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Overview of the Health and Retirement Study and Introduction to the Special Issue

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Abstract

Twenty five years ago, the largest academic behavioral and social science project ever undertaken in the U.S. began: the Health and Retirement Study (HRS). The HRS is an invaluable publicly available dataset for investigating work, aging, and retirement and informing public policy on these issues. This biennial longitudinal study began in 1992 and has studied more than 43,000 individuals and produced almost 4000 journal articles, dissertations, books, book chapters, and reports to date. The purpose of this special issue of *Work, Aging and Retirement* is to describe the HRS and highlight relevant research that utilizes this rich and complex dataset. First, we briefly describe the background that led to the development of the HRS. Then we summarize key aspects of the study, including its development, sampling, and methodology. Our review of the content of the survey focuses on the aspects of the study most relevant to research on worker aging and retirement. Next, we identify key strengths and important limitations of the study and provide advice to current and future HRS data users. Finally, we summarize the articles in this *Special Issue* (all of which use data from the HRS) and how they advance our knowledge and understanding of worker aging and retirement.

Introduction to the Health and Retirement Study

Worker aging and retirement are studied by social scientists across a wide variety of disciplines including those in psychology, management, sociology, and economics. Most research on these topics has relied heavily upon survey research methods resulting from a significant investment in large public use datasets of longitudinal surveys (Fisher & Willis, 2013), as well as numerous smaller-scale studies from organizational samples and other researcher-generated datasets. The largest dataset by far for investigating work, aging, and retirement in the U.S. is the Health and Retirement Study (HRS), which is a cooperative agreement between the National Institute on Aging (NIA) and the University of Michigan (U01 AG009740). In addition to primary funding by the NIA, significant supplemental

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funding is provided by the U.S. Social Security Administration (SSA). More than twenty years ago, Juster and Suzman (1995) claimed that the HRS is one of the "largest and most ambitious academic social science projects ever undertaken" (p. S7) and the same holds true today. The HRS has grown in sample size, content, and methodological advancements since its origin in the early 1990s (Sonnega, Faul, Ofstedal, Langa, Phillips, & Weir, 2014). The large investment in the HRS facilitates multidisciplinary research on worker aging and retirement and guides public policy (Fisher & Willis, 2013).

The purpose of this special issue of *Work, Aging and Retirement* is to describe the HRS and highlight relevant research that utilizes this rich and complex dataset. First, we briefly describe the background that led to the development of the HRS. Then we describe the study, including its development, sampling, and methodology. Our summary of the content of the survey focuses on aspects of the survey most relevant to research on worker aging and retirement. Next, we identify key strengths and important limitations of the study and provide advice to current and future HRS data users. Finally, we summarize the articles in this *Special Issue* (all of which use data from the HRS) and how they advance our knowledge and understanding of worker aging and retirement.

Background

Prior to the establishment of the HRS, the dominant data resource in the 1970s and 1980s was the Retirement History Study (RHS; Juster & Suzman, 1995). The RHS sample included a cohort of men and unmarried women ages 58–63 surveyed in 1969 and followed longitudinally until 1979. The survey data were strengthened by the linked records of the Social Security quarterly covered earnings file. Altogether the RHS data contributed valuable information about retirement at the time. For example, one of the most widely cited studies that used data from the Retirement History Study is by Rust and Phelan (1997), who developed a dynamic programming model that demonstrated that retirement age peaked at 62 and 65 for the majority of older Americans, which coincided with the early and normal age of eligibility for U.S. Social Security benefits.

By the late 1980s, the Retirement History Survey was considered to be outdated and insufficient for investigating the current landscape of retirement issues (Juster & Suzman, 1995). During this period, there were significant changes in demographics, such as an increase in the proportion of women in the workforce, more longevity due to improved health status, and trends toward earlier retirement. Women (especially married women) were underrepresented due to the sampling in the RHS, which excluded married women. The RHS did not measure physical and cognitive health status to aid researchers in understanding the trend toward increasing numbers of people applying for disability insurance. The RHS also lacked good measures of private pensions, which were becoming more prevalent by this point in time. There was some discussion in the federal and academic scientific research community about the possibility of re-interviewing the RHS cohort or adding a new cohort to the study. However, a decision was made not to do so due to Title 13 of the U.S. Code, outlining the role of the U.S. Census, which could have severely constrained the design of a new retirement survey. Altogether, this led to the decision by the National Institute on Aging

to launch a new retirement study, which became the Health and Retirement Study (Juster & Suzman, 1995).

