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Empirical Article

Early Adversity and Late Life Employment History—A Sequence Analysis Based on SHARE

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ABSTRACT

Numerous studies have linked poor socioeconomic circumstances during working life with early retirement. Few studies, however, have summarized entire patterns of employment histories and tested their links to social position at earlier stages of the life course. Therefore, this article summarizes types of late life employment histories and tests their associations with adversity both during childhood and early adulthood. We use data from the Survey of Health, Ageing and Retirement in Europe (SHARE) with retrospective life history data on 5,857 older men and women across 14 countries. Employment histories are studied with annual information on the employment situation between ages 50 and 70. To summarize employment histories we apply sequence analysis and group histories into 8 clusters with similar histories. Most of these clusters are dominated by full-time employees, with retirement before, at or after age 60. Additionally, we find clusters that are dominated by self-employment and comparatively late retirement. The remaining clusters are marked by part-time work, continuous domestic work, or discontinuous histories that include unemployment before retirement. Results of multinomial regressions (accounting for country affiliation and adjusted for potential confounders) show that early adversity is linked to full-time employment ending in retirement at age 60 or earlier and to discontinuous histories (in the case of women), but not to histories of self-employment. In sum, we find that histories of employees with early retirement and discontinuous histories are part of larger trajectories of disadvantage throughout the life course, supporting the idea of cumulative disadvantage in life course research.

Demographic ageing provides major challenges to European countries and their pension schemes. It raises, in particular, the question of how the proportion of older people on the labor market can be increased. Research therefore needs to improve knowledge on employment patterns at older ages and to investigate their determinants. With regard to this, studies show that contextual factors and political regulations influence the age by which people retire (e.g., tax incentives and retirement legislations; Börsch-Supan, Brugiavini, & Croda, 2009; Gruber & Wise, 1999). Besides, a wide range of individual characteristics have been related to retirement timing (Damman, Henkens, & Kalmijn, 2011; Fisher, Chaffee, & Sonnega, 2016; Wang & Shultz, 2010). The latter studies point to at least three types of determinants: employment and working conditions, poor health, and childhood adversity.

In the case of employment and working conditions, studies from different countries show that people who work in disadvantaged occupational positions, and under adverse physical or psychosocial working conditions, are more likely to retire early (Carr et al., 2016; Hintsä et al., 2015; Lund & Villadsen, 2005; Madero-Cabib, Gauthier, & Le Goff, 2015; Radl, 2013; Visser et al., 2016), to leave the labor

market due to disability (Falkstedt et al., 2014; Juvani et al., 2014; Lahelma et al., 2012), and to self-report retirement intentions (Carr et al., 2016; Elovainio et al., 2005; Wahrendorf, Dragano, & Siegrist, 2013). Second, with regard to health as another determinant of late life employment, studies across different countries have linked various measures of health to employment patterns (for a review see e.g., van Rijn et al., 2014), including self-perceived health (Mein, 2000), poor mental health (Virtanen et al., 2014), health functioning (McPhedran, 2012; Rice et al., 2011) and chronic disease (Majeed, Forder, & Byles, 2014; Mein, 2000; van den Berg et al., 2010). A small number of studies also show that previous stages of the life course, and especially socioeconomic disadvantage during childhood, are a third determinant of late life employment histories. For example, adversity during childhood was linked to premature retirement (Bonsdorff et al., 2015; Harkonmäki et al., 2007; Madero-Cabib et al., 2015), as well as to labor market disadvantage during adulthood (Caspi et al., 1998; Dragano & Wahrendorf, 2014; Flores, García-Gómez, & Kalwij, 2015; Wahrendorf et al., 2016). Yet, the latter studies are often based on prospective cohorts (particularly birth cohorts which have yet to reach

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old age). Therefore, studies on the complex interrelations between disadvantages at different stages of the life course, including childhood and adulthood, and labor market involvement at older ages are lacking (Fisher et al., 2016).

But at least two shortcomings in research exist: Aside from the above mentioned small number of studies linking early stages of the life course with labor market participation, a second shortcoming refers to the measurement of labor market participation in later life. Most studies use a single measure only, for example, whether a person is in paid work at a specific age or not (Flores & Kalwij, 2014; Komp, van Tilburg, & van Groenou, 2010), the age at retirement (Raymo et al., 2011), or retirement intention (Wahrendorf et al., 2013). This neither considers how retirement is embedded within larger histories, nor—more generally—does it recognize the complexity of employment patterns in later life. To describe entire employment histories in later life, for example, not only the age of retirement is important but also the occupational situation before retirement. This includes information on whether the person was unemployed, before retiring, or whether he or she worked part or full-time before leaving the labor market (McNair et al., 2004; Parker & Rougier, 2007). On a similar note it is also important to consider differences between employed and self-employed workers, as the latter generally have lower pension levels (Cahill, Giandrea, & Quinn, 2013). In other words, when studying late life employment histories, a more comprehensive approach is needed where retirement is not isolated from larger histories, but where entire patterns of labor market participation that cover an extended time frame are considered (Aisenbrey & Fasang, 2010; George, 2014). Such an approach helps to elucidate and to understand employment participation in more detail. In addition, when studying whether types of employment histories are linked to previous circumstances, we may also identify entry-points for intervention measures at earlier stages of the life course. In sum, despite an impressive number of studies on predictors of retirement and employment at older ages, only few studies investigate complete late life employment histories in the light of adversity at earlier stages of the life course. Using data from the Survey of Health and Retirement in Europe, including details on early adversity and late life employment trajectories across 14 countries, the present study aims to extend research along these lines. Our broader conceptual framework, hereby, relies on the life course perspective. The next section briefly describes some core ideas of the life course perspective that guide our study.

