Research Article

Multiple Chronic Conditions, Resilience, and Workforce Transitions in Later Life: A Socio-Ecological Model

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Abstract

Purpose of the Study: Despite the growing prevalence of multiple chronic conditions (MCC), a problem that disproportionately affects older adults, few studies have examined the impact of MCC status on changes in workforce participation in later life. Recent research suggests that resilience, the ability to recover from adversity, may buffer the negative impact of chronic disease. Guided by an adapted socio-ecological risk and resilience conceptual model, this study examined the buffering effect of resilience on the relationship between individual and contextual risks, including MCC, and workforce transitions (i.e., leaving the workforce, working fewer hours, working the same hours, or working more hours).

Design and Methods: Using the Health and Retirement Study, this study pooled a sample of 4,861 older workers aged 51 and older with 2 consecutive biannual waves of data. Nonnested multinomial logistic regression analysis was applied.

Results: MCC are related to higher risk of transitioning out of the workforce. Resilience buffered the negative effects of MCC on workforce engagement and remained independently associated with increased probability of working the same or more hours compared with leaving work.

Implications: MCC are associated with movement out of the paid workforce in later life. Despite the challenges MCC impose on older workers, having higher levels of resilience may provide the psychological resources needed to sustain work engagement in the face of new deficits. These findings suggest that identifying ways to bolster resilience may enhance the longevity of productive workforce engagement.

Keywords: Multimorbidity, Older workers, Resilience, Risk

The prevalence of multiple chronic conditions (MCC), the co-occurrence of two or more chronic diseases, has steadily increased in the United States (Boyd & Fortin, 2010; Centers for Disease Control and Prevention, 2009; Ward & Schiller, 2013; Ward, Schiller, & Goodman, 2014). Almost one third (30.6%) of individuals aged 45–64 in the United States have MCC, and it is estimated that 60%–75% of older adults are affected by MCC (Ralph, Mielenz, Parton, Flatley, & Thorpe, 2009). The growing prevalence of MCC is a serious concern due to its relation to decreased quality of life and increased disability and mortality (American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity, 2012).

Previous research has linked health decline with accelerated workforce departure. For instance, individuals with chronic conditions are more likely to report work disability (Lerner, Allaire, & Reisine, 2005), and work...
ability often declines in tandem with health status decline (Boyd & Fortin, 2010; Koolhaas, van der Klink, de Boer, Groothoff, & Brouwer, 2013). As the number of chronic conditions increases for an individual, work productivity decreases, and both presenteeism (i.e., being present at work, but exhibiting reduced work productivity due to health complications; Schultz & Edington, 2007) and the likelihood of transitioning out of the labor force altogether increase (Alavinia & Burdorf, 2008; Bound, Schoenbaum, Stinebrickner, & Waidmann, 1999; Schofield et al., 2013).

Although having MCC is related to decreased ability to meet the physical and psychosocial demands of a job (Lerner et al., 2005), few studies have directly examined the relationship between onset of MCC and changes in workforce participation. Further, multilevel determinants (i.e., individual, social, and contextual) of health and functioning—factors that likely affect one’s ability to work—have not been comprehensively explored in the context of MCC.

Thus, in order to disentangle the complexities surrounding the relationship between health and workforce behaviors, we take into consideration the factors that may have a direct influence on one’s ability to continue working in later life. Although MCC are not unique to older workers, older adults are especially vulnerable to MCC (Bound et al., 1999; Fried, Bernstein, & Bush, 2012) and are simultaneously at increased risk of leaving the workforce. Being older, along with other factors (e.g., being a racial/ethnic minority, impoverished, or medically underserved), contributes to heightened vulnerability with respect to MCC. That is, aging-related consequences of MCC are exacerbated by socioeconomic disadvantage (Macnicol, 2006; Quiñones, Liang, Bennett, Xu, & Ye, 2011; Ralph et al., 2009). Those who have fewer socioeconomic resources also often lack access to quality health care and experience frequent discriminatory treatment, and these factors have been consistently identified as contributors to disparities in health and health care for decades (Institute of Medicine of the National Academies, 2003; Smedley, 2012). As a result, those who lack sufficient resources may find it particularly difficult to manage health conditions well enough to continue working.

Although MCC may reduce one’s physical ability to work, the inability to meet financial and health care needs may also influence the decision to exit the workforce (Burr & Mutchler, 2007; Kail, 2012). Moreover, those who face other vulnerabilities, such as the effects of discrimination and financial strain, are faced with push-pull dynamics with respect to their ability and need to work. Thus far, these push-pull factors have not been comprehensively examined alongside the growing problem of becoming multimorbid. Furthermore, it is probable that these factors are shaped by additional risks (i.e., lack of social support and decline in the ability to perform instrumental activities of daily living [IADLs]). Altogether, it is imperative to recognize the relationship between the risk factors that affect older people, including MCC, if we seek to enhance older adults’ ability and/or decision to work later into life.

