

Title: The Health and Retirement Study: A Longitudinal Data Resource for Psychologists

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**Synonyms:** Nationally representative data; longitudinal; aging cohort; health; retirement.

**Definition:** Psychologists are discovering opportunities to explore complex questions using large datasets. This chapter describes and illustrates the value of the Health and Retirement Study (HRS), a nationally representative multidisciplinary dataset on aging in the US featuring a rich blend of economic, health (including genetics and biomarkers), cognition, and psychosocial information.

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## **Introduction**

Psychologists are increasingly using population-based multidisciplinary survey data to examine questions about health and aging. A major data resource that may be less well-known to psychological research scientists is the Health and Retirement Study (HRS). HRS is a nationally representative longitudinal study of more than 37,000 individuals aged 50 to 100+ (and deceased) from about 23,000 households in the United States (US). The survey, which has been fielded every two years since 1992, was established at the direction of the US Congress to provide a national resource for data on the changing health and economic circumstances associated with aging. HRS was the first longitudinal study of older people to collect detailed economic and health information in the same study (1). The goal was not only to build our understanding of aging but also to provide scientific data for studying national-level social and policy changes that may affect individuals. Indeed the data are often used to study the effects and implications of different public policies. Thus, the topics covered include resources for successful aging (e.g., economic, public, familial, physical, psychological, and cognitive); behaviors and choices (e.g., work, health behaviors, residence, transfers, use of programs); and events and transitions (e.g., health shocks, retirement, widowhood, institutionalization).

HRS has rich longitudinal measurement of several domains—income and wealth; health (including biomarkers and genetics), cognition, and use of health care services; work and retirement; and family connections—linked to various external sources of mortality, pension, Social Security, and medical care data. Since 2006, HRS participants have also reported on personal evaluations of their life circumstances, subjective well-being, lifestyle, and stress. The blend of economic, health, and psychosocial information in the HRS provides unprecedented potential to study increasingly complex questions about adult behavior and aging. In addition, HRS has become the model for a network of harmonized longitudinal studies of aging around the

world, offering the opportunity for valuable cross-national comparisons (see cross reference for examples).

Most of the data are public and are available at no cost to all registered users. Sensitive health data (such as genetic information) and restricted data (such as Social Security and Medicare records) require a separate application process that is detailed on the website. HRS is a large and very complex dataset. Various resources for getting started using the data are available on the website, and a free online help desk is offered for all users: [hqsquestions@umich.edu](mailto:hqsquestions@umich.edu). To increase the accessibility of this rich data resource, researchers at the RAND Corporation have created a user-friendly version of much of the HRS public data. The RAND contribution is available through the HRS website and is a good starting place for new users. Visit the HRS website ([hrsonline.isr.umich.edu](http://hrsonline.isr.umich.edu)), especially under the documentation link, for more information on all of the topics addressed in this chapter.

This chapter describes the HRS study design and provides descriptions of content in areas of particular relevance to geropsychologists including cognition and depression; physical health and limitations; anthropometric measures and physical performance; biomarkers and genetics; and psychosocial functioning. It also illustrates the potential of these data for psychological research.

## **Study Design**

### *The Sample*

Recruited in 1992, the original HRS cohort included individuals born 1931-41, then aged 51-61. The Asset and Health Dynamics Among the Oldest Old (AHEAD) study was fielded the next year to include the cohort born 1890-1923, then aged 70 and older. The two studies merged in 1998, and, in order to make the sample fully representative of the US population over age 50, two new cohorts were enrolled, the Children of the Depression (CODA), born 1924-1930, and

the War Babies, born 1942-1947. To keep the sample representative of the population over age 50, HRS refreshes the sample every six years with younger cohorts not previously represented. In 2004, Early Baby Boomers (EBB, born 1948-1953) were added, and in 2010, Mid Baby Boomers (MBB, born 1954-1959) were added. In 2016, the Late Baby Boomers (born 1960-1964) will be added. With all of these cohorts, in 2014 HRS includes a wealth of information about the life histories of older Americans over the last 100 years.

The HRS sample is based on a multi-stage area probability design involving geographic stratification and clustering and oversampling of African American and Hispanic individuals. Sample weights are derived and provided to account for differential probability of selection and differential non-response in each wave (2). To determine eligibility for the study, interviewers conduct a brief household screening interview. Adults over age 18 living in the household are listed with their age and couple status. A primary respondent is randomly selected from all age-eligible household members and, if the selected person is coupled, their spouse or partner is also recruited to the study, regardless of age. Household screening efforts have been conducted in 1992, 2004, and 2010. The core survey occurs every two years, making 2014 the twelfth follow-up of the initial 1992 participants.