THE LIFE COURSE PERSPECTIVE

Researchers increasingly argue that the life course perspective is a fruitful research perspective and conceptual framework that helps to better understand labor market involvements of older people (Madero-Cabib, 2015; Worts et al., 2016). Importantly, this does not simply mean that studies need to rely on longitudinal data. Foremost, the life course perspective draws attention to specific principles, or life course mechanisms, that shape individual lives (Elder, Johnson, & Crosnoe, 2003; George, 2013; Kuh et al., 2003; Sackmann & Wiggins, 2003). One important principle is that studies interested in individual life course need to adopt a holistic perspective, where research not only focuses on single “transitions” (e.g., retiring from paid work), but also on whole “trajectories” (Abbott, 1995; Aisenbrey & Fasang, 2010; Sackmann & Wiggins, 2003). In the case of late life employment histories, this refers to the above mentioned necessity of a comprehensive

study of complete late life employment histories. A statistical method with a growing interest in that respect is sequence analysis (Abbott, 1995; Aisenbrey & Fasang, 2010; Studer & Ritschard, 2016). This method uses whole trajectories as units of analyses, and enables the identification and regrouping of types of employment histories with similar patterns (see Methods for details). The first core aim of the present study is to adopt this comprehensive perspective and to study late life employment histories based on sequence analyses.

Another core principle of the life course perspective is that individual histories do not unfold independently, but are related and shaped through different mechanisms linking previous stages of the life course and later outcomes (Dannefer, 2003; Elder et al., 2003; Kuh et al., 2003). One such notion refers to the concept of “cumulative advantages or disadvantages” (Dannefer, 2003). In this perspective, adversity at earlier stages of the life course results in further disadvantages throughout the life course as well as disadvantages at older ages. In other words, disadvantages tend to cluster longitudinally throughout the life course, where inequalities grow throughout the course of life. This perspective, notably, opens a large window to the study of late life employment histories, in particular because it means that employment patterns are part of larger histories of disadvantages. An alternative life course mechanism refers to the concept of “critical periods,” which suggests that the impact of adversities differs depending on the period or life stage at which they occur. In this regard, the point at which disadvantages happen can be crucial when it comes to the impact it has. In this context, however, most studies (including the one named above) have used childhood conditions as a “critical” time window of interest (Viner et al., 2015), without studying links between adulthood conditions on health at older ages. Therefore, it is the second aim of the present article to study how adversity during childhood and adulthood are linked to types of late life employment histories.

Although this study focuses on types of late life employment histories and their links to early adversity, we need to keep in mind that late life employment histories in our sample are no doubt also linked to the historical and cultural contexts in which they unfold (between 1980 and early 2000s in our case; Elder, 1999). For example, traditional gender roles and the division of paid and unpaid work within partnerships may lead to more women working part-time compared with men, or to women that entirely focus on domestic work (Han & Moen, 1999). In addition, links between early life disadvantages and employment patterns may be different for men and women. A recent study from Australia, for example, suggests that links between childhood adversity and weak ties to the labor market during working life are more pronounced for women, while no such association exists for men (Majeed et al., 2015). Another important factor is the country itself, as well as its national pension systems and regulations (Bennet & Möhring, 2015; Gruber & Wise, 1999). Therefore, our analyses will consider gender and country affiliation as important covariates and we will discuss our findings in the light of these aspects.

All in all, this article has two aims: First, we set out to summarize complete late life employment histories and to distinguish different types of employment histories among older men and women in Europe. In doing so, we extend current knowledge, which is largely based on studies focusing on retirement timing, and give an in-depth description of late life employment patterns in our sample, including their variation by sex and country. With the second aim, we test if adversity during childhood and adulthood is related to types of late

life employment history. In accordance with the above-presented life course mechanisms, we may observe that both adversity during childhood and adulthood are related with later histories, but also that, partly, the effect of childhood is mediated by adulthood adversity. Again, we will investigate if these latter associations vary by gender, as well as considering country-affiliation in multivariable analyses.

METHODS

Data Source

The present study uses the latest data (Release 5.0) from the Survey of Health, Ageing and Retirement in Europe (Börsch-Supan et al., 2013). SHARE is a longitudinal survey collecting data on a variety of sociological, economic and health-related topics among nationally representative samples of adults aged 50 or older in different European countries. The survey started in 2004–2005 with on-going waves of data collection at 2-year intervals. The third wave of SHARE consists of a separate retrospective survey collecting life history data (also called SHARELIFE; Börsch-Supan et al., 2011). Alongside partnership and children histories, this also includes information on socioeconomic circumstances during childhood and past employment histories among older men and women. In SHARELIFE, data is available for 14 countries (Sweden, Denmark, Ireland, Germany, the Netherlands, Belgium, France, Switzerland, Austria, Italy, Spain, Greece, Poland, and Czech Republic). In each country, information is collected via computer assisted personal interviews (CAPI) in the household, where samples consist of a household probability sample. At the onset of the study, the household response rate was 61.6% for the total sample ranging from 81% in France to 39% in Switzerland, with rates above 50% in 8 out of 11 countries. This is above average compared to other European Surveys (Börsch-Supan & Jürges, 2005). With respect to attrition between wave 2 and wave 3, the percentage of respondents lost varied between 34% (Austria) and 14% (Switzerland), with rates below 20% in seven countries (Schroder, 2011). To address this selection processes, SHARE provides weights, which we use in our descriptive analyses (see analytical strategy for details).

An innovation of the retrospective data collection in SHARE, is the so called “lifegrid approach.” The recall and timing of information is hereby supported by a graphical representation of the respondent’s life which is filled in during the interview. This approach was first developed as a self-completion questionnaire (Blane, 1996), and subsequently transformed into Computer Assisted Personal Interviews (CAPI). Although recall bias is a disadvantage of collecting data retrospectively, there are also several advantages. First, it is an economic way of getting longitudinal information. Second, it guarantees comparable information referring to different time points in respondents’ life histories. Third, validation studies revealed high accuracy of recalled information, in particular when the data collection is supported by a lifegrid (Belli et al., 2007) and when asking about socio-demographic conditions (Berney & Blane, 1997; Havari & Mazzonna, 2015) and employment histories (Baumgarten, Siemiatycki, & Gibbs, 1983; Bourbonnais, Meyer, & Theriault, 1988). The Project website presents more details about SHARE and its methods (www.share-project.org).