Beliefs and attitudes, individual motivation, and coping strategies also contribute to the decisions involved in working in later life (Abma, Bültmann, Varekamp, & van der Klink, 2013). There is growing evidence that the ability to navigate adversity and maintain emotional stability, that is, being resilient, influences the relationship between disease and subsequent disability, perhaps by providing psychological resources critical to continued employment when challenges emerge in later life (Hardy, Concato, & Gill, 2004; Manning, Carr, & Kail, 2014; Marengoni et al., 2011; Sterns & Dawson, 2012). By extension, we hypothesize that the psychological and social factors that render some individuals more resilient than others could offset the challenges associated with becoming multimorbid with respect to workforce behavior. If our hypothesis is supported, further research specifically designed to elucidate psychosocial pathways among aging workers could facilitate targeted interventions designed to maintain continued engagement in paid work or to enhance the quality of work life among older workers.

### Integrated Conceptual Model

To comprehensively examine the complexities embedded in the relationship between MCC and workforce dynamics, we sought theoretical guidance from the risk and resilience framework (Fraser, Kirby, & Smokowski, 2004; Fraser & Terizan, 2005) and Bronfenbrenner’s (1979) ecological model of human development. The risk and resilience framework explains the constructive process of adapting and surviving in response to stress and adversity (Fraser & Terizan, 2005). The ecological model of human development explains the influence of multilevel environmental factors on behavioral outcomes (Bronfenbrenner, 1979).

Recent evidence shows that resilience buffers the negative impact of new chronic diseases on subsequent disability in later life (e.g., Manning et al., 2014). Greater resiliency, then, may provide people with the ability to age “successfully” and stay productive longer (Harris, 2008; Manning et al., 2014; Wagnild, 2003). Because resilience is developed through a process that involves interaction with one’s environment (Luthar, Cicchetti, & Becker, 2000), we adapted an ecological risk and resilience conceptual model that allows us to identify risk factors for workforce transitions in varying social contexts and at multiple levels (Maring, Malik, & Wallen, 2012). In aging research, an ecological model recognizes that an older adult’s health and well-being are influenced by biological and environmental factors (Satariano, 2006). Thus, we include factors in our analytical model that relate to workforce behaviors (e.g., predictors of retirement) and health status and categorize them in our conceptual model within three risk levels: individual risks, contextual risks, and risks associated with stressful life events.

As shown in Figure 1, individual risks are represented by the innermost circle. These risks include MCC (i.e., our primary risk factor of interest), poor health (self-perceived, functional, and emotional), and low educational...
being married also enhances the potential for having health insurance. Health insurance is a well-established factor that shapes workforce behaviors during the period leading up to Medicare eligibility (Currie & Madrian, 1999; Kail, 2012). Older workers lacking health insurance are more likely to experience poorer health status than their counterparts with health insurance (Baker, Sudano, Albert, Borawski, & Dor, 2001) accelerating exit from the workforce due to health problems, as well as increasing likelihood of returning to the workforce when health permits.

Stressful life events are depicted in the outermost circle. Episodic stressful life events disrupt development and cause cumulative impacts on health and daily life functioning (Fraser & Terizan, 2005). Although a range of stressful daily life events have an important impact on older workers, we highlight the impact of being treated unfairly as measured by perceived discriminatory events. Experiences with discrimination occur in tandem with life course development, and overtime plays an important role in health and work behaviors (Chae et al., 2014). Those who face regular discrimination are disproportionately burdened by MCC and thus face greater challenges with respect to continued employment (Shadmi, 2013a, 2013b; Ward & Schiller, 2013). Further, perceived discrimination is correlated with other risk factors. Racial/ethnic and socio-economic disparities are related to higher prevalence of discrimination, lower levels of financial security, and poorer outcomes with regard to MCC (Marengoni et al., 2011; Shadmi, 2013b; Starfield, 2011; Tucker-Seely, Li, Sorensen, & Subramanian, 2011). Thus, perceived discrimination produces frequent stressful circumstances that increase risks related to the deleterious effects of MCC on the ability to work in later life.

Based on this socio-ecological risk and resilience model, this study was guided by two research questions:

1. When controlling for individual risks, contextual risks, and stressful life events, how do MCC affect work transitions in later life?
2. Is the relationship between MCC and work transitions modified by level of resilience?

**Design and Methods**

**Data Source and Sample**

This study used data from the Health and Retirement Study (HRS), a nationally representative panel study that has surveyed adults over age 50 biannually in the United States since 1992 (RAND Center for the Study of Aging, 2014). The analyses were limited to those who completed the HRS Leave Behind Questionnaire (LBQ). The LBQ is a psychosocial questionnaire, which was piloted in 2004 and began in earnest in 2006, surveying half of the HRS respondents each wave with an alternating sample such that for every two-wave period the entire HRS sample is surveyed. Our sample was pooled based on the most recent two-wave period in which the LBQ was completed.
at baseline (wave$_{t-1}$) (i.e., 2006, 2008, or 2010) among working adults 51+ who also had a completed subsequent wave of data available (wave$_{t}$) (i.e., 2008, 2010, or 2012). Pooled together, 4,861 individuals had complete data.

Measures

Dependent Variables

Workforce participation was based on the calculated difference in workforce hours from wave$_{t-1}$ to wave$_{t}$. Change in workforce behavior was coded as four mutually exclusive categories: (a) stopped working (reference); (b) worked fewer hours; (c) worked the same hours; and (d) worked more hours.