Baseline response rates range from 81.6 to 69.9 percent more recently. While baseline response rates have been somewhat lower in recent years following national trends, follow-up response rates have remained high, ranging from 85 to 90 percent. Follow-up rates are based on the sample for which interviews were attempted. At each follow-up, interviewers attempt to locate the entire sample that participated at baseline. If a respondent is not interviewed in one wave, he or she is contacted again the next. Complete response rates and sample sizes for each cohort are detailed elsewhere (3).

### *Special Design Features*

HRS has several design features that enhance potential for psychological research. First, African-American and Hispanic households are oversampled at about twice the rate of whites, proportional to the US population. Ofstedal and Weir (4) show that HRS has been successful at recruiting and retaining minority participants. In 2010, the minority sample from the Baby Boom cohorts was further increased by a supplemental screening effort. This increases opportunities for important subgroup analyses.

Second, as noted above, HRS enrolls both members of coupled households. In single households, respondents answer all questions. In coupled households, each member of the couple is designated as either a financial or family respondent. Questions about housing, income, and assets are asked of the financial respondent, and questions about family composition and transfers are asked of the family respondent. Individual responses are sought from both partners in a household about work, health, disability, cognitive status, and well-being. Likewise psychosocial measures are collected individually for both members of the couple. Thus, HRS provides exceptional opportunities for dyadic analysis.

Third, when respondents are unable or unwilling to complete an interview by themselves, HRS interviewers seek a proxy respondent. Proxies are usually a spouse or other family member. Each wave, about nine percent of interviews are conducted with a proxy respondent, about 18 percent for those who are 80 and older. Proxy interviews succeed in retaining individuals who are cognitively impaired, reducing attrition bias due to cognitive impairment in a study of aging individuals (5).

Fourth, HRS samples community dwelling individuals in the first wave of data collection. However, respondents who move to nursing homes after baseline are interviewed there. The result is that HRS now fully represents the US nursing home population. Among other things, this means that research can address the functioning and well-being of the oldest old. Finally,

HRS monitors vital status through its own efforts to locate respondents and through linkages to the National Death Index. In addition, in the event of respondent death HRS attempts an “exit” interview with a surviving spouse, child, or other informant to obtain information about medical expenditures, family interactions, disposition of assets following death, and other circumstances during the final stages of life.

### *Data Collection*

In HRS, the baseline (initial entry) interview is conducted in the respondents’ home face-to-face (FTF) every two years. It takes approximately three hours to complete and constitutes the bulk of the data. The sample size is around 20,000 at any given wave. At the end of this core interview every wave there are 10 or so experimental 3-minute modules that provide greater depth on a topic that is in the core or information on a topic that is not in the core but may be of interest. Each module is completed by a different random subsample of the core sample. Module sample sizes are about 1,500. Some psychosocial content is available in modules.

Prior to 2004, the primary mode for follow-up interviews was telephone, except for respondents over the age of 80 who are always offered FTF follow-up interviews. Since 2006, HRS has utilized a mixed-mode design for follow-up interviews in which a random half of the sample is assigned to an in-home FTF interview that is enhanced with physical and biological measures and a psychosocial questionnaire. The other half of the sample completes only the core interview mostly by telephone (again, those over 80 are offered FTF interviews). The half-samples alternate waves so longitudinal information from the enhanced FTF (EFTF) interview is available every four years at the individual level, and the expanded content is available every wave on a nationally representative half-sample. Beginning in 2010, the EFTF begins with the baseline interview and alternates waves from that point on. Figure one graphically portrays the design of the EFTF.

Finally, to expand data collection at lower cost and respondent burden, HRS also conducts studies in the off years from the core survey. These studies are fielded in subsamples as internet-based surveys, mailed paper and pencil questionnaires, or in-home assessments. Sample sizes for these studies range from approximately 3,000-5,000 respondents. Some studies took place only once; others are biennial studies of varying duration.

#### *Linkages to Administrative Records*

HRS attempts to obtain permission from all HRS respondents to access and link their HRS survey data to their Social Security earnings and benefits records and, from Medicare-eligible respondents, to their Medicare records. Linkage consent rates range from 78-84 percent. In addition, HRS attempts to obtain a wide range of pension plan information from respondents' current and past employers. Finally, health care utilization and other data from the Veterans Affairs (VA) health care system are linked to HRS respondents who have self-reported prior military service and have received VA health care. All of these sources of linked data not only provide validation of self-reported information but also add information not collected from respondents in the survey. These sources of linked data are made available to researchers under restricted data use agreements.

#### *Study Content*

Survey content from the 2010 wave of data collection, which is generally representative of the core interview, is summarized elsewhere (3). This section highlights portions of the core survey that may be of particular interest to geropsychologists, specifically cognition, depression, physical health, and limitations. It also covers anthropometrics, physical performance, biomarkers, genetics, and psychosocial information, which are all obtained in the EFTF interview. Where available, associated HRS user guide/documentation reports are cited for content areas discussed in this section.

