Retirement and depressive symptoms: A 10-year cross-lagged analysis

Dikla Segel-Karpas, Liat Ayalon, Margie E. Lachman

Abstract

The effect of retirement on depressive symptoms remains a subject of scientific inquiry, given the fact that previous studies have found mixed results. Moreover, the possible effect of depressive symptoms on the propensity to retire remains relatively understudied. Given the sheer number of retirees, and the significance of depressive symptoms for individuals' well-being and ability to work, as well as for societies at large, we used a large longitudinal dataset to examine the reciprocal effects of retirement on depressive symptoms, and of depressive symptoms on the propensity to retire. Using six waves of the Health and Retirement Study (HRS) data collected over a period of 10 years (N = 6584), we tested cross-lagged models of the reciprocal relationships between retirement and depressive symptoms. The analysis revealed that retirement results in increased depressive symptoms, and that depressive symptoms increase the likelihood of retirement. No sex differences in the lagged associations were found. We conclude that depressive symptoms are a risk factor for retirement, and practitioners should try and identify older workers suffering from depression prior to the retirement transition. Similarly, as retirement increases depressive symptoms, the transition should be treated as an important and sometimes risky milestone, where adequate preparation is required.

1. Introduction

The transition to retirement is a meaningful phase in older adulthood, and marks the beginning of the 'third age' (Laslett, 1991). For many, this transition entails desired opportunities for leisure activities (Dorfman, 2013) and a reduction in the daily stress associated with employment (Blekesaune and Solem, 2005). At the same time, employment also provides important resources, first and foremost, a sense of connectivity to a structured and social daily routine (Kahn, 1972; Nathanson, 1980; Segel-Karpas, 2015). Hence, the transition to retirement could weaken social connectedness, and decrease the individual's available resources.

Empirical results have been inconclusive, thus far, regarding the effect of retirement on physical and mental health. While some found that retirement is associated with lower well-being and increased risk for physical and mental morbidity (Dave et al., 2008), others found that retirement is related to improved well-being (Drentea, 2002) and better physical and mental health (Westerlund et al., 2010). Whereas retirement could potentially affect mental health, studies also demonstrated that ill mental or physical health encourage withdrawal from the labor force, and promote retirement (Lee and Smith, 2009).

This study uses the Health and Retirement Study (HRS) – a large and representative North American survey - to follow a sample of employees/retirees over a 10 year period – from 2004 to 2014, simultaneously estimating the lagged effects of retirement on depressive symptoms, and depressive symptoms on retirement. By doing so, we add to the existing body of literature describing health—employment trajectories in later life. In contrast to past research, which has examined either one of the proposed temporal associations separately, this study capitalizes on advancements in statistics, which allow for the examination of bi-directional temporal associations.

1.1. Retirement and depression

According to 'role theory', through the performance of a work-role, individuals connect to society (Kahn, 1972), form identity (Stryker and Statham, 1985) and gain social support (Nathanson, 1980). Retirement is conceptualized as a role loss, and is expected to result in reduced well-being (Stryker and Statham, 1985). On the other hand, retirement can also release one from an unfavourable work-environment and work-related stress, thus resulting in improved well-being (Wang et al., 2011).

Studies examining the effects of retirement on mental health and well-being have thus far been inconclusive. Using the first six waves of
2. Methods

2.1. Sample

The HRS is a US nationally representative panel survey of individuals over the age of 50 and their spouse of any age. The first wave of data was collected in 1992 from those born between 1931 and 1941 (a response rate of 81.7%). Different cohorts were later added to the survey in order to preserve the number of 50 ± year-olds in the sample. For example, in 2004 and 2010 the “early boomers” (1948–1953) and “baby boomers” (1954–1959) were added (Staff, 2008). The HRS was specifically designed to explore changes in labor force participation and health transitions.

The present study uses six waves of data collected in 2004–2014 by the HRS. N, response rate (2004) = 18,469, 88.9%; N, response rate (2006) = 17,217, 88.4%; N, response rate (2008) = 22,032, 81%; N, response rate (2010) = 20,554, 89.1%; N, response rate (2012) = 18,747, 87.1% (Staff, 2017). We chose to focus on later waves of data, in order to capture the most current trends in labor-force-depression associations. The sample was restricted to individuals over the age of 50, who were classified as either employed or retired on each of the waves between 2004 and 2014 (N = 6584). Classification as retired/working was allowed to vary across waves, but only two possible options were available throughout the study: retired or employed. Participants had to report being either retired/employed in all 6 waves in order to be included in the analytic sample.