Primary Independent Variables

Three variables served as primary independent variables: two MCC variables (onset and baseline status) and resilience. MCC were operationalized as follows: a diagnosis of two or more of the most frequently occurring chronic conditions in older adults and are major contributors to disability (i.e., high blood pressure, cancer, lung disease, heart disease/condition, stroke, diabetes, or arthritis) (Administration on Aging, 2012). The two MCC measures were: (a) onset of MCC (MCC onset)—an indicator that between wave$_{t-1}$ and wave$_{t}$, an individual did not have MCC at wave$_{t-1}$ but did have MCC by the following wave and (b) a baseline measure of whether an individual had two or more chronic conditions at wave$_{t-1}$ (MCC at Baseline).

Finally, to measure resilience, we use a simplified resilience scale (SRS) introduced by Manning and colleagues (2014). The HRS does not measure resilience. However, Manning and colleagues introduced an index using HRS questions located in the LBQ designed to, as closely as possible, capture the primary psychosocial domains of resilience introduced by the extensively validated Wagnild and Young Resilience Scale (Wagnild & Young, 1993; Zeng & Shen, 2010). The SRS is based on 12 questions related to psychological resilience, with each item scaled from 0 to 1. Respondents’ final resilience score was the simple sum of the 12 items with a hypothetical range 1.92 (The minimum is 1.92, because the lowest value someone could have on the items that were originally coded 1–7 was 0.1429 and 0.16667 on the items that were originally coded 1–6.) to 12 (higher scores indicate greater resilience). The scale reliability coefficient is .85. Resilience was measured at baseline.

Individual Factors

In addition to MCC, poor health (self-perceived, functional, and emotional) and low educational attainment are individual factors relevant to workforce engagement. Health factors were measured at wave$_{t-1}$: number of IADL limitations (mobility); change in self-rated health (self-perceived health), and life satisfaction (emotional health). IADLs were a count of limitations: shopping, using the phone, using a map, managing money, taking medications, and preparing meals. Self-rated health (SRH) was measured on a 5-point score ranging from 1 (poor health) to 5 (excellent health).

Change in self-rated health was used to control for the impact of a potential correlated change between worsening health and change in employment behavior. This measure is the difference in wave$_{t-1}$ self-rated health compared with wave$_{t}$. A positive number indicates decline in self-rated health. Life satisfaction is a composite measure available in the LBQ, based on responses to five items, each scored on a 1–7 scale with higher scores indicating better life satisfaction. Education was measured as continuous years (range from 0 to 17 years).

Contextual Factors

Several contextual factors were considered for control variables. Financial strain was measured with two variables. Poverty was a dichotomous measure of being below 200% of poverty at wave$_{t-1}$. Difficulty paying bills was a dichotomous measure of financial strain, located in the LBQ: How difficult is it for you/your family to meet your monthly payments on your/your family’s bills? Those who indicated that paying bills were somewhat, very, or completely difficult were coded “1.” Informed by previous research (Kail, 2012), health insurance status was measured based on three mutually exclusive categories: private health insurance, no health insurance, and the reference group was other nonprivate health insurance at wave$_{t-1}$. Adults over 65 are eligible for public health insurance coverage (i.e., Medicare), making “no insurance” only relevant to older workers aged 50–65. Because the average adult in the United States retires prior to age 65, the purpose of this measure is to control for strong effect of insurance status on pre-Medicare eligible workers. Sensitivity analyses of other measures of health insurance coverage showed this combination of health insurance measures offers the most robust model fit. Married was measured as “1” for those who were married and “0” for those who were not married at wave$_{t-1}$. Full-time worker was a dichotomous indicator of whether an individual was working 35 hr or more per week at wave$_{t-1}$. White-collar worker indicated that, at wave$_{t-1}$, the individual was working in a managerial, professional/technical, sales, clerical, health services, or personal services profession. White- and blue-collar jobs can be measured in a range of ways. In this case, we chose to distinguish jobs that typically involve physical rigor/manual labor or industrial work, which we defined as blue-collar jobs, from jobs that are typically less physical and more cognitively demanding, which we defined as white collar.

Stressful Life Events

The HRS includes several measures of stressful life events, including childhood circumstances, and recent stressful events. However, we chose a single measure that reflects the perceived impact of stressful circumstances that could occur at any time or multiple times over the life course and are likely to have lasting effects—subjective discrimination. This measure is located in the LBQ and was coded as a dichotomous measure of whether an individual faced one or more of the following discrimination events at any point in his/her life: (a) being unfairly dismissed from a job; (b) for unfair reasons, not
being a continuous measure of total household wealth excluding Individual Retirement Accounts at wave \(_{t-1}\). Wealth was coded dichotomously; female was included in the analytical model and male served as the reference group. Race/ethnicity was measured with four indicator variables: non-Hispanic white (reference); non-Hispanic black; Hispanic; and non-Hispanic other. We chose not to include a measure of subjective retirement status in this study because previous research indicates that subjective retirement status is not reflective of work status for all social groups. Previous research shows that whites and men are differentially more likely to report being partially or fully retired regardless of actual hours of paid work reports than females and minorities who are more likely to report being disabled or unemployed when they stop working (Burr & Mutchler, 2007; Gibson, 1987). Our analyses reflect the same biases with these populations and also showed significant variation in the subjective report of retirement status at both baseline and Time 2 for our outcome categories. Postestimation tests of model fit supported our decision to exclude subjective retirement status, showing that subjective retirement status was related to poorer model fit.