The Health and Retirement Study

Under the leadership of Dr. Richard Suzman, the Division of Behavioral and Social Research at the National Institute on Aging provided support for the development of the HRS early (i.e., in 1990) relative to the survey data collection which began in 1992, in order to provide ample time for the development of a large, complex interdisciplinary study. One of the unique and key strengths of the HRS is the interdisciplinary collaboration between academic researchers across a variety of disciplines (economics, sociology, demography, psychology, epidemiology, and medicine) and government agencies (e.g., NIA and SSA) with input from many members of both the academic and federal statistical communities. This differs from other academic research projects which are designed and executed by a principal investigator, small group of researchers, or federal entity. Together the NIA and HRS co-investigators sought to provide the research community with a rich data source to study the economics, health, and demography of aging. More recently, the HRS has also paid more attention to psychological well-being and other psychosocial issues important in the study of older adults.

Sample Design

The target population for the first wave of the HRS was adults residing in households (i.e., community dwelling, non-institutionalized individuals) in the contiguous United States born between 1931 and 1941 (i.e., those who were between the ages of 51–61 in 1992 when the study began). The sample was drawn at the household financial unit level using a multistage, national area-clustered probability sample frame (Heeringa & Connor, 1995). An oversample of Blacks, Hispanics (primarily Mexican Americans), and Florida residents was drawn to increase the sample size of Blacks and Hispanics as well as those who reside in the state of Florida. A unique characteristic of the HRS sample design is that age-eligible individuals and their spouses, regardless of age, are interviewed in order to obtain data at the household financial unit level of analysis for many of the economic and family variables in addition to a wealth of individual level data about demographics, employment, health, and well-being from both partners.

Participants in the 1992 wave were re-interviewed in 1994 and 1996, and then combined with the 1993 cohort from the Asset and Health Dynamics among the Oldest Old (AHEAD) study (i.e., individuals age 70 or older in 1993) and two new cohorts added in 1998 to create a national probability sample of individuals born in 1947 or earlier (i.e., age 51 or older in 1998).

One particular strength of the HRS sample design is the use of a steady-state sampling design: a new cohort of individuals age 51–56 is added every six years (e.g., in 1998, 2004, 2010, 2016, etc.) to prevent the obsolescence that occurred in the Retirement History Survey (Juster & Suzman, 1995; Willis, 1999). A total of 43,478 individuals have been interviewed to date (i.e., between the 1992 and 2016 waves) as part of the HRS. For more information about the sample design of the HRS, see Sonnega et al. (2014).

Sample weights—Due to the complex sample survey design for HRS (using the multi-stage national probability sampling and intentional oversamples of Blacks, Hispanics, and Florida residents), the HRS co-investigators developed sample weights, clustering, and stratification variables to be used during data analysis. Sample weights are valid for age-eligible community dwelling (non-institutionalized) participants. These sample weights compensate for the unequal probabilities of selection into the sample. Sample weights adjust the proportion to which responses count based on the probability with which these individuals represent others in the population as a whole. The sample weights were developed by statistically adjusting for survey non-response and post-stratifying the HRS sample to national population data (i.e., the U.S. Current Population Survey through 2004 and the American Community Survey for 2006 and later waves). Not using sample weights in statistical analysis would result in oversampled individuals' responses being over-emphasized relative to non-Blacks, non-Hispanics, and non-Florida residents. The clustering and stratification variables are used to improve variance estimation given the inherent geographic clustering of the sample due to the manner in which the sample was selected and obtained. Omitting the clustering and stratification variables in an analysis would result in underestimated variance estimates (e.g., estimated standard errors that are lower than what they should be with the sample clustering and stratification taken into account). For more details about the HRS sample design and sample weights, see Heeringa and Connor (1995) and Ofstedal, Weir, Chen, and Wagner (2011).