## Cognition and Depression

From the beginning of the study, HRS researchers embraced a broad definition of health to include aspects of mental health and cognitive functioning. Measures of cognitive functioning included in most waves of HRS since 1992 include: 10 word immediate and delayed recall to assess memory; a serial 7's subtraction test of working memory; counting backwards to assess attention and processing speed; object naming test to assess language; and recall of the date, president, and vice-president to assess orientation (6). Information from these survey measures is summarized as a composite score ranging from 0-35 where a higher score indicates better cognitive functioning. This composite measure has been widely used to study trajectories of cognitive functioning.

An HRS supplemental study, the Aging, Demographics, and Memory Study (ADAMS) is an in-home neuropsychological assessment designed to provide a diagnostic determination of dementia or cognitive impairment without dementia (7). The study aimed to estimate the prevalence of dementia as well as risk factors and outcomes. ADAMS was conducted in a subsample of the HRS population age 71 and older who would be at higher risk for cognitive impairment. The original sample of 1,770 was followed up through in 2002, 2006, and 2008, providing information on incident dementia and other longitudinal cognitive changes.

From its inception, HRS has included a short screening measure of depressive symptoms derived from the Center for Epidemiologic Studies Depression Scale (8). Beginning in the third wave, a short form of the World Health Organization's Composite International Diagnostic Interview was also administered. This scale determines a probable diagnosis of major depressive episode, as defined by the Diagnostic and Statistical Manual of Mental Disorders, third edition revised.

### Physical Health and Limitations

At each wave, HRS assesses a range of health conditions. The survey asks respondent's if a doctor has ever (or since the last wave) told them that they have high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, and arthritis. For each of these conditions, respondents also report on whether they are taking any medications for that condition (9). Questions are also included about symptoms such as pain, swollen ankles, headaches, vision, and hearing. The study also tracks several critical health behaviors. Respondents report on their use of alcohol, history of smoking, their sleep quality, and amount of exercise. Preventive health services assessed include mammography screening, breast self-exam, prostate exam, cholesterol screening, Pap smear, and flu shot (10).

HRS also captures information about physical limitations by asking respondents to report on difficulties with activities of daily living (ADLs) such as bathing, eating, dressing, walking across a room, and getting out of bed. Instrumental Activities of Daily Living (IADLs) include preparing a meal, shopping, using a telephone, taking medication, and handling money. Limitations with these fundamental life tasks can indicate fairly severe disability. The third set of measures, the Nagi items, evaluate less fundamental tasks including things like jogging a mile, walking up a flight (or several flights) of stairs, pushing a heavy object across the floor, and picking up a coin. These series of question also include questions about respondents' receipt of help from other people with each of these activities and the use of assistive aids (e.g., walking stick). This section reflects the assumption that respondents need not be asked about relatively easy tasks if they reported being able to do more challenging tasks (11).

### Anthropometric Measures and Physical Performance

As noted above, the enhanced FTF interview includes physical tests and collection of biological specimens. HRS employs a set of standardized assessments of lung function (peak

expiratory flow), grip strength, balance, and walking speed. Arterial blood pressure and pulse are also measured, and height, weight, and waist circumferences are obtained. Before each measure, respondents are asked whether they understand the directions for the measurement and if they feel safe completing it. If the respondent answers no to either question, the measure is not administered. Likewise, interviewers are instructed not to administer a measure if they do not feel it is safe to complete it (12).

### Biomarkers and Genetics

Blood is obtained through finger prick and is collected in the form of dried blood spots during the EFTF interview. Blood samples have been assayed for five biomarkers: total and HDL cholesterol, glycosylated hemoglobin (HbA1c), C-reactive protein (CRP), and Cystatin C, for which data from the 2006 and 2008 waves are currently available for analysis (13).

Respondents' saliva is obtained for DNA extraction. HRS saliva samples are genotyped by the Centers for Inherited Disease Research (CIDR) and archived with the database of Genotypes and Phenotypes (dbGaP) at the National Institutes of Health (NIH). To date, HRS has genotyped almost 20,000 respondents from 2006-2012. The genotype data through 2008 and a limited set of phenotype measures have been deposited in dbGaP. In addition, HRS has prepared candidate gene and single nucleotide polymorphisms (SNP) files to provide access to carefully select subsets of the HRS genotype data available on dbGaP. These are smaller and more manageable files designed for users interested in a specific gene or SNP. Researchers wishing to use the HRS genetic data must first apply to dbGaP for access to the genotyped data. The process to request access to any dbGaP study is done via the dbGaP authorized access system. HRS also measures average telomere length using quantitative PCR (qPCR). The 2008 Telomere Data release includes average telomere length data from samples from 5,808 HRS respondents. These

data are considered sensitive health data and require permission to use. Detailed access information can be found on each product's page on the HRS website.