Those who had complete data concerning employment vs. retirement status on all six waves were significantly younger (M [SE] = 62.4 [0.19] vs. M [SE] = 66.3 [0.22], F [1,56] = 264.56, p < .001), had more years of education (M [SE] = 13.7 [0.07] vs. M [SE] = 12.4 [0.06], F [1,56] = 381.33, p < .001), were more likely to be men (52% vs. 45%, respectively, χ^2[1] = 127.4, p < .001), had better functional status (M [SE] = 0.21 [0.01] vs. M [SE] = 0.70 [0.02], F [1,56] = 713.05, p < .001), reported fewer depressive symptoms in 2004 (M [SE] = 0.95 [0.03] vs. M [SE] = 1.64 [0.03], F [1,56] = 290.89, p < .001), and were more likely to be employed (60% vs. 45%, respectively, χ^2[1] = 174.6, p < .001) compared with those who had incomplete data concerning employment vs. retirement status on at least one of the waves (N = 9926). A similar pattern was evident when the sample was restricted to those individuals who had complete data concerning employment vs. retirement status and depressive symptoms on all six waves (N = 6507). These patterns are consistent with the general trend of those who have complete data over time to be younger, more educated, of better financial status and better health status. (Kapteyn et al., 2006).

2.2. Measures

2.2.1. Depressive symptoms

The Center for Epidemiological Studies-Depression Scale (CES-D) (Radloff, 1977) was used as part of the core interview to assess eight depressive symptoms, using a yes-no response format. After reverse-coding appropriate items, a total score was calculated by summing the “yes” answers. The scale ranged between 0 and 8, with a higher score indicating more depressive symptoms (α = 0.80).

2.2.2. Employment status

This information was gathered through the following question: “Now I’m going to ask you some questions about your current employment situation. Are you working now, temporarily laid off, unemployed and looking for work, disabled and unable to work, retired, a homemaker, or what?” Response options were: working now, unemployed and looking for a job, temporarily laid off, disabled, retired, homemaker, other, on sick or other leave, do not know, refused. The present study concerned only individuals who reported they were 1 = working now or 0 = retired on all six waves. All other response
options, such as unemployed or disabled, were coded as missing for the purpose of the present study.

2.2.3. Covariates
Age, sex, years of education, race (divided into 4 groups: black, Latino, others, and white, white being the reference category), functional status (a sum of 11 activities of daily living and instrumental activities of daily living, with a higher score indicating greater impairment; range 0–11), and household income were gathered based on self-report. Household income generated by RAND (Pantoja et al., 2016) was used in the present study. The total household income variable was calculated as the sum of the respondent’s and spouse’s earnings, pensions and annuities, supplemental security income and social security disability payments, social security retirement payments, unemployment and workers’ compensation received, other government transfers, household capital income and other income (Pantoja et al., 2016). To account for the high variability, we divided household income by 1000.

2.3. Analysis
We first calculated descriptive statistics and correlations between variables. Next, we used Structural Equation Modeling with Mplus version 7.3 (Muthén and Muthén, 1998–2012) to evaluate the cross-lagged autoregressive model outlined in Fig. 1 (Finkel, 1995). The model allows the simultaneous evaluation of the reciprocal associations of retirement and depressive symptoms while controlling for measurement biases. The following items - age in 2004, sex, years of education, functional impairment, and household income - were included as covariates because of their known associations with depressive symptoms and employment status. Depressive symptoms were modeled as latent constructs with their items serving as indicators; age, sex, years of education, functional impairment, household income and employment status were modeled as observed variables.

Due to missing values, we used the Mplus WLSMV estimator that allows maximum likelihood estimation with robust standard errors and chi-square calculation in the presence of missing values. Weights and strata were specified in the model to account for the complex survey design. To estimate the models’ goodness-of-fit, we followed the recommendations of Schreiber et al. (2006) and report, in addition to the chi-square statistic, three approximate fit indices, the Tucker–Lewis Index (TLI), the Comparative Fit Index (CFI), and the Root Mean-Square Error of Approximation (RMSEA). TLI and CFI close to or above 0.95 combined with RMSEA of 0.06 or lower indicate a reasonably good fit (Hu and Bentler, 1999). The significance level criterion for all other statistical tests was set at 0.05.