Methodology

Mode—The biennial HRS interviews are conducted by highly trained survey interviewers employed by the Survey Research Center at the Institute for Social Research at the University of Michigan. Baseline interviews are typically conducted face-to-face (FTF), most often in the respondent's home. In 2010 (i.e., the most recent wave with a new cohort of baseline interviews), a baseline interview took approximately 2.72 hours to administer. Between 1994 and 2004, follow-up interviews (which take approximately 2 hours to conduct) were primarily conducted via telephone, except for participants older than age 80 and respondents who requested FTF interviews. Beginning with the 2006 wave, the survey mode was changed such that half of the sample receives an enhanced FTF interview and the other half is interviewed via telephone and then alternate modes each wave. In other words, all participants receive enhanced FTF interviews every four years beginning in 2006/2008.

The modification to the mode assignment in which half the sample is interviewed in person every four years provides an opportunity for additional data collection that requires being present with the participant, such as physical health, physical performance, and biomarker measures. HRS respondents are also asked to complete a paper psychosocial survey at the end of the enhanced FTF interview, providing additional psychosocial data paired with the in-person physical and biomarker data in the same wave. More detail about these measures is provided later in the *content* section. HRS participants are asked to provide their U. S. Social Security number so that their HRS data can be linked to Social Security Administration records of earnings and claims as well as Medicare claims data. The FTF interview is beneficial for improving consent rates.

Beginning in 2003, the HRS began conducting a subset of interviews via internet surveys. The internet has been demonstrated to be a viable and very cost-effective data collection tool for a subset of HRS participants (Wagner, Arrieta, Guyer, & Ofstedal, 2014). However, there are two challenges associated with this approach. First, not all participants have access to the internet. Second, not all content can be adapted for valid administration over the internet (e.g., some of the cognitive performance tests).

Participant contact and incentives—Survey interviewers work really hard to establish and maintain rapport with participants. HRS Staff first contacts participants by mail to notify them in advance of the interview and then follows up via telephone. Participants are paid as a token of appreciation for participation in the study. New participants are paid after completing their initial interview, and re-interviewed respondents are provided with the respondent payment in advance of their interview. In general, many of the survey procedures in the HRS are consistent with best practices in survey methodology (Dillman, Christian, & Smyth, 2014).

Proxy respondents—One strategy that the HRS employs is the use of a proxy respondent (e.g., a spouse, partner, or close family member) who is available and can provide information on the participant's behalf if they are unavailable or unable (e.g., too ill) to participate in the study. Proxy measures are not used for all questions in the survey (e.g., excluded for depressive symptoms, cognitive performance testing, etc. where self-report measures are essential for validity). A respondent's proxy status can vary from wave to wave, so data users should consider whether the inclusion of proxy data is appropriate for their research projects and consider whether these proxy interviews should be included in analyses.

Exit interview—Another important aspect of the HRS design is the inclusion of exit interviews when an HRS respondent has died. In the case that an HRS respondent dies over the course of the study, the HRS project team works to identify a knowledgeable proxy reporter (typically a surviving spouse or child) to get information about the circumstances of death (date, location, whether expected, duration of illness), and information on a variety of domains about the respondent during the period of time from the previous interview until death (physical health, memory and cognitive functioning, financial transfers to and from family, physical and functional limitations, employment and earnings, and the utilization of health services and insurance). The exit interview data are an underutilized component of HRS and provide researchers with an opportunity to link work and retirement histories to end-of-life experiences.

Response rates—At the time this article was written, the HRS has collected thirteen waves of data between 1992 and 2016. Response rates for the core interview are quite high, with the baseline response rate ranging from 47.4% and 81.3% across study entry cohorts and an average of being 73.0% and re-interview response rates ranging from 68.8% to 92.3% (Health and Retirement Study, 2017). Although longitudinal studies are subject to attrition, the HRS staff take great care to minimize attrition. For example, interviewers work hard to establish and maintain rapport with respondents. Study staff maintain contact with

HRS respondents by sending holiday cards and newsletters. Interested readers may refer to the HRS Participant website for examples and more information at http://hrsparticipants.isr.umich.edu/.

