronic exposure to economic hardship and changes in family economic hardship and their distinct health effects (Lynch et al., 1997). Also, the present investigation was consistent with the social consequences model of life-course disruptions by investigating the progression of an array of health problems (Aneshensel, 2005). More importantly, providing evidence for the hypothesized causal direction, the results showed that the dynamics of family economic problems in the early middle years (1990–94) are linked to decade-long health problems (2001). These influences operate largely through intra-health-domain continuities, cross-health-domain proliferation of health problems, as well as contemporaneous and longitudinal dyadic associations between husbands and wives during the middle years, not as direct influences.

For husbands, those in the chronically high economic hardship group were the most strongly affected. They experienced the most physical illnesses, higher depressive symptoms, and greater physical impairments when contrasted with the consistently low economic hardship group in 1994 as well as in 2001. These health problems of middle-aged husbands may be a long term consequence of continuously living in an economically stressed family environment (e.g., exposure to 'dose response' effect).

For wives, decreasing levels of economic hardship influenced subsequent levels of physical illness, impairment, and illness; implying that current economic conditions did not erase the health effects of previous experiences of high levels of economic hardship (McDonough & Berglund, 2003). It appears that, for these rural wives with at least two adolescents (in 1989), previous experiences with high levels of family economic problems had more persistent influence on physical impairment and illness than for husbands (e.g., latency effect or/and permanent health damages).

For wives, increasing economic hardship was also marginally associated with subsequent levels of physical illness and depressive symptoms whereas for husbands, increasing economic hardship was marginally associated with subsequent levels of physical illness only. This is consistent with recent research findings (Yuan, 2008) showing that an increase in family economic hardship is also detrimental for the health of family members.

In addition, for both husbands and wives and consistent with the proliferation principle, the results revealed evidence of cross-domain proliferation between health problems of different types over a seven-year period in the middle years. In general, these findings show that, for both husbands and wives, physical illness, depressive symptoms, and physical impairment progress over the middle years as a self-perpetuating interrelated process. However, for husbands, there appeared to be more cross-domain proliferation and reciprocity in health problems across different health domains than for wives. These results warrant future research to elucidate the mechanisms responsible for the differential health influences of different aspects of the dynamics of family economic hardship and for the husband's and wives' differences in the above processes.

Although, results showed that progression of health problems of both husbands and wives are influenced by family economic hardship, there is a lack of contemporaneous and longitudinal dyadic associations of health problems between husbands and wives. It seems that family economic hardship initiates health trajectories of husbands and wives that are not strongly interlocked during middle years.

Consistent with the social *causation* tradition, our findings showed that family economic hardship in the middle years produces negative health consequences for middle-aged husbands and wives, initiating a possibly self-perpetuating health process. The cycle may continue as poor health selects middle-aged adults into more adverse life circumstances. In general, these results are consistent with the life course perspective, in that early stressful experiences appear to produce cumulative consequences from one stage of the life course to another (Elder et al., 1996; Wickrama et al., 2003).

Despite these suggestive findings, there are also limitations to the present research. For example, our self-reported information regarding health problems may be a source of bias. Future research should extend this line of research using clinical measures of health outcomes. And although the findings provide general support for the hypothesized model, the applicability of the historical context of the study (i.e. farm crisis) and unique characteristics of the sample and the data limit the generalizability of the results. Replication with a broader cross-section of the population that includes diverse ethnic groups and both rural and urban families, with more variation in family demography (e.g., family size), and with measurements that stretches throughout midlife would increase our confidence in the general applicability of the findings presented in this study. Nevertheless, the findings of the present study are useful because they are applicable to an important specific section of the general population.

Using a sample representing an important component of the general population, this study demonstrates long-term health consequences as a function of both chronic economic hardship and changes in family economic hardship in the middle years. Thus, policies and programs geared towards reducing poverty should recognize the health consequences of long-term exposure to poverty and changes in poverty as well. In addition, our findings elaborate the progression of related health processes involving the proliferation across different types of health problems during the middle years. A better understanding these processes may aid in the formation and effective implementation of mental and physical health promotion programs for middle-aged husbands and wives.

