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Empirical Article

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Beyond Hours Worked and Dollars Earned: Multidimensional EQ, Retirement Trajectories and Health in Later Life

Sarah B. Andrea[1,2], Jerzy Eisenberg-Guyot[3], Vanessa M. Oddo[4], Trevor Peckham[5], Daniel Jacoby[6], and Anjum Hajat[7]

1. OHSU-PSU School of Public Health, Portland, OR, USA
2. Lifespan BERD Core, Rhode Island Hospital, Providence, RI, USA
3. Department of Epidemiology, Columbia Mailman School of Public Health, New York, NY, USA
4. Department of Kinesiology and Nutrition, University of Illinois Chicago, Chicago, IL, USA
5. Department of Environmental and Occupational Health Sciences, University of Washington School of Public Health, Seattle, WA, USA
6. School of Interdisciplinary Arts & Sciences, University of Washington Bothell, Bothell, WA, USA
7. Department of Epidemiology, University of Washington School of Public Health, Seattle, WA, USA

ABSTRACT

The working lives of Americans have become less stable over the past several decades and older adults may be particularly vulnerable to these changes in employment quality (EQ). We aimed to develop a multidimensional indicator of EQ among older adults and identify EQ and retirement trajectories in the United States. Using longitudinal data on employment stability, material rewards, workers' rights, working-time arrangements, unionization, and interpersonal power relations from the Health and Retirement Study (HRS), we used principal component analysis to construct an EQ score. Then, we used sequence analysis to identify late-career EQ trajectories (age 50–70 years; N = 11,958 respondents), overall and by sociodemographics (race, gender, educational attainment, marital status). We subsequently examined the sociodemographic, employment, and health profiles of these trajectories. We identified 10 EQ trajectories; the most prevalent trajectories were Minimally Attached and Wealthy (13.9%) and Good EQ to Well-off Retirement (13.7%), however, 42% of respondents were classified into suboptimal trajectories. Those in suboptimal trajectories were disproportionately women, people of color, and less-educated. Individuals in the Poor EQ to Delayed and Poor Retirement and Unattached and Poor clusters self-reported the greatest prevalence of poor health and depression, while individuals in the Wealthy Business Owners and Great EQ to Well-off Retirement clusters self-reported the lowest prevalence of poor health and depression at baseline. Trajectories were substantially constrained for women of color. Although our study demonstrates EQ is inequitably distributed in later life, labor organizing and policy change may afford opportunities to improve EQ and retirement among marginalized populations.

Over the past several decades, the working lives of Americans have become more unstable, which may have important implications for late-life health and retirement patterns. Long-term employment with a single employer until retirement has been increasingly replaced by shorter-term arrangements (Halpern-Manners et al., 2015). Although seldom available to women and people of color, throughout the mid-20th century many White men enjoyed a standard employment relationship (SER) with their employer, characterized by permanent, full-time employment with job-related benefits (e.g., pension contributions, health insurance) and often the right to collective representation. However, labor-market changes wrought by technological, economic, social and political factors have weakened working-class power and caused the destandardization of employment, resulting in worsening employment quality (EQ) for many (Benach et al., 2014; Kalleberg, 2011). Further, this dynamic has exacerbated class inequities, with the upper class enjoying greater earnings and decision-making freedom and the working class becoming more precarious; that is, less employment stability, stagnating wages, and worsening access to health insurance, paid leave, pensions, and other fringe benefits. These features of EQ are increasingly being recognized as social determinants of health (Benach et al., 2014), and long-term trend in employment relations have coincided with growing socioeconomic inequities in health (Bor

Correspondence concerning this article should be addressed to Sarah B. Andrea, 593 Eddy St, Grads Dorm 308, Providence, RI 02903, USA. E-mail: andreasa@ohsu.edu
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et al., 2017). As such, in addition to its effects on retirement timing and prosperity, worsening EQ may have implications for health and health inequities.

Recent research has emphasized the multidimensional nature of EQ. Much of this research, however, has focused on employment outside of the United States in countries with dramatically different social safety nets and labor market conditions (Kreshpaj et al., 2020). The few U.S.-based studies that have explored a multidimensional conceptualization of EQ have focused on young adulthood and midlife (Eisenberg-Guyot et al., 2020; Oddo et al., 2020; Peckham et al., 2019). Moreover, with the exception of two U.S. studies (Eisenberg-Guyot et al., 2020; Oddo et al., 2020), all have been cross-sectional. Nonetheless, well-being in later life is a culmination of preceding experiences. To truly understand the well-being of Americans as they transition into retirement, life course perspectives are needed. In this study, we aimed to examine later-life EQ and retirement trajectories of retirement-age Americans and the potential consequences worsening EQ may have for health and health inequities in this population.

Theoretical Framework

Life course theory can elucidate how individuals' experiences across the life course contribute to variation in later-life EQ and economic resources in retirement. Life course transitions (e.g., from long-term employment to retirement) are embedded within multiple interdependent trajectories (Elder et al., 2003). Moreover, such transitions cannot be fully understood absent the context of individuals' physical and financial well-being, their interpersonal relationships, and their broader social and political environment. Cumulative advantage plays a key role; that is, factors like an individual's race, gender, and class give rise to unique—and unequal—opportunities and pathways such that differences in individuals' well-being compound over time, exacerbating later-life inequities (DiPrete & Eirich, 2006). In the workplace, individual differences in workers on account of their race, gender, nativity, and educational attainment not only play a role in the distribution of work-related opportunities and rewards at any given time, but also growing inequities in these opportunities and rewards over time (van Dijk et al., 2020). Moreover, factors like an individual's race, gender, and class are not mutually exclusive, but intersect and reinforce each other, which in turn, amplifies the effects of complex structural inequities (Cho et al., 2013; Collins, 2015). For instance, the totality of inequities experienced by Black women in the United States cannot be reduced to the sum of racism and sexism; rather, racism and sexism interact (Crenshaw, 1989). We anchor the present study to three key life course principles: *human agency*, *linked lives*, and *timing* (Elder et al., 2003).

Human agency influences individual employment and retirement trajectories because further divergence in life course trajectories can emerge from individuals' choices. That is, people make choices among the (often constrained) options available to them, which shape their life course. (Elder, 1994). However, individual choices are functions of decisions and actions occurring within multi-level contexts, and individuals can select only from among the array of choices offered to them—an array structured by sociopolitical conditions (Bird, 2008). For instance, in addition to individual-level factors such as health, the choice to work in a certain kind of employment relationship, to retire, or to return to the workforce after retirement are functions of family-, community-, and societal-level factors (de Wind et al., 2014; Henkens & Solinge, 2013; Lund et al., 2001; Schreurs et al., 2011; van den Berg et al., 2010; van Rijn et al., 2014). Within the workplace itself, circumstances such as ability to develop skills, decision-making authority, wage levels, and access to fringe benefits serve as critical opportunities or constraints (van Dijk et al., 2020). Moreover, systems of oppression, like racism and sexism, not only constrain employment options available to women and workers of color—particularly women of color (Bailey et al., 2017)—but also how, when, and to what end individuals are engaged or disengaged, and perceive "fit"—in terms of factors like knowledge, abilities, and needs—within a given job (Kooij et al., 2020; Rauvola & Rudolph, 2020).

The principle of *linked lives* recognizes the lives of individuals affect and are affected by the lives of others (i.e., are interdependent), as well as the institutional, political, economic, and historical contexts in which they live (Elder et al., 2003). In the context of employment and retirement, transitions are largely driven by social relationships within the family and workplace. Because of the gendered division of care taking and other domestic-labor responsibilities and the U.S.'s limited social safety net, women are disproportionately impacted by the life transitions of their partners, children, and parents (Calasanti, 1993; Hochschild & Machung, 2003; Loretto & Vickerstaff, 2013; Moen et al., 1994). For example, women disproportionately delay labor force entry or reentry until their small children are school-aged, and often exit or partially exit the labor force to provide care to aging family members. Social and political contexts compound *linked lives*. In the workplace, the accumulation of opportunities and rewards by women, people of color, and other disenfranchised groups are constricted by discriminatory structures and beliefs—particularly when those beliefs are held by those in positions of power—as well as by limited social capital (van Dijk et al., 2020).That is, members of marginalized groups tend to experience less access to high quality employment compared to peers in the perceived majority group, for example, non-Hispanic White men, who may not face comparable discrimination and often have greater social capital (Rauvola & Rudolph, 2020; van Dijk et al., 2020). Moreover, while both White and Black women experience constrained employment opportunities during their working years, in retirement, White women tend to benefit economically from their greater marital ties to White men (Hogan & Perrucci, 2007).

Finally, the *timing* of transition into later-life employment and retirement is subject to social norms and political and economic context and has impacts on later-life health. In addition to socially constructed definitions of on-time versus early or late retirement, laws and policies stipulating eligibility for resources like Medicare and Social Security are frequently based on age. The importance of economic context was clearly seen as many older workers exited the workforce prematurely after the Great Recession (Papadopoulos et al., 2020); a phenomenon we are beginning to see again with the COVID-19 pandemic (Moen et al., n.d.). Moreover, birth cohorts experience different economic, policy, and political landscapes. For example, in the context of EQ, younger birth cohorts that entered the workforce following destandardization (circa 1990) may experience worse EQ and retirement quality than older cohorts.

EQ in Later Life

Of interest in this study are later-life transitions in employment and retirement (with a particular focus on the multidimensional construct of

EQ) and their associations with health. Prior studies have focused on the implications of employment conditions and economic well-being for retirement timing and other labor-market transitions (Beehr & Bennett, 2015; Cahill et al., 2011; Calvo et al., 2018; Fisher et al., 2016; Gonzales et al., 2017). Just as changes to the labor market have contributed to poorer EQ in early-to-mid-career, there are important new pathways through which individuals exit the labor force in later life. In fact, research in other countries suggests workers over 50 are particularly vulnerable to worsening labor market conditions (Visser et al., 2018). With destandardization of the employment relationship yielding stagnant wages and worsening access to benefits like employer-sponsored retirement plans, fewer workers can transition from full-time work to "on-time" complete retirement. Increasingly, individuals continue to work full-time until older age, or in a reduced capacity—often termed "bridge employment" (Beehr & Bennett, 2015; Cahill et al., 2015). For many, this bridge employment has low wages and lacks fringe benefits and collective bargaining power (Kantarci & Van Soest, 2008). For those able to fully retire, 15% eventually reenter the labor force (Cahill et al., 2011). Although common among the affluent, reentry is also common among those without pensions and with the lowest wages during their working years, who need to reenter the labor force to supplement their retirement income (Cahill et al., 2011).

Investigations into EQ resemble those into precarious employment (PE), as the two constructs have developed along-side each other and share a focus on multidimensionality and worker-employer power relations (Julià et al., 2017). However, conceptualizations of EQ and PE differ in key ways. First, conceptualizations of PE vary considerably from discipline to discipline, spanning from unidimensional measures to multidimensional ones (Benach et al., 2014, p. 20), as well as from individual-level measures to societal-level ones (e.g., measures at the employment-relationship level versus a "precariat" social class) (Campbell & Price, 2016). Conversely, there is consensus on seven specific dimensions of EQ, all of which focus exclusively on characteristics of the employment relationship. Second, conceptualizations of PE frequently include workers' subjective appraisals, which are often impacted by forces external to the employment relationship. For instance, the Employment Precariousness Scale, perhaps the most widely used PE instrument in health research, includes a survey item that asks participants if they are afraid to demand better working conditions, responses to which undoubtedly dependent on family-level and societal-level factors (e.g., household income and the unemployment rate) (Vives et al., 2010). In contrast, studies using the EQ construct have emphasized objective measures of the employment relationship.

While there is no single definition of EQ, the work of Benach, Vanroelen and other public health researchers (Benach et al., 2014; Julià et al., 2017; Van Aerden et al., 2014) suggest that EQ is best described in terms of seven interrelated dimensions due to their association with health: a) *employment stability* (e.g., employment tenure); b) wage and non-wage *material rewards* (e.g., paid leave, health insurance, employer contributions to pension); c) *workers' rights and social protections* (e.g., entitlement to social security); d) *working time arrangements* (e.g., hours and shifts worked); e) training and employment opportunities (e.g., employer-provided training); f) collective organization (e.g., union membership); and g) interpersonal power relations (e.g., control over work schedule). Researchers theorize that it is the interacting nature of these domains that contributes to poor health, through material deprivation, greater exposure to adverse physical and psychosocial working conditions, and limited control over both working and non-work lives (Benach et al., 2014). For instance, the compounding nature of conditions like employment instability and inadequate interpersonal power, social protections, and material rewards can lead to insufficient income, compromising access to necessities and hindering long-term life planning. Importantly, studies have found the greatest burden of poor EQ among women, those from racialized groups, and those with lower education levels (Eisenberg-Guyot et al., 2020; Oddo et al., 2020; Van Aerden et al., 2014). Thus, EQ is interrelated with the broader concept of socioeconomic status (SES), which is commonly measured in the United States by dimensions such as income or education: poor EQ results in lower income, while lower levels of education lead to poor EQ. In any case, poor EQ is more prevalent for those from marginalized populations and exacerbates marginalization's other adverse effects (Benach et al., 2014).