HRS Content

"Core" HRS survey—The HRS is designed to facilitate the interdisciplinary study of aging and retirement. The HRS "core" survey includes data on a broad array of topics, including current employment and employment history, retirement, disability, occupation, industry, job and work environment characteristics, earnings and other income, pensions, other retirement plans, housing, assets, estate planning, subjective probabilities (i.e., expectations) of future events (including retirement), demographic characteristics, heath conditions and health status, health care utilization, cognitive status, physical functioning, family characteristics, intergenerational financial transfers, health insurance, life insurance, and internet usage. The HRS has sought to balance consistency in survey content across waves and add new measures to gather valuable data regarding current issues.

The HRS also stands out as an excellent data source for investigating worker aging and retirement because data are available to investigate retirement as a process that unfolds over time (Shultz & Wang, 2011) and by considering multiple definitions of retirement (Gustman & Steinmeier, 1995; 2000). For example, Denton and Spencer (2009) identified eight different definitions of retirement, including exit from the labor force, reduction in work hours or earnings (also considered bridge employment), work hours or earnings below a minimum cutoff, receipt of retirement pension or other retirement income, exiting one's job from their main employer or career, changing careers or employment in later life, self-assessed retirement (which leaves the definition up to an individual to interpret and decide), or some combination of the above definitions. It is possible to investigate retirement based on any or all of these definitions using the HRS.

Physical health, biomarkers, and genotyping—As noted earlier, a large number of additional measures were added to the study starting in 2006 when the survey mode was modified so that half of the sample received an enhanced face-to-face interview. The added measures include physical health (interviewer-measured height, weight, waist circumference, and blood pressure), physical performance measures (e.g., grip strength, timed walk, balance tests, and a pulmonary function test), and biomarkers (e.g., blood spots to test for cholesterol, C-reactive protein, and hemoglobin A1C). Most recently, a whole blood (venous) collection was added to the HRS in 2016 for respondents who completed a 2016 Core interview (excluding proxy interviews and respondents living in nursing homes). A trained phlebotomist went to respondents' homes if they consented to participate in the whole blood component of the study and participants' were offered an additional financial incentives (Crimmins, Faul, Thyagarajan, & Weir, 2017; Guyer, Ofstedal, Lessof, & Cox, 2017). Saliva samples have also been obtained as part of the HRS to gather genetic material. Specifically, genotyping was done for more than 15,000 HRS respondents in either 2011, 2012 or 2015 to measure roughly 2.4 million single nucleotide polymorphisms (SNPs), which are a form of genotyping to measure genetic variation (see Ware, Schmitz, & Faul, 2017 for details). HRS recently released a summary file containing Polygenic Scores based

on the genomic profiles, which is now available from the HRS website. The addition of the whole blood and genetic data offers researchers a unique opportunity to pair the detailed work and retirement data from the main ("core") HRS with innovative information on immune function via flow cytometry, DNA methylation, DNA mitochondrial copy number, and genotype.

Psychosocial survey—A self-report psychosocial survey was piloted in 2004 to gather data about a variety of psychological variables (e.g., well-being, personality, experienced discrimination, job characteristics; Smith, Ryan, Sonnega, & Weir, 2017). Beginning in 2006, those HRS respondents selected for the enhanced FTF interview were given a paper Psychosocial Questionnaire to complete on their own and return by mail. This survey is also referred to as the "leave-behind questionnaire" (LBQ) due to the manner in which it is administered. Longitudinal data on this psychosocial questionnaire are collected every 4 years, in sync with the enhanced FTF interview schedule. As reported by Smith et al. (2017), the content included in the questionnaire is fairly consistent to retain longitudinal fidelity. However new scales have been added and some have been removed since the 2006 wave (see Table 1 for a full listing of scales and domains). Of particular interest to researchers on work, retirement and aging is the addition of new measures of experienced well-being in 2012 psychosocial questionnaire. Although other indicators of subjective well-being have been included in the questionnaire in previous waves (Campbell, Converse, & Rodgers, 1976; Diener, Emmons, Larsen, & Griffin, 1998; Ryff & Keyes, 1995; Watson & Clark, 1994), interest in measures of affective experiences anchored within a specific day has grown since the debut of the Day Reconstruction Method (DRM; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). The HRS team, directed by Dr. Jacqui Smith (Smith, Ryan, Queen, Becker, & Gonzalez, 2014), developed and tested a short version of the DRM to include in the psychosocial questionnaire that asks respondents about their overall positive and negative affect yesterday, which activities they did yesterday, how long they engaged in these activities, and how positive and negative they felt while doing these activities. To be time-efficient, specific activities are targeted, including whether an individual worked or volunteered yesterday. These new data provide exciting opportunities for researchers interested in understanding how adults structure their days, how they feel about the activities in which they engage, and provide opportunities to understand the experience of an adult's day before and after retirement.