Respondents

In total, 28,495 participants participated in wave 3 in 2008–2011. For the aim of our study, the following sample restrictions are applied: First of all, because we are interested in employment histories from

age 50 to 70, we only include men and women aged 70 or older at the time of the interview for which we have complete employment histories ($n = 7,852$; 3,777 men and 4,075 women). Secondly, because we investigate links between respondents occupational position during adulthood (between 25 and 49) and late life employment histories, respondents had to be in paid employment at least once during adulthood ($n = 6,958$; 3,707 men and 3,251 women). Finally, to prevent biased information on work histories, we additionally excluded respondents when the interviewer documented respondent difficulties in answering the retrospective interview ($n = 6,540$; 3,496 men and 3,044 women). We checked for missing values on all variables under study, but the amount of missing values was very low (lower than 6% for each variable) and we also found no indication of systematic missing data, which prevented the application of any imputation strategy. In sum, this leads to a final sample of 3,117 men and 2,740 women ($n = 5,857$).

Measures

Late life employment histories

The third wave of SHARE contains an extensive employment module that collects details on each job a respondent had during his or her working career, and also, on each period when the respondent was not in paid work (for 6 months or longer). Information on jobs includes the starting and ending date, whether the job was part-time or full-time and whether the respondent was an employed or self-employed worker. In addition, if a person was not working, they provided a reason for not working, including retirement, domestic work or unemployment. By combining this information, we can describe respondent’s occupational situation, for each year of age between 50 and 70 years. In a few cases, however, it is possible that there is information on paid work and on non-paid work for the same year (in 5% of all cases). For example, a person may have stopped and started a new job in the same year, including a 6-month gap of unemployment. In that case, we prioritize the information on non-paid work, because a break is considered more important than the continuation of a job spell. In our analyses, we distinguish between two types of non-employment—unemployment and domestic work. This distinguishes people who actively look for a job and (and thus still count towards the economically active population), and those who focus on home or family work. In sum, for the purpose of our analyses, seven situations (or “states”) are distinguished: (a) “employed / full-time” (working 35 or more hours a week), (b) “employed/ part-time” (working less than 35 hours a week), (c) “self-employed” (irrespective of working hours), (d) “unemployed” (and looking for a job), (e) “domestic work” (looking after home or family), and two types of retirement, depending on whether respondent retired from paid work (f) “retired from paid work,” or not (g) “retired not from paid work.” A number of other states could have been included. For example, we may have differentiated self-employment according to working hours, or included additional information about the occupational position. Yet, the importance of this distinction (and the prevalence of resulting states) appeared not relevant enough to warrant the additional complexity that would have been involved in the analyses (the number of possible sequences grows extensively with numbers of states).

In sum, our approach accounts for different forms of labor market situation and describes late life employment histories, in terms of annual information for each year of age between 50 and 70.

Adverse socioeconomic circumstances

We include two binary indicators of adverse socioeconomic circumstances, one referring to childhood and another to adulthood. In both cases, measures are based on the occupational skill level, either referring to the occupation of the main breadwinner at age 10 (in the case of childhood) or to respondents' main skill level between age 25 and 49 years (in the case of adulthood). The skill level represents the broad hierarchical structure of the International Standard Classification of Occupations (ISCO) that was developed by the International Labor Office. It divides between four different levels of required skills in the occupation for a competent performance of the tasks and duties. Notably, levels may differ from formal educational qualifications of the worker, because they can also be acquired through experience and informal training. Higher skill levels are supposed to put workers in a more advantaged situation, because higher skilled occupations are expected to be related to higher salary and job security than occupations with lower skill levels (Bergmann & Joye, 2005). Also, it constitutes an important dimension in more sophisticated classification schemes, for example, within the Erikson-Goldthorpe-Portocarero (EGP) class scheme (Erikson & Goldthorpe, 1992). For the analyses, low skill level is assumed if someone belongs to the lowest level (1st skill level).

Additional variables

Besides sex, age and country affiliation, the analysis includes health during childhood and adulthood (each assessed by two indicators), partnership and parenthood history, and education, mainly as control variables in multivariable analyses.

The first measure of childhood health refers to self-rated health (less than good) when respondents were 10 years old, the second measure is whether a person reports any period of emotional, nervous, or psychiatric problems until age 16. As regards health during adulthood, we consider the number of periods (lasting longer than 1 year) respondents reported to be ill or disabled (regrouped into “none,” “one,” and “two or more” periods) since age 16, and whether respondents reported a period of emotional, nervous, or psychiatric problems in the same time frame. In the case of partnership history we use life history data and assess whether respondents had a partner for most of the time between 50 and 70 or not (75% or more). Parenthood history is measured by the maximum number of children (aged between 0 to 16 years) a person had during adulthood, regrouped into “no children,” “one or two children” and “three or more children.” In contrast to the total number of children, this may be more appropriate for assessing child raising responsibilities during working life. Education is measured according to the International Standard Classification of Educational Degrees (ISCED-97) that we regroup into “low education” (pre-primary, primary or lower secondary education), “medium education” (secondary or post-secondary education), and “high education” (first and second stage of tertiary education). All variables are summarized in Table 1.

Analytical Strategy

Following a basic sample description in Table 1, the analyses proceed in two steps. First, we apply sequence analysis (Abbott, 1995; Aisenbrey & Fasang, 2010) and identify types of late life employment histories. Second, regression models test the associations between early life circumstances and types of late life employment histories.

Table 1. Sample Description, $n = 5,857$

	N or (Mean)	Col% or (SD)
Age	(77.24)	(5.65)
Sex		
Male	3,117	53.22
Female	2,740	46.78
Childhood adversity		
Yes	1,033	17.64
No	4,824	82.36
Adulthood adversity		
Yes	1,166	19.91
No	4,691	80.09
Education		
Low	3,389	57.86
Medium	1,571	26.82
High	897	15.32
Poor self-rated health in childhood		
Yes	456	7.79
No	5,401	92.21
Poor mental health during childhood		
Yes	34	0.58
No	5,823	99.42
Periods of disability in adulthood		
None	4,523	77.22
One	915	15.62
Two or more	419	7.15
Poor mental health in adulthood		
Yes	75	1.28
No	5,782	98.72
Number of children		
None	748	12.77
One or two	2,937	50.15
Three or more	2,172	37.08
Mainly in partnership		
Yes	5,101	87.09
No	756	12.91
Total	5,857	100.00

Note. Based on unweighted data.