However, most research examining this multidimensional EQ construct has been done in populations outside of the United States (Kreshpaj et al., 2020), while most U.S. studies have focused on aspects of a single dimension—such a contract type (Jeszeck, 2015), working time arrangements (Schneider & Harknett, 2020), and wages (Howell & Kalleberg, 2019)—or disaggregated data on multiple dimensions (Kalleberg, 2011). Multidimensional assessments of EQ in the United States are limited to a few recent studies (Eisenberg-Guyot et al., 2020; Oddo et al., 2020; Patil et al., 2020; Peckham et al., 2019). For example, informed by previous European conceptualizations of EQ, Peckham and colleagues applied latent class analysis to investigate a typology of EQ in cross-sectional General Social Survey data (Peckham et al., 2019). Using this approach, the authors identified eight employment types, ranging from SER-like (e.g., permanent regular full-time work with adequate wages, benefits, interpersonal and collective power) to precarious (e.g., low wage, nonstandard working arrangements, limited benefits, limited interpersonal and collective power)—and several other employment types representing various combinations of beneficial and poor EQ features. In one of the few longitudinal examinations of multidimensional EQ in the United States, Eisenberg-Guyot and colleagues applied a multichannel sequence-analysis approach to data from the Panel Study of Income Dynamics to identify gender-specific clusters of mid-career EQ trajectories (Eisenberg-Guyot et al., 2020). Clear trajectories emerged, ranging from individuals stably employed in SER-like employment to those employed precariously for the duration of follow-up.

Study Objectives

Our study picks up where Eisenberg-Guyot left off, analyzing the multidimensional EQ trajectories of retirement-age adults. We had four objectives to contribute to the research in this area. First, we aimed to develop a single multidimensional EQ score to succinctly describe an individual's EQ status at a given point in time. Second, we aimed to use categories developed from this score—as well as other categories capturing in an individual's relationship to the labor force at a given point in time—to identify prototypical life-course patterns in employment and retirement quality among a nationally-representative sample of older adults. Third, we aimed to describe how sociodemographics, health, and health behaviors varied across the identified later-life EQ trajectories. Finally, because we theorize cumulative advantage and intersectionality constrain the number and quality of available EQ pathways into retirement, we aimed to examine the prototypical

patterns in employment and retirement quality within strata of gender, race/ethnicity, and educational attainment.

DATA AND METHODS

Data

We used data from the Health and Retirement Study (HRS), an ongoing nationally representative biennial panel survey of older adults in the United States. Participants in the initial cohort were recruited and enrolled in 1992, with subsequent cohorts enrolled every six years thereafter (Health and Retirement Study, 2011). At the time of this analysis, 13 waves of data had been collected from 1992 to 2016. Details regarding sampling procedures are described elsewhere (Heeringa & Connor, 1995).

We utilized both the publicly available HRS data as well as those generated by the RAND Corporation (RAND Corporation, 2020). Our analysis included participants recruited in the initial cohort (born 1931–1941) as well as participants recruited in the 1998 refresher cohort who were born between 1942 and 1946. We restricted our sample to individuals born before 1946 to ensure respondents had follow-up until at least age 70, if not deceased, as confirmed with data from the National Death Index (NDI) (N = 13,566; Figure 1). For each wave, employed participants were retained if they had 9 or more of the 13 survey items used to define our EQ score. We restricted our analyses to participants with known status at least once when they were aged 50–55 years and at least once when they were aged 65–70 years (N = 11,958 participants). Since NDI data is available for all decedents irrespective of participation in subsequent waves, decedents with at least one wave of data containing information on status at age 50–55 years were also eligible for inclusion. Each participant contributed observations from 1 to 13 survey waves (median = 10).

EQ Measures

Work history was collected as part of the core HRS interview at every wave. In addition to start and stop dates affiliated with specific self-reported labor force status (e.g., currently working for pay, unemployed, retired) and date of death, we leveraged a variable constructed and imputed by the RAND corporation corresponding to the length of time the participant had been at their current job. We utilized the aforementioned survey and NDI data to categorize each participant in one of the following 10 employment states at a given age: working for someone else with poor, fair, good, or great EQ, high-earning self-employed, low-earning self-employed, not in the labor force well-off, not in the labor force poor, deceased, or status unknown but alive (Table 1).

We created a score to classify participants' EQ as great, good, fair, or poor if at a given age they were unemployed or currently working for someone else. To this end, we first mapped participants' responses to sixteen questions about their employment history from the core survey to one of seven possible interrelated dimensions of EQ based on existing research (Van Aerden et al., 2014) (Table 2): employment stability, material rewards, workers' rights and social protections, working time arrangements, collective organization, and interpersonal power relations. From these 16 questions we constructed 13 items to develop an EQ score. Although supplemental modules included questions related to the training and employment opportunities dimension, these questions were not asked in the majority of waves. Thus, this dimension was not included in our analysis. Previous research has found those with poor EQ to be compositionally similar to the unemployed (e.g., lower educational attainment, low-income, women, people of color); moreover, those with poor EQ tend to experience bouts of unemployment (Benach & Muntaner, 2007, p. 2; Van Aerden et al., 2017). Consequently, if a participant self-reported their status as unemployed at a given wave—and thus did not respond to questions

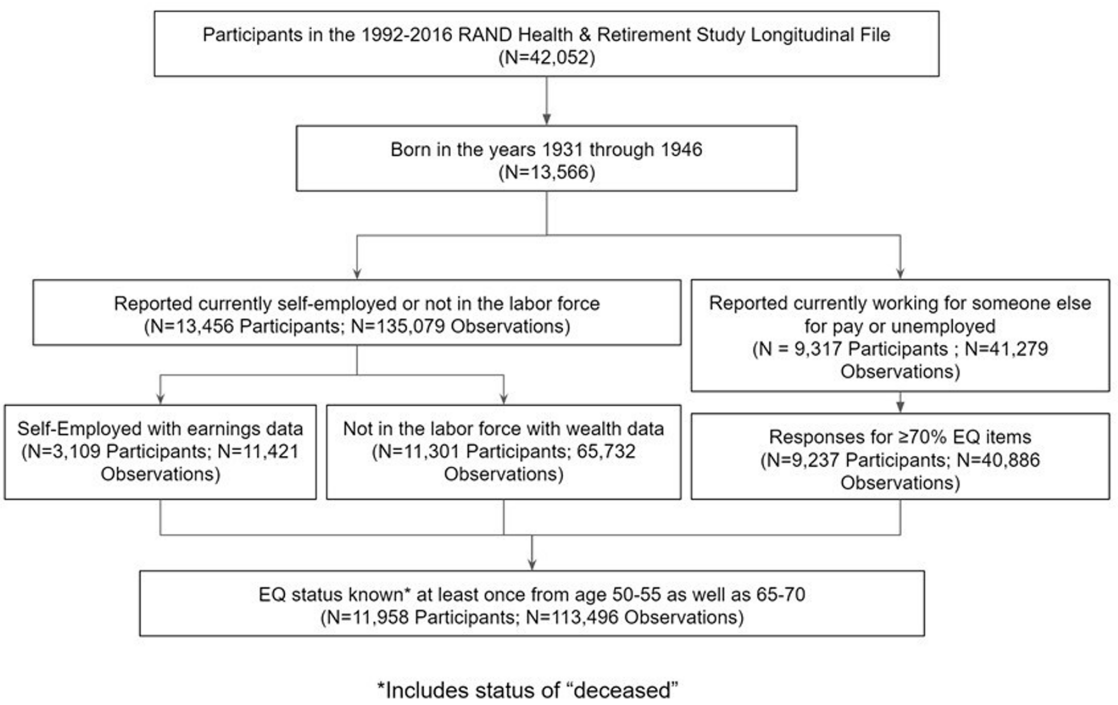

Figure 1. Construction of analytic sample.

Table 1. Summary of Employment State Determination and Color Depiction Key

State	Determination	Color Depicted in Figures
Great EQ	4th quartile of EQ score developed with PCA	
Good EQ	3rd quartile of EQ score developed with PCA	
Fair EQ	2nd quartile of EQ score developed with PCA	
Poor EQ	1st quartile of EQ score developed with PCA	
Self-employed, top 50% earnings	In top 50% for age in earning from business assets and income	
Self-employed, bottom 50% earnings	In bottom 50% for age in earning from business assets and income	
Not in labor force, top 50% wealth	In top 50% for age in non-housing wealth	
Not in labor force, bottom 50% wealth	In bottom 50% for age in non-housing wealth	
Deceased	Proxy report confirmed with NDI	
Status unknown, alive	Missing EQ information but no NDI entry	

Note. EQ = Employment Quality; NDI = National Death Index; PCA = Principal Component Analysis.

pertaining to a current job—they were assigned values corresponding to poor EQ for all items (values specified in Table 2).

A priori, we theorized that whether certain attributes of EQ were considered great or poor would vary based on one's age and proximity to retirement. Namely, fewer hours—and subsequently lower earned income—could sometimes be more desirable for older workers (Kantarci & Van Soest, 2008). Moreover, we found all EQ items were correlated with age in the data. As such, all items were age standardized prior to score development. That is, we first calculated age-specific means and standard deviations for each item and then computed each participant's z-score.

Because comprehensive employment questions were only asked of those that were employed by someone else, for participants reporting self-employment in a given wave, we utilized self-reported business income and assets data to classify individuals as high- or low-earning self-employed. We converted business earnings to 2016 USD then classified individuals as high earners if they were in the top 50% of earnings for their age and low earners if they were in the bottom 50% of earnings for their age. We similarly used inflation-adjusted self-reported non-housing wealth data to classify individuals not in the labor force as well-off or poor if their wealth was in the top or bottom 50% for their age, respectively.

Analytic Strategy

All data management and analyses were performed in Stata MP Version 16.1 (StataCorp, College Station, TX, USA). Descriptive analyses incorporated strata and sampling units to account for HRS's complex sampling design (Heeringa & Connor, 1995). Base-year respondent-level sampling weights were applied such that estimates are representative of the U.S. civilian, noninstitutionalized population aged 51 years and older (Health and Retirement Study, n.d.).

Developing EQ score.

Prior to developing the EQ score for participants with ≤4 missing items, EQ and sociodemographic data were multiply imputed (m = 10); an augment-regression approach was used to prevent perfect prediction. Within each of the 10 generated data sets, an aggregate EQ index was created from the thirteen EQ items using principal components analysis (PCA). As with factor analysis, PCA is a data reduction technique used in score scale development. However, the goal of PCA is to construct a linear combination of variables, not model the measurement of a latent variable (Widaman, 2007). PCA enabled us to obtain an index that included all dimensions—with some items and overall PCA-derived components contributing more weight to the index than others (described below)—while also minimizing bias from highly correlated employment characteristics. A four-component solution was identified in each imputation based on eigenvalues greater than 1. We applied an oblique rotation to our loadings (promax) to allow for the theoretical and observed correlation between components. For each of the four principal components for each respondent, we calculated the linear sum of each age-standardized item value multiplied by their factor loading. Within each imputation, respondents' EQ score was equal to the linear sum of their four components, with each component weighted by the percentage of the variance it explained. Finally, using the average of the scores developed across the 10 imputations, we calculated quartiles to be used as possible states in the sequence analysis (Q1: Poor, Q2: Fair, Q3: Good; Q4: Great). Because this was a descriptive study, we did not apply bootstrapping procedures to our analyses to incorporate uncertainty resulting from the imputation.

Sequence analysis.

For each participant, we constructed an individual trajectory (i.e., sequence) specifying their state (e.g., poor EQ) at each age between 50 and 70 years. In the absence of more current information from an interview wave, a participant's state in a given age was carried backwards and forwards to the reported start or end date of a self-reported labor market transition, respectively. For example, if a participant reported during their baseline interview in 1992—when they were 55 years old—that they have been working for their current employer in their current job since 1990 when they were 53 years old, we assumed their state at ages 53 and 54 was the same as their state at age 55. When state at a given age could not be surmised in this way, a participant's state for a given age was categorized as "missing." The 11,958 participants had 8,541 distinct EQ trajectories. We employed sequence analysis to measure the similarity between each individual's life course trajectory to identify normative employment experiences within our sample. As with discriminant analysis, sequence analysis is a classification technique. However, sequence analysis is an unsupervised interdependence classification technique used to divide individuals into an unknown number of groups that maximizes in-group homogeneity and minimizes between-group heterogeneity, while discriminate analysis is a supervised dependence technique with *a priori*

Table 2. Employment Quality Dimensions[a], Health and Retirement Study (HRS) Prompts, and Operationalization for Analysis

Domain	Item	Prompt	Analytic Coding
Employment stability	Job tenure	"In what month and year did you [start/last work] this job"	X-X years (value for unemployed: 0)
	Weeks worked	"Counting paid vacations as weeks of work, how many weeks a year do you usually work?"	0–52 weeks (value for unemployed: 0)
Material rewards	Income	"How much are you paid before taxes and other deductions?"	Annual income from salary/wages in 2016 USD
	Paid leave	"How many days of paid sick leave are you allowed each year?" "How many weeks of paid vacation do you get?"	Yes ≥1 for either, no otherwise (value for unemployed: 0)
	Pension	"Aside from IRA or Keogh plans, are you included in any pension plans or tax-deferred savings plans through your work?"	Yes/No (value for unemployed: 0)
	Health insurance	"Do you have any type of health insurance coverage obtained through your [or your (husband's/wife's/partner's)] employer, former employer or union, such as Blue Cross-Blue Shield or a Health Maintenance Organization? How many such health plans do you have? How is this coverage obtained?"	Yes if participants employer, no otherwise (value for unemployed: 0)
Workers' rights & social protections	Paid overtime	"If you were to work more hours than usual during some week, would you get paid for those extra hours, get time off later, or get no compensation for the extra hours?"	Yes/No (value for unemployed: 0)
	Overtime required	"Are you required to work overtime"	Yes/No (value for unemployed: 0)
Working time arrangements	Hours worked	"How many hours a week do you usually work [on this job/in this business]"	X-X hours (value for unemployed: 0)
	Stable hours	"Do you work this number of hours nearly every week"	Yes/No (value for unemployed: 0)
Training & employment opportunities		NA	
Collective organization	Union	"Are you covered on this job by a union or employee-association contract?"	Yes/No (value for unemployed: 0)
Interpersonal power relations	Schedule/role freedom	"My employer would let older workers move to a less demanding job with less pay if they wanted to." "(Not counting overtime hours,) Could you reduce the number of hours in your regular work schedule?" "Could you increase the number of hours in your regular work schedule?"	Yes to any/No (value for unemployed: 0)
	Forced retirement	"Thinking back to the time you (partly/completely) retired, was that something you wanted to do or something you felt you were forced into?"	Not retired OR own decision (1); partially own decision (2) not own decision (3) (value for unemployed: 3)

Note. [a]Seven interrelated dimensions of EQ based on existing research (Benach et al., 2014; Julià et al., 2017; Van Aerden et al., 2014).

groupings (Mukherjee et al., 2018). Sequence analysis accounts for timing of milestones (e.g., retirement) and duration spent in a given state. We grouped trajectories using dynamic hamming, a modification of optimal matching that emphasizes the age-graded temporal patterning of various employment states in a trajectory (Lesnard, 2010). Similarity of trajectories was assessed using a distance matrix summarizing the number of state changes (i.e., substitutions of a state in one person's trajectory) necessary to make one person's trajectory the same as every other's trajectory. In calculating the total "cost" of transforming one's trajectory to match another's trajectory, substitutions are permitted (e.g., at age 60 substituting "good EQ" for "great EQ") but not insertions or deletions, thus preserving states' life course timing. Substitution costs are calculated such that highly probable transitions (as observed in the data) cost less than those that are less probable. After calculating the distance matrix, we performed hierarchical cluster analysis using Ward's method to group together respondents who shared low distance values. We considered 6 to 12 cluster solutions; the optimal number was selected based on substantive knowledge, sample sizes, silhouette plots, and Calinski-Harabasz pseudo-F test and Duda/Hart Je(2)/Je(1) index cluster stopping rules; the latter

three approaches were used to identify cluster solutions that optimized within- and between cluster differences (Aisenbrey & Fasang, 2010; Rousseeuw, 1987). After identifying the clusters, we described their employment, sociodemographic and health characteristics (reported at participants' baseline interview). In addition to the variables included in the EQ score, we measured several additional employment-related characteristics within each cluster. A complete listing of these variables can be found in Tables 3 and 4.