In addition to data collected as part of the core survey and "enhanced" face-to-face measures described above, additional psychosocial data have been collected since the HRS began 25 years ago. For example, data about spending (consumption) and activities are available in the Consumption and Mail Activities Survey (CAMS). Supplemental epidemiological studies of dementia (the Aging, Demographics, and Memory Study, ADAMS, 2002 - 2009; Healthy Cognitive Aging Project, HCAP, 2016) and diabetes have also been conducted. The HRS has linkages to administrative data, including the Social Security Administration for earnings and benefit claims data, Medicare claims (for health care utilization and cost data), and the National Death Index for verification of mortality and primary cause of death information.

Strengths of the HRS

Sonnega and colleagues (2014) identified and summarized many strengths of the HRS quite well. The first strength is having a large sample size and oversamples of Blacks and Hispanics to facilitate the investigation of race and ethnicity. Second, the sample design provides a nationally representative sample so that research results can be accurately generalized to the population from the contiguous 48 states, along with replenishment sampling of individuals age 51–56 and their spouse/partner every six years which allows for continued investigation of work and retirement issues. Third, the study is comprised of broad content across an array of disciplines (including rich measures of retirement, as mentioned previously). The HRS provides a rich data source for investigating numerous antecedents, outcomes, moderators, and mediators of the retirement process. Fourth, the HRS employs numerous best practices for developing and administering surveys (Dillman et al., 2014) which contributes to high quality data for the research community. A few examples include the use of multiple modes of data collection (face-to-face, telephone, and internet surveys), using proxy respondents when primary respondents are unavailable to participate, and aiming to provide the best possible experience for participants by establishing and building rapport, and providing resources and study results to participants via newsletters and information available on the HRS website.

Limitations of the HRS

Although the HRS has many strengths as an existing data resource, it has some limitations as well. One of the biggest limitations is concerns the measurement properties of many constructs. In order to cover the breadth of content that makes the HRS so rich, the tradeoff is with the depth of the measures, so some measures lack excellent psychometric properties such as high internal consistency reliability and construct validity desired and often required for publishing academic research. Some measures in particular may lack some content validity and in particular be criterion deficient, meaning that they don’t capture the full construct.

A second limitation is that the content of the study has changed from wave to wave. In general, the HRS co-investigators have taken great care to be consistent across waves with what is measured and how. However, there is an understandable constant balance of consistency over time for a longitudinal study and making room for new content without overburdening respondents. For example, unfortunately some of the measures about psychosocial work experiences were discontinued in the psychosocial survey after 2014.

One final limitation is that the dataset is very large, complex, and can be difficult to navigate. Working with the data requires time to become familiar with the study content, identifying variables of interest, and strong data management skills.

HRS Data Access and Advice to Researchers

HRS data are publicly available and free. Data can be accessed at the HRS website (http://hrsonline.isr.umich.edu/). Data available on the website include the main HRS data, as well as the RAND HRS data, which are comprised of a cross-wave file that eliminates the need for merging multiple individual datasets. Sonnega and colleagues (2014) recommend that

the RAND HRS data may be a great place for a new user to start. Another new resource is a blog, “Using the HRS” (https://hrsusersblog.com/), which is maintained by HRS data users and provides insights and tips for those new and experienced with the dataset.

Effective use of HRS data requires excellent skills in data management (e.g., file merging and data cleaning), which are different from statistical data analysis skills. It is important to budget time to review the study content and assemble the data for analysis. The HRS website has a great deal of information and helpful documentation (especially user guides, some of which we cited in this article, questionnaires, and codebooks), but it takes considerable time to digest and understand the information about this rich, complex study. Data training opportunities are regularly offered by HRS staff at various conferences (e.g., the Gerontological Society of America) and typically for one week annually each June in Ann Arbor, Michigan as part of the Survey Research Center Summer Institute in Survey Research Techniques. The HRS also includes a Help Desk, where data users can submit questions and expect a reply within a week. For additional discussion of the use of archival datasets, including opportunities and challenges, see Fisher and Barnes-Farrell (2013).