Analysis Plan

To address our research questions, analysis proceeded in two steps. First, we examined the characteristics of individuals in each work transition category (Table 1). Second, multinomial logistic (MNL) regression models were used to examine the relationship between MCC status, socioecological risk factors, and resiliency on changes in workforce behavior (Table 2). To comprehensively examine the effect of resiliency on the relationship between MCC and work transitions, we tested the interaction between MCC and resiliency on work transitions, controlling for all other factors. Although data from multiple waves were used to construct the data file, each person had only one observation in the final data file, so nonnested regression was appropriate.

Results

Descriptive Results

Descriptive statistics for the sample \(N = 4,861\) are shown in Table 1. This table shows that compared with wave \(_{t-1}\), 1,299 individuals (27%) stopped working, 1,280 individuals (26%) were working fewer hours, 1,317 individuals (27%) were working the same number of hours, and 965 individuals (20%) were working more hours in wave \(_{t}\). In examining the characteristics of the overall sample, 7% experienced onset of MCC between wave \(_{t-1}\) and wave \(_{t}\), and 47% of the sample had two or more chronic conditions at wave \(_{t-1}\). Just over one third (37%) of the sample experienced one or more perceived lifetime discrimination events, and the average resiliency score was 10.9 (SD = 1.9). The average person in the sample had a life satisfaction score of 4.8 (SD = 1.4), 0.05 (SD = 0.3) IADL limitations, and on average, 57% of the sample experienced no change in self-rated health between wave \(_{t-1}\) and wave \(_{t}\). At baseline, 61% of the sample worked full-time, 52% were white-collar workers, and 9% had no health insurance. Thirty-six percentage of the sample was 65 or older at baseline, 13% were at or below 200% of poverty, and 24% reported some level of difficulty paying bills. The average total wealth of the sample was about $350,000. The average education was 13.5 years. Slightly more than half of the sample was female, 74% were married, and 78% were white, 12% were black, 8% were Hispanic, and 3% were another race.

Compared with the other outcomes, those who stopped working had a higher percentage experiencing MCC onset and MCC at baseline. Relative to the other transition categories, those who stopped working also had lower resilience. This group also had the highest IADL limitations, percentage over age 65, and impoverished individuals, and the lowest percentage of white-collar workers at wave \(_{t-1}\), education, and percentage married. Life satisfaction was highest among those who worked more hours. Those who worked fewer hours reported greater lifetime discrimination events.

MNL Regression Results

Table 2 shows the results from the MNL regression models predicting work transition outcomes from wave \(_{t-1}\) to wave \(_{t}\). We performed four regression models for each work transition category, with “stopped working” as the referent outcome. Across models, the cohort year was significant for all work transition outcomes, indicating that in 2008 and 2010, older workers were more likely to remain in the workforce relative to leaving, compared with 2006. This may be attributed to the economic downturn that began in 2007 and likely affected financial stability and work preferences for all older people.

In each Model 1, we examined how MCC affect workforce transitions. Results show that both those with MCC at baseline and those who experience onset of MCC are less likely to remain engaged in the workforce, relative to stopping work.

In each Model 2, we examined the effect of MCC on changes in work behaviors taking into consideration resiliency. In this model, resiliency is significant across all work transition outcomes. Compared with those who stop working, each 1-point increase in resiliency is associated with an
8% increased risk of working less; 5% increased risk of working the same hours; and 9% increased risk of working more hours. The effect of MCC on the outcomes is unchanged.

In each Model 3, we examined the effect of MCC on work transitions taking into consideration all risk factors (i.e., individual, contextual, and stressful life events). In this

| Table 1. Descriptive Characteristics |
|--------------------------------------|
| **Key variables of interest**       |
| MCC onset                           |
| Mean: 0.07                          |
| SD: 0.25                            |
| Min: 0                              |
| Max: 1                              |
| MCC at baseline                     |
| Mean: 0.47                          |
| SD: 0.5                             |
| Min: 0                              |
| Max: 1                              |
| Resiliency                          |
| Mean: 10.85                         |
| SD: 1.87                           |
| Min: 2.51                           |
| Max: 14                             |

| **Individual factors**              |
| Life satisfaction                   |
| Mean: 4.84                          |
| SD: 1.44                           |
| Min: 1                              |
| Max: 7                              |
| # IADL limitations                  |
| Mean: 0.05                          |
| SD: 0.27                           |
| Min: 0                              |
| Max: 6                              |
| No change in SRH                    |
| Mean: 0.57                          |
| SD: 0.50                           |
| Min: 0                              |
| Max: 1                              |
| Decline in SRH                      |
| Mean: 0.25                          |
| SD: 0.43                           |
| Min: 0                              |
| Max: 1                              |
| Improvement in SRH                  |
| Mean: 0.18                          |
| SD: 0.39                           |
| Min: 0                              |
| Max: 1                              |
| Education years                     |
| Mean: 13.45                         |
| SD: 2.77                           |
| Min: 0                              |
| Max: 17                             |