### Psychosocial Functioning

Figure 1 depicts the psychosocial content available in the core survey and in the Participant Lifestyle Questionnaire (PLQ), a questionnaire left behind at the end of the EFTF interview that respondents complete and return by mail. As noted above, HRS has included measures of depressive symptoms and probable depression in the core survey since the second wave (section D in the core). As of 2008, all participants in the core are also asked a single item of life satisfaction (Section B in the core). Before 2004, HRS piloted several psychosocial measures that are available as part of experimental module data. In 2004, HRS piloted the PLQ and fielded the revised questionnaire in 2006.

The figure also illustrates the design of the EFTF, which was described previously. Beginning in 2006, half of the core sample was randomly selected to participate in the EFTF and receive the PLQ (A). The other half of the sample received that EFTF in 2008 (B). The first longitudinal data from the EFTF and thus the PLQ were collected from half sample A in 2010. Longitudinal data was collected in 2012 from the second half sample (B). This rotational design will continue in future waves. Note that this figure applies as well to other data collected as part of the EFTF interview, namely, anthropometrics and physical functioning, biomarkers, and genetics.

Figure 1 Timeline for Collection of Psychosocial Data in HRS

								<i>Planned</i>
	Prior	2004	2006	2008	2010	2012	2014	2016
Core Sample	*+	+	+	+◆	+◆	+◆	+◆	+◆
EFTF Sample			A	B	A	B	A	B

\* Various sample modules  
 + Indicators of depression  
 ◆ Single-item life satisfaction  
 A First random half sample  
 B second random half sample

NB: Physical measures and biomarkers also follow this timeline beginning in 2006.

As with the core survey, in coupled households, both members of the couple complete the PLQ, and in some cases, the questionnaire is completed by a proxy. A question at the end of the survey asks: “Were the questions in this booklet answered by the person whose name is written on the front cover?” Approximately 1-2% of psychosocial questionnaires are completed by proxy respondents. A caregiver often acts as a scribe for very old participants, especially if the participant is vision impaired or finds it difficult to hold a pen due to arthritis. Because the questionnaire was left with respondents at the end of the EFTF interview for them to complete and mail back to study offices, the questionnaire came to be known as and is referred to on the HRS website as the Leave-Behind and is listed as section LB.

This section describes the psychosocial measures available within each broad content area (summarized in Figure 2). Some of the scales and measures in the PLQ are well known and widely used. Others are measures that have been developed by HRS researchers or other research psychologists. More detailed information about the scales and measures through 2010 is provided in the documentation report/user guide available on the HRS website (14). The user

guide lists the actual items in the questionnaire, reports the response coding and inter-item consistency (reliability) information. Variations in variable names across waves are also noted. With a few exceptions, the content of the PLQ did not change substantially since from 2006 to 2010; however, variations across waves are documented in the user guide.

Figure 2 Summary of HRS psychosocial content

<b>Well-being</b>	<b>Lifestyle</b>	<b>Social Relationships</b>
Life Satisfaction	Activities in life	Spouse/child/kin/friends
Domain satisfaction	Neighborhood evaluation	Positive support
Depression	Religiosity	Negative support
Positive/negative affect	Discrimination	Closeness
Hedonic Well-being	Lifetime traumas	Loneliness
Purpose in life	Early life experiences	Early parental relationships
Self-acceptance	Stressful life events	Friend contact
Personal growth	Ongoing stress	Child contact
Financial strain		
<b>Personality</b>	<b>Work</b>	<b>Self-related Beliefs</b>
Extraversion	Work stress	Personal mastery
Neuroticism	Work discrimination	Perceived constraints
Openness	Work satisfaction	Hopelessness
Agreeableness	Capacity to work	Subjective age
Conscientiousness	Effort-reward balance	Perceptions of aging
Cynical hostility	Work support	Subjective social status
Anxiety	Work/family priorities	Optimism
Anger	Work/life balance	Pessimism

### *Subjective Well-being*

Well-being is assessed with several measures. Life satisfaction is measured with the 5-item Diener Satisfaction with Life Scale, an established and reliable measure of subjective well-being that has been used extensively in international comparative studies (15). Domain satisfaction is assessed with 7-items that tap satisfaction in several life domains: housing, city or town, daily life and leisure, family life, financial situation, health, and overall life satisfaction (16). Positive and negative affect is assessed with an adjective checklist (e.g., afraid, upset, determined, enthusiastic, guilty, active, etc...) largely derived from the Positive and Negative