References

- Ahnquist J, Fredlund P, Wamala SP. Is cumulative exposure to economic hardships more hazardous to women's health than men's? A 16-year follow-up study of the Swedish Survey of Living Conditions. *Journal of epidemiology and community health* 2007;61:331–336. [PubMed: 17372294]
- Aneshensel, CS. Outcomes of the stress process. In: Horwitz, AV.; Scheid, TL., editors. *Handbook for the study of mental health: Social contexts, theories, and systems*. New York: Cambridge University Press; 1999. p. 211–227.
- Aneshensel CS. Research in mental health: Social etiology versus social consequences. *Journal of Health and Social Behavior* 2005;46:221–228. [PubMed: 16259145]
- Carmines, EG.; McIver, JP. Analyzing models with unobserved variables: Analysis of covariance structures. In: Bohmstedt, GW.; Borgatta, EF., editors. *Social measurement*. Beverly Hills, CA: Sage; 1981. p. 65–115.
- Clipp, Pavalko EE, Elder G. trajectories of Health: In Concept and Empirical Pattern. *Behavior, Health and Aging* 1992;2:159–179.
- Cockerham, WC. *Social causes of health and disease*. Malden, MA: Polity Press; 2007.
- Conger, Rand D.; Elder, Glen H, Jr. *Families in Troubled Time: Adoption in Rural America*. New York: Aldine de Gruyter; 1994.
- Derogatis LR, Melisaratos N. The Brief Symptom Inventory: An introductory report. *Psychological Medicine* 1983;13:595–605. [PubMed: 6622612]
- Dohrenwend BS, Krasnoff L, Askenasy AR, Dohrenwend BP. Exemplification of a method for scaling life events: The Peri Life Events Scale. *Journal of Health and Social Behavior* 1978;19:205–229. [PubMed: 681735]
- Elder, GH., Jr; George, LK.; Shanahan, MJ. Psychosocial stress over the life course. In: Kaplan, HB., editor. *Psychosocial stress: Perspectives on structure, theory, life-course, and methods*. San Diego, CA: Academic Press; 1996. p. 247–292.
- Enders CK. A primer on maximum likelihood algorithms available for use with missing data. *Structural Equation Modeling* 2001;8:128–141.
- Fremont, Allen; Bird, Chloe E. Social and Psychological Factors, Physiological Processes, and Physical Health. In: Bird, Chloe E.; Conrad, Peter; Fremont, Allen, editors. *Handbook of Medical Sociology*. 5. New Jersey: Prentice Hall; 2000. p. 334–352.
- Geronimus AT, Hicken M. Weathering and age patterns of all-cause mortality scores among blacks and whites in the United States. *AJPH* 2006;96(5):826–833.
- Hu, Li-tze; Bentler, Peter M. Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives. *Structural Equation Modeling* 1999;6:1–55.
- Kubzansky, Laura D.; Kawachi, Ichiro. Going to the Heart of the Matter: Do Negative Emotions Cause Coronary Heart Disease? *Journal of Psychosomatic Research* 2000;48:323–337. [PubMed: 10880655]
- Lachman, ME.; James, JB. Charting the course of midlife development: An overview. In: Lachman, ME.; James, JB., editors. *Multiple paths of midlife development*. Chicago: The University of Chicago Press; 1997. p. 1–17.
- Lever JP, Pinol NL, Uralde JH. Poverty, Psychological Resources and Subjective Well-Being. *Social Indicators Research* 2005;73:375–408.
- Lewinsohn, PM.; Clarke, GN.; Rhode, P.; Hops, H.; Seely, J. A course in coping: A cognitive-behavioral approach to the treatment of adolescent depression. In: Hibbs, D.; Jensen, PS., editors. *Psychosocial treatments for child and adolescent disorders: Empirically based strategies for clinical practice*. Washington, DC: American Psychological Association; 1996. p. 109–135.
- Lorenz FO, Elder GH Jr, Bao WN, Wickrama KAS, Conger RD. After farming: Emotional health trajectories of farm, nonfarm, and displaced couples. *Rural Sociology* 2000;65:50–71.
- Lorenz FO, Wickrama KAS, Conger RD, Elder GH Jr. The short-term and decade-long effects of divorce on women's midlife health. *Journal of Health and Social Behavior* 2006;47:111–125. [PubMed: 16821506]
- Lovaglio, WR. *Stress and health: Biological and psychological interactions*. Thousand Oaks, CA: Sage Publications; 2005.