| **Contextual factors**              |
| ≤200% of poverty                   |
| Mean: 0.13                          |
| SD: 0.33                           |
| Min: 0                              |
| Max: 1                              |
| Difficulty paying bills             |
| Mean: 0.24                          |
| SD: 0.43                           |
| Min: 0                              |
| Max: 1                              |
| Private health insurance            |
| Mean: 0.12                          |
| SD: 0.33                           |
| Min: 0                              |
| Max: 1                              |
| No health insurance                 |
| Mean: 0.09                          |
| SD: 0.29                           |
| Min: 0                              |
| Max: 1                              |
| Married                             |
| Mean: 0.74                          |
| SD: 0.44                           |
| Min: 0                              |
| Max: 1                              |
| Full-time worker                    |
| Mean: 0.61                          |
| SD: 0.49                           |
| Min: 0                              |
| Max: 1                              |
| White-collar worker                 |
| Mean: 0.52                          |
| SD: 0.5                            |
| Min: 0                              |
| Max: 1                              |
| Stressful life events               |
| Lifetime discrimination events      |
| Mean: 0.37                          |
| SD: 0.48                           |
| Min: 0                              |
| Max: 1                              |

| **Demographic factors**             |
| Age 65+                             |
| Mean: 0.36                          |
| SD: 0.48                           |
| Min: 0                              |
| Max: 1                              |
| Wealth ($ in millions)              |
| Mean: 0.35                          |
| SD: 0.86                           |
| Min: -2.2                           |
| Max: 183                            |
| Female                              |
| Mean: 0.53                          |
| SD: 0.5                            |
| Min: 0                              |
| Max: 1                              |
| Non-Hispanic white                  |
| Mean: 0.78                          |
| SD: 0.42                           |
| Min: 0                              |
| Max: 1                              |
| Non-Hispanic black                  |
| Mean: 0.12                          |
| SD: 0.33                           |
| Min: 0                              |
| Max: 1                              |
| Non-Hispanic race other             |
| Mean: 0.03                          |
| SD: 0.16                           |
| Min: 0                              |
| Max: 1                              |
| Hispanic                             |
| Mean: 0.08                          |
| SD: 0.26                           |
| Min: 0                              |
| Max: 1                              |
| Cohort                              |
| 2006                                |
| Mean: 0.23                          |
| SD: 0.42                           |
| Min: 0                              |
| Max: 1                              |
| 2008                                |
| Mean: 0.41                          |
| SD: 0.49                           |
| Min: 0                              |
| Max: 1                              |
| 2010                                |
| Mean: 0.35                          |
| SD: 0.48                           |
| Min: 0                              |
| Max: 1                              |

Notes: IADL = instrumental activity of daily living; MCC = multiple chronic conditions.
1Life satisfaction is based on responses to five items, each scored on a 1–7 scale, higher is better.
2IADLs are measured 0–6 including shopping, using the phone, using a map, managing money, taking medications, preparing meals.
3Change in self-rated health is a trichotomous measure based on the difference in self-rated health (i.e., stayed the same, worsened, or improved) from baseline to Wave 2, with positive numbers indicating decline.
4Education is in years (0–17).
5Indicates an individual at baseline has an income at or below 200% of poverty.
6A dichotomous indicator of level of difficulty paying bills (i.e., somewhat, very or completely difficult vs not very or not at all difficult).
7Reference group is individuals who have government or employer-sponsored health plans.
8Indicates individual is married at baseline.
9Full-time worker indicates that at baseline the individual was working 35 or more hours per week.
10White collar worker indicates at baseline, an individual works in a: managerial, professional/technical, sales, clerical, health services, or personal services profession.
11Indicates at baseline individual is at traditional retirement age.
12A continuous indicator of total household wealth excluding Individual Retirement Accounts.
13Reference group includes non-Hispanic whites.
Table 2. MNL Regression Results ($N = 4,861$)