Stratified sequence analyses.

To assess the potential impact of cumulative advantage/disadvantage and intersectionality on the types of trajectories that emerged, we subsequently performed sequence analysis within strata of key sociodemographic profiles: non-Hispanic White men, non-Hispanic White women, men of color, and women of color. We also performed sequence analysis in a priori defined most advantaged (married/partnered non-Hispanic White men with a college degree) and least advantaged groups (not married/partnered women of color with less than a high school degree).

Robustness Analyses.

Sequence analysis with "unemployed" as a distinct state. In our main analyses, we assumed that being unemployed was equivalent to having the poorest EQ across all 13 items. To evaluate the robustness of this assumption, we included a distinct state for "unemployed" in our sequence analyses, and examined the percent agreement with our main approach in the classification of individuals into clusters.

RESULTS

Our analytic sample of 11,958 HRS respondents was similar to all respondents born 1931–1946. Briefly, 79% of respondents were non-Hispanic White with a mean age of 56 years and 12.5 years of education (41% with at least some college) at baseline (Supplementary Table A1).

EQ Score

Supplementary Table A2 displays the average factor loadings acquired from PCA conducted on the 10 imputed data sets. With this data-driven approach, the component explaining most of the variance comprised items consistent with *working time arrangements* and *interpersonal power relations* (e.g., average number of hours worked per week, freedom to work more/less; 22.7% variance explained). The second-largest component contained items consistent with *collective organization* and non-wage *material rewards* (e.g., union membership, employer contributions to pension, health insurance; 18.6% variance explained). The third-largest component contained items related to wage *material rewards* (e.g., income; 11.6% variance explained) and the smallest component contained items related to *workers' rights* and *working time arrangements* (e.g., overtime requirements and hours that were stable from one week to the next; 8.5% variance explained). Each component score was centered at 0; the final average EQ had a mean of −0.06 and a standard deviation of 0.53 (range: −2.10, 2.72).

EQ Clusters

A 10-cluster solution was selected after considering cluster interpretability, the Calinksi-Harabasz Pseudo F-test, Duda-Hart index, visualization of silhouette plots, and sample sizes. Briefly, while a seven cluster solution exhibited optimal cluster diagnostics (i.e., the greatest between cluster variance and within-cluster matching as calculated by the Duda Hart Index; Supplementary Table A3), a 10-cluster solution separated distinct groups that we *a priori* expected to find (e.g., disaggregation of a single heterogeneous self-employed group, separation of the unattached from those who return to the labor force; Supplementary Figure A1). To provide additional context as to the role of duration of study participation in the formation of trajectory groups, Supplementary Table A4 displays number of contributed study waves by sociodemographic characteristics and trajectory group membership. Figure 2 displays trajectories from the 10 clusters in both summary and detailed form, and Table 3 displays employment characteristics at baseline stratified by cluster. The 10 clusters are as follows:

1. Wealthy Business Owners ($N = 683$): The majority of individuals in this cluster were self-employed, high earning and did not transition into retirement during follow-up. These individuals began retiring at age 65 and exited the workforce well-off. Relative to individuals in other clusters, individuals in this cluster reported the highest non-housing wealth at baseline. At baseline, 92% were self-employed and 59.1% were owners of small businesses (1–100 employees). The most common occupations were sales (23.4%), managerial (23.4%), and professional (21.4%).
2. Independent Contractors/Gig Workers with Financially Delayed Retirement ($N = 477$): The majority of individuals in this cluster were self-employed, low earning, and did not transition into retirement during follow-up. Most had non-housing wealth in the bottom 50% for their age. Eighty-six percent were currently self-employed and 59.5% reported having no employees. The most common occupations were sales (22.2%), professional (17.0%), and services (16.9%).
3. Great EQ to Well-off Retirement ($N = 1{,}329$): The majority of individuals in this cluster had great EQ from age 50 to 64, with some individuals shifting to lower quality employment before exiting the labor force well-off. At baseline, these individuals had high incomes, stability, and almost all had access to employer-provided health insurance, paid leave, and pension contributions. However, individuals in this cluster worked long hours, and the majority were not paid overtime. The most common occupations were managerial (28.9%), professional (26.7%), and sales (22.0%).
4. Good EQ to Well-off Retirement ($N = 1{,}519$): The majority of individuals in this cluster had good EQ from age 50 to 64 with some individuals shifting to lower quality employment before exiting the labor force. During their baseline interview, individuals in this cluster had similar health insurance and paid leave access to those in the Great EQ to Well-off Retirement cluster, but with lower earned income and more frequent overtime compensation. Fifty-seven percent worked in jobs requiring computer usage at least some of the time. The most common occupations were sales (26.4%), professional (19.8%), and production (18.6%).
5. Fair EQ to Good but Diminishing Wealth in Retirement ($N = 1{,}494$): The majority of individuals in this cluster had

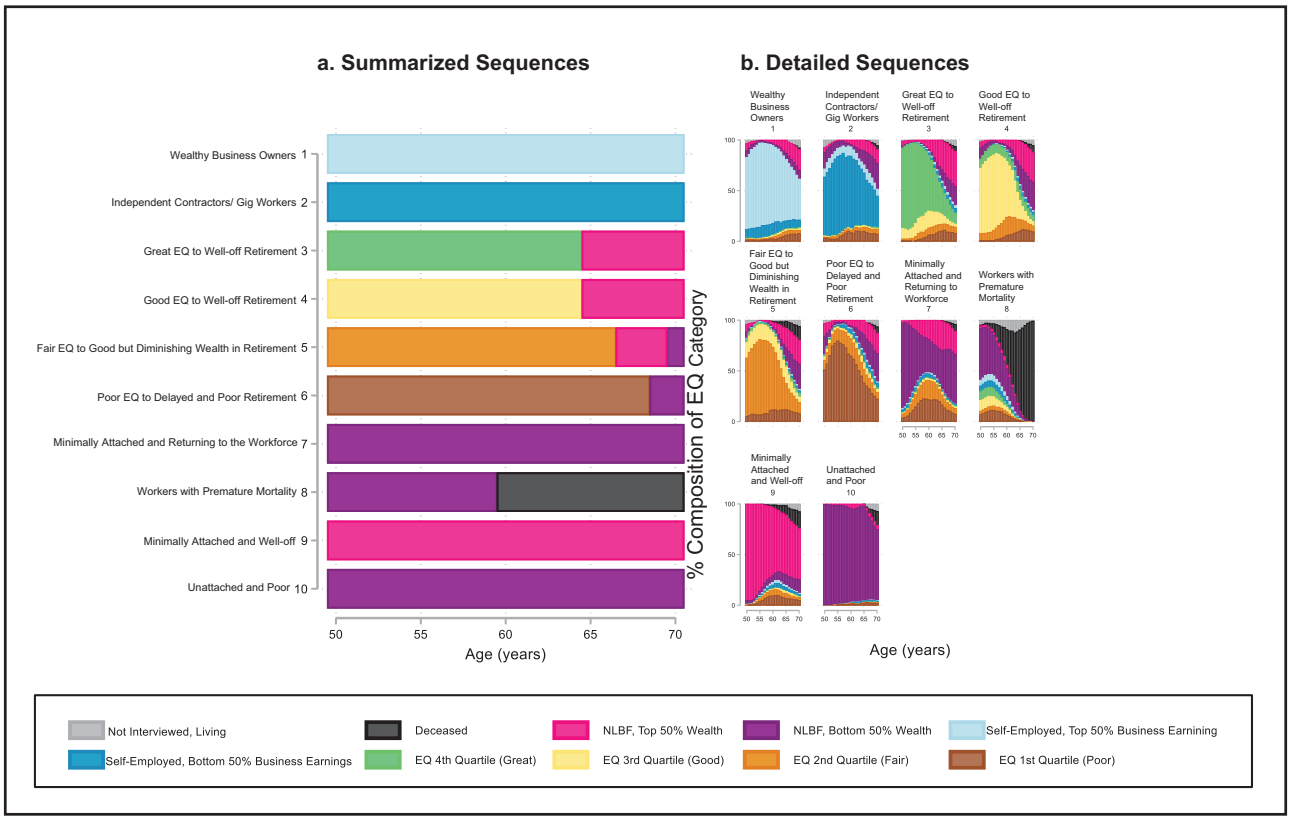

Figure 2. Visual representation of EQ trajectories, Health and Retirement Study 1992–2016. EQ, Employment Quality; NLBF, Not in the Labor Force.This figure shows the results of sequence analysis conducted on 11,958 Health and Retirement Study respondents interviewed 1992–2016. (a) shows the most common state at a given age for each cluster while (b) provides more detail of the states assumed by each individual at a given age within each cluster.

fair EQ from age 50 to 65, with some individuals shifting to lower quality employment before exiting the labor force. Their non-housing wealth following retirement was heterogeneous. While retiring in the top 50% for wealth, these individuals experience diminishing wealth over time with wealth in the bottom 50% on average by age 68. During their baseline interview, 93.6% were currently working, with an average of 40.2 hours worked per week and an average employment tenure of 11.5 years. Individuals in this cluster had similar but slightly less access to health insurance and paid leave than those in the Good EQ to Well-off Retirement cluster, and a smaller proportion had employers contributing to pensions (56.5%). 40% worked in jobs requiring computer usage at least some of the time while 70.8% worked in jobs requiring physical effort at least some of the time. The most common occupations were sales (28.0%), production (19.0%), and services (15.9%).

6. Poor EQ to Delayed and Poor Retirement ($N = 758$): The majority of individuals in this cluster had poor EQ from age 50 to 68 before exiting the labor force in the bottom 50% of non-housing wealth for their age. At baseline, 55.6% were working in jobs with stable hours, 52.2% in jobs with health insurance, 38.4% in jobs with paid leave, and only 17.3% with employers contributing to a pension. The most common occupations were sales (25.7%), services (20.2%), and operator (13.6%).
7. Minimally Attached and Returning to the Workforce ($N = 1,276$): This cluster contained the most within-group heterogeneity. At age 50, the majority of workers in this cluster were not in the labor force and had non-housing wealth in the bottom 50% for their age. Approximately 50% of individuals in this group returned to the labor force before exiting again at age 65 to heterogeneous non-housing wealth. At baseline, 39.9% were not in the labor force and 22% were at least partly retired.
8. Workers with Premature Mortality ($N = 1,041$): The majority of individuals in this cluster were in the labor force at age 50 and continued to be in the labor force until they died. Individuals in this cluster were all deceased by age 70.
9. Minimally Attached and Well-off ($N = 1,353$): The majority of individuals in this cluster were not in the labor force but were in the top 50% of non-housing wealth for their age throughout. At baseline, 72.1% were not in the labor force, with 35.1% describing themselves as homemakers and 37% describing themselves as completely retired.