Affect Schedule – Expanded Form (PANAS-X) (17). Some items were obtained from other researchers' work in this area of study (18). The Ryff Measures of Psychological Well-being (19) includes a 7-item subscale that measures purpose in life. The 2006 version of PLQ also included the dimensions of self-acceptance and personal growth. Beginning in 2012, the PLQ includes a measure of hedonic well-being, which asks respondents to rate how much they experienced seven different emotions (happy, interested, frustrated, sad, content, bored, or pain) while they were watching TV, volunteering, exercising, other health-related activity, commuting, socializing, spending time with spouse/partner, or running errands (20). A standard item of financial strain (16) was added in 2008 that asks respondents how difficult it is to make monthly bill payments. As noted, depression is captured in the core interview.

#### *Lifestyle and Stress*

Activities in life assess the level of social engagement and participation across a range of twenty different activities (e.g., attending religious services, caring for others, work on a hobby or project etc...) (21); Another set of questions have respondents evaluate the physical disorder (vandalism/graffiti, rubbish, vacant/deserted houses, crime) as well as the social cohesion/trust (feel part of this area, trust people, people are friendly, people will help you) of their neighborhood (22). A four-item measure of religious beliefs, meaning and values is used (23). Two dimensions of discrimination are evaluated. A six-item scale measures the hassles and chronic stress associated with perceived everyday discrimination (24), followed by ten potential attributions for discrimination such as age, race, weight etc...(25).

Assessment of lifetime traumas asks about the experience of seven major lifetime traumas from an ongoing longitudinal study of the health consequences of trauma in older adults (26). From the same study, early life experiences assess traumatic experiences before age 18 (repeating a year of school, trouble with the police, parental physical abuse and parental drug or

alcohol abuse). Recent stressful life events (last five years) include 3 items related to unemployment, moving to a worse neighborhood, experiencing robbery or burglary, and being the victim of fraud (27). The 2006 PLQ included assessment of chronic stressors that includes eight ongoing problems such as financial strain, housing problems, and work difficulties (28).

### *Quality of Social Ties*

A series of questions evaluates respondents' social network (four questions ask respondents if they have spouses/partners, children, family, and friends) and the level of closeness they feel and amount of contact they have with those contacts (29). For each category of contact, seven questions assess perceived social support or relationship quality (positive and negative). Loneliness is assessed in 2008 and 2010 using an eleven item scale developed by Hughes (30) for use in large-scale surveys. The first three items of the scale only are in the 2006 PLQ. The 2008 and 2010 PLQ include two items that assess the quality of early parental relationships (31).

### *Personality*

The 'Big 5' personality dimensions of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness are assessed with 31 descriptive adjectives. The 2006 and 2008 PLQ used 26 items taken from the Mid-Life in the United States study (MIDUS) (32). In 2010, four items derived from the International Personality Item Pool were added to expand coverage of conscientiousness. Cynical hostility is assessed with five items from the Cook-Medley Hostility Inventory (33), which have been used in studies evaluating potential health consequences of hostility. Five items were selected from the widely used Beck Anxiety Inventory (BAI). The Beck Inventory has been shown to distinguish symptoms of anxiety from depression and to be valid for use in older populations (34). Finally, the Spielberger Anger Expression Scale (STAX) is used to measure state and trait anger (35).

### *Work-related Beliefs*

HRS uses a 15 item scale to capture job stress and job satisfaction among working respondents. Based on the demand/control model of stress (36) and items like those contained in the Quinn and Staines Quality of Employment Survey, items were chosen and adapted to assess multiple facets of job satisfaction and multiple work stressors. An eight item scale taps the experience of chronic work discrimination (24). Capacity to work measures the perceived ability to work with respect to a job's physical, mental, and interpersonal demands (37). Two dimensions of work support are captured: three items evaluate co-worker support and five items tap supervisor support (38). Twelve questions assess work/life balance and priorities, the extent to which work has a positive and negative effect on one's personal life and vice-versa (39).

### *Self-related Beliefs*

HRS assesses personal control with 5 widely used items that measure the extent to which individuals feel they are in control of their lives. Similarly, mastery is assessed with a commonly used five item scale that assesses personal agency and self-efficacy (40, 41). Hopelessness is measured with two items from Everson et al. (42) and two items from Beck et al. (43). Subjective age is very simply measured by asking respondents "Many people feel older or younger than they actually are. What age do you feel?" (44). An eight item scale (45) taps into individuals' evaluation of the experience of aging, their positive and negative perceptions of their aging. HRS utilizes the MacArthur Scale of Subjective Social Status based on Cantril (46). The measure shows respondents a graphic depiction of a ladder with 10 rungs and asks them to place an x on where they are on the ladder of social status. Dispositional optimism and pessimism are assessed with the widely used Life Orientation Test (47).