|                           | Worked less ($n = 1,280$) | Worked same ($n = 1,317$) | Worked more ($n = 965$) |
|---------------------------|---------------------------|---------------------------|-------------------------|
|                           | Model 1 | Model 2 | Model 3 | Model 4 | Model 1 | Model 2 | Model 3 | Model 4 | Model 1 | Model 2 | Model 3 | Model 4 |
| Comparison: stopped       | MCC     | MCC + Res. | MCC + Risk | MCC + Res. + Risk | MCC     | MCC + Res. | MCC + Risk | MCC + Res. + Risk | MCC     | MCC + Res. | MCC + Risk | MCC + Res. + Risk |
| MCC onset                 | 0.56*** | 0.56**   | 0.59*** | 0.59*** | 0.54*** | 0.54***   | 0.64*** | 0.64*** | 0.54*** | 0.55***   | 0.63*** | 0.63***   |
|                           | 0.09    | 0.09     | 0.10    | 0.10    | 0.09    | 0.09      | 0.11    | 0.11    | 0.09    | 0.09      | 0.11    | 0.11      |
| MCC at baseline           | 0.57*** | 0.59*** | 0.68*** | 0.68*** | 0.60*** | 0.61***   | 0.80*** | 0.81*   | 0.50*** | 0.53***   | 0.61*** | 0.62***   |
|                           | 0.05    | 0.05     | 0.06    | 0.06    | 0.05    | 0.05      | 0.07    | 0.07    | 0.05    | 0.05      | 0.06    | 0.06      |
| Resiliency                | 1.08*** | 1.08*    | 1.05*   | 1.06*   | 1.09*** | 1.09***   | 1.09*** | 1.09*** |
|                           | 0.02    | 0.03     | 0.02    | 0.03    | 0.03    | 0.03      | 0.03    | 0.04    |
| Individual factors        |         |          |         |         |         |          |         |         |
| Life satisfaction         |         | 1.05    | 0.98    | 1.01    | 0.96    | 1.05    | 0.97    |
|                           |         | 0.03    | 0.04    | 0.03    | 0.04    | 0.03    | 0.04    |
| # IADL limitations        |         | 0.92    | 0.95    | 0.69*   | 0.71    | 0.90    | 0.90    |
|                           |         | 0.14    | 0.14    | 0.12    | 0.13    | 0.15    | 0.16    |
| Improved SRH              |         | 0.76*   | 0.76*   | 0.80*   | 0.80*   | 0.90    | 0.90    |
|                           |         | 0.08    | 0.08    | 0.09    | 0.09    | 0.10    | 0.10    |
| Worsened SRH              |         | 0.92    | 0.92    | 0.79*   | 0.79*   | 0.68*** | 0.68*** |
|                           |         | 0.09    | 0.09    | 0.08    | 0.08    | 0.07    | 0.07    |
| Education years           |         | 1.07*** | 1.06*   | 1.02    | 1.02    | 1.08*** | 1.07*** |
|                           |         | 0.02    | 0.02    | 0.02    | 0.02    | 0.02    | 0.02    |
| Contextual factors        |         |          |         |         |         |          |         |         |
| ≤200% of poverty          |         | 0.59*** | 0.60*** | 0.60*** | 0.60*** | 0.70**  | 0.71*   |
|                           |         | 0.08    | 0.08    | 0.08    | 0.08    | 0.10    | 0.10    |
| Difficulty paying bills   |         | 1.06    | 1.10    | 1.13    | 1.16    | 1.17    | 1.22    |
|                           |         | 0.11    | 0.11    | 0.11    | 0.12    | 0.13    | 0.13    |
| Private health insurance  |         | 1.24    | 1.24    | 0.92    | 0.92    | 1.11    | 1.11    |
|                           |         | 0.15    | 0.15    | 0.13    | 0.13    | 0.15    | 0.15    |
| No health insurance       |         | 1.30    | 1.29    | 0.65**  | 0.65**  | 1.12    | 1.11    |
|                           |         | 0.20    | 0.20    | 0.11    | 0.11    | 0.18    | 0.18    |
| Married                   |         | 1.02    | 1.02    | 1.10    | 1.10    | 1.09    | 1.09    |
|                           |         | 0.10    | 0.10    | 0.11    | 0.11    | 0.12    | 0.12    |
| Full-time worker          |         | 1.90*** | 1.90*** | 2.55*** | 2.55*** | 0.72*** | -0.72***|
|                           |         | 0.17    | 0.17    | 0.25    | 0.25    | 0.07    | 0.07    |
| White-collar worker       |         | 1.12    | 1.12    | 1.51*** | 1.12    | 1.13    | 1.12    |
|                           |         | 0.10    | 0.10    | 0.13    | 0.13    | 0.11    | 0.10    |
| Stressful life events     |         |          |         |         |         |          |         |         |
| Lifetime discrimination   |         | 1.21*   | 1.22*   | 0.91    | 0.91    | 1.09    | 1.11    |
| events                   |         | 0.10    | 0.11    | 0.08    | 0.08    | 0.10    | 0.10    |
### Table 2. Continued

| Demographic factors | Worked less ($n = 1,280$) | Worked same ($n = 1,317$) | Worked more ($n = 965$) |
|---------------------|---------------------------|---------------------------|-------------------------|
|                     | Model 1 | Model 2 | Model 3 | Model 4 | Model 1 | Model 2 | Model 3 | Model 4 | Model 1 | Model 2 | Model 3 | Model 4 |
| Age 65+             | 0.86    | 0.87   | 0.51*** | 0.51   | 0.47*** | 0.47*** |
| Wealth              | 1.00    | 1.00   | 1.00    | 1.00   | 1.00    | 1.00    |
| Female              | 1.00    | 1.01   | 0.98    | 0.99   | 0.97    | 0.97    |
| Non-Hispanic black  | 0.78    | 0.77*  | 1.11    | 1.10   | 0.92    | 0.89    |
| Non-Hispanic race other | 0.10    | 0.10   | 0.14    | 0.14   | 0.13    | 0.13    |
| Hispanic            | 1.55*   | 1.56** | 1.60**  | 1.61** | 1.35    | 1.36    |
| Cohort              |          |         |         |         |         |         |
| 2008                | 0.16    | 0.16   | 0.14    | 0.14   | 0.15    | 0.15    |
| 2010                | 1.64**  | 1.65** | 1.70*** | 1.71** | 1.76*** | 1.84**  |
| Intercept           | 0.09    | 0.10   | 0.05    | 0.14   | 0.12    | 0.10    |
| -2 Log likelihood   | −6,636  | −6,625 | −6,335  | −6,330 | −6,335  | −6,330  |
| Akaike's Information Criterion | 13,303  | 13,287 | 12,809  | 12,809 | 13,303  | 13,287  |

Notes: Relative risk ratios. Standard errors below. IADL = instrumental activity of daily living; MCC = multiple chronic conditions.