Table 3. Characteristics of 11,958 Health and Retirement Study (HRS) Participants at the Time of the First Interview by EQ Trajectory, Health and Retirement Study 1992–2016

	EQ Trajectory										Total
	Wealthy Business Owners ($N = 683$)	Independent Contractors/ Gig workers ($N = 477$)	Great EQ to Well-off Retirement ($N = 1,329$)	Good EQ to Well-off Retirement ($N = 1,519$)	Fair EQ to Good but Diminishing Wealth in Retirement ($N = 1,494$)	Poor EQ to Delayed and Poor Retirement ($N = 758$)	Minimally Attached and Returning ($N = 1,387$)	Workers with Premature Mortality ($N = 1,151$)	Minimally Attached and Wealthy ($N = 1,643$)	Unattached and Poor ($N = 1,517$)	
	% or mean (SE)										
Non-housing financial wealth ($)	313,860 (41,485)	59,405 (8,375)	151,845 (24,482)	87,871 (11,447)	55,475 (6,374)	63,755 (19,899)	55,268 (4,999)	28,989 (3,818)	271,374 (29,459)	1,751 (4,671)	112,665 (8,931)
Labor force status											
Currently working full time/part time OR in partial retirement by choice	4.6%	9.4%	99.1%	97.7%	93.6%	78.2%	45.1%	40.2%	20.1%	10.1%	54.9%
in partial retirement, some choice	0.0%	0.0%	0.2%	0.3%	1.5%	2.0%	0.3%	0.1%	0.2%	0.0%	0.4%
in partial retirement, not by choice	0.0%	0.0%	0.2%	0.3%	2.1%	6.6%	1.6%	0.3%	1.4%	0.5%	1.1%
Self- Employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Homemaker	3.4%	5.5%	1.3%	1.2%	2.5%	7.7%	20.9%	9.2%	34.4%	26.5%	12.3%
Disabled	0.6%	0.9%	0.0%	0.3%	0.2%	2.3%	10.5%	29.6%	11.1%	39.8%	10.1%
Weekly hours[a]	48.1 (0.8)	38.6 (1.0)	47.0 (0.3)	41.9 (0.2)	40.2 (0.4)	30.2 (0.7)	32. (0.9)	38.3 (1.0)	29.7 (1.1)	22.8 (1.4)	39.6 (0.2)
Annual weeks worked[a]	48.8 (0.4)	47.0 (0.6)	50.7 (0.2)	50.6 (0.2)	49.5 (0.3)	42.1 (0.6)	41.9 (0.7)	43.4 (0.9)	41.5 (0.6)	34.9 (0.9)	45.4 (0.3)
Job tenure (years)[a]	17.6 (0.6)	13.8 (0.7)	21.7 (0.4)	14.3 (0.3)	11.5 (0.3)	6.6 (0.3)	4.4 (0.4)	14.1 (0.5)	6.3 (0.6)	5.8 (0.7)	13.3 (0.2)
Longest job tenure (years)	20.5 (0.5)	17.5 (0.7)	23.1 (0.4)	17.2 (0.3)	15.4 (0.3)	11.9 (0.4)	13.2 (0.4)	15.8 (0.4)	16.7 (0.4)	13.2 (0.5)	16.8 (0.2)
Number of times previously unemployed	42.6 (6.5)	46.1 (7.6)	40.4 (1.3)	42.7 (1.4)	48.4 (1.4)	49.6 (2.0)	43.2 (2.0)	43.0 (2.2)	43.9 (2.2)	26.5 (2.6)	43.5 (0.6)
0	87.2%	79.1%	90.7%	76.3%	70.8%	59.7%	58.4%	68.3%	75.1%	73.0%	73.5%
1	6.4%	10.5%	6.2%	14.4%	15.3%	14.3%	15.3%	12.0%	11.0%	7.4%	11.5%
2 or more	6.4%	10.3%	3.1%	9.4%	13.9%	25.9%	26.4%	19.7%	14.0%	19.5%	15.0%

Table 3. Continued

	EQ Trajectory										Total
	Wealthy Business Owners ($N = 683$)	Independent Contractors/ Gig workers ($N = 477$)	Great EQ to Well-off Retirement ($N = 1,329$)	Good EQ to Well-off Retirement ($N = 1,519$)	Fair EQ to Good but Diminishing Wealth in Retirement ($N = 1,494$)	Poor EQ to Delayed and Poor Retirement ($N = 758$)	Minimally Attached and Returning ($N = 1,387$)	Workers with Premature Mortality ($N = 1,151$)	Minimally Attached and Wealthy ($N = 1,643$)	Unattached and Poor ($N = 1,517$)	
	% or mean (SE)										
Income from salary/ wages ($)	55,813 (4,139)	20,125 (1,539)	88,608 (2,970)	54,706 (1,308)	41,955 (1,139)	23,839 (1,465)	16,879 (1,306)	25,219 (1,923)	10,951 (980)	2,631 (384)	36,123 (1,057)
Weekly hours stable											
No	2.1%	3.5%	12.6%	17.3%	25.0%	30.8%	12.0%	10.7%	6.7%	2.5%	12.4%
Yes	2.5%	5.8%	86.8%	80.9%	72.2%	55.6%	34.7%	29.8%	14.9%	7.8%	43.9%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.3%	0.0%	0.2%	0.2%	0.1%
Health insurance											
No	1.1%	2.7%	1.1%	1.4%	12.3%	34.4%	14.4%	7.6%	3.3%	4.2%	7.0%
Yes	3.5%	6.7%	98.4%	96.9%	85.0%	52.2%	32.5%	32.9%	18.3%	6.0%	49.2%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.4%
Unemployed	0.8%	0.8%	0.0%	0.3%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.7%	41.8%	70.0%	84.6%	27.8%
Missing											
Paid leave											
No	1.1%	4.2%	1.4%	2.7%	9.9%	47.9%	15.1%	7.5%	7.0%	4.3%	8.4%
Yes	3.5%	5.2%	98.0%	95.5%	87.4%	38.4%	31.8%	33.0%	14.5%	5.9%	47.9%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.0%	0.0%	0.1%	0.0%	0.4%	0.1%	0.0%	0.3%	0.3%	0.1%
Employer contributes to pension											
No	2.3%	6.8%	3.3%	10.3%	40.4%	68.8%	32.1%	15.5%	12.6%	6.3%	18.0%
Yes	2.4%	2.5%	96.0%	87.7%	56.5%	17.3%	13.8%	24.9%	9.0%	3.8%	38.1%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.0%	0.2%	0.3%	0.5%	0.6%	1.0%	0.1%	0.2%	0.6%	0.4%

Table 3. Continued

	EQ Trajectory										Total
	Wealthy Business Owners ($N = 683$)	Independent Contractors/ Gig workers ($N = 477$)	Great EQ to Well-off Retirement ($N = 1,329$)	Good EQ to Well-off Retirement ($N = 1,519$)	Fair EQ to Good but Diminishing Wealth in Retirement ($N = 1,494$)	Poor EQ to Delayed and Poor Retirement ($N = 758$)	Minimally Attached and Returning ($N = 1,387$)	Workers with Premature Mortality ($N = 1,151$)	Minimally Attached and Wealthy ($N = 1,643$)	Unattached and Poor ($N = 1,517$)	
	% or mean (SE)										
Overtime is paid											
No	3.1%	4.2%	55.1%	21.5%	16.7%	11.7%	6.8%	9.4%	4.3%	1.6%	15.7%
Yes	1.5%	4.3%	43.4%	76.0%	78.0%	67.5%	36.0%	29.6%	16.3%	5.3%	38.6%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.8%	1.0%	0.8%	2.6%	7.6%	4.2%	1.5%	1.2%	3.7%	2.2%
Union											
No	4.3%	8.2%	62.5%	64.4%	76.7%	77.0%	39.9%	29.0%	17.2%	7.8%	41.1%
Yes	0.3%	1.2%	37.0%	33.7%	20.5%	9.6%	6.8%	11.5%	4.4%	2.7%	15.3%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.0%	0.0%	0.2%	0.1%	0.1%	0.3%	0.0%	0.1%	0.1%	0.1%
Job involves a lot of stress											
Disagree/strongly disagree	1.6%	3.3%	24.3%	32.7%	34.9%	42.9%	20.9%	15.2%	10.1%	4.0%	19.7%
Agree/strongly agree	3.0%	4.6%	75.1%	65.6%	62.3%	43.5%	25.4%	24.9%	11.0%	5.5%	35.8%
Self-employed	92.1%	87.7%	0.6%	1.1%	1.7%	2.4%	9.7%	14.7%	4.8%	0.9%	13.6%
Unemployed	0.8%	0.8%	0.0%	0.3%	0.7%	6.3%	7.0%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.5%	4.9%	37.1%	42.1%	70.4%	85.3%	28.3%
Missing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Freedom to work more/less hours or less demanding job											
No	1.0%	2.9%	37.6%	41.1%	39.6%	25.7%	17.4%	16.2%	7.1%	4.1%	21.6%
Yes	3.6%	6.4%	61.9%	57.0%	57.8%	60.9%	29.3%	24.3%	14.6%	6.4%	34.8%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.0%	0.0%	0.2%	0.0%	0.1%	0.2%	0.0%	0.0%	0.1%	0.1%
Overtime is not required											
No	0.6%	0.5%	6.0%	17.2%	22.2%	13.1%	6.2%	4.8%	2.7%	0.6%	8.0%
Yes	4.0%	8.9%	93.4%	81.1%	75.1%	73.6%	40.7%	35.7%	18.9%	9.8%	48.4%

Table 3. Continued

	EQ Trajectory										Total
	Wealthy Business Owners ($N = 683$)	Independent Contractors/ Gig workers ($N = 477$)	Great EQ to Well-off Retirement ($N = 1,329$)	Good EQ to Well-off Retirement ($N = 1,519$)	Fair EQ to Good but Diminishing Wealth in Retirement ($N = 1,494$)	Poor EQ to Delayed and Poor Retirement ($N = 758$)	Minimally Attached and Returning ($N = 1,387$)	Workers with Premature Mortality ($N = 1,151$)	Minimally Attached and Wealthy ($N = 1,643$)	Unattached and Poor ($N = 1,517$)	
	% or mean (SE)										
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.1%
Make decisions about the hiring, promoting, and firing of others											
No	2.9%	7.1%	65.5%	82.1%	85.0%	78.7%	43.3%	33.4%	18.5%	10.0%	46.0%
Yes	1.7%	2.3%	33.6%	16.1%	11.5%	7.6%	3.4%	7.0%	3.0%	0.3%	10.2%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	0.0%	0.0%	0.4%	0.1%	0.7%	0.5%	0.2%	0.0%	0.3%	0.2%	0.3%
Firm size											
Self	32.0%	59.5%	1.0%	2.1%	2.6%	6.5%	8.7%	7.7%	3.6%	1.5%	7.9%
2–100	59.1%	32.6%	43.0%	42.3%	55.1%	57.8%	30.1%	29.6%	15.2%	5.5%	35.0%
>100	4.2%	1.5%	44.8%	40.6%	27.5%	10.4%	9.5%	12.9%	5.2%	1.8%	18.8%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	1.4%	2.0%	11.2%	14.3%	13.7%	14.3%	8.2%	5.0%	2.6%	2.7%	8.0%
Job requires use of computers											
At least some of the time	2.3%	2.9%	66.3%	57.1%	40.0%	25.3%	11.0%	14.6%	8.5%	1.6%	26.9%
None or almost none of the time	1.2%	3.2%	19.7%	28.5%	41.2%	44.2%	25.0%	16.1%	10.2%	5.2%	20.1%
Self-employed	92.1%	86.2%	0.5%	1.1%	1.6%	2.3%	9.6%	14.6%	4.7%	0.9%	13.3%
Unemployed	0.8%	0.8%	0.0%	0.2%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.4%	4.8%	36.6%	41.8%	69.8%	84.3%	27.7%
Missing	1.1%	3.3%	13.5%	12.7%	16.1%	17.3%	10.9%	9.8%	3.1%	3.7%	9.5%
Job requires physical effort											
At least some of the time	2.4%	4.1%	56.1%	63.8%	70.8%	64.0%	33.2%	28.9%	13.1%	7.3%	36.9%
None or almost none of the time	2.2%	3.7%	43.3%	34.5%	26.4%	22.4%	13.1%	11.2%	8.1%	2.2%	18.8%
Self-employed	92.1%	87.7%	0.6%	1.1%	1.7%	2.4%	9.7%	14.7%	4.8%	0.9%	13.6%

Table 3. Continued

	EQ Trajectory										Total
	Wealthy Business Owners ($N = 683$)	Independent Contractors/ Gig workers ($N = 477$)	Great EQ to Well-off Retirement ($N = 1,329$)	Good EQ to Well-off Retirement ($N = 1,519$)	Fair EQ to Good but Diminishing Wealth in Retirement ($N = 1,494$)	Poor EQ to Delayed and Poor Retirement ($N = 758$)	Minimally Attached and Returning ($N = 1,387$)	Workers with Premature Mortality ($N = 1,151$)	Minimally Attached and Wealthy ($N = 1,643$)	Unattached and Poor ($N = 1,517$)	
	% or mean (SE)										
Unemployed	0.8%	0.8%	0.0%	0.3%	0.7%	6.3%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.4%	0.5%	4.9%	37.0%	42.1%	70.4%	85.3%	28.2%
Occupation											
Farming	12.5%	3.3%	0.3%	0.9%	1.1%	4.2%	1.1%	2.3%	0.6%	0.5%	2.0%
Managerial	23.4%	12.7%	28.9%	15.5%	9.1%	6.2%	5.8%	10.3%	3.3%	1.3%	11.7%
Operator	8.9%	16.8%	8.6%	10.2%	12.2%	13.6%	7.8%	7.0%	3.0%	1.5%	8.1%
Production	4.3%	6.7%	13.2%	18.6%	19.0%	7.5%	7.7%	8.3%	3.0%	1.4%	9.6%
Professional	21.4%	17.0%	26.7%	19.8%	13.7%	11.6%	5.6%	6.0%	4.2%	0.8%	12.5%
Services	2.8%	16.9%	4.4%	8.0%	15.9%	20.2%	13.2%	7.7%	3.5%	3.8%	8.5%
Sales	23.4%	22.2%	17.9%	26.4%	28.0%	25.7%	15.5%	13.6%	8.7%	1.8%	17.4%
Unemployed	0.8%	0.8%	0.0%	0.3%	0.7%	6.2%	6.9%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.3%	0.4%	4.8%	36.5%	41.8%	70.0%	84.5%	27.6%
Industry											
Agriculture/forest/ hunting	13.2%	3.4%	0.5%	1.2%	1.5%	4.1%	1.6%	2.0%	0.6%	0.5%	2.2%
Mining/construction	10.8%	17.6%	4.2%	3.9%	6.2%	7.3%	3.9%	2.7%	1.3%	0.9%	4.6%
Transportation/ information/utilities	7.0%	4.4%	20.7%	17.5%	13.9%	11.2%	6.9%	8.1%	3.3%	1.2%	10.1%
Manufacturing	4.0%	2.1%	17.1%	15.7%	12.2%	4.0%	4.6%	6.3%	2.4%	1.1%	7.9%
Wholesale	5.5%	2.7%	5.6%	3.7%	4.5%	2.3%	2.6%	2.8%	1.1%	0.4%	3.1%
Retail/food service	10.2%	11.8%	4.0%	6.3%	11.4%	15.7%	9.5%	8.1%	3.5%	1.8%	7.2%
Finance/real estate/ insurance	10.9%	8.5%	5.4%	6.8%	4.7%	5.1%	3.7%	3.8%	2.4%	0.6%	4.7%
Professional	19.0%	16.0%	28.8%	31.2%	31.5%	23.9%	11.7%	9.2%	6.0%	3.0%	18.3%
Management/ support/waste	10.8%	14.2%	3.3%	3.4%	5.6%	5.6%	5.7%	4.5%	2.7%	0.4%	4.6%
Personal services	2.9%	13.6%	0.8%	0.6%	2.3%	5.7%	4.3%	2.2%	1.5%	0.9%	2.5%
Public administration & military	2.4%	1.4%	9.5%	9.2%	5.2%	4.0%	1.9%	5.2%	1.4%	0.3%	4.5%
Unemployed	0.8%	0.8%	0.0%	0.3%	0.7%	6.2%	7.0%	3.1%	3.7%	4.3%	2.6%
Not in the labor force	2.5%	3.7%	0.0%	0.3%	0.4%	4.8%	36.8%	42.1%	70.1%	84.5%	27.8%

Note. EQ = Employment Quality; SE = Standard Error. Percentages, means, and standard errors are calculated by accounting for survey weights, strata, and clusters.
[a]Among those reporting currently working for pay at the time of their first interview.