More specifically, the first step starts with a general overview of late life employment histories for men and women, where we present the average years spent in the seven different occupational situations (cumulative state duration, Table 2). In addition, the mean number of spells (consecutive runs of the same occupational situation) and an indicator to describe the general heterogeneity of late life employment histories (Shannon's entropy) is presented. Then, we regroup histories with similar patterns into empirically distinct clusters. Specifically, we compare each individual's employment history to all other histories that are observed in the data and calculate differences of each single sequence to another, using Optimal Matching (Halpin, 2012; Studer & Ritschard, 2016). This adequately considers duration, timing and ordering when comparing sequences to one another—three key aspects for characterizing life trajectories (Studer & Ritschard, 2016). Statistically, differences (or “distances”) are calculated in terms of transformations or, more precisely, number of operations that are

necessary to make one sequence equal to the other, either by substituting states (so-called “substitution costs”) or by inserting and deleting states (so-called “indel costs”). For the analysis, we follow the standard practice (Abbott & Tsay, 2000), and set the substitution costs consistently to twice the indel cost, 1.0 and 0.5, respectively. Comparing each sequence to another results in a matrix that quantifies distances for each pair of individuals in the sample (i.e., a 5857 × 5857 matrix in our study). Thereafter, we regroup similar sequences into typologies of late life employment history based on cluster analysis. More specifically, we use Partitioning Around Medoids (PAM) clustering, as implemented in the WeightedCluster package in R (Studer, 2013). To determine the most appropriate number of clusters, we compared

a 6 to 10 cluster solution based on the following measures of cluster quality, as proposed in the literature: the Average Silhouette Width (ASW), the Point Biserial Correlation (PBC) and Hubert’s Gamma (HG; Studer, 2013), as well as the within/between cluster distance ratio (WB-ratio) (Aisenbrey & Fasang, 2010). These measures are presented in Supplementary Table S1. In addition, we verified each cluster solution in terms of its content validity, and whether a higher cluster solution added another cluster of interest with reasonable size. On this basis, we decided to adopt an eight-cluster solution, because all solutions revealed a good structure (an ASW above 0.5 is considered a reasonable value; Studer, 2013), and because this turned out to be the most informative cluster solution with distinct clusters. An overview of resulting clusters is presented in Figure 1 in terms of indexplots and chronograms. Indexplots draw a horizontal line for each individual, where each state has a distinct color, and chronograms present a vertical line showing the prevalence of each occupational situation in percent for each age. Furthermore we present frequencies for each cluster and their distribution by sex in Table 3, including tests of significance (χ^2). Calculations and graphs are based on the SADI-package (Halpin, 2014) and the SQ-package (Brzinsky-Fay, Kohler, & Luniak, 2006) in Stata, as well as those, we use the TraMineR-package (Gabardinho et al., 2011) and the WeightedCluster-package (Studer, 2013) in R for calculating dissimilarities and clusters, respectively.

The second set of analyses studies associations between the two indicators of adversity and the probability of belonging to a specific cluster of late life employment histories. For this, we investigate how the two indicators of adversity are associated with cluster membership, estimating a series of multinomial regression models with cluster membership as the dependent variable. The findings are presented for men (Table 4A) and women (Table 4B) separately. In sum, we estimate three models both for childhood and adulthood adversity. Model 1

Table 2. Characteristics of Late Life Employment Histories—Mean and SD

	Male	Female	Total
	Mean (SD)	Mean (SD)	Mean (SD)
Average duration (years) being			
Employed/full-time	7.57 (5.66)	3.94 (5.27)	5.66 (5.75)
Employed/part-time	0.11 (1.14)	1.22 (3.59)	0.70 (2.78)
Self-employed	2.89 (5.83)	1.68 (4.62)	2.26 (5.26)
Unemployed	0.54 (2.28)	0.43 (2.38)	0.48 (2.33)
Domestic work	0.47 (2.44)	6.81 (8.90)	3.80 (7.38)
Retired/regular	8.87 (5.52)	5.81 (6.48)	7.26 (6.23)
Retired/non-regular	0.55 (2.33)	1.11 (3.57)	0.84 (3.06)
Average number of spells	2.03 (0.49)	1.80 (0.60)	1.91 (0.56)
Shannon’s Entropy	0.87 (0.31)	0.67 (0.46)	0.76 (0.41)

Note. Based on weighted data.