- Lynch JW, Kaplan GA, Shema SJ. Cumulative impact of sustained economic hardship on physical, cognitive, psychological, and social functioning. *The New England Journal of Medicine* 1997;337:1889–1895. [PubMed: 9407157]
- Martikainen P, Stansfeld S, Hemingway H, Marmot M. Determinants of socioeconomic differences in change in physical and mental functioning. *Social Science & Medicine* 1999;49:499–507. [PubMed: 10414809]
- McDonough P, Berglund P. Histories of poverty and self-rated health trajectories. *Journal of Health and Social Behavior* 2003;44:200–216.
- McDonough P, Sacker A, Wiggins RD. Time on my side? Life course trajectories of poverty and health. *Social Science & Medicine* 2005;61:1795–1808. [PubMed: 16029777]
- McLeod JD, Shanahan MJ. Trajectories of poverty and children's mental health. *Journal of Health and Social Behavior* 1996;37:207–220. [PubMed: 8898493]
- Meaney, MJ.; Bhatnagar, S., et al. Early environment and the development of individual differences in the hypothalamic-pituitary-adrenal stress response. In: Pfeffer, CR., editor. *Severe stress and mental disturbance in children*. Washington, DC, USA: American Psychiatric Press, Inc; 1996. p. 85-127.
- Mirowsky J, Ross CE. Age and the effect of economic hardship on depression. *Journal of Health and Social Behavior* 2001;42:132–150. [PubMed: 11467249]
- Mirowsky J, Ross CE. Economic hardship across the life course. *American Sociological Review* 1999;64:548–569.
- Nakao, K.; Treas, J. *Computing 1989 occupational prestige scores*. Chicago: University of Chicago, National Opinion Research Center; 1990.
- O'Brien M. Studying individual and family development: Linking theory and research. *Journal of Marriage and Family* 2005;67:880–890.
- Pearlin LI. The sociological study of stress. *Journal of Health and Social Behavior* 1989;30:241–256. [PubMed: 2674272]
- Pearlin LI, Schieman S, Fazio EM, Meersman SC. Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior* 2005;46:205–219. [PubMed: 16028458]
- Pearlin LI, Skaff MM. Stress and the life course: A paradigmatic alliance. *The Gerontologist* 1996;36:239–247. [PubMed: 8920095]
- Robert S, House JS. SES differentials in health by age and alternative indicators of SES. *Journal of Aging and Health* 1996;8:359–388. [PubMed: 10165980]
- Siegler, IC. Promoting health and minimizing stress in mid-life. In: Lachman, ME.; James, JB., editors. *Multiple paths of mid-life development*. Chicago: University Chicago Press; 1997. p. 241-256.
- Singh-Manoux A, Ferrie JE, Chandola T, Marmot M. Socioeconomic trajectories across the life course and health outcomes in midlife: Evidence for the accumulation hypothesis? *International Journal of Epidemiology* 2004;33:1072–1079. [PubMed: 15256527]
- Steptoe A, Marmot M. Burden of psychosocial adversity and vulnerability in middle age: Associations with biobehavioral risk factors and quality of life. *Psychosomatic Medicine* 2003;65:1029–1037. [PubMed: 14645782]
- Taylor MG, Lynch SM. Trajectories of impairment, social support, and depressive symptoms in later life. *Journal of Gerontology: Social Sciences* 2004;59B:S238–S246.
- U. S. Bureau of the Census. *The statistical abstract of the United States 1995*. Washington, D.C: U.S. Government Printing Office; 1994.
- Wickrama KAS, Conger RD, Wallace LE, Elder GH Jr. Linking early social risks to impaired physical health during the transition to adulthood. *Journal of Health and Social Behavior* 2003;44:61–74. [PubMed: 12751311]
- Wickrama KAS, Conger RD, Abraham T. Early adversity and later health: The intergenerational transmission of adversity through mental disorder and physical illness. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* 2005;60:S125–S129.
- Wickrama KAS, Lorenz FO, Conger RD, Elder GH Jr, Abraham WT, Fang SA. Changes in family financial circumstances and the physical health of married and recently divorced mothers. *Social Science and Medicine* 2006;63:123–136. [PubMed: 16414162]

- Wickrama KAS, Lorenz FO, Conger RD, Matthews L. Role identity, role satisfaction, and perceived physical health. *Social Psychology Quarterly* 1995;58:270–283.
- Wickrama KAS, Lorenz FO, Wallace LE, Peiris L, Conger RD, Elder GH Jr. Family influence on physical health during the middle years: The case of the onset of hypertension. *Journal of Marriage and the Family* 2001;63:527–539.
- Yuan ASV. Exploring the changes in economic hardship and children’s well-being over time: The “linked lives” of parents and children. *Advances in Life Course Research* 2008;13:321–341.

Figure 1.
Dynamics of Family Economic Hardship and Progression of Health Problems of Husband and Wife in Different Health D

Figure 2.
Economic Hardship Group Trajectories in the Early Middle Years

Figure 3.

The Effects of Different Aspects of the Dynamics of Family Economic Hardship (1989–1992) on Husbands' (upper values) and Wives' (lower values) Physical Impairment, Depressive Symptoms, and Physical Illness in 2001 (M1). (Standardized Regression Coefficients, *t*-values in the parentheses)

Note. The model is controlled for education. All correlations between education and economic hardship groups and paths from education to health problems were not significant. * $p < .05$. + $p < .10$.

Figure 4.

The Effects of the Dynamics of Family Economic Hardship on the Progression of Husbands' Physical Impairment, Depressive Symptoms, and Physical Illness (M2) (Standardized Regression Coefficients, *t*-values in the parentheses)

Note. The model is controlled for education. All correlations between education and economic hardship groups and paths from education to health problems were not significant.