Table 4. Sociodemographic, Behavioral, and Health-Related Characteristics of 11,958 Participants at the Time of the First Interview by EQ Trajectory, Health and Retirement Study 1992–2016

	EQ Trajectory										TOTAL
	Wealthy Business Owners (N = 683)	Independent Contractors/ Gig workers (N = 477)	Great EQ to Well-off Retirement (N = 1,329)	Good EQ to Well-off Retirement (N = 1,519)	Fair EQ to Good but Diminishing Wealth in Retirement (N = 1,494)	Poor EQ to Delayed and Poor Retirement (N = 758)	Minimally Attached and Returning (N = 1,387)	Workers with Premature Mortality (N = 1,151)	Minimally Attached and Wealthy (N = 1,643)	Unattached and Poor (N = 1,517)	
	% or mean (SE)										
Gender											
Men	76.4%	56.5%	70.3%	52.8%	46.9%	36.1%	38.6%	61.4%	38.2%	40.3%	51.1%
Women	23.7%	43.5%	29.7%	47.2%	53.1%	63.9%	61.4%	38.6%	61.8%	59.7%	48.9%
Race/ethnicity											
NH White	92.1%	78.7%	86.8%	79.2%	78.4%	76.9%	74.7%	73.0%	92.8%	55.1%	79.0%
NH Black	2.2%	9.3%	8.2%	11.5%	11.7%	9.3%	12.2%	18.3%	3.5%	22.5%	11.1%
Hispanic	2.8%	5.6%	2.5%	4.8%	5.8%	8.7%	7.6%	4.5%	1.9%	12.9%	5.5%
Mixed/other	2.9%	6.4%	2.5%	4.6%	4.1%	5.2%	5.6%	4.2%	1.8%	9.5%	4.5%
U.S.-Born	91.1%	88.5%	94.1%	92.2%	91.8%	88.5%	89.7%	94.8%	92.3%	82.8%	90.9%
Married/partnered	85.5%	73.6%	80.7%	74.4%	75.9%	73.0%	72.4%	63.1%	88.6%	66.2%	75.9%
Region of residence											
Northeast	15.8%	14.1%	20.0%	19.6%	18.7%	21.0%	18.5%	19.5%	20.7%	17.7%	18.9%
Midwest	30.0%	17.5%	27.5%	23.9%	26.9%	24.4%	24.1%	25.0%	26.0%	15.8%	24.4%
South	29.9%	41.9%	34.0%	37.1%	41.9%	33.7%	40.2%	40.3%	31.0%	50.5%	38.0%
West	24.3%	26.5%	18.6%	19.4%	12.5%	20.9%	17.3%	15.3%	22.3%	15.9%	18.7%
Age (years)	55.8 (0.2)	55.6 (0.2)	55.4 (0.1)	55.2 (0.1)	54.7 (0.1)	54.7 (0.2)	56.2 (0.1)	54.8 (0.1)	57.8 (0.1)	58.8 (0.2)	56.0 (0.06)
Birth cohort											
Original HRS cohort (1932–1941)	64.0%	61.5%	54.3%	62.5%	68.8%	69.1%	73.3%	63.3%	78.4%	69.0%	66.7%
War babies (1942–1946)	36.0%	38.5%	45.7%	37.5%	31.2%	31.0%	26.8%	36.7%	21.6%	31.0%	33.3%
Education (years)	13.9 (0.1)	12.8 (0.2)	14.2 (0.1)	13.1 (0.8)	12.3 (0.1)	12.3 (0.2)	11.8 (0.1)	11.7 (0.1)	13.0 (0.1)	10.0 (0.2)	12.5 (0.1)
Low childhood SES	26.0%	30.2%	25.7%	31.2%	28.1%	29.4%	32.0%	35.6%	27.8%	41.9%	30.7%
Dad's education (years)	10.6 (0.2)	9.7 (0.3)	10.4 (0.1)	9.6 (0.1)	9.4 (0.1)	9.1 (0.2)	8.8 (0.2)	8.4 (0.2)	9.9 (0.1)	7.2 (0.2)	9.4 (0.1)

Table 4. Continued

	EQ Trajectory										TOTAL
	Wealthy Business Owners (N = 683)	Independent Contractors/ Gig workers (N = 477)	Great EQ to Well-off Retirement (N = 1,329)	Good EQ to Well-off Retirement (N = 1,519)	Fair EQ to Good but Diminishing Wealth in Retirement (N = 1,494)	Poor EQ to Delayed and Poor Retirement (N = 758)	Minimally Attached and Returning (N = 1,387)	Workers with Premature Mortality (N = 1,151)	Minimally Attached and Wealthy (N = 1,643)	Unattached and Poor (N = 1,517)	
	% or mean (SE)										
Mom's education (years)	11.0 (0.1)	9.9 (0.2)	10.7 (0.1)	10.1 (0.1)	9.5 (0.2)	9.7 (0.2)	9.2 (0.1)	9.1 (0.2)	10.2 (0.1)	7.8 (0.2)	9.7 (0.1)
Childhood Health											
Good/very good/excellent	96.7%	92.5%	96.0%	95.6%	93.3%	94.4%	93.6%	90.7%	93.6%	86.1%	93.4%
Fair/poor	3.2%	7.5%	3.9%	4.4%	6.7%	5.4%	6.2%	9.3%	6.2%	13.7%	6.7%
Self-reported health & behaviors at baseline											
Smoking status											
Never	41.4%	39.4%	39.4%	40.7%	36.7%	35.5%	33.6%	19.4%	37.7%	34.7%	36.0%
Former	41.4%	36.6%	43.3%	37.4%	34.7%	34.9%	35.5%	32.0%	41.7%	31.6%	37.2%
Current	17.2%	24.1%	17.3%	21.9%	28.6%	29.6%	30.9%	48.6%	20.6%	33.8%	26.8%
Alcohol Use											
Never	25.0%	45.5%	26.7%	34.4%	35.4%	37.5%	43.7%	42.7%	31.9%	58.0%	37.7%
Not heavy	22.5%	15.4%	27.4%	19.5%	15.7%	17.5%	12.5%	16.2%	13.7%	16.0%	17.7%
Heavy	52.5%	39.2%	45.9%	46.1%	49.0%	45.1%	43.8%	41.1%	54.5%	26.0%	44.6%
Depression[a]											
No	88.7%	84.0%	88.7%	84.4%	81.5%	79.1%	75.3%	68.1%	80.6%	59.1%	78.8%
Yes	11.3%	16.0%	11.3%	15.6%	18.5%	20.9%	24.7%	31.9%	19.4%	40.9%	21.2%
Self-Rated Health											
Good/very good/excellent	92.9%	84.8%	93.0%	90.7%	87.5%	85.2%	75.8%	51.5%	79.3%	44.0%	78.2%
Fair/poor	7.1%	15.2%	7.0%	9.3%	12.5%	14.8%	24.2%	48.5%	20.7%	56.0%	21.8%

Note. EQ = Employment Quality; SES = Socioeconomic Status; SE = Standard Error. Percentages, means, and standard errors are calculated by accounting for survey weights, strata, and clusters.
[a]≥4 on the brief revised Center for Epidemiologic Studies Depression scale.

10. Unattached and Poor (N = 1,459) The majority of individuals in this cluster were not in the labor force and in the bottom 50% of non-housing wealth for their age throughout follow-up. At baseline, 82.1% were not in the labor force; 36.9% reported not working due to disability, 27.3% described themselves as homemakers, 40.5% described themselves as completely retired, and 18.5% reported no previous work history.

Overall, 42% of respondents were classified into one of the five "suboptimal" trajectories (Independent Contractors/Gig Workers with Financially Delayed Retirement, Fair EQ to Good but Diminishing Wealth in Retirement, Poor EQ to Delayed and Poor Retirement, Workers with Premature Mortality, and Unattached and Poor), contributing to wealth in the bottom 50% upon retirement or premature death. Conversely, approximately 34% of respondents were classified into one of the best EQ trajectories (Wealthy Business Owners, Great EQ to Well-off Retirement or Good EQ to Well-off Retirement). Approximately 36% of respondents were classified into one of the three "minimally attached" trajectories (Minimally Attached and Returning to the Workforce, Minimally Attached and Well-off, and the Unattached and Poor) defined by limited—if any—attachment to the labor force during the observed period of their life course. Respondents in the best EQ trajectories were disproportionately men, non-Hispanic White, U.S.-born, and highly educated. Meanwhile women, people of color, and those with lower educational attainment were disproportionately in suboptimal trajectories (Table 4).

EQ, Health, and Health Behaviors

The prevalence of self-reported health behaviors and health outcomes at baseline also differed by EQ trajectory (Table 4). The lowest proportion of current or former smoking was observed among Wealthy Business Owners and those in the Great EQ to Well-off Retirement cluster, with 17% in each cluster reporting as currently smoking in contrast with 29.6% of those in Poor EQ to Delayed and Poor Retirement and 33.8% of those Unattached and Poor. Conversely, those in better EQ clusters tended to report a greater prevalence of current—if not heavy—alcohol use relative to those in lower EQ trajectories. The prevalence of depression and self-rated fair/poor health was lowest for Wealthy Business Owners and those in the Great EQ to Well-off Retirement cluster and highest for those that were Unattached and Poor. Among those attached to the labor force, the highest prevalence was reported by those in the Poor EQ to Delayed and Poor Retirement trajectory.

Distribution of Overall EQ Trajectories by Key Sociodemographics

The distribution of clusters identified in the overall sequence analysis varied by key sociodemographics (Figure 3). A greater proportion of men were in the Wealthy Business Owners (10.1% of all men vs. 3.3% of all women), and Great EQ to Well-off Retirement clusters (18.7% of all men vs. 8.3% of all women) while a greater proportion of women were in the Minimally Attached (44.9% of all women vs 27.4% of all men) and Poor EQ to Delayed and Poor Retirement clusters (7.4% of all women vs. 4.0% of all men). A greater proportion of non-Hispanic Whites were in the Wealthy Business Owners (7.9% of all non-Hispanic White vs. 1.3% of all non-Hispanic Black), Great EQ to Well-off Retirement (15.0% of all non-Hispanic White vs. 10.1% of all non-Hispanic Black), or Minimally Attached and Well-off clusters (16.3% of all non-Hispanic White vs. 4.4% of all non-Hispanic Black) while a greater proportion of non-Hispanic Black respondents were in the Unattached and Poor (22.9% of all non-Hispanic Black vs 7.8% of non-Hispanic White) or Workers with Premature Mortality clusters (15.1% of all non-Hispanic Black vs 8.4% of non-Hispanic White). The prevalence of Wealthy Business Owners and Great EQ to Well-off Retirement increased across levels of educational attainment.

Socially Stratified EQ Trajectories

To demonstrate the potential impact of cumulative advantage, cumulative disadvantage, and intersectionality on the quantity and quality of available EQ trajectories, we subsequently performed sequence analysis within strata of key sociodemographic profiles (Figure 4a–f). While all of the clusters identified in the overall sample were similarly identified when analyses were restricted to just non-Hispanic White men, this was not the case for non-Hispanic White women, men of color, or women of color. Notably, the Wealthy Business Owners cluster only emerged for non-Hispanic White men and women, while all the clusters identified for both men and women of color involved Poor Retirement. Women of color only had five possible clusters emerge; neither Great EQ to Well-off Retirement nor either of the self-employed clusters emerged (Figure 4d). Upon incorporation of marital status and educational attainment into the strata, additional more affluent clusters emerged for married non-Hispanic White men with college degrees (Figure 4e). Namely, most clusters involved Well-off Retirement; on average poor EQ was only experienced by those with high non-housing wealth who returned to the workforce. Two separate types of Great EQ trajectories emerged for this sociodemographically advantaged group, including one that experienced on-time complete retirement (i.e., full exit from the work force). In contrast, like for women of color overall, for unmarried women of color with less than a high school degree, only five patterns emerged; all involved Poor Retirement (Figure 4f). Those in Fair and Poor EQ trajectories also retired late, with many still working in Fair EQ beyond age 70.