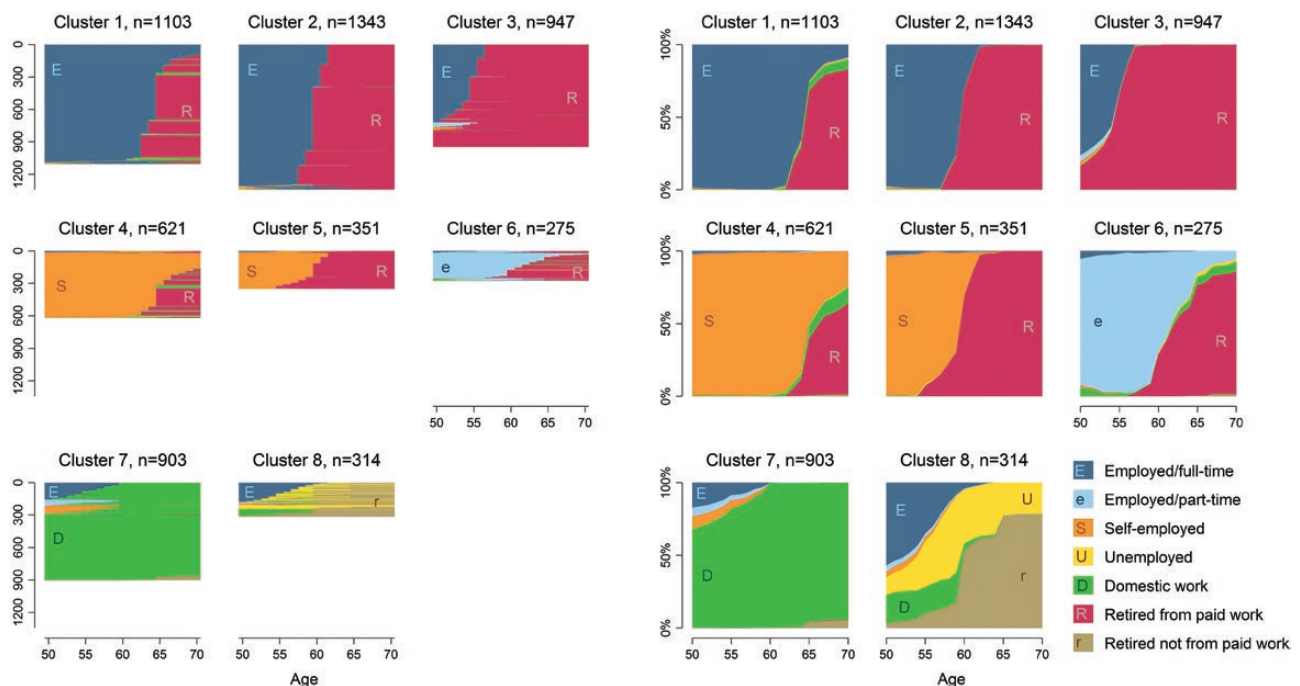


Figure 1. Clusters of late life employment histories. Indexplots and chronograms, n = 5,857.

Table 3. Distribution of Late Life Employment Clusters

Cluster Number and Label	Male	Female	Total
	%	%	%
1. Employed/full-time and retirement around age 65	22.17	8.84	15.16
2. Employed/full-time and retirement around age 60	28.65	16.09	22.05
3. Employed/full-time and retirement around age 55	18.39	13.82	15.98
4. Self-employed and retirement after age 65	12.44	6.55	9.34
5. Self-employed and retirement around age 60	8.10	4.65	6.29
6. Employed/part-time	0.65	8.37	4.71
7. Continuous domestic work	2.51	31.88	17.96
8. Discontinuous employment	7.10	9.80	8.52
Total	100.00	100.00	100.00

$\chi^2: 1464.55, p < .001$

Note. Based on weighted data.

estimates unadjusted associations between adversity and cluster membership. Model 2 estimates adjusted associations for each indicator of adversity separately, adjusted for age (included as a continuous variable), country affiliation (included as country dummies), education, partnership history, parenthood and health prior and during working life). Model 3 considers all variables simultaneously. All models have their own value in understanding the importance of life course adversity for late life employment histories: On the one hand, the first two models allow the testing of the unadjusted and adjusted effects for adversity at two different stages of the life course. On the other hand, the third model investigates the combined associations of both measures of adversity. All calculations are done with Stata 14.

To facilitate the presentation and interpretation of findings of the multinomial regression models (Table 4), we follow recent recommendations and present average marginal effects (denoted as “AME”) together with levels of significance and confidence intervals (Williams, 2012). On the one hand, AME are more intuitive and easier to interpret compared to Odds Ratios, and on the other hand we do not need to use one cluster as a reference category and interpret results in relation to this category. Instead, we can contrast the probability of belonging to each cluster for people with and without adversity. For example, in case we find an AME of -5.00 for childhood adversity, this means that the probability of being part of the cluster is on average 5 percentage points lower for people with adversity than for those without adversity.

Finally, to summarize the core findings of the article, we predict the probability of being part of each cluster for levels of adversity separately and display results as bar charts in Figure 2 for the total sample (average adjusted prediction; Williams, 2012). In addition, we formally test if the association between early adversity and late life employment histories differs for men and women, introducing interactions between sex and adversity (presented in Supplementary Table S2).

In order to compensate for unit nonresponse, we apply calibrated cross-sectional weights in descriptive analysis. These weights are specifically defined for wave 3 and are calculated for each country

separately (see SHARE Release guide 5.0.0 for details; Börsch-Supan, 2016). They help to reduce a potential selection bias due to unit non-response and to reproduce the size of each national target populations, for example, when calculating the prevalence of clusters. In addition, to account for the dependency of cases within a household, regression models for the total sample account for clustering within households by using robust estimators (Rogers, 1993).

RESULTS

Descriptive Findings

As shown in Table 1, our sample includes slightly more men ($n = 3,117$) than women ($n = 2,740$) with an average age of 77 years. The majority of respondents have low education (no, primary or lower secondary education), and about 20% had adversity during childhood or adulthood (for details see Table 1).

Table 2 shows how many years people spent on average in the seven studied states between age 50 and 70 years (observation period: 21 years). In sum, men spent more years in paid work than women. This is both true for self-employed work and, in particular, for employed work in full-time (men: 7.6 years, women: 3.9 years). Men also had more years in retirement. But we see that women were part-time employed and in domestic work longer than men (men: 0.5 years, women: 6.8 years). Overall, men have a higher number of different spells and histories are slightly more complex (as indicated by higher values for Shannon’s entropy).

Types of Late Life Employment Histories

Which types of employment histories in later life—or “clusters”—can be distinguished in our sample? Figure 1 examines this question, and Table 3 shows how the clusters vary by sex. We identify eight clusters: The first three clusters (clusters 1–3) are dominated by histories of full-time employed workers that either retired around age 65 years, around age 60, or even earlier (at around 55). These three clusters are quite homogenous and the majority of the total sample belongs to one of them, in particular men. Clusters 4 and 5, in contrast, include persons who were self-employed workers and entered retirement around either age 65 (cluster 4) or age 60 (cluster 5). Furthermore, cluster 6 captures those who were part-time employed workers before retiring, and cluster 7 is dominated by continued domestic work without retirement. The two latter clusters are clearly dominated by women. Cluster 8, finally, covers discontinuous histories that often involve a spell of paid work, which is interrupted by unemployment before ending in retirement. It is the smallest and least homogenous cluster of the analyses. As demonstrated in Table 3, the distribution of clusters differs significantly by sex ($p < .001$).