*Life satisfaction is based on responses to five items, each scored on a 1–7 scale, higher is better.

1IADLs are measured 0–6 including shopping, using the phone, using a map, managing money, taking medications, preparing meals.

2Change in self-rated health is a trichotomous measure based on the difference in self-rated health (i.e., stayed the same [referent], worsened, or improved) from baseline to Wave 2.

3Education is in years (0–17).

4Indicates an individual at baseline has an income at or below 200% of poverty.

5A dichotomous indicator of level of difficulty paying bills (i.e., somewhat, very or completely difficult vs not very or not at all difficult).

6Reference group is individuals who have government or employer-sponsored health plans.

7Indicates individual is married at baseline.

8Full-time worker indicates that at baseline the individual was working 35 or more hours per week.

9White collar worked indicates at baseline, an individual works in: managerial, professional/technical, sales, clerical, health services, or personal services profession.

10Indicates at baseline individual is at traditional retirement age.

11A continuous indicator of total household wealth excluding Individual Retirement Accounts.

12Reference group includes non-Hispanic whites.

*p < .05, **p < .01, ***p < .001.
model, having MCC at baseline and onset of MCC were significantly associated with a lower risk in all work transition categories, compared with stopping work. Individual, contextual, and stressful life events have little effect on the significant relationship between MCC and all work transition outcomes. Individuals who have experienced discrimination have 21% greater risk of working less, relative to stopping work. Being 65 or older is significantly associated with reduced risk of working the same or more hours and being a white-collar worker is associated with a 51% increased risk of working the same hours, versus stopping work. Starting off as a full-time worker is associated with 90% increased risk of working fewer hours; 2.6 times increased risk of working the same hours; and 28% reduced risk of working more, relative to stopping work. Being impoverished is associated with reduced risk of continued workforce engagement. A 1-year increase in educational attainment is associated with 7% and 8% increased risk of working less and working more, respectively, relative to stopping work. Compared with those with government or employee-sponsored health insurance, uninsured individuals are less likely to work the same hours, relative to stopping work.

In each Model 4, we examined the effect of MCC on work transitions taking into consideration resiliency and all risk factors (i.e., individual, contextual, and stressful life events). Higher levels of resiliency is significantly associated with continued work at various levels of engagement relative to stopping work and the effect of resiliency on work transitions remains relatively the same after controlling for other risk factors. In addition, the effect of lifetime discrimination on working fewer hours remains the same when accounting for resiliency.

To fully assess the impact of resiliency on work transitions, we calculated marginal probabilities of each transition as resiliency increases, based on calculations in Model 4 (holding all covariates at the mean). As shown in Figure 2, as resiliency level increases, the probability of stopping work decreases, the probability of working more or less moderately increases, and the probability of working the same hours increases slightly.

To examine if resiliency moderates the relationship between MCC and work status changes, we examined the interaction between MCC status and resiliency, holding all other factors in the full model at the mean. Model results and postestimation statistical tests confirming significance are available upon request. Figure 3 presents the marginal probabilities based on this model, showing that as resiliency increases, the impact of MCC onset disappears. This suggests that resiliency may have the potential to mitigate the effects of MCC onset in a similar way that resiliency has been found to offset the impact of a new health condition (Manning et al., 2014).

In additional sensitivity analyses, we examined the interaction of MCC with individual, contextual, stressful life events, and demographic factors. In these models (not shown, but available upon request), the effect of MCC onset on work transitions was not moderated by any other factors.

From these tests, as well as our assessment of model fit (i.e., Model 5 provides the best model fit), we conclude that resiliency moderates MCC and workforce behaviors.
Discussion

Guided by an adapted ecological risk and resilience framework, this study was designed to examine the effects of multilevel factors, with particular focus on MCC and resilience, on workforce transitions among older workers aged 50 and older. Our findings indicate that, accounting for individual factors, contextual factors, and stressful life events, having and developing MCC is related to departure from the workforce. These findings support previous research, which found that health decline in general is associated with departure from the labor force in later life (Bound et al., 1999; Schofield et al., 2013) and, more specifically, that individuals with chronic conditions are more likely to report work disability (Lerner et al., 2005). Additionally, those with declining health are more likely to have their perception of personal ability to work shaped by their health status experiences (Boyd & Fortin, 2010). The effect on the relationship between MCC and work behaviors is explained by resilience. Further, resiliency has a significant, independent effect on work engagement behaviors among older workers, suggesting that it may bolster engagement in the workforce even when MCC is not at play. That is, as resiliency increases, the likelihood of working less, the same, and working more increases, in spite of MCC among this group.