Sequence Analysis with "Unemployed" as a Distinct State

Supplementary Figure A2 displays the summarized and detailed trajectories when "unemployed" was treated as a separate state in the sequence analyses; compositionally similar trajectories emerged. Overall, clusters from sequence analyses with "unemployed" treated as a separate state had high percent agreement (74%) with clusters from sequence analyses with "unemployed" treated as poorest EQ across all 13 EQ indicators. Percent agreement was highest for those classified as Wealthy Business Owners (94.4%) and Workers with Premature Mortality (89.7%; Supplementary Table A5). Percent agreement was lowest for those classified as Minimally Attached and Returning to the Workforce (43.8%); when "unemployed" was treated as a separate state, 7.8% of these participants were classified as Poor EQ to Delayed to Poor Retirement and 35.8% were classified as Unattached and Poor.

DISCUSSION

In this study, we first developed a single measure that captured the multidimensional nature of EQ among older adults. We then identified

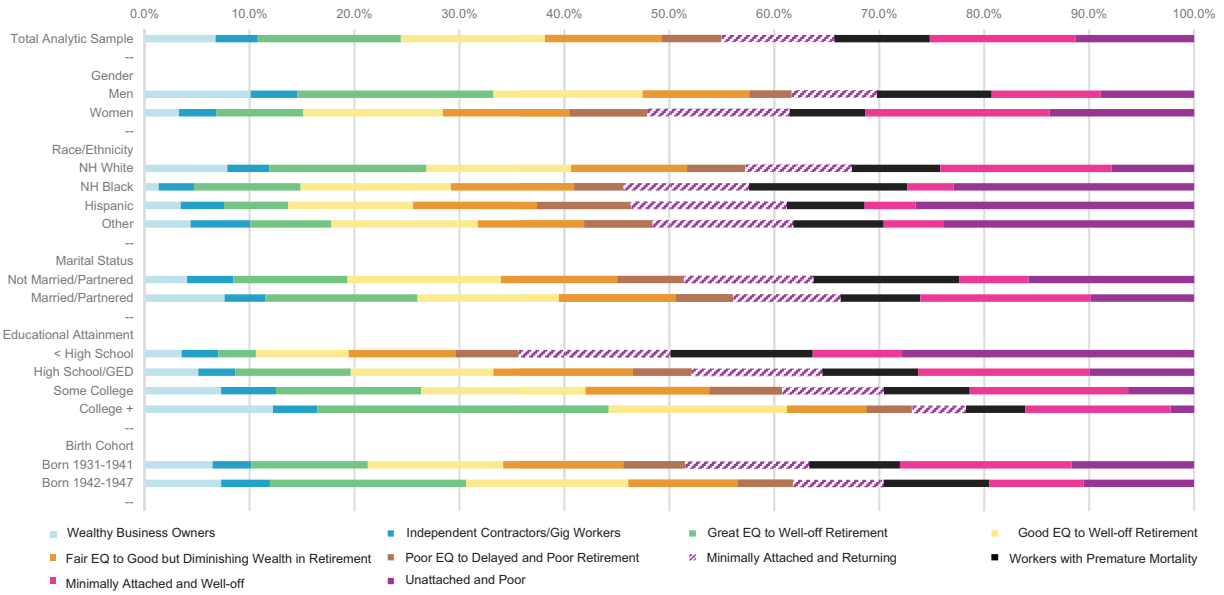

Figure 3. Trajectory distribution by key sociodemographic characteristics, Health and Retirement Study 1992–2016. This figure shows the distribution of trajectory clusters identified conducting sequence analysis on 11,958 Health and Retirement Study respondents interviewed 1992–2016.

10 employment and retirement quality trajectories in a nationally representative sample of U.S. older adults born between 1931 and 1946 and ages 50 and 70. Men—especially non-Hispanic White men—were disproportionately represented in the Wealthy Business Owners and Great EQ to Well-off Retirement clusters. Respondents in these clusters reported the lowest prevalence of poor self-rated health and depression during their baseline interviews. In contrast, people of color were disproportionately represented in the Poor EQ to Delayed and Poor Retirement and Unattached and Poor clusters. Respondents in these clusters reported the greatest prevalence of poor self-rated health and depression. Moreover, we observed the quantity and quality of available EQ trajectories varied across intersecting identities. For example, married non-Hispanic White men with college degrees were afforded the highest quality and greatest number of high-quality pathways into retirement (even compared to other White men). In contrast, the opportunities for women of color were already severely constrained due to racism and sexism; additional sample restrictions to those who were unmarried and had less than a high school degree did not substantially alter the available pathways.

EQ and Intersectional Agency Constraints Throughout the Life Course

Our work complements and expands upon the existing rich literature elucidating life course transitions into retirement (Fisher et al., 2016). Our finding that EQ trajectories in later-life were highly stratified across gender, race/ethnicity, and class is consistent with literature on labor market segregation of women and people of color into poorer quality jobs, as well as with literature on the gendered division of labor (Calvo et al., 2018; McDonough et al., 2017). In addition to the previously observed gender differences in attachment to the labor force and hours worked (McDonough et al., 2017), our work highlights gendered, racial/ethnic, and educational attainment differences in EQ and retirement trajectories, with women of color in particular experiencing substantially constrained opportunities leading to disproportionate experiences of poor EQ, longer labor force attachment and inequitable economic well-being in retirement. In the context of life course theory, we observed the potential consequences of disproportionate constraints on the *agency* of women, people of color, and those with low educational attainment. The observation that people of color and in particular Black women are constrained into more suboptimal trajectories is not random or accidental, rather it has been caused by centuries of racist policies and structures that have shaped the inequitable distribution of wealth and implementation of policies like minimum wage standards, social security, worker's compensation and more (Bailey et al., 2017; Siqueira et al., 2014). For example, the Social Security Act of 1935 deliberately excluded agricultural and domestic workers—occupations that were disproportionately held by Black men and women—thus making these workers ineligible for benefits in retirement (Bailey et al., 2017). Observed social patterning in EQ trajectories were further consistent with the life course principles of *linked lives* and *timing*, underscoring the limits of agency for successful aging at work highlighted by others (Rauvola & Rudolph, 2020). That is, those with the least social advantages (e.g., power, respect, social support) and the most disadvantages (e.g., exclusion, stigmatization) on account of their race, gender, and educational attainment—namely women of color with less than a high school degree—accumulated the least financial resources, necessitating delays in retirement. Our findings suggest the segregation of people of color and women of color into poor-EQ trajectories may contribute to health inequities (Bailey et al., 2017), as these individuals are not only disproportionately represented in trajectories with a higher prevalence of fair/poor self-rated health and depression, but are also disproportionately classified as Workers with Premature Mortality.

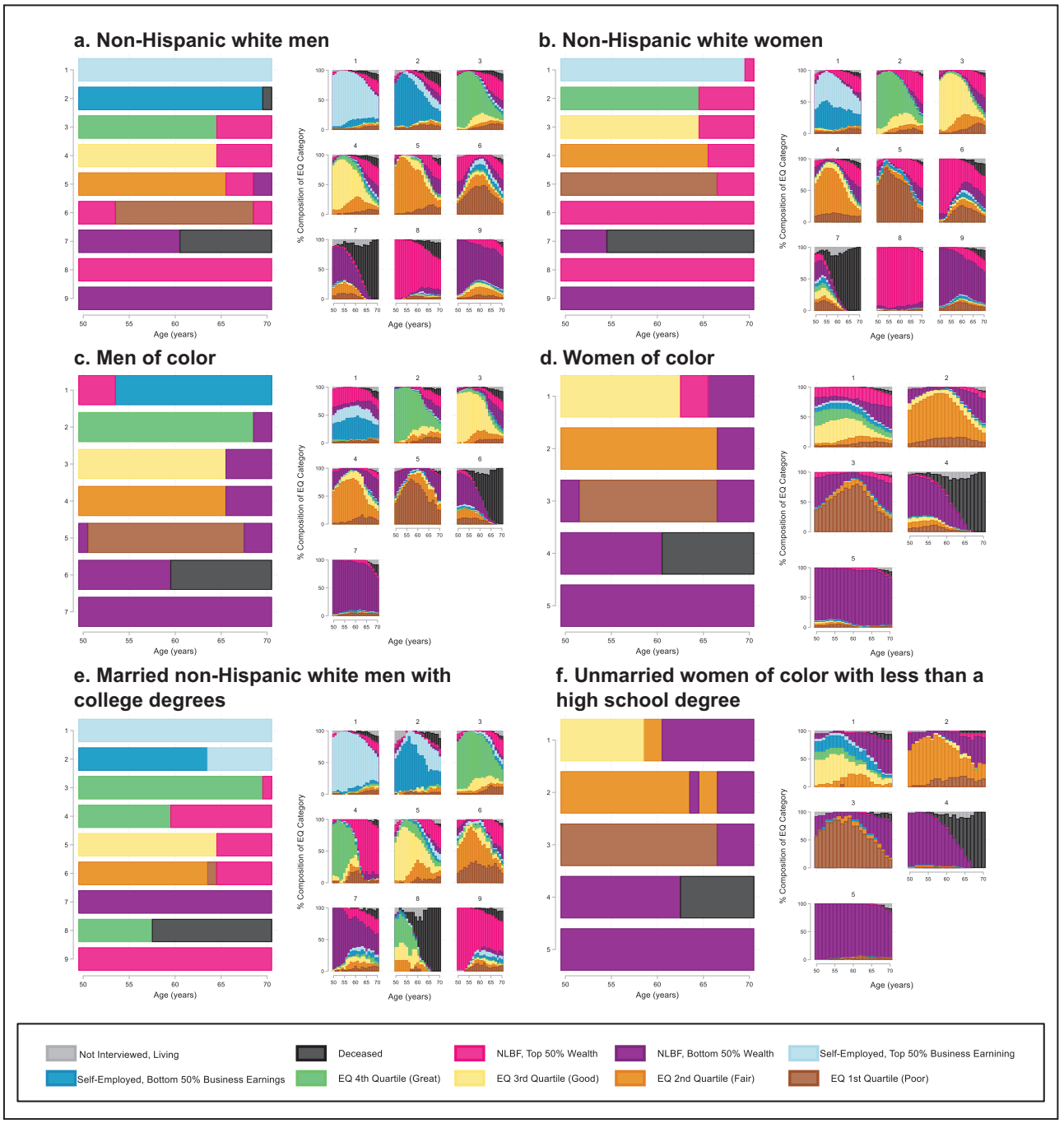

Figure 4. Visual representation of EQ trajectories stratified by cumulative advantage, Health and Retirement Study 1992–2016. EQ, Employment Quality; NLBF, Not in the Labor Force. This figure shows the results of sequence analysis conducted in within strata of race, gender, and educational attainment on 11,958 Health and Retirement Study respondents interviewed 1992–2016. For each strata of interest, the figure on the left shows the most common state at a given age for each cluster while the figure on the right provides more detail of the states assumed by each individual at a given age within each cluster.

Study Comparability with Previous EQ Research

Our analyses yielded similar classes to those identified in recent U.S. Studies that used multidimensional EQ measures. For example, our Great EQ to Well-off Retirement cluster resembled the portfolio cluster identified by Peckham et al., with high stability, income, and strong power relations but long working hours. Similarly, our Good EQ to Well-off Retirement cluster resembled Peckham's SER-like cluster, while our Poor EQ to Delayed and Poor Retirement cluster most resembled the precarious cluster (Peckham et al., 2019). That our longitudinal clusters bore such resemblance to those found in

cross-sectional assessments of mid-life Americans is unsurprising given that early-50s EQ appeared to be driving differences across clusters in the present analysis. Moreover, the majority of the trajectories identified in the present study appear to be continuations of those from earlier stages in the life course (ages 29–50) identified by Eisenberg-Guyot et al. (2020), including but not limited to the wealthy and poor self-employed (like our Wealthy Business Owners and Independent Contractors/Gig Workers clusters), consistently precariously employed (like our Poor EQ to Delayed and Poor Retirement cluster), stably high wage (like our Great EQ to Well-off Retirement cluster), and those exiting the workforce (like our Minimally Attached and Returning to the Workforce clusters). Taken together, our findings are consistent with the role of cumulative advantage; individuals' exposure to racism and sexism, as well as their earlier-life EQ, may give rise to unique pathways that are compounded over time (DiPrete & Eirich, 2006). Lastly, in addition to the comparability of our findings with studies conducted in the United States, our observation of worse self-rated health among those in more suboptimal trajectories is consistent with sequence analyses conducted in Swiss and Italian workers (Devillanova et al., 2019; Giudici & Morselli, 2019).

EQ and Agency in the Timing of Retirement

In our principal component analysis, items consistent with *working time arrangements* and *interpersonal power* (e.g., hours worked, freedom to work more/less, whether or not retirement was voluntary) were weighted the highest in our EQ score, while hours stability and overtime requirements were weighted the lowest. While we hypothesize interpersonal and collective power are key components of great EQ irrespective of life stage, these factors may be particularly important in the context of retirement. Specifically, later life is a time in the life course where transitions in and out of the workforce are more prevalent and eventually terminal. Whether or not these transitions are voluntary may be driven by one's power in the workplace.

The notion of stable long-term full-time employment to complete on-time retirement was shaped by the previous prominence of defined-benefit pension plans, and their associated penalties for continuing to work after a certain age (Cahill & Quinn, 2020).The shift in the 1980s to defined-contribution plans did away with this penalty, and also shifted more responsibility and risk from the employer to the employee. Because access to careers with these defined-benefit plans was already inequitable, this pathway was already unavailable to many and became increasingly so in subsequent years. This pathway only emerged in our present analysis for married non-Hispanic White men with college degrees and even then, only accounted for 6.0% of that subpopulation.