Associations Between Early Adversity and Late Life Employment Histories

The second aim—to examine associations between early adversity and late life employment histories—is addressed by applying multinomial logistic regression for men (Table 4A) and women (Table 4B). We present three models both for childhood and adulthood adversity, including an unadjusted model (Model 1), an adjusted model (Model 2), and a final model where the two measures of adversity are analyzed simultaneously (Model 3). Starting with men, we see that those with adversity during childhood or adulthood are less likely to be part of cluster 4 or 5—the two clusters with self-employed workers and a rather late

Table 4 Associations Between Disadvantaged Social Position (During Childhood and Adulthood) and Clusters of Late Life Employment History for Men ($n = 3,117$) and Women ($n = 2,740$)

	1. Employed/ Full-time and Retirement Around Age 65	2. Employed/ Full-time and Retirement Around Age 60	3. Employed/Full- time and Retirement Around Age 55	4. Self-employed and Retirement Age 65	5. Self-employed and Retirement Around Age 60	6. Employed/ Part-time	7. Continuous Domestic Work	8. Discontinuous Employment
	AME	AME	AME	AME	AME	AME	AME	AME
(A) Men								
Childhood adversity								
Model 1 (unadjusted)								
Yes (ref.: no)	-3.6	4.5*	8.7***	-8.2***	-2.5*	-0.3	0.8	0.5
Model 2 (adjusted)								
Yes (ref.: no)	0.6	5.0*	6.2***	-8.9***	-3.2**	-0.3	0.2	0.3
Model 3 (M2 + adulthood adversity)								
Yes (ref.: no)	-0.4	3.5	5.0**	-6.1***	-1.7	-0.2	0.1	-0.1
Adulthood adversity								
Model 1 (unadjusted)								
Yes (ref.: no)	-1.3	4.2	9.9***	-10.9***	-5.1***	-0.4	1.7*	2.0
Model 2 (adjusted)								
Yes (ref.: no)	3.9	7.7**	6.0**	-13.3***	-6.4***	-0.5	0.5	2.0
Model 3 (M2 + childhood adversity)								
Yes (ref.: no)	4.4	7.1**	4.8*	-12.4***	-6.1***	-0.4	0.5	2.1
(B) Women								
Childhood adversity								
Model 1 (unadjusted)								
Yes (ref.: no)	-1.5	-3.8*	-0.3	-4.0***	-3.1***	-1.0	6.4**	7.3***
Model 2 (adjusted)								
Yes (ref.: no)	0.8	-0.3	3.5	-4.5***	-3.6***	-0.1	-0.8	5.0***
Model 3 (M2 + adulthood adversity)								
Yes (ref.: no)	1.1	-0.8	2.7	-2.5*	-2.1*	-1.0	-1.8	4.4**
Adulthood adversity								
Model 1 (unadjusted)								
Yes (ref.: no)	-3.0*	-3.1*	1.0	-6.7***	-5.1***	1.2	12.3***	3.4**
Model 2 (adjusted)								
Yes (ref.: no)	-1.5	2.0	3.0	-8.4***	-6.0***	4.8**	3.4	2.7*
Model 3 (M2 + childhood adversity)								
Yes (ref.: no)gg	-1.7	2.3	2.4	-8.1***	-5.7***	5.1**	4.0	1.7

Note. Average marginal effects (AME) based on multinomial regression analysis in percent. Model 2 and Model 3 are adjusted for age, country-affiliation, education, partnership and parenthood history, and health prior and during working life.

* $p < .05$. ** $p < .01$. *** $p < .001$.

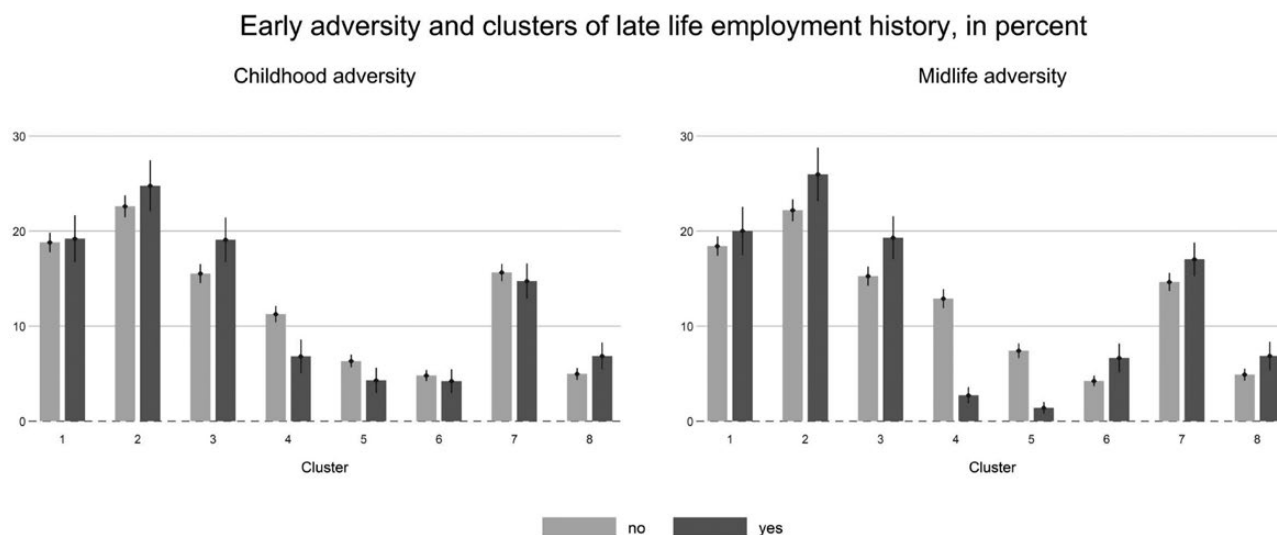


Figure 2. Probability of cluster membership by early adversity for the total sample. Adjusted for sex, age, country-affiliation, education, partnership and parenthood history, and health prior and during working life, $n = 5,857$.