Impact

At the time this article was written, almost 4,000 papers were written using data from the HRS, including almost 2500 journal articles, 814 reports, 493 dissertations, and 191 books and book chapters. More than one third of these papers are related to the study of retirement.

Some examples of high-impact studies relevant to worker aging and retirement conducted using data from the HRS include research by Smith (1995, 1997), who demonstrated a strong positive correlation between wealth and health. Willis (1999) expanded upon this finding by relating husband’s health status, wife’s health status, and household wealth, and illustrated that both husband’s and wife’s health were strongly correlated with household net worth. Gustman and Steinmeier have published numerous papers on pensions and Social Security, contributing greatly to what we know about various sources of retirement savings and income, as well as retirement trends in relation to pensions and changes in Social Security policy (e.g., Gustman & Steinmeier, 2004, 2009; Gustman, Steinmeier, & Tabatabai, 2010a, 2010b). Bound et al. (1999) examined the dynamic effects of health on labor force transitions, including disability and retirement. Cahill and colleagues (e.g., Cahill, Quinn, & Giandrea, 2006) were among the first to highlight heterogeneous work and retirement patterns and an increasing prevalence of bride employment in the U.S. Wang and colleagues identified four categories of antecedents of bridge employment in transition to retirement, including individual characteristics, job-related psychological variables, family-related variables, and retirement planning, and found that engaging in bridge employment is associated with better physical and mental health outcomes compared to full retirement (Wang, Zhan, Liu, & Shultz, 2008; Zhan, Wang, Liu, & Shultz, 2009). Rohwedder and Willis (2010) used data from HRS and comparable surveys from other countries to examine cognitive functioning in relation to retirement age and found that cognitive functioning is better in countries with older ages of retirement. Fisher, Stachowski, Infurna, Grosch, Faul, and Tetrick (2014) examined cognitive job complexity (mental work demands) in relation to

cognitive functioning before and after retirement, and concluded that complexity is related to cognition before and protective against cognitive decline after retirement.

International sister studies—The HRS has become a model for similar studies now conducted around the world. For the past decade, international efforts to develop studies like the HRS have grown rapidly. See Table 2 for a current list of these studies. For information about how to access the data and harmonize constructs across studies, please refer to the Gateway to Global Aging website at the University of Southern California (https://g2aging.org/).

Articles in this Special Issue

This special issue is designed to highlight the potential of the HRS for research relevant to *Work, Aging and Retirement* and to publish a set of empirical studies that advances our knowledge of worker aging and retirement issues using these data. These papers were invited and selected to reflect the diverse opportunities within the HRS dataset and to address critical research gaps.

Following from the highly cited work on “mental retirement” by Rohwedder and Willis (2010) and other past studies of cognition and aging based on HRS data (e.g., Andel et al., 2015; Fisher et al., 2014), Infurna and Andel (2018) utilized longitudinal data from the HRS to examine the interplay of episodic memory and the transition to retirement on later risk of disability, cardiovascular disease, and mortality. Using a sample of HRS participants selected for having retired during the course of their participation in the study, Infurna and Andel (2018) found that episodic memory ability around the timing of retirement is linked to risk for all three health outcomes, and that decline in memory post-retirement was also implicated in risk for later disability and cardiovascular disease. Although previous research has examined the impact of retirement on cognition and on physical health, this innovative paper moves the field forward by considering the dynamics of these three critical health domains over time.

Burgard and Sonnega (2018) also examined physical health by investigating how occupation is related to body mass index (BMI) and therefore obesity risk over time. In addition, they examined how obesity was related to employment patterns, such as labor force withdrawal and retirement timing. This study identified important differences in BMI across occupational groups and how these patterns changed over time. Furthermore, they extended prior research on retirement timing (e.g., Fisher, Chaffee, & Sonnega, 2016) to take a deeper dive into how physical health, and specifically body mass index, relates to retirement behavior.