### **An International Model**

HRS has also become the model for a network of 30 other international studies of aging (see cross-reference). HRS supports the development of these surveys through technical assistance, interviewer training, and collaboration. These surveys not only provide data for individual countries but also offer the opportunity for cross-national comparisons. The Gateway to Global Aging Data (G2G) is a useful resource for researchers interested in cross-national data, also available through the HRS website. G2G provides interactive tools that allow researchers to find comparable questions across the surveys ([www.g2gaging.org](http://www.g2gaging.org)).

### **Research Examples**

Researchers are now using this wealth of data to investigate a wide range of topics in geropsychology. The value of the cross-national psychosocial data is illustrated in a study comparing the patterns of disability in the US and the United Kingdom (UK) (48). Older adults in the US report a very high sense of personal control, whereas older adults in the UK are much more likely to feel that events in life are not always under their control. The study finds much lower disability rates for older US adults with a high sense of personal control compared to their counterparts in the UK. Another study compares cognition in the US and the UK and finds that older adults in the US score much better than English adults on a measure of cognition despite the fact that they have more risks for heart disease and other diseases that may lead to poorer cognitive function (49). The study shows that American adults tend to be wealthier and better educated and have less depression, which accounts for some of the US cognitive advantage. They are also more likely to be taking medications for hypertension, which may also help cognitive function.

Investigators are beginning to realize the benefits of HRS couples data. For example, Roberts et al. (50) investigate the impact of conscientiousness on health in older couples. While most research demonstrates that a conscientious personality is associated with a range of positive

health outcomes, this study explores the potential impact of an individual's conscientiousness on his or her spouse or partner's health, what they call compensatory conscientiousness. They show that having a conscientious partner is health enhancing regardless of personal conscientiousness. Similarly, a longitudinal analysis of personal and partner optimism shows that having an optimistic spouse or partner is beneficial for health beyond the positive impact of personal optimism (51).

Lastly, Ailshire and Crimmins (52) examine the social relationships, feelings of loneliness, and satisfaction with life and the aging experience among the oldest-old (age 90-104) and older adults (age 70-79). The oldest-old report a higher level of social support and maintenance of social relationships with family and friends compared to the 70-79 year olds. Despite this, the oldest-old reported greater loneliness, likely associated with higher rates of widowhood. The older group reported greater life satisfaction overall but more negative perceptions of their aging.

## **Conclusion**

In sum, HRS is a representative sample of the US population over age 50, re-interviewed biennially throughout their lives. HRS encompasses a wide range of multidisciplinary content, and new data on biomarkers and psychosocial factors makes it a potent resource for psychologists interested in the modeling of causal pathways to health and well-being.

## **Cross References**

Irish Longitudinal Study on Ageing (TILDA); English Longitudinal Study of Aging (ELSA); China Health and Retirement Longitudinal Study; Korean Longitudinal Study of Ageing (KLoSA); Japan's population ageing, and description of JSTAR project and participants, specifically focusing on psychological wellbeing and life experiences.