retirement. An AME of -8.2 for childhood adversity (Model 1), for example, means the probability that men with adversity during childhood are part of cluster 4 is, on average, 8.2 percentage points lower. Corresponding values indicate a lower probability of 10.9 percentage points in case of adversity during adulthood. Estimates remain significant in the adjusted model (Model 2, including education and health), and also when the combined effects of childhood and adulthood are estimated (Model 3). Thus, we find that the observed associations persist after adjustments for education and health, and also that childhood and adulthood adversity are both independently related to histories of self-employment with retirement around age 65 (cluster 4). When we turn to the first three clusters (full-time employed histories), adversity during childhood leads to comparatively early retirement (clusters 2 and 3), most consistently in the case of adversity (during both childhood and adulthood) and retirement before age 55. Retirement around age 65 (cluster 1), though, is not related to early adversity. Finally, albeit not significant, results indicate that adversity during adulthood is linked to discontinuous histories (cluster 8).

For women (Table 4B), early adversity (childhood and adulthood) is again related to a lower probability of being part of cluster 4 or 5 (self-employed with comparatively late retirement). In contrast to men, however, adversity is not significantly related to an early retirement (before age 55) following work as an employee (cluster 3). Another finding for women is that those who had adversity during adulthood are more likely to have histories of part-time or domestic work in later life (but not in case of childhood adversity). Lastly, turning to cluster 8, we see that discontinuous histories are significantly related to early adversity for women.

Notably, as shown in Supplementary Table S2, the associations between each indicator of early adversity and employment histories are significantly different between men and women (see Supplementary Table S2 for details).

Finally, to summarize main findings, we present the predicted probabilities of being part of one cluster by early adversity (based on Model 3 of previous regressions) for the total sample (Figure 2). Compared with persons without early adversity, those who had early adversity

have again a higher probability of belonging to clusters 2 or 3 (full-time employed workers retiring before age 65), and also to cluster 8 (discontinuous histories). In the case of clusters 4 and 5 (self-employment with retirement after age 60), however, those with early adversity have a lower probability of belonging to one these two clusters. Reported associations are significant and slightly more pronounced in the case of adulthood adversity.

DISCUSSION

This contribution relies on retrospective data from SHARE with detailed information on late life employment histories between age 50 and 70 years for 5,457 men and women in Europe. With the first aim, we summarize employment histories using sequence analysis. This asks which types of late life employment histories can be distinguished for men and women in our sample. With the second aim, we investigate if types of employment histories in later life are linked to early adversity (measured both for childhood and adulthood).

Overall, findings of the present study are in line with previous research on life course influences on later labor market participation, specifically studies investigating consequences of early life disadvantage on labor market involvements later on (Bonsdorff et al., 2015; Carr et al., 2016; Harkonmäki et al., 2007; Radl, 2013). Yet, because we studied entire employment patterns (instead of single outcomes) in conjunction with adversity during both childhood and adulthood, we add further insight to existing literature—at least in three ways.

Firstly, by studying entire employment histories on the basis of sequence analyses we derived eight distinct types of late life employment histories out of the complexity and variety of individual histories. Importantly, in contrast to previous studies focusing on retirement timing, this broader perspective did not require that people retire in the study period or work at study onset. In doing so, we gave a more comprehensive picture of late life employment histories that, for example, also includes women who had histories of domestic work that would have been otherwise excluded (Worts et al., 2016). Furthermore, because we distinguished between different forms of labor market

participation (i.e., full time employment, part-time employment and self-employment), it also became clear that retirement ages vary depending on previous types of labor market involvement, with self-employed workers tending to have a later retirement than employed workers. The comparatively earlier retirement of employed people could be because they have restricted opportunities to work longer (even if they want to continue working)-and that self-employed workers have more freedom in deciding at what age they retire and often choose to continue working. From this perspective, findings may indicate that more flexible retirement arrangements are necessary for employed workers who want to work longer, for example, through retirement schemes that allow a reduction of working time before leaving the labor market. This argument is further supported by the fact that such a cluster (where employed people reduced their working hours before retiring) was not found in our analyses. The later retirement of self-employed people, though, may also be because they are likely to have lower pension levels which forces them to work longer (even if they do not want to continue working; Cahill et al., 2013). Or, we may assume that self-employed workers have comparatively better working conditions (e.g., lower levels of work stress or higher salary), and therefore, are more likely to continue working because they enjoy it. In fact, the group of self-employed people is probably more heterogeneous than employed workers (Blanchflower, 2000), covering a wider spectrum of motives that may lead to extended working lives (Halvorsen & Morrow-Howell, 2016).

Secondly, by studying how both childhood and adulthood adversity are linked to types of employment histories we found evidence to support the notion that disadvantaged histories are likely to be part of larger histories of disadvantages. More specifically, we found that childhood and adulthood adversity were both independently linked to clusters of full-time employment with early retirement and to discontinuous histories. This supports the idea of cumulative disadvantages (Dannefer, 2003; DiPrete & Eirich, 2006) and extends previous research that is restricted to childhood conditions. It shows that adulthood conditions are important as well (irrespective of what happened before) and that neither childhood nor adulthood can be seen as a “critical period” in its strict sense (Kuh & Ben-Shlomo, 1997).

Thirdly, our results also revealed interesting differences between men and women, both in terms of employment histories and the way early adversity was linked to types of histories. Following our expectations, most men had a history marked by full-time work (either employed or self-employed) and retirement later on. Many women, in contrast, had histories with continuous domestic work (without retirement) or part-time work. This shows that female histories are often dominated by one state only (continued domestic work), while most male histories involve different states (work and retirement). This is in line with existing research of traditional gender divisions of paid and unpaid work and indicates that, compared to men, women have a weaker attachment to the labor market (Worts et al., 2016). Aside from these differences in employment histories, the association between early adversity and late life employment history also concerns differences between both genders. Specifically, we found that the association between early adversity and discontinuous histories in later life was significant for women, but not for men. Possibly, as suggested in a recent study from Australia (Majeed et al., 2015), cultural expectations and traditional gender roles lead to greater difficulties for women in gaining a foothold in the labor market, specifically if they experience

adversity earlier on. Future studies, however, need to investigate if this holds true for all countries, including those with less pronounced gender differences (Worts et al., 2016).