Sonnega, McFall, Hudomiet, Willis, and Fisher (2018) took a different approach for studying retirement timing. Specifically, they derived measures of physical, affective, and cognitive job demands using two different sources of data about workers’ jobs: HRS respondents’ own perceptions of their jobs as reported directly in the HRS (i.e., self-report data), and occupation-level characteristics obtained from the Occupational Information Network (O*NET) database (Peterson, Mumford, Borman, Jeanneret, & Fleishman, 1999)

linked to HRS using detailed occupation codes. Based on testing hypotheses using the job demands-resources model, Sonnega and colleagues' results indicated that subjective and objective job characteristics each account for unique variance in predicting retirement timing. Jobs with higher levels of physical and emotional job demands were associated with earlier retirement than jobs with high levels of cognitive job demands. The authors of this study linked the detailed (3-digit) occupational codes (coded by HRS based on self-reported occupational history in the core survey and available as restricted data due to confidentiality) to Census codes to standard occupational codes (SOC) in order to link occupational history to job characteristics in the O*NET database.

Hudomiet, Parker, and Rohwedder (2018) used an alternative approach to investigate patterns and predictors of work and retirement behavior. Based on a growing body of research that has identified heterogeneous patterns in paths to retirement (e.g., Cahill et al., 2011), Hudomiet and colleagues first compiled longitudinal employment status data over 14-year periods of observation to identify various pathways to retirement and retirement timing. Then based on person-environment fit theory, these authors investigated the extent to which cognitive functioning and personality characteristics predicted pathways to retirement, retirement expectations, and retirement timing. Results of their study indicated that both cognitive ability and extraversion were associated with working longer, and that extraversion was also linked to a greater chance of engaging in part-time work during late career stages.

Beier, Torres, and Gilberto (2018) considered the association of personality traits and individual resources (wealth, memory performance, education) on activity engagement and later physical health, mental health, and retirement expectations. The authors took advantage of longitudinal data in the HRS, including information on magnitude of activity engagement in productive, physical, social, and leisure activities) and activity variety from the CAMS questionnaire data. Beier and colleagues (2018) utilized HRS data in a creative design to expand investment theories from a traditional focus on intellectual growth to applications for other aging and work outcomes. Overall, results found that personality, neuroticism in particular, and individual resources have direct effects on later health and retirement expectations, without much evidence for the mediating role of activity engagement. By leveraging the unique design features of the HRS, Beier and colleagues (2018) have made important expansions to investment theory.

Barnes-Farrell and Petery (2018) focused on the direction of association between psychological age and health, and the ways in which employment status and gender affected this relationship. Specifically, the authors posed competing hypotheses about the directionality of this association: 1) social comparison theory (Festinger, 1954) would predict that health (physical and mental) are antecedents of psychological age; 2) stereotype embodiment theory (Levy, 2009) would suggest that psychological age is an antecedent to physical and mental health. This paper makes a unique contribution to the literature by testing these competing hypotheses longitudinally, using HRS data. Interestingly, the results did not provide overwhelming support for one causal direction over another, with the directionality of effects dependent on the health outcome and contextualized in a nuanced pattern by occupational status and gender. Overall, Barnes-Farrell and Petery (2018)

highlight the complexity of perception-health links and the importance of taking careful consideration of the occupational and demographic context.

Liu, McGonagle, and Fisher (2018) used data from three waves of the psychosocial leave-behind questionnaire from HRS to investigate how workers' reports of job-related stressors relate to their general sense of control, and in turn, psychological well-being. Liu and colleagues extend prior research that has focused on within-domain control (e.g., autonomy at work) to investigate a more general sense of control which has been identified as an important factor for well-being across the life course and particularly among older adults. Additionally, this study tests hypotheses using longitudinal data, whereas most prior research has relied upon cross-sectional data in spite of theorizing about a work stress process that unfolds over time. Based on testing a cross-lagged panel model, results of their study found that there was a reciprocal relationship between job and life satisfaction.