Variance resulting from specific measurement occurrences in the cross-lagged panel model was accounted for by correlating the uniquenesses within waves (Marsh and Hau, 1996). Because factorial invariance across time points is a major requirement of a valid autoregressive model (Finkel, 1995), we first tested for and assured “weak factorial invariance” (in terms of Meredith, 1993) by setting the factor loadings of the main research latent variable - depressive symptoms - as

Table 1
Baseline sample characteristics in 2004 and intercorrelations among variables (N = 6584)¹.

<table>
<thead>
<tr>
<th></th>
<th>Mean±SE/N[%]</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>62.4(0.20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>3319 (47.7%)</td>
<td>−0.04**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>13.7(0.061)</td>
<td>−0.16***</td>
<td>−0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>3172 (59.4%)</td>
<td>−0.60***</td>
<td>0.04**</td>
<td>0.13***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressive symptoms (0–8)</td>
<td>0.95(0.03)</td>
<td>0.02**</td>
<td>0.11***</td>
<td>−0.14***</td>
<td>−0.03***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional impairment (0–11)</td>
<td>0.21(0.01)</td>
<td>0.13***</td>
<td>0.08***</td>
<td>−0.10***</td>
<td>−0.11***</td>
<td>0.17***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household income/1,000</td>
<td>86.80(2.32)</td>
<td>−0.22***</td>
<td>−0.08***</td>
<td>0.29***</td>
<td>0.23***</td>
<td>−0.10***</td>
<td>−0.08***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>800(7.5%)</td>
<td>−0.03*</td>
<td>0.08***</td>
<td>−0.10***</td>
<td>0.01</td>
<td>0.09***</td>
<td>0.04*</td>
<td>−0.09***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latino</td>
<td>389(5.0%)</td>
<td>0.07***</td>
<td>0.05***</td>
<td>−0.24***</td>
<td>0.06***</td>
<td>0.06***</td>
<td>0.03</td>
<td>−0.07***</td>
<td>−0.09***</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>139(2.3%)</td>
<td>−0.04***</td>
<td>−0.00</td>
<td>0.03*</td>
<td>0.02</td>
<td>0.03</td>
<td>−0.01</td>
<td>0.00</td>
<td>−0.05***</td>
<td>−0.04***</td>
</tr>
</tbody>
</table>

¹ Based on pairwise correlations.

A structural equation model of cross-lagged employment status and depressive symptoms effects with standardized parameters. The solid lines indicate paths statistically significant at p < .05. R² represents the proportion of explained variance.

1. Employed=1, Retired=0; 2. Depressive symptoms ranged between 0-8

Fig. 1. A cross-lagged panel model of the reciprocal relations of employment status and depressive symptoms².
equal across waves. Stationarity was tested for and specified by setting all path coefficients to be invariant across waves (except for the correlation between retirement and depressive symptoms at wave 1).

As women are more prone than men to experience depressive symptoms, and are less likely to participate in the workforce, in an additional sensitivity analysis, we examined whether the cross-lagged effects are moderated by sex. The grouping command and the DIFFEST function were used. The restricted model, in which the cross-lagged effects were comparable across the two groups, was examined against a model that allowed the cross-lagged effects to differ in men and women. A significant result suggests that the cross-lagged effects significantly differ between men and women.

3. Results

Table 1 summarizes the model’s baseline characteristics. As can be seen, almost 60% of the analytic sample was employed and the remaining sample self-identified as retired. The average depressive symptoms score was Mean[SE] = 0.95[0.03]. As can be seen in Table 2, there were significant negative correlations between depressive symptoms and employment status across the six waves, indicating lower levels of depressive symptoms among the employed.

As a first step of our main analyses, we tested the measurement model of the latent construct, depressive symptoms, measured over six waves. The model and the data showed a good fit, with \( \chi^2(998) = 3046.707, p < .001, TLI = 0.962, CFI = 0.966, RMSEA = 0.018 (90\% CI = 0.017; 0.018) \).

Next, we fit the hypothesized autoregressive cross-lagged model with covariates. Baseline measurements of age, gender, race, educational and functional impairment were specified to affect depressive symptoms and employment status at each wave. This model fit the data well, \( \chi^2(1570) = 5698.476, p < .001, TLI = 0.946, CFI = 0.950, RMSEA = 0.020 (90\% CI = 0.020–0.021) \). Fig. 1 presents the main elements of this model (standardized paths and proportions of explained variance), with relations between controls and main research variables omitted from the Figure.