All in all, our study illustrates how the life course perspective helps to elucidate labor market involvement at older ages. Particularly, we see that men and women have different types of late life employment histories and that the complexity of these histories requires an in depth analysis that is not limited to retirement timing only. In addition, we see that employment histories are partly related to conditions at previous stages of the life course, including adversity during childhood and adulthood.

Strengths and Limitations

Our study profits from several strengths, including a large study sample, detailed life history data, the use of sequence analyses and the inclusion of several covariates. It is imperative, however, that we consider several limitations.

First, our study focuses on individual determinants and thereby, we did not consider details on country specific policies and pension schemes. Previous studies have shown, for example, that institutional differences between countries, such as pension systems and active labor market policies are important factors in explaining labor market participation in late life (Börsch-Supan et al., 2009; Engelhardt, 2012; Fischer & Sousa-Poza, 2006). Therefore we could have included details on pension schemes for each country into the analyses (e.g., average level of public pension or country-specific state pension ages) and investigated how these are related to cluster membership. Or, we could even have conducted clustering for each country separately. Yet, for country specific clustering, 14 countries may not be sufficient for conducting meaningful multilevel analyses on the influence of national contexts. Nevertheless, it is worth noting that—albeit we found that some clusters were more likely in some countries—clusters were represented in each country. Furthermore, when testing links between early adversity and types of late life employment histories, regression models were adjusted for country-affiliation, and we also considered country specific weights in descriptive findings. In addition, while it is plausible that the national context affects types of employment histories, the association between adversity and employment histories in later life may be less affected. In sum, we think the existing sample size is not large enough to warrant the additional complexity that would have been involved in country-specific analyses.

Second, some may argue that clustering of histories should also have been conducted for men and women separately. However, sex-specific clustering would have complicated comparisons between both sexes, such that it would not have been possible to test if men are more likely to belong to the same types of history compared to women. Furthermore, we would have had use two different cluster solutions as outcomes in multinomial regression analyses, making meaningful comparisons of links between early adversity and histories between both genders impossible.

Third, the core measures of our study were collected retrospectively, namely early adversity and employment histories between ages 50 and 70 years. As such, respondents may have remembered information inaccurately, or remembered things rosier than they were. We thus need to consider a potential recall bias. Yet, the proportion of respondents with early adversity was quite high. Likewise, there is increasing support that retrospective data (in particular those collected via

“lifegrid” as the case in SHARE) provide reliable and valid information (e.g., Belli et al., 2007; Berney and Blane, 1997; Havari and Mazzonna, 2015).

Fourth, the measurements of adversity during childhood and adulthood were both based on a simple binary indicator, referring to the occupational position. Clearly, this does not adequately cover other dimensions of socioeconomic disadvantages, including material circumstances (e.g., household income or housing conditions) and educational factors (e.g., number of books or educational attainment; Galobardes, Lynch, & Davey Smith, 2004; Galobardes et al., 2006). Yet, occupational position was the only measure that was available for childhood and adulthood in SHARE. Also, while future studies may compare and test if our findings hold true for other indicators, we nevertheless maintain that the measure used is a valid indicator of socioeconomic disadvantages, as used in various previous studies (e.g., Wahrendorf et al., 2013).

Fifth, in our study, employment sequences were measured on a yearly basis, and spells were recorded only if they were longer than 6 months in the interview. We may, therefore, have bypassed short spells (e.g., spells of short-term unemployment) and underestimated the diversity of employment sequences. Similarly, albeit we distinguished seven different occupational situations in our study, future studies may go even further and include or combine additional information when defining occupational states. For example, it may be interesting to include information on voluntary work or to specify our measure of retirement in terms of types and levels of pension benefit. Similarly, it would be desirable to combine our data with information on pension benefits from administrative sources. Administrative data, however, is only available for the German subsample of SHARE (Börsch-Supan, Alt, & Bucher-Koenen, 2015), and again, we need to ask if the resulting, more detailed subgroups are large enough to allow for meaningful analyses.

Finally, our results rely on a sample of men and women born between 1908 and 1939. They grew up under specific circumstances (e.g., 1930s depression), and also had their late life employment histories during a specific historic period (mostly between 1988 and 2008). Therefore, albeit this is unavoidable for methodological reasons, the relevance of our results for today’s workforce is possibly different. In fact, given that the nature of work and employment has changed significantly over the past few decades (often combined with instability and discontinuity of employment histories (Gallie, 2013; Kalleberg, 2012)), we may have underestimated the present amount of discontinuous histories. Similarly, the importance of socioeconomic circumstances may be different today, and thus the impact of early adversity may be different as well.

CONCLUSIONS

In conclusion, our study shows that employment histories in late life, in particular those marked by early retirement and discontinuity, are part of larger trajectories of disadvantages throughout the life course. One implication is that policies that want to increase the amount of workers at older ages need to consider that some measures are more appropriately for specific age groups (Leisering, 2004) and should also address different stages of the life course. More specifically, pension schemes or working conditions of older workers are only one of the many inter-related aspects that are related to the labor market involvements of older workers. In fact, our findings suggest that circumstances during

childhood and adulthood are also relevant. This could, for example, include policies that reduce childhood poverty or promote workforce participation at younger ages through active labor market policies. A second, rather conceptual implication is that our study may, in a broader frame, also be instrumental in elucidating health inequalities at older age. Specifically, since an increasing number of studies show that work and employment conditions, and in particular discontinuous histories predict poor health at older ages, our study adds to these by showing that histories themselves are related to social conditions earlier on (Breeze et al., 2001; Wahrendorf, 2015). In other words, our study indirectly supports existing research by observing that links between early adversity and health in older ages are partly due to labor market disadvantage (Blane et al., 2012; Wahrendorf & Blane, 2015).

SUPPLEMENTARY MATERIAL

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

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