## **References**

1. Juster, F. T., & Suzman, R.: An overview of the Health and Retirement Study. *J. Hum. Resour.* S7-S56 (1995)
2. Heeringa, S. G., & Connor, J. H.: Sample design and methods for the Health and Retirement Survey. Technical Report. Statistical Design Group, Survey Research Center, University of Michigan, Ann Arbor (1995)
3. Sonnega, A. J., Faul, J. F., Ofstedal, M. B., Langa, K., Phillips, W. R. J., & Weir, D.: Cohort Profile: the Health and Retirement Study. *Int. J. Epidemiol.* (2014)
4. Ofstedal, M. B., & Weir, D. R.: Recruitment and retention of minority participants in the health and retirement study. *Gerontologist* 51, S8-S20 (2011)
5. Weir, D., Faul, J. D., & Langa, K.: Proxy interviews and bias in the distribution of cognitive abilities due to non-response in longitudinal studies: A comparison of HRS and ELSA. *Longitud. Life Course Stud.* 2, 170-184 (2011)
6. Ofstedal, M. B., Fisher, G. G., & Herzog, A. R.: Documentation of cognitive functioning measures in the Health and Retirement Study. University of Michigan, Ann Arbor (2005)
7. Heeringa, S. G., Fisher, G. G., Hurd, M. D., Langa, K. M., Ofstedal, M. B., Plassman, B. L., Rodgers, W. L., & Weir, D. R.: ADAMS: Sample design, weighting and analysis for ADAMS. (2009)
8. Steffick, D. E.: Documentation of affective functioning measures in the Health and Retirement Study. HRS Health Working Group, Ann Arbor (2000)
9. Fisher, G. G., Faul, J. D., Weir, D. R., & Wallace, R. B.: Documentation of chronic disease measures in the Health and Retirement Study (HRS/AHEAD). University of Michigan, Ann Arbor (2005)
10. Jenkins, K. R., Ofstedal, M. B., & Weir, D.: Documentation of health behaviors and risk factors measured in the Health and Retirement Study (HRS/AHEAD). University of Michigan, Ann Arbor (2008)
11. Fonda, S., & Herzog, A. R.: Documentation of physical functioning measured in the Health and Retirement Study and the Asset and Health Dynamics among the Oldest Old Study. University of Michigan, Ann Arbor (2004)
12. Crimmins, E. M., Guyer, H., Langa, K. M., Ofstedal, M. B., Wallace, R. B., & Weir, D. R.: Documentation of physical measures, anthropometrics and blood pressure in the Health and Retirement Study. (2008)
13. Crimmins, E., Faul, J., Kim, J. K., Guyer, H., Langa, K., Ofstedal, M. B., Sonnega, A., Wallace, R., & Weir, D. R.: Documentation of biomarkers in the 2006 and 2008 Health and Retirement Study. (2013)
14. Smith, J., Fisher, G., Ryan, L., Clarke, P., House, J., & Weir, D. R.: Psychosocial and Lifestyle Questionnaire 2006 - 2010: Documentation Report (2013)
15. Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S.: The Satisfaction With Life Scale. *J. Person. Assess.*, 49(1), 71-75 (1985)
16. Campbell, A., Converse, P. E., & Rodgers, W. L.: The quality of American life: Perceptions, evaluations, and satisfactions. Russell Sage Foundation, New York (1976)
17. Watson, D., & Clark, L.A.: The PANAS-X: Manual for the positive and negative affect schedule – expanded form. Unpublished manuscript. University of Iowa (1994)
18. Carstensen, L. L., Pasupathi, M., Mayr, U., & Nesselroade, J. R.: Emotional experience in everyday life across the adult life span. *J. Person. Soc. Psych.*, 79(4), 644-655 (2000)
19. Ryff, C. D.: Psychological well-being in adult life. *Curr. Dir. Psychol. Sci.* 4, 99-104 (1995)

20. Smith, J, Ryan, L.H., Queen, T.L., Becker, S. & Gonzales, R.: Snapshots of mixtures of affective experiences in a day: Findings from the Health and Retirement Study. *J. Popul Aging*, 7(1), 55-79 (2014)
21. Jopp, D. S., & Hertzog, C.: Assessing adult leisure activities: An extension of a self-report activity questionnaire. *Psychol. Assessment* 22, 108-120 (2010)
22. Mendes de Leon, C. F., Cagney, K. A., Bienias, J. L., Barnes, L. L., Skarupski, K. A., Scherr, P. A., & Evans, D. A.: Neighborhood social cohesion and disorder in relation to walking in community-dwelling older adults: A multilevel analysis. *J. Aging Health* 21, 155-171 (2009)
23. Fetzer Institute.: Brief Multidimensional Measure of Religiousness/Spirituality: 1999. In N. W. Group (ed.) *Multidimensional measurement of religiousness/spirituality for use in health research: A report of the Fetzer Institute/National Institute on Aging Working Group* (2nd ed.), pp. 85-88. John E. Fetzer Institute, Kalamazoo (2003)
24. Williams, D. R., Yu, Y., Jackson, J. S., & Anderson, N. B.: Racial differences in physical and mental health: socio-economic status, stress and discrimination. *J. Health Psychol.* 2, 335-351 (1997)
25. Kessler, R. C., Mickelson, K. D., & Williams, D. R.: The prevalence, distribution, and mental health correlates of perceived discrimination in the United States. *J. Health Soc. Behav.* 40, 208-230 (1999)
26. Krause, N., Shaw, B. A., & Cairney, J.: A descriptive epidemiology of lifetime trauma and the physical health status of older adults. *Psychol. Aging* 19, 637-648 (2004)
27. Turner, R. J., Wheaton, B., & Lloyd, D. A.: The epidemiology of social stress. *Am. Sociol. Rev.* 60, 104-125 (1995)
28. Troxel, W. M., Matthews, K. A., Bromberger, J. T., & Sutton-Tyrrell, K.: Chronic stress burden, discrimination, and subclinical carotid artery disease in African American and Caucasian women. *Health Psychol.* 22, 300-309 (2003)
29. Turner, R. J., Frankel, G., & Levin, D. M.: Social support: Conceptualization, measurement, and implications for mental health. In Greenley, J. R., & Simmons, R. G. (eds.) *Research in Community and Mental Health*, pp. 67-111. JAI Press, Greenwich (1983)
30. Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T.: A short scale for measuring loneliness in large surveys: results from two population-based studies. *Res. Aging*, 655-672 (2004)
31. Rossi, A. S.: Developmental roots of adult social responsibility. In Rossi, A. S. (ed.) *Caring and doing for others: Social responsibility in the domains of family, work, and community*. University of Chicago Press, Chicago (2001)
32. Lachman, M. E., & Weaver, S. L.: Midlife Development Inventory (MIDI) personality scales: Scale construction and scoring. Unpublished Technical Report, Brandeis University (1997)
33. Cook, W. W., & Medley, D. M.: Proposed hostility and pharisaic-virtue scales for the MMPI. *J. Appl. Psychol.* 38, 414-418 (1954)
34. Beck, A. T., Epstein, N., Brown, G., & Steer, R. A.: An inventory for measuring clinical anxiety: Psychometric properties. *J. Consult. Clin. Psych.* 56, 893-897 (1988)
35. Forgays, D. K., Spielberger, C. D., Ottaway, S. A., & Forgays, D. G.: Factor structure of the state-trait anger expression inventory for middle-aged men and women. *Assessment* 5, 141-155 (1998)
36. Karasek, R.: Job demands, job decision latitude, and mental strain: Implications for job re-design. *Admin. Sci. Quart.* 24, 285-306 (1979)