Note. Health problems in 1994 are significantly correlated.

* $p < .05$. + $p < .10$.

Figure 5.

The Effects of the Dynamics of Family Economic Hardship on the Progression of Wives' Physical Impairment, Depressive Symptoms, and Physical Illness (M2) (Standardized Regression Coefficients, *t*-values in the parentheses).

Note. The model is controlled for education. All correlations between education and economic hardship groups were not significant. Only for wives, education significantly influences physical impairment and depressive symptoms in 1994.

Note. Health problems in 1994 are significantly correlated.

* $p < .05$. + $p < .10$

Table 1

Group means of Study Variables (Standard Deviations are in the parentheses)

Economic Hardship Groups	Husbands						Wives					
	1994			2001			1994			2001		
	Impairment	Depression	Illness	Impairment	Depression	Illness	Impairment	Depression	Illness	Impairment	Depression	Illness
Consistently Low	1.12 (.20)	1.31 (.43)	3.01 (2.13)	1.20 (.29)	1.37 (.41)	3.97 (2.70)	1.16 (.28)	1.45 (.52)	3.91 (2.62)	1.26 (.36)	1.44 (.45)	4.80 (3.74)
Decreasing	1.15 (.25)	1.32 (.36)	3.53 (2.11)	1.25 (.32)	1.41 (.47)	4.07 (3.17)	1.34 (.42)	1.64 (.61)	4.80 (3.24)	1.46 (.51)	1.61 (.55)	5.97 (4.33)
Increasing	1.14 (.25)	1.35 (.38)	3.34 (2.24)	1.18 (.30)	1.38 (.34)	4.85 3.65)	1.20 (.31)	1.64 (.60)	4.88 (2.89)	1.31 (.30)	1.55 (.54)	5.78 (4.29)
Chronically High	1.22 (.30)	1.50 (.50)	4.00 (2.62)	1.33 (.40)	1.52 (.52)	4.75 (3.35)	1.19 (.27)	1.70 (.57)	4.45 (3.15)	1.32 (.41)	1.61 (.50)	5.37 (3.92)
Total	1.15 (.24)	1.36 (.43)	3.38 (2.30)	1.24 (.33)	1.41 (.44)	4.30 (3.10)	1.20 (.31)	1.57 (.57)	4.32 (2.93)	1.32 (.40)	1.53 (.50)	5.27 (3.98)
Cronbach's alpha for total	.84	.91		.89	.89		.88	.91		.91	.89	

The Husband-Wife Dyadic Model(M3): The Effects of the Dynamics of Family Economic Hardship on the Progression of Wives’ and Husbands’ Health Problems (Standardized Regression Coefficients, t-values in the parentheses).

Table 2

Outcomes Predictors	WIMP-1994	HIMP-1994	WDEP1- 1994	HDEP1-1994	WILL-1994	HILL-1994	WIMP-2001	HIMP-2001	WDEP-2001	HDEP-2001	WILL-2001	HILL-2001
Decreasing EH Group	.21 * (3.81)	.05 (.78)	.12 * (2.16)	.01 (.25)	.11 * (2.02)	.09 (1.47)						
Increasing EH Group	.04 (.78)	.02 (.35)	.11 * (1.97)	.03 (.58)	.11 * (1.97)	.06 (1.00)						
Chronically High EH Group	.04 (.70)	.16 * (2.74)	.19 (3.36)	.20 * (3.37)	.08 (1.44)	.19 * (3.19)						
Wife Physical Impairment (WIMP-1994)	1	-	-	-	-	-	.47 ** (9.38)	.04 (.97)			.20 * (4.82)	.14 * (2.80)
Hus. Physical Impairment (HIMP-1994)	r= .15 *	1	-	-	-	.28 *	-.03 (-.58)	.53 ** (11.31)				
Wife Dep. Symptoms (WDEP-1994)	r= .22 *	-	1	-	-	-			.48 ** (9.73)	.09 * (1.97)		
Hus. Dep Symptoms (HDEP-1994)	-	r= .14 *	r= .10 *	1	-	-	.15 * (3.33)		.00 (-.03)	.50 ** (10.42)		.16 * (3.24)
Wife Physical Illness (WILL-1994)	-	-	r= .37 *	-	1	-			.09 (1.78)		.54 ** (12.78)	-.01 (-.30)
Hus. Physical Illness (HILL-1994)	-	-	.	r= .24 *	r= .10 *	1	.17 * (3.38)	.17 * (3.68)		.16 * (3.30)	.04 (1.06)	.42 ** (8.12)

Note.

* denotes p < .05,

** denotes p < .01.

Significant correlations between HDEP and WDEP, HDEP and HILL, HIMP and WIMP, and WIMP and WILL in 2001 were .10, .11, .12, and .14 p <.05, respectively, not shown in the table.