Previous research indicates that the relationship between the onset of one new chronic condition and subsequent disability is moderated by resilience (Manning et al., 2014). Our research supports these findings, and extends them, suggesting that resiliency not only seems to facilitate better adjustment to MCC but also appears to facilitate continued employment. It is important to point out that our findings do not provide evidence of a causal relationship of resilience on MCC. A plausible explanation for these findings may lie in an accumulation of resiliency over time. Those who are at a greater risk of being diagnosed with chronic conditions are also at greater risk of having experienced adverse situations earlier in life and thus had an opportunity to build and employ added resilience as an adaptive coping mechanism in the face of adversity. Therefore, resiliency may accumulate over time, rather than merely emerge in later life. It is also plausible that even if highly resilient individuals are protected against subsequent disability associated with new chronic conditions, the burden imposed by having two or more chronic conditions may eventually create a tipping point that impedes ability to work regardless of one’s level of resiliency. In the childhood and adolescent literature, this phenomenon is referred to as “bundled risks” in which risks accompany each other up to a point that leads to a high-risk status (Fraser & Terizan, 2005; Rutter, 2000; Sameroff, 1985). Future research to explore the longer-term relationships between resilience and MCC, and the degree to which resilience may be shaped by earlier life situations, and other adverse risks and challenging events over time.

Our results indicate that those with higher levels of resilience experience extended time in the workforce as compared with those with lower levels of resilience. Although our study does not provide an opportunity to explain the mechanisms
of these findings, we offer a few possible explanations that could be examined in future research. First, our finding that as resilience increases, the impact of MCC onset decreases implies that there is an opportunity to combat the negative effects of MCC post onset. As noted earlier, a number of chronic conditions are associated with presenteeism (Schultz & Edington, 2007). Part of the relationship between chronic conditions and ability to work in later life is likely based on the influence of work environment. For example, there is strong evidence that one’s ability to work is enhanced by employers providing work accommodation and resources available to facilitate management of chronic health conditions (Franche et al., 2005). Thus, future research should consider the extent to which the risks imposed by MCC can be modified by a supportive work environment and effective management of chronic conditions.

Second, in addition to factors that may lead to decreased risk of MCC on work engagement in later life, given the relation between resilience and work engagement, we propose a need for research examining ways to leverage resilience in the work environment. Research seeking to better understand ways to “teach” resilience to children, particularly those who have faced significant adversities is growing (Lowenthal, 2001; Seligman, 2011). However, little effort has been placed on exploring whether interventions designed to enhance the resilience of adults, older adults in particular, can significantly enhance this advantageous individual resource. Given growing evidence in the literature that resilience may help adults remain engaged in the workforce longer in later life, greater attention is needed in understanding better the risks imposed and the possible interventions available to decrease the impact of such risks on older workers’ continued engagement in the workforce.

Finally, previous research has indicated that individuals with inadequate or limited health insurance benefits may affect workforce transitions and thus affect access to health care (Burr & Mutchler, 2007; Kail, 2012). Therefore, in the face of a health crisis, one may remain or reenter the workforce as a mechanism for securing affordable health care in lieu of retirement options. Although our study has considered financial strain and health insurance status as a way to capture the complexities associated with the complicated problem of having health limitations but still needing to work, future research should examine how health insurance status and other factors interface with MCC onset. In addition, there are also likely other reasons not related to health that could explain why older workers leave the workforce, such as planned retirement or financial stability. Future research should seek to differentiate individuals with plans to retire from those who leave the workforce unplanned in relation to MCC and resilience. Our finding that those who have experienced discrimination are more susceptible to working fewer hours suggest that further research may be useful in determining how other risk factors like discrimination create barriers to older adults’ continued engagement in the workforce.

Our research findings should be considered in light of several limitations. First, although our study utilized nationally representative data about older workers, our sample was selected from all older workers, some of whom were already facing significant health problems at baseline. These existing health deficits may minimize our understanding of the costs of MCC and the benefits of resiliency because the causal direction of our findings cannot be traced. Future research might address this issue by assessing the effect of resiliency on healthy older workers who are faced with a new health problem. Second, no research has considered the stability of the resiliency index used in this study over time. It is plausible that resilience and health have a bidirectional or endogenous relationship. As more waves of HRS data become available, more robust testing of this measure over time will be possible. Third, although our study did include multilevel risk factors to changes in work behaviors, it is plausible that certain factors (e.g., individual preferences) that may serve as mediators to work engagement behaviors were unable to be accounted for in our analysis. Future research should consider other measures of risks to determine whether the results remain consistent. Finally, it is plausible that those with higher resilience could have greater access to protective factors (e.g., access to health care, health insurance, social support, etc.) beyond those discussed in this paper. Future research should examine other protective factors that may predict workforce engagement for older workers with MCC.

In conclusion, this study provides insight into the relationship between MCC and resilience on workforce transitions. The key concern in this study was to explain how health contributed to changes in older workers’ engagement in the work force, with careful consideration of those who are faced with risks that are simultaneously affecting older workers’ decisions about whether to remain engaged in the workforce. In spite of additional risk factors, MCC serve as a barrier to older adults’ continued engagement in the workforce. However, resilience plays a key role in mitigating the detrimental impact of MCC. Our findings suggest that it is prudent that we pay closer attention to factors that affect individuals with MCC so they can manage their chronic conditions well enough to remain employed as long as they desire. We should also seek to identify effective strategies to bolster resilience among older workers. Such research is critical given the impending shifts in the workforce associated with the retirement of Baby Boomers. Thus, a better understanding of buffers of the often negative effects of health changes on older workers’ lives will only become more important as we seek to decrease the loss of talent and abilities of our older workers to retirement in the near future.

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