37. Ilmarinen, J., & Rantanen, J.: Promotion of work ability during ageing. *Am. J. Ind. Med.* 1, 21-23 (1999)
38. Haynes, C. E., Wall, T. D., Bolden, R. I., Stride, C., & Rick, J. E.: Measures of perceived work characteristics for health services research: Test of a measurement model and normative data. *Brit. J. Health Psych.* 4, 257-275 (1999)
39. MacDermid, S. M., Barnett, R., Crosby, F., Greenhaus, J., Koblenz, M., Marks, S., Perry-Jenkins, M., Voydanoff, P., Wethington, E., Sabbatini-Bunch, L.: The measurement of work/life tension: Recommendations of a virtual think tank. Alfred P Sloan Foundation, Boston (2000)
40. Pearlin, L. I., & Schooler, C.: The structure of coping. *J. Health Soc. Behav.* 19, 2-21 (1978)
41. Lachman, M. E., & Weaver, S. L.: The sense of control as a moderator of social class differences in health and well-being. *J. Pers. Soc. Psychol.* 74, 763-773 (1998)
42. Everson, S. A., Kaplan, G. A., Goldberg, D. E., Salonen, R., & Salonen, J. T.: Hopelessness and 4-year progression of carotid atherosclerosis: The Kuopio Ischemic Heart Disease Risk Factor Study. *Arterioscl. Throm. Vas.* 17, 1490-1495 (1997)
43. Beck, A. T., Weissman, A., Lester, D., & Trexler, L.: The measurement of pessimism: The hopelessness scale. *J. Consult. Clin. Psych.* 42, 861-865 (1974)
44. Kastenbaum, R., Durbin, V., Sabatini, P., & Artt, S.: "The ages of me": Toward personal and interpersonal definitions of functional aging. *Aging Hum. Develop.* 3, 197-211 (1972)
45. Lawton, M. P.: The Philadelphia Geriatric Center Morale Scale: A revision. *J. Gerontol.* 30, 85-89 (1975)
46. Cantril, H.: The pattern of human concerns. Rutgers University Press, New Brunswick (1965)
47. Scheier, M. F., Carver, C. S., & Bridges, M. W.: Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the Life Orientation Test. *J. Pers. Soc. Psychol.* 67, 1063-1078 (1994)
48. Clarke, P. & Smith, J.: Aging in a cultural context: Cross-national differences in disability and the moderating role of personal control among older adults in the United States and England. *J. Geront.: Psych. Sci. Soc. Sci.*; 66(4) 457-467 (2011)
49. Langa, K.M., Llewellyn, D.J., Lang, I.A., Weir, D.R., Kabeto, M.U., & Huppert, F.: Cognitive health among older adults in the United States and England. *BMC Geriatr.*, 9(23), 1-11 (2009)
50. Roberts, B.W., Smith, J., Jackson, J., Edmonds, G.: Compensatory conscientiousness and health in older couples. *Psychol. Sci.* 20(5), 553-559 (2009)
51. Kim, E.S., Chopik, W. J., & Smith, J.: Are people healthier if their partners are more optimistic? The dyadic effect of optimism on health among older adults. *J. Psychosom. Res.* 76(6), 447-453 (2014)
52. Ailshire, J. A. & Crimmins, E. M.: Psychosocial factors associated with longevity in the United States: Age differences between the old and oldest-old in the Health and Retirement Study, *J. Aging Res.* 1-10 (2011)