Wan, Antonucci, Birditt, and Smith (2018) focused on a different aspect of work experience –work hours – among married couples and sought to understand how patterns (trajectories) of work hours over time were related to depressive symptoms among both husbands and wives. Wan and colleagues' results indicated that two groups reported higher levels of depressive symptoms than others: retiring husbands whose wives continued to work, and wives who worked few hours across their lives. This study adds to our knowledge about work hours and well-being taking a life course perspective, and also adds to the literature by identifying the work hours as a psychological health risk among couples.

Collectively, these papers all use the longitudinal data to investigate phenomena over time. Three papers examined various aspects of transitions from work to retirement (Hudomiet et al., 2018; Infurna & Andel, 2018; Sonnega et al., 2018) and other psychological processes over time (e.g., Liu et al., 2018; Wan et al., 2018). In addition to capitalizing on the longitudinal panel design of the HRS, Wan and colleagues made use of the dyadic data to examine both husbands and wives' levels of depressive symptoms. This set of papers also demonstrates the breadth of content available in the HRS and across multiple aspects of the study, including not only multiple domains of health available in the core survey (Burgard & Sonnega, 2018; Infurna & Andel), but also the consumption and activities mail survey (e.g., Beier et al., 2018), and the psychosocial leave-behind questionnaire (e.g., Liu et al., 2018). We hope the reader enjoys these papers and considers using the HRS for their own research.

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Table 1

List of psychosocial domains assessed in the leave-behind psychosocial questionnaire.

General Topics:	
Life Satisfaction	Self Perceptions of Aging / Subjective Age
Satisfaction with Life Domains	Compassion and Self-image Goals
Big 5 Personality Traits	Self-Control / Impulsiveness
Sub-Facets of Trait Conscientiousness	Need for Cognition
Positive & Negative Affect	Psychological Well-being (Purpose in Life)
Social Participation / Engagement	Experienced Well-being
Retrospective Social Participation	Risk Attitudes
Composition of Social Network	Stressful Life Events
# Close Social Relationships	Lifetime Traumas
Contact with Social Network	Financial Strain
Perceived Social Support	Change in Control over Financial Situation
Family and Friends in Neighborhood	Experience of Chronic Stress
Partner Division of Labor	Everyday Discrimination
Cynical Hostility	Attributions of Everday Discrimination
Optimism/Pessimism	Major Experiences of Lifetime Discrimination
Hopelessness	Unusual Living Circumstances
Loneliness	Neighborhood Disorder / Social Cohesion
Personal Sense of Control (Agency)	Quality of Relationship with Parents in Early Life
Domain Specific Control	Anxiety
Social Effort / Reward Balance	Anger
Religiosity / Sprituality	Subjective Social Status (Cantril Ladder)
Prayer Frequency	Day Reconstruction Measure
Work-specific Topics:	
Work Status	Work Environment Characteristics
Job Satisfaction	Work Ability
Job Stressors	Job Lock
Coworker Support	Work/Family Priorities
Supervisor Support	
Work/Nonwork Interference & Enhancement	

Note: Not all domains are collected at all waves. Data users should refer to the HRS website for documentation.

Table 2

List of International Sister Studies

Study Name	Abbreviation
English Longitudinal Study of Ageing	ELSA
Survey of Health, Ageing and Retirement in Europe (Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Israel, Italy, The Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, and Switzerland)	SHARE
The Irish Longitudinal Study of Ageing	TILDA
Northern Ireland Cohort Study on Ageing	NICOLA
Healthy Aging in Scotland	HAGIS
Canadian Longitudinal Study on Aging	CLSA
Japanese Study of Aging and Retirement	JSTAR
China Health, Aging, and Retirement Longitudinal Study	CHARLS
Korean Longitudinal Study of Ageing	KloSA
Study on Health, Aging, and Retirement in Thailand	HART
Health and Aging Research Team (New Zealand)	HART
Longitudinal Aging Study in India	LASI
Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa	HAALSI
Indonesian Family Life Survey	IFLS
Mexican Health and Ageing Study	MHAS
Brazilian Longitudinal Study of Aging	ELSI-BRASIL
Costa Rican Longevity and Health Aging Study	CRELES
Study on Global Ageing and Adult Health	SAGE

Note: Please refer to the HRS website (https://hrs.isr.umich.edu/about/international-sister-studies) for links to individual studies.