The autoregressive effects of depressive symptoms (B[SE] = 0.86[0.01], \( p < .001 \)) and employment status (B[SE] = 1.22[0.02], \( p < .001 \)) were substantive and significant across the six waves, pointing to the stability of these constructs.

The lagged effect of depressive symptoms on employment status was significant (B[SE] = −0.05 [.01], \( p = .001 \)), indicating that higher levels of depressive symptoms pose a risk for retirement. Similarly, the lagged effect of employment status on depressive symptoms was significant (B[SE] = −0.03[0.0041], \( p < .001 \)), indicating that being retired precedes higher levels of depressive symptoms two years afterwards.

To test for possible differences in the magnitude of the effects, we compared an unrestricted model to a model where the paths between employment status to depressive symptoms were set to be equal to those between depressive symptoms to employment status. The unrestricted model did not fit the data significantly better than the restricted data, indicating that the effects are similar (\( \Delta \chi^2[1] = 2.907, p = .088 \)).

We similarly tested for gender differences. The unrestricted model, which allowed the cross-lagged effects of depressive symptoms on employment status to differ between men and women, had an adequate fit (\( \chi^2[3047] = 6757.610, p < .001, TLI = 0.951, CFI = 0.955, RMSEA = 0.019 (90\% CI = 0.019–0.020) \)). However, this model was non-significantly different from the restricted model (\( \Delta \chi^2[1] = 1.260, p = .26 \)). Similarly, the unrestricted model, which allowed the cross-lagged effects of employment status on depressive symptoms to differ between men and women, had an adequate fit (\( \chi^2[3047] = 6753.787, p < .001, TLI = 0.951, CFI = 0.955, RMSEA = 0.019 (90\% CI = 0.019–0.020) \)). This model was also non-significantly different from the restricted model (\( \Delta \chi^2[1] = 2.022, p = .16 \)). Hence, there was no support for a moderating sex effect.

4. Discussion

Retirement is a major transition in later life, and as such, needs to be thoroughly understood. The transition to retirement could, on the one hand, result in reduced physical and mental strain, and thus improve well-being (Adams et al., 2002). On the other hand, employment provides valued financial and social resources, and the transition to retirement could result in the loss of these resources, causing stress and distress (Thoits, 1992).

Research tapping into the effects of retirement on depression has yielded inconsistent results, and the effects of depression on retirement have not been thoroughly studied. The present study adds to the literature by examining the concurrent reciprocal effect of retirement on depressive symptoms and depressive symptoms on retirement.

Examining 10 years of data using six waves of the HRS, our results suggest that depressive symptoms increase the probability of...
reirement. This is in line with previous studies noting that depression increases the risk of retirement (Conti et al., 2006; Doshi et al., 2008). Depressive symptoms can be expressed by lower energy levels and the inability to concentrate, and hence increase the perception of inability to perform a work-role (Conti et al., 2006). They could also reduce productivity at work, prompting employers to push older workers into retirement. In the case of involuntary retirement (where an employee is pushed out against his or her will), the consequences for well-being could be harsher (Dingemans and Henkens, 2014), resulting in a greater increase in depressive symptoms. Hence, the reciprocal effects between involuntary retirement and depressive symptoms should be examined in future research.