A recent analysis found that in the context of reduced benefits, macroeconomic disruptions, and incentives that promote working into one's later years, the majority of individuals with previous full-time careers undergo some form of gradual retirement versus going "cold-turkey" (Cahill & Quinn, 2020). While phased retirement—whereby individuals continue to work for their career employer but in a reduced capacity—can maximize human capital, this is the rarest form of gradual retirement (Cahill & Quinn, 2020; Kantarci & Van Soest, 2008). While defined pension programs are rare, one contributing factor to the low uptake of phased retirement may be that pension plans—when available—often base benefits on the last few years of actual earnings; those who reduce their hours with their career employers for a period of time before complete retirement are penalized financially (Cahill & Quinn, 2020). Regardless, bridge employment—whereby individuals take on work with a new employer outside of their primary career—is common. While voluntary—and sometimes lucrative—transitions into bridge employment for those with high educational attainment are common, involuntary transitions into precarious bridge employment can exacerbate inequities (Cahill & Quinn, 2020).

In addition to gradual retirement, approximately 15% of retirees reenter the workforce two or more years after retirement (Cahill et al., 2011). Our selection of the 10-cluster solution enabled us to identify such trajectories, including the statistically and substantively heterogenous Minimally Attached and Returning to the Workforce cluster. The heterogeneity of this cluster is unsurprising given that—much like those in bridge employment—there are many different types of people who reenter the labor force. Cahill et al. found that labor force reentry was most common for both the lowest and highest wage earners, with mid-wage earners opting to stay in retirement (Cahill et al., 2011). The healthy and affluent voluntarily enter for fulfillment and continue to collect their pension, while the socioeconomically disadvantaged involuntarily re-enter because they cannot afford the alternative.

EQ for the Self-employed and Unemployed

Comprehensive EQ data are not routinely collected in surveys for individuals reporting self-employment. As such, previous studies examining EQ have either operationalized the self-employed as a monolith—despite the likelihood that this group is even more heterogeneous than waged-laborers (Blanchflower, 2000; Halvorsen & Morrow-Howell, 2017)—or excluded them all together. While crude, our use of business-related assets and income data to construct two distinct self-employed states enabled us to identify two very different typologies of self-employed clusters. The resulting self-employed trajectories bear similarities to existing findings on delayed labor force exits (Cahill et al., 2013; Hoven et al., 2018). While the decision of those in the Wealthy Business Owners trajectory to delay retirement may have more to do with their freedom to do so (and subsequent prosperous retirement), delay in retirement among those in the Independent Contractors/Gig Workers trajectory may have been out of necessity (Cahill et al., 2013).

Our work diverges from previous multidimensional EQ literature regarding our treatment of the unemployed (Cho, 2020; Lewchuk, 2017; Padrosa et al., 2020; Peckham et al., 2019; Van Aerden et al., 2017; Vives et al., 2011). Specifically, we not only included the unemployed in the development of our EQ score but decided *a priori* to assign individuals reporting unemployment the worst values for all 13 EQ items. We based this decision on compositional similarities between the unemployed and those with poor EQ, that those with poor EQ themselves tend to experience bouts of unemployment (Benach & Muntaner, 2007), and that recent observed associations between poor EQ and health were similar in magnitude to those observed between unemployment and health (Van Aerden et al., 2017). In a robustness check, we observed high agreement between our primary approach and an approach in which we treated "unemployed" as a separate state in the sequence analyses.

Implications for Policy

EQ is modifiable through both employer-driven workplace adjustments and policy levers. Our findings shed light on important

considerations for refining current and proposed policies. We observed that those in suboptimal trajectories tended to have shorter job tenure, work fewer hours, earn less, have less access to employer-sponsored paid leave and experience more bouts of unemployment than those in more optimal trajectories. Thus, individuals in these trajectories would be more likely to be ineligible for a myriad of social safety net programs. For instance, to be eligible for paid leave through the Family and Medical Leave Act, an employee must have worked for at least 1,250 hr during the 12 months prior to the start of leave (U.S. Department of Labor, 2020). Similarly, to have access to unemployment insurance, individuals must have worked for a certain amount of time and earned at least a certain amount of money during that time, with specific criteria stipulated at the state level. As such, those in suboptimal trajectories are simultaneously the most likely to need the social safety net and the least likely to be able to access it. New policies such as secure scheduling ordinances directly address the working time arrangements dimension of EQ in the hopes of enhancing worker's sense of power and control. Several localities (e.g., Seattle, New York and Chicago) are currently experimenting with these new worker protections. Furthermore, policies such as a national paid family medical leave policy that provides coverage for *all* working people—irrespective of job tenure, hours worked, and wages earned—could mitigate inequities wrought by poor EQ (Montez et al., 2020).

Limitations and Future Research Directions

Our study strengths included a rich data source and multidimensional longitudinal EQ measure, which enabled us to further contextualize retirement timing and prosperity. Moreover, unlike most prior research on the topic, we incorporated the self-employed and unemployed into our analyses. Nonetheless, our study also has important limitations.

First, the Health and Retirement Study population is majority non-Hispanic White. However, the study population is commensurate with the broader U.S. population of older adults (Administration for Community Living & Administration on Aging, 2020; Schmidt, 2018). We were limited in our ability to further disaggregate people of color both due to small numbers and lack of further disaggregation in the study interview. That is, participants providing a race besides "White/Caucasian" or "Black/African American" were coded as "other" in publicly available data. Sequences generated within people of color are most generalizable to Black respondents and those who self-identified as Mexican American. Future research in more racially and ethnically diverse populations is warranted.

Second, to observe life course histories through age 70, we restricted analyses to individuals who would be at least 70 years of age at the time of the last HRS interview in 2016. That is, the youngest participants in our analytic sample were born in 1946 and reached mid-career in ~1976. With more substantial labor-market changes occurring around the 1990s, we may not see the breadth of such changes on retirement timing and prosperity for another decade.

Third, our analyses were restricted to individuals for whom a status was known at two time points at least 10 years apart; however, those who were included in our analytic sample were not appreciably different from all HRS respondents born in those years (Supplementary Table A1).

Fourth, to construct an individual's sequence in the absence of more current data from an interview wave, we assume their EQ state would be constant and could be carried backwards to the start date or forwards to the end date of a given labor market transition. Moreover, even when interviewed at given age, most employment-related questions were only asked when a participant reported changes in their place of employment or job title. However, all respondents who lived to age 70 participated in at least three waves; 93.6% participated in six or more waves, with 71.8% participating in at least 10. While they participated in disproportionately fewer waves than non-Hispanic White and more educated respondents, 92% of non-Hispanic Black respondents and 93% of those with less than a high school degree who were alive at age 70 participated in at least six waves.

Fifth, to construct categorical states of EQ to be used alongside the states of self-employed, not in the labor force, and deceased, we first aggregated the seven dimensions of EQ into a composite linear score conceptually ranging from "poorest EQ" to "greatest EQ." However, EQ may not be reducible to a continuum and certain combinations may not interact linearly. Further, in contrast to previous theory-driven score development assuming equal weight to each of the seven dimensions (Oddo et al., 2020), we opted for a data driven approach. PCA is limited in that it assumes linear relationships between variables and interpretation of individual variables within the score become difficult to interpret. However, a potential benefit to this approach is that the differential weighting of individual items and components enables the construction of the EQ score—and what is considered poorer versus greater EQ—to vary across study contexts.

Sixth, while we are among the first to adapt our examination of EQ to both include and distinguish different typologies of the self-employed based on their business-related assets and earnings, this operationalization is likely still too crude to accurately capture self-employed EQ. In the context of the growing gig economy, there is a pressing need for existing ongoing cohort studies, surveillance projects, and new proposals to collect data on the employment characteristics of this heterogeneous group.

Seventh, our clusters contained considerable within-cluster heterogeneity due to the length of follow-up and many possible states at each wave. Nonetheless, the clusters retained theoretical coherence, which allowed us to identify normative typologies of life course transitions among retirement-age adults.

Finally, while HRS has among the richest individual-level data pertinent to EQ in the United States, there were no questions routinely asked in the core interview in the domain of employment opportunities. However, promotions and other career advancements likely correlate with measured EQ domains. Nevertheless, there is a pressing need for health surveillance efforts to incorporate and better characterize EQ, and such has been explicitly called for (National Academies of Sciences, Engineering, and Medicine, 2018).

CONCLUSION

The changing labor market over the last few decades has dramatically altered EQ, with implications for the health and well-being of those nearing retirement. In this first examination of longitudinal multidimensional EQ among older adults, we found 10 broad employment and retirement quality trajectory clusters that were highly patterned by gender, race, and educational attainment. Moreover, the prevalence of poor/fair self-rated health and depression varied considerably across clusters, with respondents in worse EQ and retirement clusters

reporting worse health than others. Although our study demonstrates EQ is inequitably distributed in later years, it is highly modifiable through policy and organizing.

SUPPLEMENTARY MATERIAL

Supplementary data is available at *Work, Aging, and Retirement* online.

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REFERENCES

Administration for Community Living & Administration on Aging. (2020). 2019 profile of older Americans. U.S. Department of Health and Human Services. https://acl.gov/sites/default/files/Aging%20and%20Disability%20in%20America/2019ProfileOlderAmericans508.pdf (2021, March 19, date accessed).

Aisenbrey, S., & Fasang, A. E. (2010). New life for old ideas: The "Second Wave" of sequence analysis bringing the "Course" back into the life course. *Sociological Methods & Research*, 38, 420–462. doi:10.1177/0049124109357532.

Bailey, Z. D., Krieger, N., Agénor, M., Graves, J., Linos, N., & Bassett, M. T. (2017). Structural racism and health inequities in the USA: Evidence and interventions. *The Lancet*, 389(10077), 1453–1463. doi:10.1016/S0140-6736(17)30569-X

Beehr, T. A., & Bennett, M. M. (2015). Working after retirement: Features of bridge employment and research directions. *Work, Aging and Retirement*, 1(1), 112–128. doi:10.1093/workar/wau007

Benach, J., & Muntaner, C. (2007). Precarious employment and health: Developing a research agenda. *Journal of Epidemiology and Community Health*, 61(4), 276–277. doi:10.1136/jech.2005.045237

Benach, J., Vives, A., Amable, M., Vanroelen, C., Tarafa, G., & Muntaner, C. (2014). Precarious employment: Understanding an emerging social determinant of health. *Annual Review of Public Health*, 35(1), 229–253. doi:10.1146/annurev-publhealth-032013-182500

Bird, C. (2008). *Gender and Health: The Effects of Constrained Choices and Social Policies (1 edition)*. Cambridge, UK: Cambridge University Press.

Blanchflower, D. G. (2000). Self-employment in OECD countries. *Labour Economics*, 7(5), 471–505. doi:10.1016/S0927-5371(00)00011-7

Bor, J., Cohen, G. H., & Galea, S. (2017). Population health in an era of rising income inequality: USA, 1980–2015. *The Lancet*, 389(10077), 1475–1490. doi:10.1016/S0140-6736(17)30571–8

Cahill, K. E., Giandrea, M. D., & Quinn, J. F. (2011). Reentering the labor force after retirement. *Monthly Labor Review*, 134, 34–42.

Cahill, K. E., Giandrea, M. D., & Quinn, J. F. (2013). New Evidence on Self-Employment Transitions Among Older Americans with Career Jobs. BLS Working Papers, WP-463. https://www.bls.gov/osmr/research-papers/2013/ec130030.htm.

Cahill, K. E., Giandrea, M. D., & Quinn, J. F. (2015). Retirement patterns and the macroeconomy, 1992–2010: The prevalence and determinants of bridge jobs, phased retirement, and reentry among three recent cohorts of older americans. *The Gerontologist*, 55(3), 384–403. doi:10.1093/geront/gnt146

Cahill, K. E., & Quinn, J. F. (2020). The importance of gradual retirement in America today. *Public Policy & Aging Report*, 30(3), 107–112. doi:10.1093/ppar/praa013

Calasanti, T. M. (1993). Bringing in diversity: Toward an inclusive theory of retirement. *Journal of Aging Studies*, 7(2), 133–150. doi:10.1016/0890-4065(93)90030-N

Calvo, E., Madero-Cabib, I., & Staudinger, U. M. (2018). Retirement sequences of older Americans: Moderately destandardized and highly stratified across gender, class, and race. *The Gerontologist*, 58(6), 1166–1176. doi:10.1093/geront/gnx052

Campbell, I., & Price, R. (2016). Precarious work and precarious workers: Towards an improved conceptualisation. *The Economic and Labour Relations Review*, 27(3), 314–332. doi:10.1177/1035304616652074

Cho, S., Crenshaw, K. W., & McCall, L. (2013). Toward a field of intersectionality studies: Theory, applications, and praxis. *Signs*, 38(4), 785–810. doi:10.1086/669608

Cho, Y. (2020). The associations between patterns of precarious employment and workers' health. *The Social Science Journal*, 1–14. doi:10.1016/j.soscij.2019.09.006

Collins, P. H. (2015). Intersectionality's definitional dilemmas. *Annual Review of Sociology*, 41(1), 1–20. doi:10.1146/annurev-soc-073014-112142

Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *University of Chicago Legal Forum*, 140, 139–167.

de Wind, A., Geuskens, G. A., Ybema, J. F., Blatter, B. M., Burdorf, A., Bongers, P. M., & van der Beek, A. J. (2014). Health, job characteristics, skills, and social and financial factors in relation to early retirement—Results from a longitudinal study in the Netherlands. *Scandinavian Journal of Work, Environment & Health*, 40(2), 186–194. doi:10.5271/sjweh.3393

Devillanova, C., Raitano, M., & Struffolino, E. (2019). Longitudinal employment trajectories and health in middle life: Insights from linked administrative and survey data. *Demographic Research*, 40, 1375–1412. doi:10.4054/DemRes.2019.40.47

DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, 32, 271–297. doi:10.1146/annurev.soc.32.061604.123127

Eisenberg-Guyot, J., Peckham, T., Andrea, S. B., Oddo, V., Seixas, N., & Hajat, A. (2020). Life-course trajectories of employment quality and health in the U.S.: A multichannel sequence analysis. *Social Science & Medicine*, 264, 113327. doi:10.1016/j.socscimed.2020.113327

Elder, G. H. (1994). Time, human agency, and social change: Perspectives on the life Course. *Social Psychology Quarterly*, 57(1), 4–15. doi:10.2307/2786971

Elder, G. H., Johnson, M. K., & Crosnoe, R. (2003). The Emergence and Development of Life Course Theory. In J. T. Mortimer & M. J. Shanahan (Eds.), *Handbook of the Life Course* (pp. 3–19). Boston, MA: Springer US. doi:10.1007/978-0-306-48247-2_1

Fisher, G. G., Chaffee, D. S., & Sonnega, A. (2016). Retirement timing: A review and recommendations for future research. *Work, Aging and Retirement*, 2(2), 230–261. doi:10.1093/workar/waw001

Giudici, F., & Morselli, D. (2019). 20 years in the world of work: A study of (nonstandard) occupational trajectories and health. *Social Science & Medicine*, 224, 138–148. doi:10.1016/j.socscimed.2019.02.002

Gonzales, E., Lee, Y., & Brown, C. (2017). Back to work? Not everyone. Examining the longitudinal relationships between informal caregiving and paid work after formal retirement. *The Journals of Gerontology: Series B*, 72(3), 532–539. doi:10.1093/geronb/gbv095

Halpern-Manners, A., Warren, J. R., Raymo, J. M., & Nicholson, D. A. (2015). The impact of work and family life histories on economic well-being at older ages. *Social Forces*, 93(4), 1369–1396. doi:10.1093/sf/sov005

Halvorsen, C. J., & Morrow-Howell, N. (2017). A conceptual framework on self-employment in later life: Toward a research agenda. *Work, Aging and Retirement*, 3(4), 313–324. doi:10.1093/workar/waw031

Health and Retirement Study. (2011). Sample Sizes and Response Rates. https://hrsonline.isr.umich.edu/sitedocs/sampleresponse.pdf (2020, September 11, date accessed).

Health and Retirement Study. (n.d.). Sampling Weights. https://hrsonline.isr.umich.edu/sitedocs/wghtdoc.pdf (2020, September 11, date accessed).

Heeringa, S., & Connor, J. (1995). Technical description of the Health and Retirement Study sample. Institute for Social Research University of Michigan Ann Arbor, MI. https://hrsonline.isr.umich.edu/sitedocs/userg/HRSSAMP.pdf (2020, September 11, date accessed).

Henkens, K., & Solinge, H. (2013). Returning to Work after Retirement: Who, What and Why? Netspar Discussion Paper, No. 09/2013–029. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2327482.

Hochschild, A. R., & Machung, A. (2003). *The Second Shift*. England: Penguin Books.

Hogan, R., & Perrucci, C. C. (2007). Black women: Truly disadvantaged in the transition from employment to retirement income. *Social Science Research*, 36(3), 1184–1199. doi:10.1016/j.ssresearch.2006.07.002

Hoven, H., Dragano, N., Blane, D., & Wahrendorf, M. (2018). Early adversity and late life employment history—A sequence analysis based on SHARE. *Work, Aging and Retirement*, 4(3), 238–250. doi:10.1093/workar/wax014

Howell, D. R., & Kalleberg, A. L. (2019). Declining job quality in the United States: Explanations and evidence. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 5(4), 1–53. doi:10.7758/RSF.2019.5.4.01

Jeszeck, C. (2015). *Contingent Workforce: Size, Characteristics, Earnings, and Benefits*. U. S. Government Accountability Office, GAO-15-168R. https://www.gao.gov/products/GAO-15-168R (2020, July 21, date accessed).

Julià, M., Vanroelen, C., Bosmans, K., Van Aerden, K., & Benach, J. (2017). Precarious employment and quality of employment in relation to health and well-being in Europe. *International Journal of Health Services*, 47(3), 389–409. doi:10.1177/0020731417707491

Kalleberg, A. L. (2011). Good Jobs, Bad Jobs: The Rise of Polarized and Precarious Employment Systems in the United States, 1970s-2000s. Russell Sage Foundation; JSTOR. https://www.jstor.org/stable/10.7758/9781610447478 (2020, September 11, date accessed).

Kantarci, T., & Van Soest, A. (2008). Gradual retirement: Preferences and limitations. *De Economist*, 156(2), 113–144. doi:10.1007/s10645-008-9086-1

Kooij, D. T. A. M., Zacher, H., Wang, M., & Heckhausen, J. (2020). Successful aging at work: A process model to guide future research and practice. *Industrial and Organizational Psychology*, 13(3), 345–365. doi:10.1017/iop.2020.1

Kreshpaj, B., Orellana, C., Burström, B., Davis, L., Hemmingsson, T., Johansson, G., Kjellberg, K., Jonsson, J., Wegman, D. H., & Bodin, T. (2020). What is precarious employment? A systematic review of definitions and operationalizations from quantitative and qualitative studies. *Scandinavian Journal of Work, Environment & Health*, 46(3), 235–247. doi:10.5271/sjweh.3875

Lesnard, L. (2010). Setting cost in optimal matching to uncover contemporaneous socio-temporal patterns. *Sociological Methods & Research*, 38(3), 389–419. doi:10.1177/0049124110362526

Lewchuk, W. (2017). Precarious jobs: Where are they, and how do they affect well-being? https://journals.sagepub.com/doi/abs/10.1177/1035304617722943?journalCode=elra (2020, September 11, date accessed).

Loretto, W., & Vickerstaff, S. (2013). The domestic and gendered context for retirement. *Human Relations*, 66, 65–86. doi:10.1177/0018726712455832

Lund, T., Iversen, L., & Poulsen, K. B. (2001). Work environment factors, health, lifestyle and marital status as predictors of job change and early retirement in physically heavy occupations. *American Journal of Industrial Medicine*, 40(2), 161–169. doi:10.1002/ajim.1084

McDonough, P., Worts, D., Corna, L. M., McMunn, A., & Sacker, A. (2017). Later-life employment trajectories and health. *Advances in Life Course Research*, 34, 22–33. doi:10.1016/j.alcr.2017.09.002

Moen, P., Pedtke, J. H., & Flood, S. (n.d.). Disparate disruptions: Intersectional COVID-19 employment effects by age, gender, education, and race/ethnicity. *Work, Aging and Retirement*, 2020, 6, 207–228. doi:10.1093/workar/waaa013

Moen, P., Robison, J., & Fields, V. (1994). Women's work and caregiving roles: A life course approach. *Journal of Gerontology*, 49(4), S176–S186. doi:10.1093/geronj/49.4.S176

Montez, K., Thomson, S., & Shabo, V. (2020). An opportunity to promote health equity: National paid family and medical leave. *Pediatrics*, 146(3), e20201122. doi:10.1542/peds.2020-1122

Mukherjee, S. P., Sinha, B. K., & Chattopadhyay, A. K. (2018). Cluster and discriminant analysis. In S. P. Mukherjee, B. K. Sinha, &

A. K. Chattopadhyay (Eds.), *Statistical Methods in Social Science Research* (pp. 75–94). Singapore: Springer Nature Singapore Pte Ltd. doi:10.1007/978-981-13-2146-7_8

National Academies of Sciences, Engineering, and Medicine. (2018). *A Smarter National Surveillance System for Occupational Safety and Health in the 21st Century*. Washington, DC: The National Academies Press. https://doi.org/10.17226/24835.

Oddo, V. M., Zhuang, C. C., Andrea, S. B., Eisenberg-Guyot, J., Peckham, T., Jacoby, D., & Hajat, A. (2020). Changes in precarious employment in the United States: A longitudinal analysis. *Scandinavian Journal of Work, Environment & Health*, 47(3), 171–180. doi:10.5271/sjweh.3939

Padrosa, E., Belvis, F., Benach, J., & Julià, M. (2020). Measuring precarious employment in the European Working Conditions Survey: Psychometric properties and construct validity in Spain. *Quality & Quantity*, 55, 543–562. doi:10.1007/s11135-020-01017-2

Papadopoulos, M., Fisher, B., Ghilarducci, T., & Radpour, S. (2020). Over Half of Unemployed Older Workers at Risk of Involuntary Retirement. The New School Retirement Equity Lab. https://www.economicpolicyresearch.org/images/INET_docs/Status_of_older_workers_reports/Q1_2020_OWAG_V12.pdf.

Patil, D., Enquobahrie, D. A., Peckham, T., Seixas, N., & Hajat, A. (2020). Retrospective cohort study of the association between maternal employment precarity and infant low birth weight in women in the USA. *BMJ Open*, 10(1), e029584. doi:10.1136/bmjopen-2019–029584

Peckham, T., Fujishiro, K., Hajat, A., Flaherty, B. P., & Seixas, N. (2019). Evaluating employment quality as a determinant of health in a changing labor market. *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 5(4), 258–281. doi:10.7758/RSF.2019.5.4.09

RAND Corporation. (2020). RAND HRS Longitudinal File 2016 (V2). http://www.rand.org/labor/aging/dataprod/hrs-data.html (2020, September 11, date accessed).

Rauvola, R. S., & Rudolph, C. W. (2020). On the limits of agency for successful aging at work. *Industrial and Organizational Psychology*, 13(3), 383–387. doi:10.1017/iop.2020.61

Rousseeuw, P. J. (1987). Silhouettes: A graphical aid to the interpretation and validation of cluster analysis. *Journal of Computational and Applied Mathematics*, 20, 53–65. doi:10.1016/0377-0427(87)90125–7

Schmidt, E. (2018, July 31). U.S. Population More Educated Than Ever Before. United States Census Bureau. https://www.census.gov/library/stories/2018/07/educational-attainment.html (2021, March 19, date accessed).

Schneider, D., & Harknett, K. (2020). Estimates of Workers Who Lack Access to Paid Sick Leave at 91 Large Service Sector Employers (The Shift Project). UC Berkley. https://shift.berkeley.edu/paid-sick-leave-brief/ (2020, April 23, date accessed).

Schreurs, B., Cuyper, N. D., Emmerik, I. J. H., van Notelaers, G., & Witte, H. de. (2011). Job demands and resources and their associations with early retirement intentions through recovery need and work enjoyment. *SA Journal of Industrial Psychology*, 37(2), 11. doi:10.4102/sajip.v37i2.859

Siqueira, C. E., Gaydos, M., Monforton, C., Slatin, C., Borkowski, L., Dooley, P., Liebman, A., Rosenberg, E., Shor, G., & Keifer, M. (2014). Effects of social, economic, and labor policies on occupational health disparities. *American Journal of Industrial Medicine*, 57(5), 557–572. doi:10.1002/ajim.22186

U.S. Department of Labor. (2020). Frequently Asked Questions and Answers About the Revisions to the Family and Medical Leave Act. Wage & Hour Divisions (WHD). https://www.dol.gov/agencies/whd/fmla/final-rule/faq (2021, February 21, date accessed).

Van Aerden, K., Gadeyne, S., & Vanroelen, C. (2017). Is any job better than no job at all? Studying the relations between employment types, unemployment and subjective health in Belgium. *Archives of Public Health*, 75(1), 55. doi:10.1186/s13690-017-0225-5

Van Aerden, K., Moors, G., Levecque, K., & Vanroelen, C. (2014). Measuring employment arrangements in the European Labour Force: A typological approach. *Social Indicators Research*, 116(3), 771–791. doi:10.1007/s11205-013-0312-0

van den Berg, T. I. J., Elders, L. A. M., & Burdorf, A. (2010). Influence of health and work on early retirement. *Journal of Occupational and Environmental Medicine*, 52(6), 576–583. doi:10.1097/JOM.0b013e3181de8133

van Dijk, H., Kooij, D., Karanika-Murray, M., De Vos, A., & Meyer, B. (2020). Meritocracy a myth? A multilevel perspective of how social inequality accumulates through work. *Organizational Psychology Review*, 10(3–4), 240–269. doi:10.1177/2041386620930063

van Rijn, R. M., Robroek, S. J. W., Brouwer, S., & Burdorf, A. (2014). Influence of poor health on exit from paid employment: A systematic review. *Occupational and Environmental Medicine*, 71(4), 295–301. doi:10.1136/oemed-2013-101591

Visser, M., Gesthuizen, M., Kraaykamp, G., & Wolbers, M. H. J. (2018). Labor market vulnerability of older workers in the Netherlands and its impact on downward mobility and reduction of working hours. *Work, Aging and Retirement*, 4(3), 289–299. doi:10.1093/workar/wax017

Vives, A., Amable, M., Ferrer, M., Moncada, S., Llorens, C., Muntaner, C., Benavides, F. G., & Benach, J. (2010). The Employment Precariousness Scale (EPRES): Psychometric properties of a new tool for epidemiological studies among waged and salaried workers. *Occupational and Environmental Medicine*, 67(8), 548–555. doi:10.1136/oem.2009.048967

Vives, A., Vanroelen, C., Amable, M., Ferrer, M., Moncada, S., Llorens, C., Muntaner, C., Benavides, F. G., & Benach, J. (2011). Employment precariousness in Spain: Prevalence, social distribution, and population-attributable risk percent of poor mental health. *International Journal of Health Services: Planning, Administration, Evaluation*, 41(4), 625–646. doi:10.2190/HS.41.4.b

Widaman, K. F. (2007). Common factors versus components: Principals and principles, errors and misconceptions. In R. Cudeck & R. C. MacCallum (Eds.), *Factor analysis at 100: Historical developments and future directions* (pp. 177–203). Lawrence Erlbaum Associates Publishers.