In this study, depressive symptoms were predictive of retirement. This finding is in line with previous studies, suggesting that depression leads to early retirement and disability pension (Conti et al., 2006; Doshi et al., 2008; Karpansalo et al., 2005). At the same time, we also found that retirement results in an increase in depressive symptoms. While in line with some previous studies (e.g. Butterworth et al., 2006), the results contradict other studies finding that retirement improves mental health (e.g., Kolodziej and García-Gómez, 2017). The contradiction may be the result of measurement and sample biases, or unaccounted variables that may tip the results, such as the voluntary nature of the retirement. In contrast to some previous studies (e.g., Doshi et al., 2008), we did not find significant differences between men and women in the relationship between retirement and mental health. While, in general, women tend to report more depressive symptoms than men (Cole and Dendukuri, 2003), and are also less likely to be engaged in the workforce (retrieved: Bureau of Labor Statistics, 2018), the literature regarding the effect of sex in the context of the relationship between retirement and mental health presents a more complex picture. For example, in Vo et al.’s study, the association between retirement and mental health among older respondents (aged 65–74) was only significant for men, but not for women. Similarly, Olesen et al., (2012) report that poor mental health is related to retirement in men and, more generally, workforce exit in women. Examining the joint effect of retirement and spouse’s ADL on mental well-being, Szinovacz and Davey (2004) report a negative effect for women, but not for men. Doshi et al.’s (2008) findings suggest that the gendered effect depends on the level of depression (active vs. sub-threshold) as well as on objective involvement in the workforce (partial vs. full-time employment). In other words, it is possible that the gender-related influence is not general, but rather depends on other factors that were not accounted for in this study, such as age, depression level, caregiving tasks and hours worked. As women go through gendered labor-force participation patterns, it is possible that their self-definition of employment status differs from that of men. In other words, women who experienced multiple entries and exits from the labor force might not define themselves as retired, but rather as temporarily unemployed or looking for a job, even in old age. Women who were homemakers in later adulthood could also present different self-definitions of their employment status, transitioning from homemaking to retirement when they reach a certain age. This should be further examined in a research design that specifically taps into the ways older women with varied workforce participation patterns define their employment status in later life. Future research could also examine whether the lagged effects of retirement and depressive symptoms are moderated by other factors, such as loneliness, income and the voluntariness of the transition.

Exams the concurrent effect of retirement on depressive symptoms and the effect of depressive symptoms on retirement further our understanding regarding the temporal order of the relationship between retirement and depressive symptoms, showing that both depressive symptoms encourage labor force withdrawal, and that withdrawal in the form of retirement results in an increase in depressive symptoms.

4.1. Limitations

A few study limitations bear mentioning. First, while dichotomizing employment and retirement status provides a more focused and comprehensive design, we neglected to examine other forms of non-participation in the labor force. Future research could benefit from examining other forms of non-labor force participation, such as disability leave or temporary unemployment. In addition, although we focus on self-defined retirement, future studies could compare the associations between self-defined retirement and other forms of definition, such as age-based definition, with depressive symptoms. Although focusing on those who self-defined themselves as retirees is a limitation, it is also an advantage when considering that retirement is a change in status that requires an adjustment process. In this regard, the self-definition of retirement as an important transition could be a more important predictor of psychological well-being than other definitions, based, for example, on age or the withdrawal of pension funds. Second, although using longitudinal data provides valuable information regarding the temporal and directional relationships between employment and depressive symptoms, it does not completely eliminate the concern that other factors could affect retirement or the development of depressive symptoms. For instance, it is possible that poor health is related to the decision to retire as well as to the development of depressive symptoms. The present design cannot answer this question. Third, an analysis of incomplete data reveals that those who provided complete data were more educated, less depressed, and more likely to be employed. Hence, our results may represent a stronger-healthier population than the overall sample. This indicates that the results presented here could be more moderate than the actual phenomenon. Similarly, the mean score of depressive symptoms was very low, once again indicating that the sample consists mostly of respondents with relatively good mental health. It is possible that the results would have been stronger given a wider range of depression in the sample. This proposition is supported by Doshi, Cen and Polsky’s (2008) study, which found that active depression was a catalyst for retirement among men and women alike, while sub-threshold depression was associated with retirement only among women. Future studies could focus on depressed retirees, and examine whether, and under what conditions, depressive symptoms are alleviated or strengthened by retirement.

While this study focused on one form of well-being, future research could benefit from examining other forms of well-being, such as a feeling of purpose in life and self-acceptance (Ryff, 1989). Future research could also benefit from examining how different reasons for retirement or the timing of retirement (on-time vs. early) affect the reciprocal relationship between retirement and well-being. Finally, the cultural context of the transition should also be examined as a possible mechanism shaping the retirement–well-being relationships.

Theoretically, this study joins the existing body of literature, which attempts to shed light on the complex relationships between retirement and well-being. Practically, our results suggest that depressive symptoms are a risk factor for retirement and practitioners should try to identify older workers who suffer from depression before they transition into retirement. Similarly, as retirement seems to increase depressive symptoms, the transition should be perceived and accordingly treated as an important and sometimes risky transition, which requires adequate preparation.

Acknowledgment

The HRS is supported by the National Institute on Aging (NIA U01AG009740) and the Social Security Administration. The collection and production of HRS data comply with the requirements of the University of Michigan’s Institutional Review Board (IRB).
References


